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Pulmonary Embolism Response Teams in the Emergency Setting

Data suggest as many as 900,000 people in the United States experience a pulmonary embolism (PE) or deep vein thrombosis (DVT) event every year, with 60,000 to 100,000 individuals dying from their condition. In fact, 10% to 30% of patients with PE or DVT die within one month of diagnosis.[1]

These conditions certainly are well-known to emergency physicians, many of whom have become highly skilled in both the diagnosis and treatment of PE and DVT. However, for patients with intermediate- or high-risk thromboembolisms, treatment often requires more than anticoagulation therapy. But precisely how to proceed is not always clear.

Nonetheless, with time to treatment a critical factor, how does the frontline provider expedite the kind of multi-disciplinary insight needed to reach a sound treatment decision? Innovators at Massachusetts General Hospital (MGH) devised their own solution to this dilemma with the creation of the first pulmonary embolism response team (PERT) in 2012.

Akin to other rapid response mechanisms, a PERT activation quickly assembles a team of experts from multiple specialties so an informed treatment decision can be made quickly. In fact, the concept has worked so well at MGH that it has been adopted by medical centers across the United States and even globally.

Furthermore, at least in the United States, emergency medicine physicians play a central role in the PERT process, explains **Christopher Kabrhel**, MD, MPH, an emergency medicine specialist and director of the Center for Vascular Emergencies at MGH.

"About 60% of PERT activations, not only in our hospital but across the country, come from the ED. That's because the ED is the most common place for a PE to be diagnosed," he says. "However, it is important for emergency physicians to also be active members of PERTs. We have an active knowledge and skill set that is useful in helping with the diagnosis, risk-stratification, and treatment decisions [for] patients with PE precisely because we do diagnose so many of them."

Risk-Stratify

Although the PERT concept has been adopted by many hospitals, not

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AUTHOR: Dorothy Brooks
EDITOR: Jonathan Springston
EDITOR: Jill Drachenberg
EDITORIAL GROUP MANAGER: Leslie Coplin
ACCREDITATIONS DIRECTOR: Amy M. Johnson, MSN, RN, CPN

all emergency providers can access a PERT in their institutions. A group called the PERT Consortium, established in 2015, is trying to facilitate wider adoption of the concept while also collecting data and pushing improvements in PE care.[2]

Rachel Rosovsky, MD, MPH, vice president of the PERT Consortium, described the evolution of PE care in recent years during a March 11 presentation sponsored by the CDC.

For patients with acute PE, she said anticoagulation saves lives, but stressed therapy must start early. To learn which patients would benefit from more advanced therapies beyond anticoagulation, Rosovsky said patients must be risk-stratified.

For instance, patients at high risk of dying from PE are hemodynamically unstable, meaning their blood pressure is low, there is a clear strain on the heart, the right ventricle shows dysfunction, and troponin levels are elevated.

"These patients clearly need something beyond anticoagulation. They need primary reperfusion," Rosovsky indicated, referring to advanced therapies aimed at restoring blood flow through or around blocked arteries.

The next risk category is intermediate, divided into intermediate-high and intermediate-low. Patients in this group typically record normal blood pressure, but there are signs of right ventricular strain on their heart, revealed through either an echocardiogram or a CT scan, and elevated cardiac troponin levels.

"Intermediate-high is when patients have evidence of right heart strain on both of those modalities [CT/echo and troponin levels], and intermediate-low is when they have evidence of right heart strain on just one of those [modalities]," Rosovsky said. "These [intermediate-risk] patients definitely need anticoagulation, and there is a subset that may benefit from rescue reperfusion therapy."

Patients at low risk do not show problematic blood pressure levels or any evidence of heart strain. "These patients need anticoagulation and often can be discharged early," Rosovsky said.

For intermediate-risk and high-risk patients, it often is unclear what, if any, advanced therapies should be employed. Rosovsky said this is caused in part by a lack of quality comparative data, the rapid advancement of interventional tools in recent years, and conflicting guideline recommendations.

Consequently, before the implementation of the PERT at MGH "the lead patients for treatment really depended on who got called and where they were in the hospital," Rosovsky said. "There was no consistency in decision-making and there was ... no single team or acceptable algorithm. There was really no systemic way that we were evaluating our results."

All these factors figured into the creation of the first PERT, which today includes representatives from vascular medicine, emergency medicine, hematology/oncology, interventional cardiology, vascular surgery, radiology, pharmacy, interventional radiology, non-interventional cardiology, cardiac surgery, and pulmonary/critical care. Sometimes, even the patient or family members take part in a PERT call.

"Anyone in the hospital can activate the PERT if they are concerned about a patient with PE or even a patient with a suspected

severe PE," Kabrhel explains. "For example, some patients present with a likely PE, but they are too unstable to undergo imaging, and we activate a PERT."

There is a specific number used to activate PERT. That number is well publicized throughout the hospital, along with some indications for activation.

A PERT fellow, who often is an interventional cardiology, vascular medicine, or pulmonary fellow, will respond to the page, gather some basic information, and activate the rest of the multidisciplinary team by sending a group page and an email that includes a link to an online meeting.

The meetings are scheduled to take place promptly, typically within just a few minutes, to discuss the case. Further, during the conference call, participants can access a patient's imaging and lab results.

Kabrhel describes one recent case that involved a woman in the later stages of pregnancy who was beginning to contract. She was diagnosed with a large, central PE and right heart strain.

"The PERT got activated, and I was one of the people who responded," he shares. "The question was how to deal with the patient's PE in the setting of her impending delivery."

It was a difficult case because clinicians knew once the woman was in active labor, she would start to bear down, and she would ultimately become less stable.

"We knew that we couldn't do a spinal or epidural anesthetic in order to do a C-section. She needed to be on blood thinners, and that was, therefore, contraindicated," Kabrhel says. "Yet, we also knew if we were to intubate her and plan to do an operative C-section, the process of intubation acts much the same way as the process of bearing down in labor does. It [would] decrease blood flow to the heart, and there is a good chance she would code during that process."

Making the multidisciplinary PERT available enabled clinicians to evaluate all the complexities of the patient's care.

"My contribution, for example, was understanding what happens to patients when you emergently intubate them and what happens to their physiology in the setting of a large PE," Kabrhel says.

Ultimately, clinicians decided to take the patient to the cardiac surgery operating room.

She would be intubated, but only once the cardiac surgeons and the critical care intensivists were at the bedside and prepared to put her on cardiac bypass.

"We anticipated that with intubation, which we unfortunately couldn't avoid, the patient might become unstable. We prepared for that by being able to put her on bypass emergently without any delay, which could result in hypertension or brain damage," Kabrhel explains.

The event proceeded precisely as clinicians expected: The woman was intubated, she became unstable, and was placed on cardiac bypass.

"An emergency C-section took place, and the baby was delivered and is doing fine," Kabrhel reports. "The woman has since undergone a percutaneous thrombectomy with our interventional cardiology and vascular medicine team [to break up or remove the PE]."

This case is a good illustration of how multiple specialists involved with a PERT can contribute to a complex case, providing the best chance for a good outcome.

MGH has collected data to show how the PERT process has elevated care and outcomes for PE patients overall. For instance, Rosovsky shared data showing that before the implementation of PERT, the 30-day mortality rate for patients who presented to the hospital with a PE was on the rise. However, this trend reversed once PERT was implemented.[3]

Rosovsky noted other medical centers that have implemented PERT have reported positive results, too, although she acknowledged not every

EXECUTIVE SUMMARY

Emergency clinicians are adept at diagnosing and treating pulmonary embolisms (PE). In cases deemed intermediate- or high-risk, determining which treatment is best is not always clear. Innovators at Massachusetts General Hospital developed the first pulmonary embolism response team (PERT), which has since been adopted widely.

- A PERT is a multidisciplinary panel of specialists who rapidly respond to PE cases that present complex challenges to the treating clinician.
- PERTs can be activated from anywhere, but experts note 60% of PERT calls start in the emergency setting.
- Emergency physicians serve as valuable participants on PERTs, considering they diagnose and treat so many PEs.
- Studies have shown PERTs produce improved outcomes, but there is a big push to centralize data collection on PERT cases so the benefits can be documented better, and care can be optimized.

single-center study has demonstrated such positive outcomes.[4]

Address Buy-In

Are there enough resources at every facility to assemble a PERT approach? Kabrhel says roughly 30% of PERTs are in community hospitals.

"No one expects that every community hospital is going to have access to ECMO, advanced cardiac surgery, or even some of these newer catheter-based thrombectomy devices that the large academic medical centers have," Kabrhel explains. "However, a lot of PERT patients are treated with anticoagulation alone, and many receive catheter-directed thrombolysis that can be done at small hospitals."

Kabrhel adds that when creating a PERT at a small facility, it is easy to liaise with a larger hospital, either for a virtual PERT consultation or a network transfer to places with the right resources to take care of a patient. "PERT can happen anywhere, with the recognition that there will be occasional patients who need to be transferred to other academic centers," Kabrhel says.

A PERT requires an activation system; at MGH, that is as simple as a phone number. "Hospitals have these for other things. They have rapid response teams for codes, and they have STEMI teams. We just copied that."

Facilities have to activate several specialties simultaneously, but Kabrhel argues that is not complicated. "Simply sending out a Zoom link for a multidisciplinary meeting after you receive a page about it is commonplace," he explains.

What may be complicated is securing buy-in from various specialties. Some clinicians might be concerned another specialist is going to dictate how they should manage PE. "There are different approaches among different specialties in terms of what they think the optimal management of PE is. There is sometimes reluctance on the part of participants to join a [PERT] if they think they will now be going to have to adopt someone else's algorithms," Kabrhel observes.

Still, Kabrhel stresses this kind is not what PERT is about. "PERT is a process, it is not a protocol," he says. "The benefit of PERT comes from the discussion among specialists who have different opinions, different literature bases, and different biases. The ability to openly discuss the best treatment for a patient among people with whom you may not agree, I think, results in the best care."

Most often, the hurdles are about overcoming egos and achieving cooperation among people who are fearful they are going to be told what to do. In reality, everyone will be asked to give their opinions. "Focus on the fact that we want people with different opinions, and we value those different opinions," Kabrhel adds.

Engage the Patient

If there are differing opinions, how does a PERT decide which treatment is best? In most cases, PERT participants reach a consensus on how to proceed. "There are occasional cases where there are differences of opinion. In those instances, whenever it is possible, we try to leave [the decision] up to the patient," Kabrhel says. "We believe in shared decision-making."

Typically, clinicians tell the patient about treatment options, including supportive data as well as pros and cons. "In those instances when we have had patients or their families or their primary care physicians participate in the multidisciplinary call, it has always been a positive experience," Kabrhel says. "The patient realizes just how much thought and care is going in to the treatment decisions that are being made."

Over the past year, blood clots associated with COVID-19 have added another layer of complexity for clinicians, including the MGH PERT. "Initially, we were getting activated a lot because of COVID-related thromboses, and no one knew what to make of that," Kabrhel explains. "The types of patients we care for in the ED ... go from being a diversity of patients to being predominantly COVID-19 [patients], and then trickling back to something that seems a little more like normal."

Also, there has been ample debate over where and how various COVID-19-related clots originated, and how the PERT should respond. "We had to evolve just like everybody in medicine," Kabrhel says. "We certainly are still busy and active. It was ... a moving target over time."

At MGH, the PERT activates 12 to 20 times a month, with more than half those activations coming from the ED. "You probably need at least a few [activations] per month in order to inspire people to participate [in a PERT]," Kabrhel says. "[But] it may only take one patient for whom activating multidisciplinary care and facilitating access to various resources can be life-saving."

Consider New Tools

The concept of PERT is consistent and well-understood, but not all PERTs operate similarly. For instance, while a fellow takes the lead in setting multidisciplinary meetings at MGH, most PERTs begin with a call to a specific attending physician

who happens to be on call that day. "Then, [that attending physician] will activate the rest of the team," Kabrhel says.

Not every specialist will be available to respond to each PERT call. "There is enough redundancy that we always have four or five different people and specialists who respond to the call, even though it may not be the same four or five people every time," Kabrhel says.

Kabrhel regularly encourages colleagues in emergency medicine to take part in the PERT process, noting it is an enriching experience. "The idea of serving on a PERT ... is a little bit unusual," Kabrhel says. "It can be incredibly rewarding to participate in the care of these complex patients, and to provide advice and expertise that we as emergency physicians have."

Although PERTs are widespread, the PERT Consortium has collected more data from institutions on the East and West Coasts vs. other areas of the United States. **Jeffrey Kline**, MD, a professor of emergency medicine at Indiana University, says the Midwest tends to be more conservative.

"[Practitioners here] are waiting for clear evidence of effectiveness, which is lacking," Kline says, adding PERT programs probably make a large difference to a tiny number of patients.

Another reason why PERTs may be less visible in the Midwest is because there are fewer vascular medicine fellowships there, according to Kline. "These fellows often do the majority of the work in East Coast [hospitals]. That said, there is strong representation [in the PERT Consortium] from Indiana, Michigan, Nashville, and Cleveland."

Kline suggests the biggest technical issue to consider is what the role of the mechanical suction catheter, a tool he refers to as disruptive, will be going forward in the care of PE patients. "I could see 90% of clots treated with this catheter in five years," he predicts. "Emergency medicine physicians [will] still have a role because many patients are referred [to PERTs] who should not be, and they still need care, if not by the PERT." ■

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Database Designed to Drive Improvements in Pulmonary Embolism Care

In a CDC-sponsored presentation about pulmonary embolism response teams (PERT) on March 11, **Rachel Rosovsky**, MD, MPH, vice president of the PERT Consortium, acknowledged most of the data supporting the PERT concept come from single-center reports that lack prospective, controlled studies to evaluate the benefits.[1]

However, she noted PERTs are so prevalent today that it is doubtful researchers could conduct a randomized, clinical trial.

To surmount this hurdle, Rosovsky said the PERT Consortium is endeavoring to bring everyone's data together in one multicenter registry called the PERT Consortium Quality Database.[2]

"In just over two years, we have [collected data] on thousands of new patients from 33 sites across the United States," Rosovsky reported. "This is not a database of all PEs in your institutions. It is a database for whom the PERT ... was activated. These are really the sicker patients, and the patients for whom there is not really a clear-cut answer for how to treat them."

Perhaps not surprisingly, 54% of the PEs represented in the database thus far are categorized as intermediate risk, with 12% at intermediate-high and 12% at intermediate-low. She also noted that just over 50% of patients were started on anticoagulation therapy before PERT activation, a statistic that underscores an opportunity for improvement, considering the importance of early anticoagulation in cases of PE.

"The power of the database is to positively incentivize people to work together and improve outcomes," Rosovsky said. "This may be the largest modern database in the world reporting outcomes just with PE alone." ■

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U.K., U.S. Research Groups Report Progress on Objective Concussion Test

Word that a saliva test can accurately identify whether an individual has sustained a concussion has created quite a buzz in recent weeks. The news comes from scientists at the University of Birmingham in the United Kingdom who studied saliva samples from some of the top rugby players in the country over the course of two seasons.[1]

Researchers compared saliva samples taken during the preseason with samples taken from players undergoing standard head injury assessments during regular season play. They also studied saliva samples taken from players assessed for injuries affecting other parts of the body.

They found specific micro RNAs or biomarkers in the saliva leave a distinctive signature for concussion, accurately identifying the players who were diagnosed with concussions with 94% accuracy.

Much of the discussion surrounding these findings has focused on how a saliva test could help sports coaches quickly determine when it is safe for athletes to safely return to active play following a blow to the head. Beyond the playing field, such a test would provide an important new tool to frontline providers in their assessments of patients who present to medical facilities with head injuries.

"Right now in the ED, we still don't have a completely objective tool for diagnosing concussion," explains **Steven Hicks**, MD, PhD, clinical director of the pediatric clinical research office at Penn State Health. "Imaging just helps you identify if [a patient is suffering from] a severe TBI [traumatic brain injury]."

Consequently, emergency clinicians must rely on largely subjective assessments and feedback from the patient. Particularly in the case of an athlete or student who wants to resume actively participating in sports, this type of feedback may not be entirely reliable.

That is why an objective measure could be critical in confirming or ruling out a concussion, a valuable supplement to subjective assessments and head injury protocols already in place. "You could potentially run a saliva sample or a blood sample, if someone replicates this work in blood, and have a supporting, objective answer within an hour or so of seeing a patient," Hicks observes.

Consider Gender

The test out of the United Kingdom has received considerable attention, but the saliva-based test that Hicks and colleagues have been developing in the states for concussion works in a similar fashion.

"In terms of the technology used to measure the molecules in saliva, [the two tests] are pretty much the same," he says. "The difference is the exact markers within each of our panels."

Further, Hicks notes the U.K. researchers looked specifically at male athletes, so the results of their study are not generalizable to other populations yet. Conversely, in a study of their saliva test published in October 2020, Hicks and colleagues included a wider range of participants in terms of age, gender, and occupation. For instance, some participants had experienced military-related head trauma.[2]

"We were able to use the same algorithm to differentiate the concussed and the non-concussed participants in our study, whether they were male or female," Hicks says. "Knowing how concussions can affect women differently than men — it is really important to ensure that your test works in both sexes."

One strength of the U.K. study was the inclusion of a control group comprised of rugby athletes who had been hit in the head but were cleared through concussion exams and protocols. "A lot of studies out there will just use healthy controls," Hicks notes. "I think that is one of the things that study did nicely that is likely to move the field forward."

Expedite Results

Where do these saliva tests stand now? Hicks and colleagues received a large grant from the National

Institutes of Health to validate the findings they published last year.[3] "It is a three-year grant. It is specifically to develop a CLIA [Clinical Laboratory Improvement Amendments]-approved test," Hicks says. "Our hope is to that within three years, we can develop an objective, saliva-based test for concussion. I think the group in the U.K. is probably working along a similar timeline." To make such a test practical and useful in the clinical setting and for coaches on the playing field, technology must be developed to analyze the saliva samples quickly. Hicks explains he and colleagues are already working with engineers at the Penn State College of Medicine to produce portable technology capable of meeting this need.

The U.K. research group is reportedly planning to submit a saliva test for use in hospital settings for FDA approval soon, although a precise timeline is unclear.[4] The U.K. researchers also indicate they are conducting research with female athletes to see if the same test is effective at identifying concussion in women, or whether modifications are needed to produce a consistent level of accuracy.[5] ■

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Use State-Level Policy to Drive Rapid Changes in Opioid Use Disorder Treatment

Recognizing that EDs are uniquely positioned to engage patients with opioid use disorder (OUD) into effective treatment, Pennsylvania officials decided to test whether financial incentives would be enough to nudge hospitals to facilitate stronger action.

In 2019, the Pennsylvania Department of Human Services created the Opioid Hospital Quality Improvement Program (O-HQIP). Hospitals were given the opportunity to receive incentive payments if they adopted practice changes aimed at increasing the rate of follow-up treatment for Medicaid patients within seven days of an ED visit for OUD.

Under the voluntary O-HQIP, hospitals could receive incentive payments based on their implementation of four specific treatment pathways: initiation of buprenorphine treatment during the ED encounter, a warm handoff to outpatient treatment providers, referral to treatment for pregnant mothers, and inpatient initiation of buprenorphine or methadone treatment.

Hospitals implementing all four pathways received full incentive payments ($193,000), while hospitals

that chose to implement three or fewer of the pathways received smaller payments ($25,000 to $108,000).

It is the first state-level, voluntary incentive program aimed at getting patients with OUD connected with appropriate care, and further steps are needed to gauge whether the program is ultimately successful. Early reports suggest higher-level policy-making may offer a valid approach for pushing practice change at the hospital/ED level, particularly when managed in a way that is synergistic with other quality improvement efforts by researchers and frontline clinicians.

Identify Barriers

Seeking to understand the effect of the incentives, investigators from the Perelman School of Medicine at the University of Pennsylvania spoke with hospital leaders from across the state to understand why they did or did not participant in the program. Researchers wanted to learn what barriers continue to prevent certain hospitals from implementing some or all of the identified pathways.[1]

In terms of overall participation, researchers consider O-HQIP a success, as at least 80% of the hospitals in the state chose to implement at least one of the designated pathways, explains **Austin Kilaru**, MD, MSHP, lead author of this research.

"Certainly, there is a great deal of interest among hospitals and EDs in developing a system to provide warm handoffs," he says.

Still, Kilaru and colleagues found many of the hospitals were reluctant to initiate buprenorphine treatment during an ED encounter, citing resource or operational barriers. "It was just harder for some of the hospitals to want to undergo the changes necessary, and to justify those changes based on the volume of the patients they were seeing," observes Kilaru, a fellow at the Center for Emergency Care and Policy Research at the Perelman School of Medicine.

Further, some physicians were reluctant to prescribe buprenorphine because they were uncertain whether patients would continue with their treatment once they left the ED.

"There was the barrier of starting the medicine without knowing ultimately what the subsequent [treatment] destination of the patient would be," Kilaru shares. "That issue was somewhat mitigated by the other pathways [focused] on creating partnerships between EDs and external facilities. The stronger those partnerships became between the ED and long-term treatment [providers], EDs were more willing to adopt that pathway."

> THE INCENTIVES WERE ENOUGH TO PROMPT HOSPITALS TO PUT SYSTEMS IN PLACE DIRECTED TOWARD CONNECTING OUD PATIENTS WITH EFFECTIVE TREATMENT.

In speaking with hospital leaders, Kilaru and colleagues also heard a lot about stigma attached to prescribing buprenorphine. "There was the thought that EDs are not necessarily in the business of prescribing chronic medications for patients. Some EDs didn't want to become a place where this kind of treatment was available," Kilaru relates.

While some hospital representatives raised the issue of stigma, barriers related to operational training and management issues were cited more frequently when discussing why they declined to implement one or more of the treatment pathways.

Form Partnerships

Interestingly, payments aligned with implementation of the treatment pathways were a single, one-time process incentive designed to motivate hospitals around the state to think about how to deliver care for patients with OUD.

"The overall goal of this program is to get as many people to treatment after an ED visit for OUD as possible," Kilaru says. "The pathways themselves were stepping stones or guidelines for ways of doing that ... but [going forward], hospitals are being incentivized from year to year for improvement, regardless of the pathways."

To be more specific, the more patients who are afforded treatment following an ED visit for OUD, the better hospitals will fare in terms of incentive payments.

"It is more about the rate of follow-up encounters. Prescriptions for buprenorphine are one of the things that the state is looking for in terms of counting that rate, but the pathways were a way of launching the whole program," Kilaru explains.

Still, it is clear the modest pathway-aligned incentives were enough to prompt hospitals to put

systems in place directed toward connecting OUD patients to effective treatment. One of the big lessons was the importance of engaging with external partners.

"We found that a lot of the hospitals that implemented pathways ... really tried to strengthen that linkage [with a community treatment provider] so they could communicate in real time when there was a patient in the ED who would need follow-up care," Kilaru says.

Another key lesson was the value offered by peer recovery specialists. These were personnel often engaged by community providers. In some cases, they would come to the ED when a patient there required OUD treatment.

"That [peer recovery specialist] navigating and solving issues over time was seen as really instrumental in getting these patients into care, and motivating patients to get into care as well," Kilaru notes.

Now that hospitals and EDs are incentivized on annual performance improvements, it remains to be seen whether the O-HQIP will make a serious dent in moving more patients with OUD into treatment and reducing overdose deaths.

However, Kilaru notes this is one example of how higher-level policy can prompt rapid practice change while also "giving [clinicians and administrators] the flexibility to do what works best for them at their own hospital." ■

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RESOURCES

- Fiscal year 2019-2020 opioid use disorder (OUD) quality improvement program statewide results. https://bit.ly/3tKeaYD
- Hospital quality improvement program frequently asked questions. https://bit.ly/2Pj0vck

COVID-19 Pandemic Put Pioneering Capacity Command Center to the Test

No knew the world would be in the grips of COVID-19 in 2016. That is when Johns Hopkins Hospital unveiled a first-of-its-kind Capacity Command Center (CCC), a high-tech control room designed to apply all the latest analytical tools to bed management, patient transfers, and surge planning.

Built in collaboration with GE Healthcare, CCC leaders have spent the last five years working around the clock to optimize patient flow and anticipate any potential bottlenecks. But there is no question the concept has been put to the test by pandemic conditions. How did it fare?

By March 1, 2021, administrators reported the CCC managed the transfer of 659 patients with COVID-19 to and from hospitals in the Johns Hopkins Health System. Another 877 patients with the virus were transferred internally within Johns Hopkins Hospital. In each case, there were no reported patient-to-staff virus transmissions.

Safe transfers are a key responsibility of the more than two dozen staff members who work the CCC 24 hours a day, but this only represents a slice of what the CCC is all about.

To find out more about how the concept performed in the most harrowing of years, *ED Management*

connected with **Anna Ye**, MHA, assistant administrator of the office of capacity management, the leadership team of the CCC.

Accelerate the Pace

Not surprisingly, Ye says the hospital was fortunate the CCC had been running for several years before the pandemic hit.

"We maintained normal operations as we worked," she says. "We didn't have to alter much about how we were operating to manage the volume, understand the changes that were happening, and how to respond to them."

However, that does not mean there have not been challenges. For example, Ye notes the pace for decision-making had to accelerate, beginning with the initial patient surge in April 2020.

"The office of capacity management was heavily involved with the leadership team of the hospital to try to anticipate the creation of spaces needed to take care of our patients, especially those with COVID-19," Ye explains. "Having the [CCC] gave us the ability to use these systems engineering tools that we have at our disposal, tools like predictive modeling and real-time analytics, to help us make those quick strategic decisions."

During the rapid influx of patients in spring 2020, CCC staff members were devising ways to create new COVID-19 units every week.

"We used epidemiological modeling to try to anticipate what the demand [would be]. Based off of that, we created a surge plan of how many COVID-19 patients we might see in the coming weeks," Ye shares. "We tried to stay at least two weeks ahead, but we could plan even a little bit further ahead."

Such plans would include provisions for how the hospital would respond to various levels of demand. As soon as one hospital unit was turned into a strictly COVID-19 unit, CCC staff members were thinking about how they would flip the next unit.

Boost Communications

The CCC remained the center of gravity for all clinical operations within the hospital. But Ye notes that with COVID-19, it quickly became clear there was a need for new avenues of communications.

Not only was it vital to keep the hospital's leadership team connected and involved, it was important to maintain the transparency of decisions made at the executive level. Thus, the CCC began to host daily leadership briefings. "At the beginning of the pandemic, we were actually having [these briefings] twice a day, but now we have gone to a daily cadence, [including] 50 to 100 leaders across the hospital," Ye explains. "This is where any new therapeutics or new guidance from the CDC can be brought up and discussed at a leadership level, and where quick decisions can be made."

The briefings have enabled the CCC to act faster and to stay on top of any changing needs or directives. For example, it became clear that long waits for COVID-19 test results for patients presenting to the ED were a significant drag on hospital throughput. CCC leadership seized on the opportunity to bring in the equipment necessary to provide point-of-care testing in the ED, a step several physicians had been pushing administrators to take before the pandemic.

"Once we put in the point-of-care testing and also put in some automatic orders to get the testing done from the nursing perspective, that really helped push our throughput and allowed us to deal with some of the isolation concerns [with respect to patients with suspected COVID-19] a little bit more easily within the ED," Ye says.

The approach has eliminated the time it used to take for specimens to be transported to the hospital's

central lab for processing. Test results are expedited. "This was a big project. A lot of different people were involved, but it has been a huge success," Ye adds.

Beyond leadership briefings, the CCC stays in close contact with the ED all day, every day.

"We have our bed management staff in the CCC, and a lot of our admissions come through the ED. They are in constant communication about what operations look like in the ED and how they might affect the rest of the hospital," Ye says.

Typically, when the ED decides a patient needs to be admitted, the bed managers in the CCC will receive an alert to look for a bed for that patient.

"If there is a disagreement with the service line or the level of care, [the bed managers] will communicate with the clinicians in the ED to determine what the best placement for the patient might be," Ye says. "Often, this goes without a hitch, but if there is any escalation needed, that is when the attendings will come into play."

Leverage Protocols

Before the pandemic, the CCC was working to ensure patients who present to the ED with mental health concerns or substance use disorders received prompt, appropriate, and safe care, and that approach has continued. However, as a systemwide strategy, added provisions have been put in place for patients in this population who also have COVID-19.

"We created a special [psychiatric] unit at one of our hospitals where we would transfer any patients from across the entire health system if they became COVID-19-positive at any point," Ye explains. "That eased any isolation concerns while also making sure those patients receive the best care."

The CCC has a range of procedures and protocols in place for when the hospital hits high occupancy levels, all of which were employed during surges of COVID-19 patients. These included building new ICU-level care units, working with the hospital medicine team to discharge as many patients from the floor as possible to improve throughput, and helping the ED with extra beds and linens.

Ye acknowledges the demand for ICU beds proved particularly challenging. This prompted capacity management leadership to create a new role in the CCC called the Hopkins triage and integration physician, a position designed to help with triage, but especially regarding ICU-level care.

"Since the ICU was such a bottleneck for us, we needed to make sure that appropriate patients were placed in our ICU beds," Ye explains. "This was definitely a new lesson for us, and something we will continue using going forward. Having a physician in the CCC helping to triage patients has been really beneficial."

Since the debut of the CCC, other medical centers have jumped into the space, creating command centers of their own, often with the guidance or assistance of the pioneers at Johns Hopkins. "Before the pandemic, we were doing one to two tours [of the CCC] every week," Ye observes. "We are happy to share everything we have learned ... with anyone who will listen."

Johns Hopkins is hoping to learn from the new entries into the space, too.

Adds Ye, "We have been able to create an ecosystem of others who share the same mindset and some of the same challenges that we have now." ■

CME/CE OBJECTIVES

After completing this activity, participants will be able to:

1. Apply new information about various approaches to ED management;
2. Discuss how developments in the regulatory arena apply to the ED setting;
3. Implement managerial procedures suggested by your peers in the publication.

COMING IN FUTURE MONTHS

- An alternative to ED discharge for COVID-19 patients identified with added social or medical risks
- A pathway toward improved diagnostic accuracy
- Help for EMS providers struggling under the weight of pandemic-related stressors
- Emergency nurses and combatting firearms-related injuries

CME/CE INSTRUCTIONS

To earn credit for this activity, please follow these instructions:

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CME/CE QUESTIONS

1. **During the height of the COVID-19 pandemic, demand for ICU beds proved challenging at Johns Hopkins Hospital in Baltimore. This prompted capacity management leadership to create a new role in the hospital's Capacity Command Center called the Hopkins:**

   a. triage and integration physician.
   b. nurse specialist in charge of critical care management.
   c. analytics manager for higher-level care.
   d. clinical logistics coordinator.

2. **When comparing saliva samples taken from rugby players during the preseason with samples taken from the players undergoing standard head injury assessments during regular season play, researchers from the United Kingdom reported specific micro RNAs or biomarkers in the saliva leave a distinctive signature for:**

   a. brain bleeds.
   b. concussion.
   c. pulmonary embolism.
   d. migraine.

3. **Researchers assessing the effect of Pennsylvania's Opioid Hospital Quality Improvement Program reported the program demonstrates how higher-level policy can offer the hospital flexibility and can prompt:**

   a. productivity improvements.
   b. reductions in medical errors.
   c. rapid practice change.
   d. Lean-driven improvement.

4. **Activations of pulmonary embolism response teams come from the ED about what percentage of the time?**

   a. 30%
   b. 40%
   c. 50%
   d. 60%

ED ACCREDITATION UPDATE
COVERING COMPLIANCE WITH JOINT COMMISSION STANDARDS

The Healing Process for Healthcare Workers Exposed to Workplace Violence

The Occupational Safety and Health Administration reports roughly three-quarters of all workplace violence incidents occur in healthcare settings.[1] Further, EDs are consistently found to be among the most common sites of workplace violence in healthcare.[2-4]

Beefed-up security and other safety measures are critical to keeping healthcare workers and patients safe from this violence. But research suggests there are other important steps organizations can take to help those who have been exposed to on-the-job violence.

Investigators reported well-organized systems of peer support can be marshaled to help those who may be experiencing stress and anxiety following a workplace violence episode.[5]

Administrators of the forYOU program at the University of Missouri Health Care report they began seeing an increase in referrals for peer support related to workplace violence about five years ago, and the trend has been accelerating of late. Between 2009 and 2019, investigators reported 9% of the peer support interventions were related to workplace violence. However, looking at just the 2018-2019 period, 20% of the interventions were related to workplace violence.

The health system has learned several lessons along the way regarding the importance of providing peer support to healthcare workers affected by workplace violence. Leaders also learned how to respond most effectively to individuals who are suffering emotionally from their exposure to such incidents.

Susan Scott, PhD, RN, CPPS, FAAN, a nurse scientist and associate professor at the University of Missouri Health Care, says the forYOU program's expansion into cases involving workplace violence was organic, as calls for peer support assistance relating to such incidents began to increase. Fortunately, administrators discovered the intervention is generalizable to many different types of incidents.

> WELL-ORGANIZED SYSTEMS OF PEER SUPPORT CAN BE MARSHALED TO HELP THOSE WHO MAY BE EXPERIENCING STRESS AND ANXIETY FOLLOWING A WORKPLACE VIOLENCE EPISODE.

"When the [forYOU] team first started, we were kind of looking at adverse events related to medical errors. Quickly, even before the team was deployed, we expanded that scope to include unanticipated clinical events without any type of medical error," Scott relates. "Then, we expanded again to tragic clinician losses — the loss of a co-worker or death of a co-worker, and workplace violence. Now, we are also offering COVID-related support."

While such interventions can be helpful, the efficacy often depends heavily on who is providing the peer support.

"The main key is to pick the right supporters to serve their co-workers," Scott stresses.

She advises colleagues to look for individuals with a natural, empathic presence, people who are nurturers.

"[We] ask local leadership to identify individuals who have very high emotional intelligence," Scott says.

To be more precise, Scott will ask leaders to think about those who offer a supportive presence when the department is very swamped with patients. "These individuals tend to be natural confidants for their peers;

they hold their confidence and people trust them. These are the kind of people we try to recruit for the [forYOU] team," Scott says.

Initially, forYOU administrators looked for physicians and nurses to serve as voluntary peer supporters, but they quickly realized the need for a multidisciplinary team.

"There are a lot of individuals within the healthcare environment who can also experience exposures to emotionally challenging ... events that need support," Scott notes.

For example, she says about 20% of the support offered through the forYOU program goes to non-allied health-trained individuals (e.g., environmental services workers, interpreters, security guards, and many others).

"It is important that you have mechanisms in place so that you can address any of those types of individuals [as well as clinicians]," Scott adds.

Determining the right number of peer supporters to put on a unit depends, in part, on how many second victim incidents have been reported in the area in the last year and whether the individuals reporting such experiences received emotional support from someone within the organization following the experience. This information is derived from culture surveys the healthcare organization collects on a regular basis.

Once peer supporter candidates are nominated and selected, they go through a training course through which they learn about what people experience when they go through a clinically challenging event. Candidates also learn about typical healing patterns so they can intervene at different stages.

"They also learn about partnering and having conversations with individuals in crisis, how to offer a supportive presence," Scott explains.

Developers of the forYOU approach realized quickly they would need to provide multiple ways to identify people who could benefit from peer support.

"Only about 15% of healthcare workers will ask for help on their own behalf. As healthcare workers, we are very good at helping people, but we are very poor at [requesting assistance]," Scott observes.

Consequently, while the program provides multiple modes of contact people can use to contact the forYOU team, it also relies heavily on local leaders to let them know when intervention might be helpful. "They are the ones who can identify when something goes wrong and to holistically think about who could be involved," Scott says.

For example, when there is a mass casualty event, a local leader might identify not just the clinicians involved in caring for the patients, but also an environmental services worker who he discovered crying in the locker room after cleaning up after the event. "He would reach out to the forYOU team on behalf of the care team members," Scott explains.

Another way the program monitors for opportunities to intervene is through the active surveillance efforts of the trained peer supporters. For instance, during shift report, a peer supporter might hear about a mass casualty event that happened the night before.

"That is when the antenna of the peer supporter would be peaked," Scott says. "The peer supporter would want to know who was involved ... and then to proactively reach out to those folks to make sure they are doing OK."

Healthcare workers who have benefitted from the intervention are telling forYOU program managers about other colleagues who are

EXECUTIVE SUMMARY

Research suggests peer support programs that may have been developed to support clinicians following an adverse event or medical error also be leveraged to help those suffering from stress, anxiety, or other emotional difficulties following incidents of workplace violence. Administrators of the forYOU program at the University of Missouri Health Care have found the intervention is generalizable to many types of circumstances.

- Between 2009 and 2019, investigators reported 9% of forYOU program interventions were related to workplace violence. However, between 2018 and 2019, 20% of the interventions were related to workplace violence.
- Experts note the key to the success of this initiative is choosing the right people to serve as peer supporters — those who can provide an empathic presence.
- The forYOU program relies on local leaders to identify peer supporters; then, candidates undergo training to learn about what people experience when they go through a clinically challenging event, and how to engage in conversations with individuals in crisis.
- Leaders across the healthcare organization must learn about the program and regularly engage with the peer support team.

hurting. In some cases, these workers will suggest it might help for these hurting workers to talk to someone on the forYOU team.

"The whole culture is evolving into more of a nurturing, caring-for-our-workers mentality," Scott says. "I think that has been heightened with COVID."

Prioritize Connections

Finding the time in a busy work environment is challenging, but Scott stresses peer supporters have become creative in finding opportunities to connect with those in need.

"Our average peer support conversation is only 22 minutes, so it is just a little bit longer than the average break might be for people," she explains. "I know average breaks are few and far between, but people make it work."

Sometimes, supervisors will cover a little bit extra, or they might enable a staff member to take lunch at the same time as the peer supporter.

"Prior to COVID, we did almost everything face to face. There were very few virtual, over-the-phone or text messages," Scott recalls. "Now that COVID is here, we are doing a few more [interactions] virtually than face to face. Those seem to be working OK ... peer supporters just make them happen."

Healthcare personnel who experience physical injuries as a result of workplace violence will be treated for those injuries first. Then, their care will be complemented with emotional support. However, Scott notes about half of employees exposed to workplace violence will suffer from emotional injuries that are, in some ways, harder to treat because there are no obvious bites or scratches.

"The emotional harm you can't really see, and that is why peer support is so helpful in these particular cases," Scott says.

In about 13% of cases, workers will require help beyond what the peer supporter can provide. In these cases, there is an escalated process that makes additional mental health resources available.

Spread the Word

Staci Walters, MSN, RN, CNL, CPPS, spent many years as an ED nurse, where she witnessed the effects of workplace violence. "I can think of one specific time when a very experienced nurse was taking care of a teenaged psychiatric patient, and the nurse suffered a significant injury. She really thought she was trying to help the person, and [the assault] came out of the blue," recalls Walters, who now works as a risk management and claims consultant for Healthcare Services Group in Jefferson City, MO.

The nurse said she would deal with it on her own, but as the nurse's manager, Walters now believes she should have advocated for more involvement with the forYOU team.

"It wasn't until I really stepped into a patient safety position and had official training with the forYOU team that I realized how much I should have pushed for it as a department leader," she says.

Today, Walters considers it fundamental to educate all healthcare supervisors about the program and encourage their involvement with peer support teams.

"Frontline supervisors need to know what it is, and managers and directors need to not only be supportive, but also encouraging [personnel] to reach out to [peer supporters]."

Such advocacy should extend to making sure a manager's own department is adequately represented by peer supporters.

"Education to the entire staff [is important]," she says. "They have to know that [peer support] is available, and that it is not just for the extraordinary cases. It is for the everyday cases that can build on each other."

Echoing Scott's sentiments, Walters emphasizes that for an initiative to work, leaders must

recruit the right peer supporters. This goes beyond only offering an opportunity for career advancement in exchange for participation, which might not attract those best suited for the role.

"Some people have the innate ability to be good peer supporters. I think for a peer support system to work in the ED, the people almost have to be hand-selected. Managers and supervisors know who those natural nurturers are," Walters says.

Walters says some of the best peer supporters are those who have been on the receiving end of such encouragement in the past.

"They recognize that it helped them through an event, and maybe several events in a row," she says. "They are able to take some of those tools [that they learned] and pass them on to the people who they support."

In an ED, it is especially important to include EMS professionals as part of the peer support group. "Recognize that there is a lot of shared experience," Walters adds.

Administrators interested in establishing a peer support program should delve into the second victim experience to ensure they have a thorough understanding of what the impact can be. "Awareness is the first intervention," Scott says. "As humans, we have some very predictable responses to stress. If [leaders] can understand that, they can understand there are some key clinical events that could evoke a second victim response."

Next, start proactively gauging the interest in developing a peer support program. Leaders might be surprised at the response. "What I have found is that when one person is interested in helping to develop a program like this, there is almost a groundswell of people who want to help you, and a lot of them are newer graduates," Scott says.

Finally, engage a key executive champion who appreciates the value of an established peer support system.

"Let's normalize this so that we have something in place, and we don't have to piecemeal it with each crisis that happens to come up," Scott says. ■

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