

In a busy hospital emergency department such as that of St. David's South Austin Hospital, a part of St. David's HealthCare in Austin, Texas, U.S., it is a race against time to diagnose acute coronary syndrome. Shearing unprecedented time off the diagnostic process contributes to faster, more appropriate therapy, better asset utilization and lower costs. Most importantly – it saves lives.

By Diana Smith

# Rush Hour

'Time is muscle' is a common adage among cardiologists, referring to the critical moments after a myocardial infarction (MI), or heart attack, when even minutes without intervention can translate into muscle damage. However, not all patients present to emergency departments with obvious MI symptoms. For these patients, the need to rapidly determine if a heart attack has occurred, obviously, is critical. Yet evaluation can be a clinical challenge when blood must be sent to a busy cen-

tral hospital laboratory where even immediate tests can take an hour or more.

"Time is very much a factor in acute coronary syndrome [ACS]," says Steve Berkowitz, MD, Chief Medical Officer of St. David's South Austin Hospital, a member of the St. David's HealthCare system in central Texas. "When that coronary artery is blocked, the heart doesn't receive blood flow to itself and it will fail as a pump in a course that would have dire consequences to the patient. The bottom line: Mortality improves when we can intervene faster, so that is our fundamental goal."

In an effort to speed up this critical time between diagnosis and treatment, administrators at the 252-bed facility turned



to Siemens Healthcare Diagnostics for cutting-edge technology that has transformed the way the Emergency Department delivers care for patients who arrive with atypical heart attack symptoms. The Stratus® CS Acute Care™ Diagnostic System with high-sensitivity assay capability has dramatically improved the time it takes to arrive at a diagnosis for patients with atypical symptoms, according to Berkowitz.

### **Increased Demand**

In Austin, the fourth-largest city in Texas, roughly the size of San Francisco, the St. David's Emergency Department is one of the busiest in town, seeing more than 60,000 patients each year. Located south of the Colorado River in the self-pro-

claimed 'Live Music Capital of the World,' the hospital is a certified Chest Pain Center accredited by the Society for Chest Pain Centers.

Built in 1982, St. David's South Austin Hospital completed a US\$50 million expansion project in 2004. Today, its 42-bed Emergency Department is divided into three areas of care: cardiac, examination, and fast track. "On average, we see 160 to 180 patients and admit 30 to 40 in a 24-hour period," says Renee Buhman, RN, the Emergency Department's educator.

Buhman credits specially trained staff and advanced technology for much of the hospital's success in dealing with cardiac cases. "With a high volume of patients in general, there is always the potential for

a higher number of acute care patients like those presenting with chest pain or other cardiac complaints. When we can determine whether the patient does or does not have an acute cardiac event, the appropriate diagnosis can be made. Siemens point-of-care cardiac technology gets us this information fast."

### **The Role of Cardiac Marker Testing**

"In an emergency setting, speed is critical for patients who have electrocardiographic signs of a heart attack, referred to as ST-elevation myocardial infarction, or STEMI. These patients require immediate attention," Berkowitz says. "They are very sick people, and we take them directly to the catheterization lab for inva-

## Summary

### Challenge:

- Reduce amount of time for cardiac biomarker test results for quicker diagnosis of patients with atypical MI symptoms
- Improve management of chest pain patients in the emergency department
- Implement protocol that results in proven efficiency to allow better reimbursement under pay-for-performance system

### Solution:

- Initiate point-of-care biomarker testing using the Stratus CS Acute Care Diagnostic System from Siemens Healthcare Diagnostics right in the ED
- Establish a protocol for the use of the systems that allows for best patient care and clinical workflow
- Educate physicians, nurses, and laboratory personnel about the benefits of point-of-care testing

### Result<sup>1</sup>:

- Dramatic time savings on test results (troponin and other cardiac biomarker test results available in only 14 to 17 minutes)
- Earlier diagnoses lead to earlier intervention (70 percent reduction in time from 'door to PCI')
- 56 percent reduction in admissions for low-risk chest pain patients
- Faster turnover of ED beds, reduction of unnecessary procedures, lowered length of stay, and fewer readmissions of cardiac patients
- Better patient care
- Organized, efficient use of clinicians' time and hospital's resources
- Improved reimbursement

<sup>1</sup> Results may vary. Data on file.



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Steve Berkowitz, MD,  
Chief Medical Officer,  
South Austin Hospital,  
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sive treatment as quickly as possible. It's almost like Monopoly – do not pass Go; do not collect 200 Dollars; go right to the cath lab.”

According to the Chief Medical Officer, the situation becomes trickier when people do not have 'typical' symptoms – severe, crushing chest pain “like an elephant standing on your chest,” pain radiating down the arm, severe shortness of breath, nausea, vomiting, and sweating. “As many as half of patients don't have the typical textbook symptoms,” he reports. “And time is just as critical for those people as it is for those who have an established heart attack on the electrocardiogram.”

In these non-STEMI (NSTEMI) cases, standard protocols call for cardiac biochemi-

cal marker testing, which requires that blood be drawn and evaluated for chemical indicators that show whether a heart attack has occurred. These typically include a troponin test, which may be ordered along with other cardiac biomarkers, such as CK-MB, which in high concentrations indicates long-term damage of the heart muscle, or myoglobin. “Elevated troponin is a good indicator of heart attack, because when heart cells die, they release troponin into the bloodstream,” explains Berkowitz.

### Quickened Response

“In the past, it was necessary to send blood specimens to the lab for testing,” adds Buhman. “We would get results back in 30 to 45 minutes minimum.” Now, St. David's South Austin Hospital has turned that number upside down, typically getting results in only 14 to 17 minutes.

The reason? Three years ago, the hospital implemented four Stratus CS Acute Care Diagnostic Systems from Siemens right in the Emergency Department to run the blood assay tests, saving precious time for patients. With its high sensitivity<sup>2</sup> troponin test method, proximity at the point of emergency patient care, and quick test turnaround times, the Stratus CS systems' protocol translated into meaningful results for patients. Cardiac biochemical marker results are delivered in mere minutes, not the standard one-hour 'vein to brain' timeframe recommended by many international medical organizations.

“With reduced time to decision, we are able to initiate therapies much more quickly. Those extra minutes of time can be the difference of life or death for a patient with heart disease,” says Berkowitz.

Further, getting results faster provides some relief on an emotional level, explains Buhman. Chest pain patients frequently are anxious, she says. “If we find their cardiac biomarkers are indicating an acute cardiac condition, we can let the patient know quickly and

<sup>2</sup> Defined by the ESC/ACC/AHA/WHF committee as an imprecision level of ≤10 percent at the 99th percentile of normal.

# Integrated Technology: Helping Transform U.S. Healthcare

Today, hospitals in the U.S. are facing immense pressure to provide more efficient and higher quality healthcare while reducing costs. Increasingly, reimbursement is linked directly to a hospital's clinical performance.

Sandra Sieck, RN, President of Sieck Healthcare Consulting in Mobile, Alabama, a top expert on healthcare business reform, has worked with more than 2,000 hospitals across the country to optimize clinical and financial outcomes. According to Sieck, though U.S. per capita spending on healthcare substantially outpaces European countries, the U.S. fails to achieve better health outcomes, and has been shown in multiple studies to be last on dimensions of access, patient safety, efficiency, and equity. Patients and payers alike are demanding fundamental, widespread change. Advanced integrated technology is helping lead the way.

## American versus European Models

Per capita spending in the U.S. is higher than in Europe, largely because of differences in disease prevalence. The U.S. takes a more aggressive approach to detecting and treating patients, yet data shows that Americans are in poorer health, with higher rates of serious chronic illnesses.

## Reimbursement Challenges

The U.S. multipayer system also presents financial challenges, explains Sieck. "With its multiple rules, forms, and procedures, it costs an estimated 20 to 30 percent of the total healthcare expenditure, in contrast to only ten percent in Canada and some European countries," she says. "Today, in the U.S., we're seeing increasing expenditures and expanding federal benefits to cover a growing beneficiary population, Baby Boomers and Baby Loomers [babies born in the 70s]. As a self-funded government payer, CMS [Centers for Medicare and Medicaid Services], the federal agency that operates the Medicare program, has only two

choices: raise taxes to cover waste or eliminate waste, such as excessive treatment times, unnecessary resource utilization, and unnecessary hospitalizations."

As a result, CMS is seeking widespread transformation of the U.S. healthcare system and is using reimbursement as a major impetus for change. In 2007, the Secretary of Health and Human Services delivered a report to Congress suggesting ways to transform Medicare from a passive payer to an active purchaser of high-quality, efficient healthcare. That plan includes value-based purchasing, which links payment more directly to the quality of care and rewards providers who supply it.

## The Future of U.S. Healthcare

Value-based purchasing demands that identified patient populations receive specific medical and clinical tests and treatment in accordance with professionally recognized standards of healthcare to assure full CMS market basket reimbursement. Hospitals must have:

- Better asset or resource utilization – omit waste
- Optimized decision times – fast, accurate test results that facilitate timely treatment decisions
- Shorter lengths of stay – reduce stays, but not being so lean that hospitals face compliance issues or negative patient outcomes

There is no easy answer for improved clinical and financial success, but advanced, integrated technology is a key component to providing more efficient and higher-quality healthcare. Combination testing using advanced technology, such as the integration of laboratory, IT, and imaging, help ensure better data for treatment decisions and improves cost-effectiveness through improved clinical workflow. Patients and hospitals alike benefit from better quality and maximized efficiency; hospitals can increase reimbursement.

begin treatment. When biomarkers and the ECG are negative, we can let those patients know their condition does not show an acute cardiac condition at that time. We decrease patient anxiety by letting them know if they have an acute cardiac event going on or not. Information gives patients back the control they feel has been lost."

St. David's South Austin Hospital and a second hospital in the St. David's system are the only facilities in Austin using the Stratus CS systems to deliver rapid results for the diagnosis of a cardiac event in NSTEMI patients. From 2003 to 2007, the number of NSTEMI patients in the Emergency Department increased by 68 percent. Yet, the hospital has seen a 70 per-

cent reduction in time from 'door to PCI' (time the patient came through the door to percutaneous coronary intervention). Additionally, the hospital has realized a 56 percent reduction in admissions for low-risk chest pain patients. Besides improving the speed of appropriate patient therapy, Berkowitz and Buhman credit the state-of-the-art tech-



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Renee Buhman, RN, Educator, Emergency Department,  
South Austin Hospital, St. David's HealthCare, Austin, TX, USA

nology for helping increase numerous efficiencies in the hospital. These include, for example, faster turnover of Emergency Department beds, reduction of unnecessary procedures, appropriate use of telemetry beds, lowered length of stay, and fewer readmissions of cardiac patients.<sup>3</sup> Additionally, the hospital has seen reimbursement improvements, according to Buhman. “There is a better chance of appropriate reimbursement when evidence supporting the physician diagnosis and assigned treatment is in black and white. The elevation in cardiac markers provides just that in ACS/chest pain patients.”

### Synchronized Effort

“The protocol would have never worked without the buy-in of our chief pathologist, laboratory department, and emergency nurses,” says Berkowitz. “With CLIA [Clinical Laboratory Improvements Amendments] licensing at stake, there were concerns from the lab, which wanted to be sure the tests were performed and analyzed correctly.” He con-

tinues, “Intuitively, we wanted to get the test done as fast as we could, which meant the ED nurses, not laboratory personnel, would be responsible for performing the tests. When the nurses saw how the timeliness would improve patient care, they committed to learning how to perform the tests.” Now, about 60 nurses are trained to use the analyzer, which translates into direct time savings and faster intervention.

The Stratus CS Acute Care Diagnostic System is uniquely designed for use in an acute care setting. Small in size, the analyzer can be configured as both a bench-top or stand-alone workstation, with its own lightweight cart, refrigerator, and uninterrupted power supply. This is what St. David's South Austin Hospital uses.

“We had the choice of going with a competitor's handheld device or the Siemens Stratus CS,” says Berkowitz. “We chose the Stratus CS system based on its speed and high sensitivity testing, but also because of the track record of Siemens and the confidence we have in the company. The analyzers are the same ones the lab has always been using, so they

knew the instrument and were comfortable with it. Overall, we have been very pleased with the system, plus the training and support by Siemens and their Clinical Quality Initiatives team has been exceptional,” he says.

In any busy emergency department, there are moments when time is critical. When cardiac patients arrive, the pressure is on and the clock is ticking. For this central Texas hospital, expedited high-sensitivity<sup>4</sup> troponin testing in the Emergency Department with Siemens Stratus CS Acute Care Diagnostic Systems has led to unprecedented results – improving efficiency, buying valuable time, and making a difference to patients.

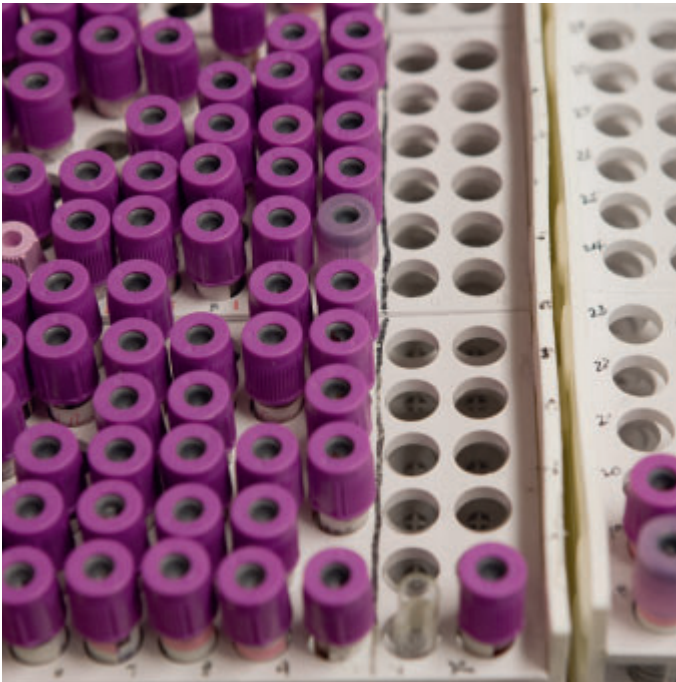
*Diana Smith is a freelance writer based in Liberty Hill, TX, USA.*

<sup>4</sup> Defined by the ESCI/ACC/AHA/WHF committee as an imprecision level of  $\leq 10$  percent at the 99th percentile of normal.

### Further Information

[www.siemens.com/diagnostics](http://www.siemens.com/diagnostics)

<sup>3</sup> Results may vary. Data on file.



At South Austin Hospital, cardiac biomarkers like troponin are analyzed with four Stratus CS Acute Care Diagnostic Systems directly at the point of care in the Emergency Department.