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The NEW ENGLAND JOURNAL of MEDICINE

October 6, 2022

Dear Physician:

As you near completion of your training, I'm sure that finding the right employment opportunity is a top priority for you. The *New England Journal of Medicine* (NEJM) is the leading source of information about job openings, especially practice opportunities, in the country. Because we want to assist you in this important search, a complimentary copy of the 2022 *Career Guide: Residents and Fellows* edition booklet is enclosed. This special booklet contains current physician job openings across the country. To further aid in your career advancement, we've also included a couple of recent selections from our Career Resources section of the NEJM CareerCenter website (NEJMCareerCenter.org).

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A career in medicine is challenging, and current practice leaves little time for keeping up with changes. With this in mind, we have developed these new features to bring you the best, most relevant information in a practical and clinically useful format each week.

On behalf of the entire *New England Journal of Medicine* staff, please accept my wishes for a rewarding career.

Sincerely,

Eric J. Rubin, MD, PhD

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Eyeing Physician Career Boost Via Formal Business Education

Getting a business degree can be highly rewarding, but planning and foresight are essential

By Bonnie Darves, a Seattle-based freelance health care writer

Physicians pursue formal business education for a whole host of reasons, but there are some common threads. For many, it's a desire to effect change within their organizations or even health care delivery as a whole. For others, a master of business administration (MBA) or master of medical management degree (MMM), or the Certified Physician Executive (CPE) credential, is viewed as a way to better position them as credible participants in big-picture discussions about organizational direction or in decisions that affect their professional lives or their specialty's future.

Increasingly, especially in large organizations, the business degree may be a requirement for seeking a senior leadership position. Some physicians have a specific reason for getting an MBA or MMM, such as launching a new clinical service. A final subset of physicians obtains formal business education as a first step toward exiting clinical medicine and moving wholesale into a nonclinical leadership role.

For internist Pamela Sullivan, MD, MBA, the driver was twofold. She needed a better understanding of the business world to help her perform more effectively in the leadership realm in which she was already functioning as a medical director. She also wanted to make a better-informed decision about how to focus the rest of her career.

"I realized that I needed to know more, and that I needed to be able to speak the [business] language whether I was in a clinical meeting or a business meeting," said Dr. Sullivan, who is chief clinical officer of implementation for Landmark Health, which partners with health plans and uses a "house calls" model to care for patients with multiple chronic conditions. "The MBA program gave me the confidence I needed to do that."

Dr. Sullivan opted for the one-year physician executive MBA program at the University of Tennessee's Haslam School of Business. In part, she chose it because it was shorter than some MBA programs, but also because she wanted a practical curriculum and the face-to-face experience of the four weeks of onsite residence. "I learn by doing, and this program was not

about taking exams — we got real-life practical assignments. It was so energizing," Dr. Sullivan said.

Andrew Furman, MD, MMM, took a more stepwise, protracted approach to getting his master's in medical management. The emergency medicine physician started by taking courses through the American College of Healthcare Executives and the American Association for Physician Leadership (AAPL) over a few years. He then carried those credits into the MMM program at University of Southern California (USC) in Los Angeles, which he completed in 2017. Today, after stints at Geisinger Health System, and Salem Health in Oregon, he is medical director for Accolade, Inc., an innovative private care-delivery and benefits company serving self-insured employers.

The slower approach enabled Dr. Furman to initially select courses on topics that related to issues he was encountering in his work, while allowing him to accrue credits toward an eventual master's degree. "I started piecemeal when I was three years out of residency and was doing committee work. The AAPL courses were fantastic because they set me on a path to a one-year USC program," Dr. Furman said.

From the outset, Dr. Furman was clear about his motivation for learning about business: "I wanted to be part of the change in health care, and any change that occurs affects physicians," he said. "If you just want the three letters after your name, you might not get much out of it. If you want to shake up the mess we're in in health care, you will." For Anil Singh, MD, MPH, MMM, executive medical director of clinical transformation at Highmark Health and system division director of Critical Care at Allegheny Health Network in Pittsburgh, Pennsylvania, the decision to obtain a business degree arose in part out of frustration. "I was being asked increasingly to do things that did not involve patient care, and to help fix issues," said Dr. Singh, who obtained his MMM from Carnegie Mellon University. Business people sometimes asked him to write a pro forma or show ROI [return on investment] when he proposed a solution.

"I had no idea what they were talking about and decided I needed to understand the jargon. Being in the program opened up a different side of my brain that I'd never used before," Dr. Singh said. "Now, when I speak to businesspeople in their own language, I've got immediate 'street cred'."

Benefits of business education: professional and personal

Like Dr. Singh, other physicians interviewed for this article were unanimous on one key benefit of formal business education: becoming conversant in the language spoken in board rooms and management meetings.

"I knew that if I was going to be communicating with CEOs and CFOs, and marketing directors, I needed to understand their language — and I needed the credentials and knowledge to participate effectively. The MBA gave me that confidence," said anesthesiologist Talal Ghazal, MD, MBA, co-director of the Holy Cross Hospital Pain Center in Wheaton, Maryland. "I also wanted to learn about something I wasn't trained in. I found that business is no big mystery — it's a matter of understanding the fundamentals and concepts."

Physicians who pursued MMM and MBA degrees that included an onsite component also cited interactions and continued networking with their cohort members as a major benefit.

"Working on an MBA, MMM, or CPE helps you develop a network of colleagues with similar goals or interests, who become an ongoing resource for advice or counsel," according to John Jurica, MD, MPH, CPE, medical director of an Illinois urgent care network who blogs and delivers podcasts on physician leadership.

For Dr. Furman, the networking was especially gratifying. "The cohort experience was amazing. You learn so much from being in the room with people with varied backgrounds who often are experiencing similar issues," he said. The diverse specialty and background profiles of a typical MBA cohort enrich the learning experience, notes Kate Atchley, PhD, executive director of the University of Tennessee's Physician Executive MBA program. "In a typical year, we'll draw physicians who are entrepreneurial-minded, some who are in mid-career or are already in administrative positions who want business acumen, and younger physicians who know that medicine is changing and want to be part of that change," she said. "The benefit of the physician-only environment is that the students come in with the same educational background and the same experience of clinical work — they can relate to each other."

Dr. Singh's cohort, for example, included hospitalists, internists, cardiologists, a pathologist, and a palliative medicine physician. "Learning from the other physicians was a phenomenal experience," he said.

Rex Kovacevich, MBA, a professor of clinical marketing in USC's MMM program, sees those valuable interactions firsthand. He often witnesses physicians sharing their stories and experiences, and in doing so, helping each other deal with situations in their own organizations or professional lives. "That's one of the key benefits of the cohort model — the physicians become comfortable sharing with each other," said Mr. Kovacevich. Monique Butler, MD, MBA, chief medical officer for Swedish Medical Center, in Englewood, Colorado, cites those networking benefits and the resulting relationships she built as an important outcome of her participation in the University of Tennessee's Physician Executive MBA program. "The cohort experience gives you a huge support network. We're able to just pick up the phone and call each other when we're working through a challenge," she said. "It's been incredibly helpful."

Weighing the education options

The chief decision physicians face when they decide to pursue business education is choosing which route to take. The formal physician executive MBA, MMM, and CPE programs teach similar content, but their formats differ. The traditional MBA program, offered online or in a hybrid online/on-campus format, or as an immersive on-campus experience, ranges from one to two years and focuses on business theory, concepts, and principles. There are more than two dozen traditional MBA programs that have a health care business or leadership focus. Several universities now offer physician-only executive MBA degrees structured to accommodate the schedule constraints of practicing physicians and to deliver targeted content. Programs developed as part-time offerings often impose a maximum time for completion.

The MMM, a more recent entrant in the business-degree realm, is designed specifically for physicians and typically targets those who are at least three years out of residency. Physicians who pursue an MMM often end up serving as medical directors, department chairs, chief medical officers, or president/vice president of medical affairs. The programs run 12 to 18 months, and prerequisites might be required. These programs incorporate online learning and an onsite residential component several times annually. Common courses include organizational management, health economics, health policy, health finance, health law, and operations management.

Maeleine Mira, director of the MMM program at USC's Marshall School of Business, said that a key feature of the MMM curriculum is that it's designed to teach students how the business cases apply in health care. "That's one of the benefits of the MMM compared to traditional MBA programs," she said. "Every student graduates with an implementable capstone, so that they're ready to go back and institute changes." USC also offers a pre-MMM fellowship option for final-year residents.

When considering any MBA or MMM program, prospective participants should carefully evaluate the content focus to choose a program that suits their individual needs or career objectives, several sources pointed out. Physicians should also keep in mind that some programs require that participants have three to five years of clinical experience post-residency.

The CPE that AAPL offers focuses heavily on both business content and leadership training and is pursued on a course-by-course basis in a 150-credit curriculum consisting of online learning and live events. The focus is on hands-on learning. The CPE offers flexibility for participants who might need to complete the curriculum at an uneven rate or over a longer period, and it requires a final capstone project and audiovisual presentation. A sophisticated technology platform facilitates interaction among learners, and AAPL also provides professional development resources such as career assessment and executive coaching.

Typically, physicians earn their CPE designation in two to $2^1/_2$ years, according to Peter Angood, MD, AAPL's president and chief executive officer. AAPL also partners with five universities to enable students to complete prerequisites toward master's degrees and easily transition into those programs.

Other degrees that include some business content include the master in healthcare quality and safety management (MS-HQSM) and master of science in the science of healthcare delivery (MS-SHCD), as well as clinical informatics degrees. The master of health administration also includes business principles but focuses on applied health care experience.

When choosing a degree program, especially an MBA, physicians should be fairly clear about what they want to achieve, Dr. Jurica advises, in part because of the financial investment. That might range from under $10,000 for an online-only program to $100,000 for a big-name university MBA. The CPE path is generally less expensive than the traditional MBA or MMM program, he added. "It might be worth waiting to start a program, if there's a way to get your employer to help with the costs," Dr. Jurica said. He also advised physicians who aren't ready to commit to a program to

consider taking business courses through the AAPL, specialty organizations, online programs, or local education institutions.

"It's important to decide whether you need the name recognition — which might be the case for those who will compete for a senior management position at a large organization — or just the degree and the core business knowledge," Dr. Jurica said. In the latter case, an economical online program might suffice.

What to expect

The prospect of continuing clinical practice while obtaining a business degree can be daunting, but it's doable for physicians who organize their time efficiently and strategically, sources agreed. The MBA and MMM programs typically carry a workload of 12 to 25 hours weekly, in addition to the onsite periods.

Physicians who want to get a business degree should plan well in advance, all sources said, and should ensure they will have support from their families, colleagues, and organizations before they start. Ideally, they should also try to either reduce or reconfigure their clinical hours to accommodate program demands. "The most important aspects of preparing for a graduate business degree are figuring out how you'll arrange your time when you add the program to your other responsibilities and making sure that those close to you — your spouse, your coworkers, your children — are onboard," said Mr. Kovacevich.

That's one reason that Dr. Ghazal, who obtained his health care MBA from George Washington University in Washington, D.C., encourages physicians who are eyeing a specific role to consider getting a degree earlier in their careers. "By the time you get to mid-career, and have a demanding practice and a family, it can be a challenge to fit it in because of the time requirements — you basically have a deadline every week."

Deborah Vinton, MD, medical director of the emergency department at the University of Virginia in Charlottesville, found herself on a crash course path when she began the University of Tennessee Physician Executive MBA, five years after finishing residency. She started the program just six weeks after delivering her third child. Despite the logistical challenges, the timing was important: she had an opportunity to participate in planning the UVA's new emergency department and needed business credentials to be effective.

"I wanted to be a physician leader at this academic center, and I knew I needed this education," Dr. Vinton said. The school and her cohort were "amazingly supportive," she said, and she was able to bring her infant daughter with her for the onsite residency portions. "I was surprised by how accommodating everyone was — I didn't expect that," she said.

For Jamie Eng, MD, MMM, who completed her MMM at USC as a continuation of the administrative emergency fellowship that program offers, the degree better equipped her for the administrative work she was already doing at USC-Los Angeles County Medical Center. "It was fortuitous because the fellowship actually required me do the MMM. I looked at other administration fellowships, but this was such a good fit that I decided I might as well get the degree," said Dr. Eng, who is associate medical director of emergency medicine at Providence Tarzana Medical Center in Tarzana, California, and director of the USC Administrative Emergency Medicine Fellowship program.

"The cohort was fantastic," Dr. Eng said. "I feel like my administrative experience was sped up by a decade learning from the experiences of others."

Tips for choosing a program and planning the journey

Physicians interviewed for this article offered the following additional guidance for their colleagues planning to pursue formal business education:

"When you're evaluating programs, look at how the curriculum and the schedule can intersect with your job. If you're not able to merge your work with the requirements, you might have to consider other options." — Deborah Vinton, MD, MBA

"I think it's important to get awareness of the various learning opportunities, so that you have a better sense of what you want for your professional growth."
— Peter Angood, MD, AAPL president and CEO

"When you're looking at programs, be clear about your career and where you want to be in five years — and how a particular program or fellowship is going to get you there."
— Jamie Eng, MD, MMM

"You must be able to make the commitment before you start a program. You need a game plan, the financial resources, and the buy-in from family and colleagues. I ended up devoting two full days a week to my studies." — Pamela Sullivan, MD, MBA

"Truly understand the time commitment. Programs might cite a certain number of hours per week but assume that that's the minimum. It might take more time to meet your requirements." — Talal Ghazal, MD, MBA

"Do the degree at the right time in your career. It's important to be a good doctor first and to have that credibility. I think five years in practice is the minimum, and that seven to 10 might be the sweet spot." — Anil Singh, MD, MPH, MMM

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Defining Success in the Workplace

By Nisha Mehta, MD, *a physician leader whose work focuses on physician empowerment, community building, and career longevity in medicine*

We all have different definitions of *success* in the workplace, and it's important to be honest with ourselves about what those are. They will be the gauge by which we derive career satisfaction, so they are of utmost importance when considering a job.

Importantly, there is no right approach, as much as we may all know the stereotypically correct answers to give at interviews. The things that drive us and give us purpose are inherently intertwined with who we are as individuals, and after years of being told what the "right" answers are, it may require some real introspection to realize what things we are truly aiming for.

Therefore, prior to embarking on the job search, take a few hours and write down the things that you value and you think will ultimately lead to job satisfaction. If applicable, discuss these goals with your family, and even ask your friends if they agree with your personal assessment. Sometimes they know you better than you know yourself, and they will be able to get to the heart of what you really want. Taking this time to challenge what you've been groomed to think you want is well worth it, as over time, these things will reveal themselves in the form of job turnover.

Once this is done, you should look at each job to determine if the job is compatible with the priorities you have outlined.

If you view leadership as one of your goals and indicators of success, you are going to want to pick a job where there is a pathway to promotion or ownership. A private practice that does not offer partnership options or a position in a company where the senior leadership is not composed of physicians would likely not be a good fit for you.

If you think having more vacation or more flexibility in work hours will help you achieve work-life balance and career satisfaction, you may want to look at a large practice where there are more coverage options or start a solo practice if your specialty is amenable to flexibility in this setting. In these scenarios, you will likely sacrifice some element of compensation or willingly take on inefficiencies in practice overhead in order to have the options you want.

If you decide publishing papers or teaching isn't something that gives you career satisfaction, then academics is likely not for you, as you'll feel frustrated having to sacrifice time in these endeavors instead of focusing on what drives you. Remember that everything you say yes to is something else that you say no to.

For some, all efforts are aimed at achieving work-life balance, whereas for others, money or prestige may be the sole factor that is considered. Not surprisingly, for most it's not that straightforward, and the ideal career involves some balance of these factors, which is determined by the relative weight that you place on each of them. Fortunately, the breadth of options within the job market should allow you to find a position that meets your requirements as long as you cast your net wide or are open to the idea of opening your own practice. Acknowledging the benchmarks by which we personally define success and viewing each job opportunity against those will be key for ensuring longevity at the job.

CLINICAL PRACTICE

Caren G. Solomon, M.D., M.P.H., *Editor*

Pulmonary Embolism

Susan R. Kahn, M.D., and Kerstin de Wit, M.B., Ch.B., M.D.

This Journal *feature begins with a case vignette highlighting a common clinical problem. Evidence supporting various strategies is then presented, followed by a review of formal guidelines, when they exist. The article ends with the authors' clinical recommendations.*

A 41-year-old man presents to the emergency department with a 3-week history of breathlessness. He recently completed a course of antibiotic medication for presumed pneumonia. On the day of presentation, he awoke with dull pain on the right side of the back. His medical history is otherwise unremarkable. His heart rate is 88 beats per minute, blood pressure 149/86 mm Hg, respiratory rate 18 breaths per minute, temperature 37°C, and oxygen saturation 95% while he is breathing ambient air. Auscultation of his chest reveals normal breath sounds and normal heart sounds. An examination of the legs is normal. His creatinine and troponin levels are within normal limits, and a radiograph of the chest is normal. The physician's implicit assessment is that the likelihood of pulmonary embolism is greater than 15%. The patient's Wells score is 0 (on a scale of 0 to 12.5, with higher scores indicating a higher probability of pulmonary embolism), and the D-dimer level is 2560 ng per milliliter. How would you evaluate this patient for pulmonary embolism, and how would you manage this case?

From Lady Davis Institute at Jewish General Hospital and the Department of Medicine, McGill University, Montreal (S.R.K.), the Department of Emergency Medicine, Queen's University, Kingston, ON (K.W.), and the Departments of Medicine and Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, ON (K.W.) — all in Canada. Dr. Kahn can be contacted at susan.kahn@mcgill.ca.

Drs. Kahn and de Wit contributed equally to this article.

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An audio version of this article is available at NEJM.org

THE CLINICAL PROBLEM

Pulmonary embolism occurs when embolic venous thrombi are caught within the branching lung vasculature. These thrombi often develop within the leg or pelvic veins, and approximately half of all deep-vein thrombi embolize to the lungs.[1] The annual incidence of pulmonary embolism worldwide is approximately 1 in 1000 persons.[2,3] Although almost 20% of patients who are treated for pulmonary embolism dies within 90 days,[2] pulmonary embolism is not commonly the cause of death because it frequently coexists with other serious conditions, such as cancer, sepsis, or illness leading to hospitalization, or with other events, such as surgeries. The true mortality associated with undiagnosed pulmonary embolism is estimated to be less than 5%,[4] but recovery from pulmonary embolism is associated with complications such as bleeding due to anticoagulant treatment,[5] recurrent venous thromboembolism, chronic thromboembolic pulmonary hypertension,[6] and long-term psychological distress.[7] Approximately half the patients who receive a diagnosis of pulmonary embolism have functional and exercise limitations 1 year later (known as post–pulmonary-embolism syndrome),[8] and the health-related quality of life for patients with a history of pulmonary embolism is diminished as compared with that of matched controls.[9] Therefore, the timely diagnosis and expert management of pulmonary embolism are important.

KEY CLINICAL POINTS

PULMONARY EMBOLISM

- Pulmonary embolism is a common diagnosis and can be associated with recurrent venous thromboembolism, bleeding due to anticoagulant therapy, chronic thromboembolic pulmonary hypertension, and long-term psychological distress.
- A minority of patients who are evaluated for possible pulmonary embolism benefit from chest imaging (e.g., computed tomography).
- Initial treatment is guided by classification of the pulmonary embolism as high-risk, intermediate-risk, or low-risk. Most patients have low-risk pulmonary embolism, and their care can be managed at home with a direct oral anticoagulant.
- Patients with acute pulmonary embolism should receive anticoagulant therapy for at least 3 months. The decision to continue treatment indefinitely depends on whether the associated reduction in the risk of recurrent venous thromboembolism outweighs the increased risk of bleeding and should take into account patient preferences.
- Patients should be followed longitudinally after an acute pulmonary embolism to assess for dyspnea or functional limitation, which may indicate the development of post–pulmonary-embolism syndrome or chronic thromboembolic pulmonary hypertension.

STRATEGIES AND EVIDENCE

DIAGNOSTIC TESTING FOR PULMONARY EMBOLISM

Perhaps the most challenging aspect of testing for pulmonary embolism is knowing when to test.[10] Common symptoms of pulmonary embolism are fatigue, breathlessness, chest pain, dizziness, cough, diaphoresis, fever, and hemoptysis.[11] A meta-analysis of cohort studies showed that a history of dyspnea, immobilization, recent surgery, active cancer, hemoptysis, previous venous thromboembolism, or syncope was associated with an increased likelihood of pulmonary embolism.[12] Testing for pulmonary embolism should also be considered if a patient appears not to have had a response to treatment for another diagnosed respiratory condition, because initial misdiagnosis is common.

In North America, pulmonary embolism is diagnosed in only 1 patient for every 20 who are tested for the presence of pulmonary embolism when they present to the emergency department.[13] This prevalence has remained stable for two decades and is four times lower than the prevalence reported among patients in Europe.[13] Established guidelines do not stipulate which patients should undergo testing for the presence of pulmonary embolism. Qualitative research suggests that physician norms and local culture are major drivers in the decision to test for pulmonary embolism.[10] Noninvasive tests to rule out the diagnosis that are based on the assessed clinical probability of pulmonary embolism are extremely effective in safely reducing the use of computed tomography (CT),[14] resulting in only 30 to 40% of patients with suspected pulmonary embolism subsequently undergoing diagnostic imaging.[13]

In cases in which physicians have an implicit sense that their patient is very unlikely to have pulmonary embolism (estimated likelihood, <15%), large cohort studies have shown that the Pulmonary Embolism Rule-out Criteria (PERC) rule can safely rule out pulmonary embolism without further diagnostic imaging.[15] In practice, however, implicit estimation typically overestimates the probability of pulmonary embolism, which can limit the use of the PERC rule.[10] Physicians should be familiar with a validated decision rule to guide the use of D-dimer testing. Among patients with a low structured clinical probability score — a Wells score of 4.0 or less (found in 80% of patients tested in North America[16]), a revised Geneva score of 10 or less (on a scale ranging from 0 to 22, with higher scores indicating a greater probability of pulmonary embolism), and a simplified Geneva score of 4 or less (on a scale ranging from 0 to 9, with higher scores indicating greater probability of pulmonary embolism) — pulmonary embolism can be safely ruled out on the basis of D-dimer levels when manufacturer-recommended cutoffs were used (sensitivity, 98 to 99%; specificity, 37 to 40%).[17] Additional details of the scoring systems and their use are provided in Figure 1. Older data from a different D-dimer assay suggested that a D-dimer level of less than 500 ng per milliliter could be used to rule out pulmonary embolism without consideration of clinical risk factors, but more data are needed to confirm the usefulness of this approach with current assays and relative to currently recommended strategies. The diagnostic accuracy of D-dimer testing in patients with coronavirus disease 2019 (Covid-19) remains unchanged.[18]

Newer approaches have adjusted the D-dimer threshold for ruling out pulmonary embolism and are validated for D-dimer assays for which the manufacturer-recommended cutoff is equivalent to 500 ng per milliliter. These strategies include D-dimer levels that are adjusted for age[19,20] (reported sensitivity for the age-adjusted approach ranges from 97 to 99%, and specificity ranges from 42 to 47%[17]) or that are adjusted to the YEARS algorithm for ruling out pulmonary embolism[21] (sensitivity, 96 to 98%; specificity, 54 to 61%[17]) or the Wells score[16] (sensitivity, 93 to 97%; specificity, 61 to 67%[17]). Randomized trials that compare various D-dimer strategies in patients with pulmonary embolism are lacking.

Diagnostic imaging is reserved for patients in whom pulmonary embolism cannot be ruled out on the basis of a decision rule, given the potential harms of radiation exposure. CT pulmonary angiography is usually the most timely and accessible imaging technique; however, to minimize lung and breast-tissue irradiation in younger patients, ventilation–perfusion single-photon-emission CT (SPECT) is a low-radiation option. The incidence of false positive results from CT screening vary among providers and may be as high as 5%.[22] Within 3 months after having normal results on CT that had been performed because of suspicion of pulmonary embolism, 1.2% of patients receive a diagnosis of venous thrombosis.[23] In contrast, the diagnostic performance of ventilation–perfusion SPECT has not been well established.[24]

Many patients who have been hospitalized for an unrelated condition are also tested for pulmonary embolism; there is less evidence to guide D-dimer use in these patients. Although D-dimer levels may still be highly sensitive for testing patients who are hospitalized, they are less useful in ruling out pulmonary embolism because levels are often elevated during illness and after surgery.

TREATMENT

Initial Management

Initial treatment of pulmonary embolism is guided by risk stratification of the pulmonary embolism as high, intermediate, or low risk on the basis of the patient's clinical presentation (Fig. 2).[25] The nomenclature of "massive" and "submassive" in describing pulmonary embolism is confusing, given that clot size does not dictate therapy.

High Risk

Approximately 5% of patients present with high-risk pulmonary embolism, involving shock, end-organ hypoperfusion, hypotension (systolic blood pressure of <90 mm Hg or a decrease in systolic blood pressure of >40 mm Hg that is not caused by sepsis, arrhythmia, or hypovolemia), or cardiac arrest. Observational data support the evaluation of patients with high-risk pulmonary embolism for immediate reperfusion therapy by ruling out contraindications (e.g., brain metastases, bleeding disorders, and recent surgery). Intravenous systemic thrombolysis is the most readily available option for reperfusion, and protocols include a weight-based dose of tenecteplase,[26] alteplase at a dose of 0.6 mg per kilogram of body weight,[27] or alteplase at a dose of 100 mg administered over a period of 1 to 2 hours.[25] There is insufficient evidence to support one of these agents over the other; however, tenecteplase can be administered as a bolus in an emergency, and weight-based dosing may be preferable in elderly patients or patients with low body weight.[26] Alternative reperfusion approaches include surgical thrombectomy and catheter-directed thrombolysis (with or without thrombectomy). Additional supportive measures include the administration of inotropes and the use of extracorporeal life support.

Intermediate Risk

Patients with echocardiographic or CT evidence of right heart strain, elevated cardiac biomarkers (such as troponin or brain natriuretic peptide), or both are considered to have intermediate-risk pulmonary embolism.[25] Systemic thrombolysis is not typically recommended for these patients; in a randomized, controlled trial that assessed the addition of tenecteplase to heparin, treatment with tenecteplase resulted in an absolute reduction in the risk of hemodynamic decompensation of 3 percentage points, at the expense of a 9-percentage-point increase in the risk of major bleeding (and a 2-percentage-point increase in the risk of hemorrhagic stroke).[26] Rather, patients with intermediate-risk pulmonary embolism should receive anticoagulant therapy and be close-

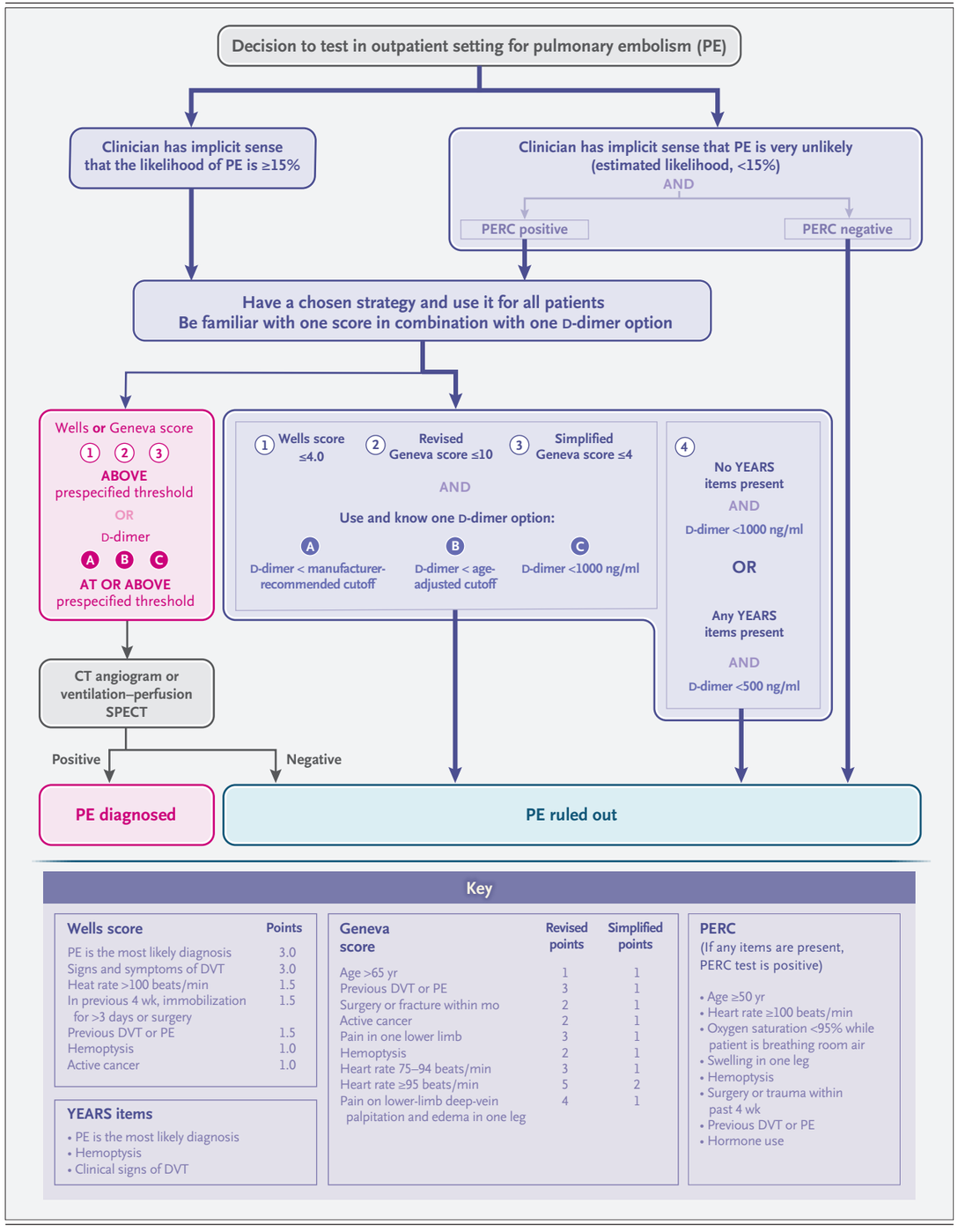

Figure 1 (facing page). Overview of Testing for Pulmonary Embolism in Outpatients or Patients in the Emergency Department.

Physicians may use Pulmonary Embolism Rule-out Criteria (PERC) to rule out pulmonary embolism if their implicit sense suggests there is less than 15% probability that the patient has pulmonary embolism. Otherwise, physicians should use a D-dimer assay to rule out pulmonary embolism in patients who have a low structured clinical probability score (a Wells score of ≤4.0 on a scale of 0 to 12.5, a revised Geneva score of ≤10 on a scale ranging from 0 to 22, or a simplified Geneva score of ≤4 on a scale of 0 to 9; on all three scales, higher scores indicate a greater probability of pulmonary embolism) or should use the YEARS algorithm. Each circled number refers to a different clinical decision rule, and each circled letter to a distinct D-dimer strategy. Imaging can be avoided in patients with clinical probability scores at or below the given cutoff and D-dimer level below the given cutoff. Computed tomography (CT) and ventilation–perfusion single-photon-emission computed tomography (SPECT) are reserved for patients with a clinical probability score above the preset cutoff for the chosen score or a D-dimer at or above the preset cutoff for the chosen D-dimer option. The adjusted D-dimer thresholds have been validated for assays with a manufacturer-recommended cutoff of 500 ng per milliliter. DVT denotes deep-vein thrombosis.

ly monitored to identify the 1 patient in 20 in whom shock may subsequently develop[26] (at which point reperfusion therapy may be administered). There are no guidelines for door-to-needle time for the treatment of pulmonary embolism like those that exist for the treatment of myocardial infarction and stroke.

On the basis of expert opinion, low-molecular-weight heparin is the preferred immediate anticoagulant for patients with intermediate-risk pulmonary embolism. The therapeutic effects of immediate treatment with direct oral anticoagulants rivaroxaban and apixaban as compared with low-molecular-weight heparin have not been studied in patients at intermediate risk for pulmonary embolism, and unfractionated heparin causes excess bleeding.[28] When available, catheter-directed thrombolysis remains an option for patients at intermediate risk who have proximal, central pulmonary embolism; however, there is insufficient evidence to support catheter-directed thrombolysis over low-molecular-weight heparin in these patients.

Low Risk

Patients with pulmonary embolism whose conditions are hemodynamically stable and who have no right ventricular strain and normal cardiac biomarkers are considered to have low-risk pulmonary embolism. Most of these patients can be treated with a direct oral anticoagulant (on the basis of high-quality trial data[29]) and assessed for outpatient treatment. The decision for a patient to be treated at home can be guided by the score on the simplified Pulmonary Embolism Severity Index (PESI)[25,30] or the Hestia score (Fig. 2). In contrast to the Hestia score (a checklist of criteria that preclude treatment at home), the score on the simplified PESI predicts the risk of death rather than nonfatal complications and does not account for important variables such as the availability of support for the patient at home. Results of a randomized, controlled trial showed a low risk of adverse events among patients with no Hestia criteria or with a score of 0 on the simplified PESI who received treatment as outpatients.[31]

Subsequent Management

Direct oral anticoagulants are the first-line treatment for most patients. Randomized trials have shown that direct oral anticoagulants, which do not necessitate monitoring, are as effective at reducing the risk of recurrent venous thromboembolism as vitamin K antagonists and result in a lower risk of major bleeding.[29] Because comparisons of direct oral anticoagulants are lacking, the choice of agent is guided by pharmacologic properties and patient characteristics and preferences (e.g., concomitant interacting medications and patient preference for once-daily or twice-daily medication).[32] In patients with cancer, trials support the safety and efficacy of the direct oral anticoagulants apixaban, edoxaban, and rivaroxaban as alternatives to treatment with low-molecular-weight heparin.[33,34]

Vitamin K antagonists are preferred over direct oral anticoagulants in patients with advanced kidney or liver disease and in patients with antiphospholipid syndrome who are triple-positive (i.e., positive for lupus anticoagulant, anticardiolipin, and anti–β_2-glycoprotein I antibodies), have very high antibody titers, or have a history of arterial thrombosis.[35,36] Low-molecular-weight heparin should be used to treat pregnant women

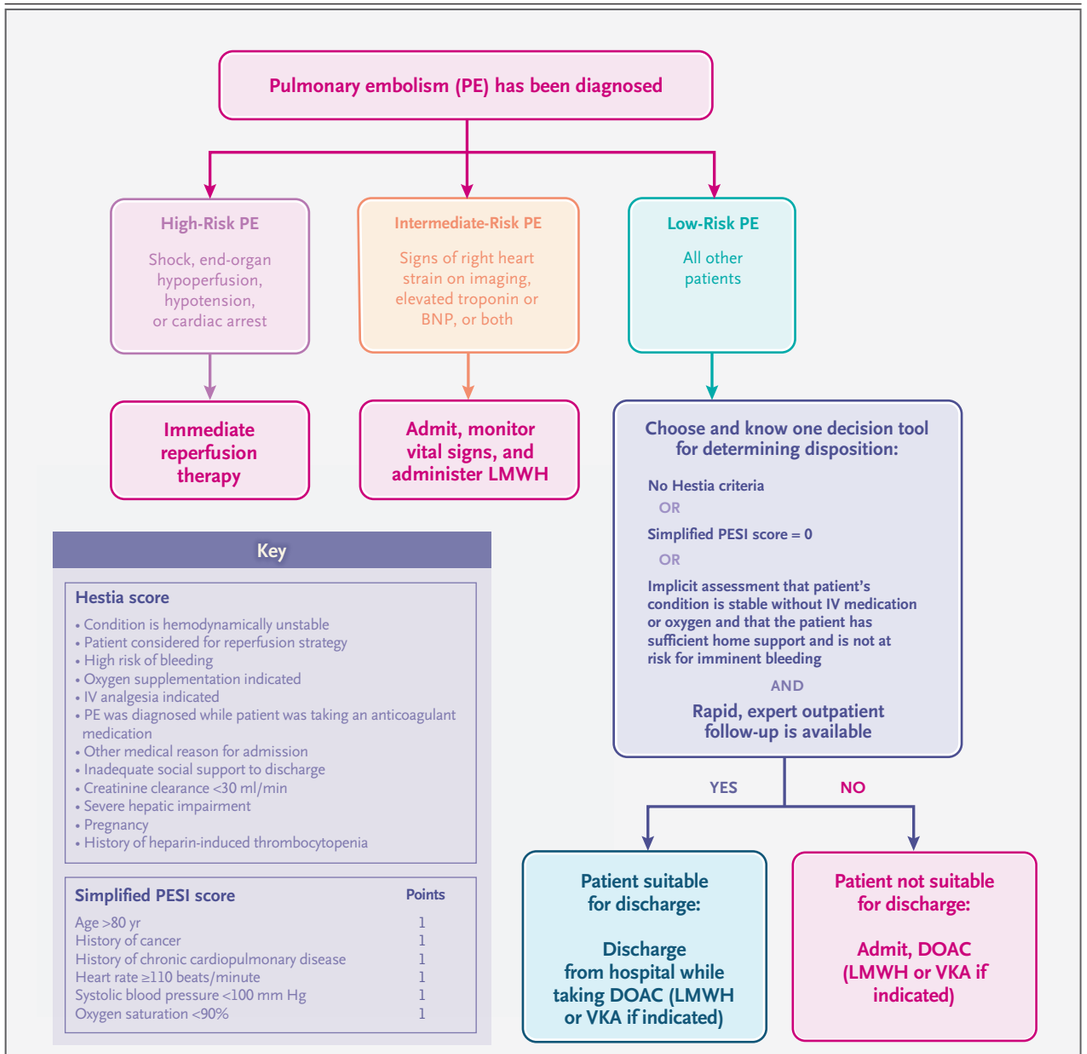

Figure 2. Overview of Pulmonary Embolism Management in the Context of Risk Stratification.

At the time of diagnosis, pulmonary embolism should be stratified as low risk, intermediate risk, or high risk. Patients with high-risk pulmonary embolism should be assessed for immediate reperfusion interventions such as systemic thrombolysis. Patients with intermediate-risk pulmonary embolism should be carefully monitored and assessed for initiation of treatment with low-molecular-weight heparin (LMWH). Most patients have low-risk pulmonary embolism and can be assessed for outpatient anticoagulant therapy according to their Hestia score, score on the simplified Pulmonary Embolism Severity Index (PESI), or the physician's implicit judgment. All patients discharged home would benefit from rapid, reliable outpatient follow-up. BNP denotes brain natriuretic peptide, DOAC direct oral anticoagulant, IV intravenous, and VKA vitamin K antagonist.

Table 1. Anticoagulant Treatment Regimens for Pulmonary Embolism.*

Initial Phase of Anticoagulation	Short-Term Phase of Anticoagulation (3–6 mo)	Indefinite Phase of Anticoagulation (after 3–6 mo)
Apixaban, administered orally, 10 mg twice a day for 7 days	Apixaban, administered orally, 5 mg twice a day	Apixaban, administered orally, 5 mg twice a day or 2.5 mg twice a day†
Rivaroxaban, administered orally, 15 mg twice a day for 21 days	Rivaroxaban, administered orally, 20 mg once a day	Rivaroxaban, administered orally, 20 mg once a day or 10 mg once a day†
Low-molecular-weight heparin‡		
Administered subcutaneously for a minimum of 5 days§	Dabigatran, administered orally, 150 mg twice a day	Dabigatran, administered orally, 150 mg twice a day
Administered subcutaneously for a minimum of 5 days§	Edoxaban, administered orally, 60 mg once a day¶	Edoxaban, administered orally, 60 mg once a day¶
Administered subcutaneously for a minimum of 5 days,§ plus vitamin K antagonist, administered orally, with INR ≥2 for 2 days	Vitamin K antagonist, administered orally, with target INR of 2 to 3	Vitamin K antagonist, administered orally, with target INR of 2 to 3

* Direct oral anticoagulants and low-molecular-weight heparin are contraindicated in patients with severe renal impairment. Dosing of these medications in patients with renal impairment differs with the specific agent and among jurisdictions. With regard to use of direct oral anticoagulants in patients with obesity, post hoc analyses of phase 3 trials, observational data, and pharmacokinetic and pharmacodynamic data suggest that direct oral anticoagulants and vitamin K antagonists have similar effectiveness and safety in patients with body weight up to 120 kg or a body-mass index (BMI; the weight in kilograms divided by the square of the height in meters) of up to 40. For patients who weigh more than 120 kg or have a BMI higher than 40, standard doses of rivaroxaban or apixaban are among appropriate anticoagulant options; fewer supportive data exist for apixaban than for rivaroxaban. Other options include vitamin K antagonists, weight-based low-molecular-weight heparin (administered according to manufacturer recommendations), and fondaparinux.[52] INR denotes international normalized ratio.

† A reduction in dose may be considered after 3 to 6 months of therapy.

‡ Low-molecular-weight heparin may be administered subcutaneously throughout initial, short-term, and indefinite phases of treatment, with dosage according to body weight.

§ Low-molecular-weight heparin should be administered for 5 to 10 days before the initiation of dabigatran or edoxaban and concurrent to initiating vitamin K antagonists.

¶ Edoxaban should be administered at a dose of 30 mg daily if the creatinine clearance is 15 to 50 ml per minute, if the patient's body weight is less than 60 kg, or if potent P-glycoprotein inhibitors are being used.

with pulmonary embolism, since vitamin K antagonists and direct oral anticoagulants cross the placenta and are associated with adverse pregnancy outcomes.[25,37]

Duration of Therapy

Patients with acute pulmonary embolism should receive anticoagulant therapy for at least 3 months to reduce the risks of further embolization, thrombus extension, early recurrence of venous thromboembolism, and death (Table 1).[38] Whether treatment is stopped at 3 months or continued indefinitely depends on whether the reduced risk of recurrent venous thromboembolism with continued anticoagulation therapy outweighs the increased risk of bleeding, and the decision should take patient preferences into account.[39]

Among patients who have pulmonary embolism that was provoked by a major transient (i.e., reversible) risk factor (e.g., surgery with general anesthesia lasting >30 minutes, confinement to bed in the hospital for ≥3 days due to an acute illness, or major trauma or fracture),[40] the long-term risk of venous thromboembolism recurrence is low and anticoagulation therapy can be stopped after 3 months. If the pulmonary embolism was very large or was associated with moderate dysfunction of the right ventricle or if the patient has persistent residual symptoms, some experts recommend that treatment extend to 6 months.[39] In patients with persistent provoking factors such as active cancer or antiphospholipid syndrome or who have had previous episodes of unprovoked venous thromboembo-

Table 2. Summary of Key Guideline Recommendations for the Treatment of Pulmonary Embolism.*

Scenario	American College of Chest Physicians†	American Society of Hematology‡	European Society of Cardiology§
Home vs. hospital treatment for low-risk PE	Recommend outpatient treatment if access to medications, care, and home circumstances adequate	Suggest home treatment	Consider early discharge and home treatment if proper outpatient care and anticoagulation can be provided
Subsegmental PE	In low-risk PE, suggest clinical surveillance and ultrasonography of both legs In high-risk PE (patient is hospitalized, immobile, has cancer, is pregnant, or has unprovoked PE), suggest anticoagulation	In patients with cancer, suggest short-term anticoagulation instead of observation	Not addressed
Choice of anticoagulant	Recommend direct oral anticoagulant instead of vitamin K antagonist In antiphospholipid syndrome, recommend vitamin K antagonist instead of direct oral anticoagulant	Suggest direct oral anticoagulant instead of vitamin K antagonist unless renal impairment, liver disease, or antiphospholipid syndrome is present	Recommend direct oral anticoagulant instead of vitamin K antagonist unless severe renal insufficiency, pregnancy or lactation, or antiphospholipid syndrome is present
Choice of anticoagulant for cancer-associated PE	Recommend direct oral anticoagulant instead of low-molecular-weight heparin for most patients	Suggest direct oral anticoagulant instead of low-molecular-weight heparin for first 3 to 6 mo of treatment	Consider weight-adjusted subcutaneous low-molecular-weight heparin for first 6 mo instead of vitamin K antagonists Consider edoxaban or rivaroxaban as alternative to low-molecular-weight heparin in patients without gastrointestinal cancer
Treatment of incidentally found asymptomatic PE	Suggest same initial and long-term anticoagulation as in patients with similar symptomatic PE	Short-term anticoagulation rather than observation suggested in patients with cancer	In patients with cancer, consider same management as in patients with symptomatic PE
Thrombolysis of PE	If no hypotension, recommend against systemic thrombolysis If patient has hypotension, suggest systemic thrombolysis if bleeding risk is not high If deterioration occurs after starting anticoagulation but there is no hypotension or increased bleeding risk, suggest systemic thrombolysis instead of no thrombolysis When thrombolysis is used, suggest systemic thrombolysis instead of catheter-directed thrombolysis If hypotension and high bleeding risk, failed thrombolysis, or imminent shock is present, suggest catheter-directed thrombus removal	If hemodynamic compromise is present, recommend thrombolysis followed by anticoagulation instead of anticoagulation alone If no hemodynamic compromise is present but evidence exists of right ventricular dysfunction (according to echocardiogram and biomarkers), suggest anticoagulation alone instead of routine use of thrombolysis plus anticoagulation If thrombolysis is used, suggest systemic thrombolysis instead of catheter-directed thrombolysis	In high-risk PE, recommend rapid initiation of unfractionated heparin administered intravenously and systemic thrombolysis In presence of contraindications to or failed systemic thrombolysis, recommend surgical pulmonary embolectomy and consider percutaneous catheter-directed treatment Recommend rescue thrombolysis if hemodynamic deterioration occurs with anticoagulation; as alternative, consider surgical embolectomy or percutaneous catheter-directed treatment In intermediate-risk or low-risk PE, routine use of primary systemic thrombolysis is not recommended.
Use of inferior vena cava filter	Recommend against inferior vena cava filter in patients who can receive anticoagulation	Suggest that inferior vena cava filter not be used in patients who can receive anticoagulation	Recommend against inferior vena cava filters; consider if absolute contraindications to anticoagulation or PE recurrence despite therapeutic anticoagulation are present
Duration of anticoagulant treatment, including cancer-associated PE	Recommend 3 mo anticoagulation for primary treatment In PE provoked by major transient risk factor, recommend stopping anticoagulation at 3 mo In unprovoked PE or PE provoked by persistent risk factor, recommend extended-phase anticoagulation with direct oral anticoagulant; suggest reduced-dose instead of full-dose apixaban or rivaroxaban If patient cannot receive direct oral anticoagulant, suggest extended-phase anticoagulation with vitamin K antagonist If patient has active cancer without high bleeding risk, recommend extended anticoagulation instead of stopping anticoagulation at 3 mo; if high bleeding risk, suggest extended anticoagulation instead of stopping at 3 mo	Suggest 3 to 6 mo of anticoagulation instead of 6 to 12 mo for primary treatment Suggest indefinite anticoagulation if PE is unprovoked, provoked by chronic risk factor, or patient had previous episodes of unprovoked VTE, if bleeding risk not high and patient prefers to stay on anticoagulation For indefinite direct oral anticoagulant treatment, suggest standard-dose or lower dose direct oral anticoagulant If patient has active cancer, suggest long-term anticoagulation with direct oral anticoagulant or low-molecular-weight heparin rather than short-term anticoagulation	For first PE provoked by major transient or reversible risk factor, recommend stopping anticoagulation after 3 mo For recurrent VTE (≥1 previous episode of PE or deep-vein thrombosis) unrelated to major transient or reversible risk factor, recommend indefinite duration oral anticoagulation For antiphospholipid syndrome, recommend treatment of indefinite duration with vitamin K antagonist For first episode of PE without identifiable risk factor, or persistent risk factor other than antiphospholipid syndrome, or minor transient or reversible risk factor, consider treatment of indefinite duration with oral anticoagulation If patient does not have cancer and is receiving extended oral anticoagulation, consider low-dose direct oral anticoagulant (apixaban or rivaroxaban) after 6 mo of therapeutic anticoagulation If patient has cancer, consider extended anticoagulation for indefinite period or until cancer is cured If patient is receiving extended anticoagulation, regularly assess side effects, adherence, hepatic and renal function, and bleeding risk

* These guidelines do not include management of pulmonary embolism (PE) and venous thromboembolism (VTE) risk during pregnancy planning, pregnancy, and post partum; these specialized topics have been addressed in other guidelines.[25,37,54]

† Recommendations are based on a Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach; the strength of the recommendations are categorized as strong (phrased in the American College of Chest Physicians guidelines as "we recommend") or weak (phrased as "we suggest").[30]

‡ Recommendations are based on a GRADE approach; recommendations are labeled as strong (phrased in the American Society of Hematology guidelines as "the guideline panel recommends") or conditional ("the guideline panel suggests").[51,55]

§ The level of evidence and the strength of the recommendations were weighed and graded according to predefined scales. Recommendations are expressed as: class I, in which the evidence or general agreement (or both) is that a given treatment or procedure is beneficial, useful, and effective (phrased in the European Society of Cardiology guidelines as "is recommended"); class II, in which there is conflicting evidence or divergence of opinion (or both) about the usefulness or efficacy of a given treatment or procedure; class IIa, in which the weight of the evidence or opinion is in favor of the usefulness or efficacy of a given treatment or procedure ("should be considered"); class IIb, in which the usefulness or efficacy is less well established by the evidence or opinion ("may be considered"); and class III, in which there is evidence or general agreement that a given treatment or procedure is not useful or effective and in some cases may be harmful ("is not recommended").[25]

lism, the long-term risk of recurrence is high and indefinite anticoagulation therapy is recommended.[25,30,41]

Decision making is more nuanced in patients with a first pulmonary embolism that was unprovoked or weakly provoked (i.e., associated with a minor transient risk factor, such as estrogen therapy, pregnancy, minor surgery, or minor leg injury).[40] Among these patients, the risks of recurrent venous thromboembolism and fatal pulmonary embolism after stopping anticoagulation therapy are 10% and 0.4%, respectively, at 1 year, and 36% and 1.5% at 10 years; the risks are higher among men than among women.[42] Trials have shown that extended anticoagulation therapy, as compared with shorter durations of anticoagulation, is highly effective for the prevention of recurrent venous thromboembolism.[39] However, in a meta-analysis (involving 14 randomized, controlled trials and 13 cohort studies), extended anticoagulation with direct oral anticoagulants was associated with a risk of 1.12 major bleeding events per 100 person-years (case fatality, 9.7%), and extended anticoagulation with vitamin K antagonists was associated with a risk of 1.74 major bleeding events per 100 person-years (case fatality, 8.3%).[43] The risk of bleeding was higher among older patients and among patients who had a creatinine clearance of less than 50 ml per minute, a history of bleeding, had received antiplatelet therapy, or had a hemoglobin level of less than 10 g per deciliter.[43]

Although indefinite treatment with anticoagulation is typically recommended after a first unprovoked or weakly provoked venous thromboembolism event, particularly in patients who are not at high risk for bleeding,[39] time-limited treatment may be appropriate in some patients, including those among whom the estimated risk of recurrent venous thromboembolism is less than 5% within the first year after anticoagulation therapy is stopped.[44] Decision making with regard to the treatment of venous thromboembolism in women may be guided by the HERDOO2 rule, a prospectively validated prediction score that identifies some women with a first unprovoked or weakly provoked venous thromboembolism event who can safely discontinue anticoagulation therapy (Table S1 in the Supplementary Appendix, available with the full text of this article at NEJM.org).[45] No validated score is currently available for use in men who have had a first unprovoked or weakly provoked pulmonary embolism, and many experts recommend continuing anticoagulation therapy indefinitely in these patients.

In patients who continue to receive anticoagulants indefinitely, data from randomized trials indicate that low-dose direct oral anticoagulant regimens (i.e., rivaroxaban or apixaban) after the initial 6 months of full-dose anticoagulation have effectiveness and safety similar to those of full-dose regimens[46,47] and greater effectiveness than aspirin.[47] However, low-dose regimens have not been assessed in pulmonary embolism in patients with cancer, in those with anatomically extensive pulmonary embolism, or in those at high risk for recurrent pulmonary embolism. Factors that may influence the choice of indefinite anticoagulant regimen are shown in Table S2.

OTHER TESTING

Occult cancer is detected in 5.2% of patients within 1 year after a diagnosis of unprovoked pulmonary embolism.[48] An extensive screening strategy may detect more cancers than limited screening, but data are limited as to whether such screening is associated with better patient outcomes.[48,49] Experts recommend limited cancer screening guided by medical history, physical examination, basic laboratory tests and chest radiographs, and age-specific and sex-specific cancer screening.[49]

Patients should be evaluated 3 to 6 months after acute pulmonary embolism is diagnosed to assess for dyspnea or functional limitation, which may indicate the development of post–pulmonary-embolism syndrome or chronic thromboembolic pulmonary hypertension.[25,50] If a decision to continue anticoagulation indefinitely was made at the time of diagnosis of pulmonary embolism, this decision should be reassessed annually or more often; anticoagulation may need to be discontinued if the risk of bleeding increases, a major bleeding event occurs, or the patient prefers to stop treatment.

GUIDELINES

Current guidelines for pulmonary embolism management include those issued by the American College of Chest Physicians (ACCP),[30] the American Society of Hematology (ASH),[41,51] and the European Society of Cardiology (ESC).[25] A summary of the key recommendations in these guidelines is provided in Table 2. Our recommendations align with these guidelines, which are largely concordant but differ in the strength of their recommendations for some topics. ACCP and ASH guidelines recommend anticoagulation be stopped at 3 months in the case of a first pulmonary embolism provoked by a weak transient risk factor, a recommendation that diverges from ESC guidelines, which suggest that indefinite anticoagulation be considered in such patients. Our approach to this situation generally aligns with the ACCP and ASH guidelines while taking into account factors that influence the risk of recurrence (e.g., male sex or older age) and patient preference.

AREAS OF UNCERTAINTY

Appropriate management of subsegmental pulmonary embolism (a single isolated subsegmental pulmonary embolus or multiple emboli, without the presence of pulmonary embolism in segmental or more proximal pulmonary vessels and without deep-vein thrombosis in the legs) is uncertain. Although some guidelines suggest clinical surveillance instead of anticoagulation in patients with low-risk subsegmental pulmonary embolism, a recent prospective cohort study involving such patients who were treated without anticoagulation therapy showed a higher-than-expected incidence of recurrent venous thromboembolism during 90-day follow-up.[53] A randomized, placebo-controlled trial of clinical surveillance as compared with anticoagulation in this patient population is ongoing (ClinicalTrials.gov number, NCT04263038).

Whether a particular direct oral anticoagulant is preferable for the treatment of pulmonary embolism is not known. Ongoing randomized trials are assessing apixaban as compared with rivaroxaban for the initial treatment in patients with venous thromboembolism (NCT03266783) and various doses of these drugs for extended treatment of such patients (NCT03285438). A multinational, randomized, controlled trial is under way to assess the efficacy and safety of a therapy involving a reduced dose of thrombolytic medication in patients with intermediate-risk acute pulmonary embolism (NCT04430569). High-quality data are needed to inform the benefits and risks of intravascular thrombolysis and clot-retrieval approaches in the treatment of patients with pulmonary embolism.

CONCLUSIONS AND RECOMMENDATIONS

The patient with breathlessness described in the vignette was estimated to have greater than a 15% likelihood of pulmonary embolism. In the context of the patient's low Wells score for pulmonary embolism, D-dimer testing was warranted to guide the need for imaging; CT is indicated, given the D-dimer level of more than 1000 ng per milliliter. Under the presumption that the patient's CT scan confirms pulmonary embolism and shows normal right-ventricle dimensions, he would be classified as having low-risk pulmonary embolism, given his normal troponin level. Treatment with a direct oral anticoagulant should be started promptly, and the patient should be given information about the pulmonary embolism diagnosis. In the absence of contraindications to treatment on an outpatient basis (no Hestia criteria present), the patient can be discharged directly from the emergency department with prompt clinic follow-up. We would recommend that he undergo cancer screening appropriate for his age and personal risk. After the patient receives 3 to 6 months of therapy with a direct oral anticoagulant administered at a treatment-level dose, in the absence of an increased bleeding risk and considering his preferences, we would recommend switching to a low-dose direct oral anticoagulant on a long-term basis for secondary prevention.

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

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All orders, cancellations, and changes must be received in writing. E-mail your advertisement to us at ads@nejmcareercenter.org, or fax it to 1-781-895-1045 or 1-781-893-5003. We will contact you to confirm your order. Our closing date is typically the Friday 20 days prior to publication date; however, please consult the rate card online at **nejmcareercenter.org** or contact the Classified Advertising Department at 1-800-635-6991. Be sure to tell us the classification heading you would like your ad to appear under (see listings above). If no classification is offered, we will determine the most appropriate classification. Cancellations must be made 20 days prior to publication date. Send all advertisements to the address listed below.

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We define a word as one or more letters bound by spaces. Following are some typical examples:

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617-555-1234 ..... = 1 word
Obstetrician/Gynecologist ... = 1 word
A ..... = 1 word
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As a further example, here is a typical ad and how the pricing for each insertion is calculated:

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This advertisement is 56 words. At $10.25 per word, it equals $574.00. This ad would be placed under the Chiefs/Directors/ Department Heads classification.

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Advertisers may choose to have their classified line and display advertisements placed on NEJM CareerCenter for a fee. The web fee for line ads is $125.00 per issue per advertisement and $210.00 per issue per advertisement for display ads. The ads will run online two weeks prior to their appearance in print and one week after. For online-only recruitment advertising, please visit nejmcareercenter.org for more information, or call 1-800-635-6991.

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Classified Ad Deadlines

Issue	Closing Date
November 10	October 21
November 17	October 28
November 24	November 4
December 1	November 10

Cardiology

CLINICAL CARDIOLOGIST OPPORTUNITY: NORTHERN NJ — Excellent opportunity for a BC/BE non-invasive to join a well-established Cardiology practice. Competitive salary, full benefits, balanced call schedule. Partnership or Employment track available. Please forward CV and cover letter to: njcardiologist@gmail.com

FOUR-PHYSICIAN PRIVATE PRACTICE GROUP ON LONG ISLAND — Seeking BC/BE noninvasive Cardiologist to join a well-established successful team. Competitive compensation with built-in salary increases yearly, four and one half day work-week, four weeks' vacation, 401K plan, full medical benefits, and CME allowance. New doctor will do all cardiac modalities including echo, stress echo, vascular, nuclear cardiology, TEE, and PPM follow ups. Will train vascular. Our group includes an EP and an affiliated interventionalist. Offices located in Smithtown and Bayshore. One hour from NYC. Hospital privileges in Good Samaritan, St. Catherine of Sienna, and Southshore University Hospital (Southside). Hospitals have full cardiac services including cath labs, EP labs, open heart programs, and structural programs (TAVR, Mitraclip, watchman). Access to NYC tertiary programs (transplant). Long Island is a great place to live, work, and raise a family. Beautiful beaches, restaurants, parks, with easy access to all of New England. Most importantly, our group prides itself upon its commitment to balancing work and family life for all its physicians and employees. Please e-mail resume to: Suffolkdoctor3@aol.com

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Hematology-Oncology

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Hospitalist

PHYSICIAN (HOSPITALIST) — Multiple openings. Full-time position working for Lifespan Physician Group, Inc., providing Hospitalist services at Rhode Island Hospital and possibly at the Miriam Hospital, both located in Providence, RI. Requirements include BE in Internal Medicine or Family Medicine. If interested, apply online, at: www.lifespancareers.org by searching job number 31970.

HOSPITALIST — For Concord Hospital-Laconia, Concord Hospital-Franklin, Concord Hospital, and other community locations. Requires MD and completion of residency in Internal or Family Medicine. BE/C, eligibility for NH medical license. Contact: Jennifer Bubert, Provider Recruiter, Concord Hospital Medical Group, 250 Pleasant Street, Concord, NH 03301; jbubert@crhc.org

Infectious Disease

INFECTIOUS DISEASE PHYSICIAN — For Keystone Rural Health Center in Chambersburg, Pennsylvania. Send CV to: Amy Ehrhart, Keystone Rural Health Center, 111 Chambers Hill Drive, Suite 200, Chambersburg, PA 17201. No J-1 or H-1B opportunities.

Internal Medicine (see also FM and Primary Care)

INTERNAL MEDICINE PHYSICIAN — Indiana University Health Arnett, Inc., worksites in Lafayette and West Lafayette, Indiana: Deliver Internal Medicine Physician services to patients through the diagnosis, treatment, and prevention of diseases, ailments, and disabilities in a clinical setting with no restrictions or limitations; REQs: Medical Degree (MD) degree or foreign equivalent; Internal Medicine residency; eligibility for or possession of Indiana medical license; BC/BE in Internal Medicine. Send Resume: FitzgerC@iuhealth.org

Nephrology

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Recruitment:
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Fellowship Coordinator
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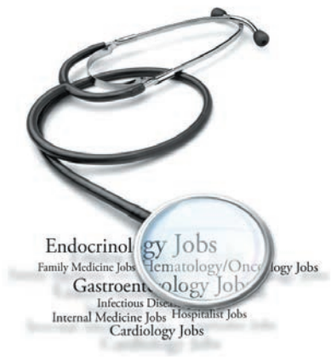

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