pulsara®

SYSTEMS OF CARE THAT SCALE

Pulsara is the communications and logistics platform that unites distributed teams and fragmented technologies as dynamic events evolve. From the routine STEMI or stroke to the full-blown multiple patient incident, Pulsara connects the right teams at the right time on one scalable platform.

The data included in this deck represents a sampling of the accomplishments of some of our customers who have used the platform for their inter- and intra-organization patient care coordination needs and have tracked the impacts of the streamlined and flexible communication Pulsara enables.

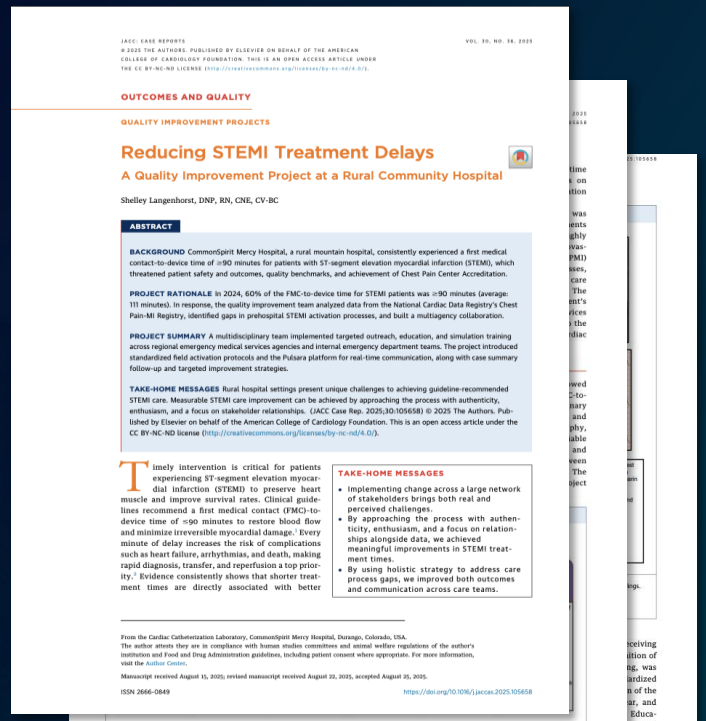
Our customers' ability to communicate seamlessly from initial assessment to definitive care has yielded reductions in average treatment times between 22% and 68%.If your organization is interested in a specific use case not reflected here, be sure to reach out to us for a reference!

IT'S ABOUT PEOPLE

pulsara

CommonSpirit Mercy Hospital

Durango, Colorado



OUTCOMES AND QUALITY

QUALITY IMPROVEMENT PROJECTS

Reducing STEMI Treatment Delays

A Quality Improvement Project at a Rural Community Hospital

Shelley Langenhorst, DNP, RN, CNE, CV-BC

ABSTRACT

BACKGROUND CommonSpirit Mercy Hospital, a rural mountain hospital, consistently experienced a first medical contact-to-device time of ≥90 minutes for patients with ST-segment elevation myocardial infarction (STEMI), which threatened patient safety and outcomes, quality benchmarks, and achievement of Chest Pain Center Accreditation.

PROJECT RATIONALE In 2024, 60% of the FMC-to-device time for STEMI patients was ≥90 minutes (average: 111 minutes). In response, the quality improvement team analyzed data from the National Cardiac Data Registry's Chest Pain-MI Registry, identified gaps in prehospital STEMI activation processes, and built a multiagency collaboration.

PROJECT SUMMARY A multidisciplinary team implemented targeted outreach, education, and simulation training across regional emergency medical services agencies and internal emergency department teams. The project introduced standardized field activation protocols and the Pulsara platform for real-time communication, along with case summary follow-up and targeted improvement strategies.

TAKE-HOME MESSAGES Rural hospital settings present unique challenges to achieving guideline-recommended STEMI care. Measurable STEMI care improvement can be achieved by approaching the process with authenticity, enthusiasm, and a focus on stakeholder relationships. (JACC Case Rep. 2025;30:105658)

Timely intervention is critical for patients experiencing ST-segment elevation myocardial infarction (STEMI) to preserve heart muscle and improve survival rates. Clinical guidelines recommend a first medical contact (FMC)-to-device time of ≤90 minutes to restore blood flow and minimize irreversible myocardial damage.[1] Every minute of delay increases the risk of complications such as heart failure, arrhythmias, and death, making rapid diagnosis, transfer, and reperfusion a top priority.[2] Evidence consistently shows that shorter treatment times are directly associated with better

TAKE-HOME MESSAGES

- Implementing change across a large network of stakeholders brings both real and perceived challenges.
- By approaching the process with authenticity, enthusiasm, and a focus on relationships alongside data, we achieved meaningful improvements in STEMI treatment times.
- By using holistic strategy to address care process gaps, we improved both outcomes and communication across care teams.

From the Cardiac Catheterization Laboratory, CommonSpirit Mercy Hospital, Durango, Colorado, USA.

The author attests they are in compliance with human studies committees and animal welfare regulations of the author's institution and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

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Reducing FMC-to-Device Times in Rural STEMI Care – Project Summary

intentional alignment of diverse stakeholders—regional EMS teams, ED staff, interventional cardiologists, catheterization laboratory team members, ... An equally important aspect of the project was the feedback loop created through the STEMI case summary form. Providing timely, case-specific

VIEW STUDY

STEMI

TIME TO TREATMENT

First Medical Contact-to-Device in Rural Region

pulsara

Cy-Fair Fire Department

Harris County, Texas

CASE STUDY

pulsara

CY-FAIR FIRE DEPARTMENT EMS

Texas EMS Agency Cuts Hospital Offload Times by 77% With Door-to-Lobby Protocol and Pulsara

THE CHALLENGE

Cy-Fair Fire Department was seeing a concerning number of 911 calls for non-urgent medical needs. These patients, while stable, arrived by ambulance and triggered standard intake procedures, including waiting for a hospital bed.

Since many of these cases would ultimately be directed to the waiting room, they used more hospital and EMS resources than required, costing precious time for more urgent patients.

"The majority of our calls are basic cases that don't necessarily require an ambulance," said Chief Abodeeb. "We wish to take those patients straight to the ED lobby in order to treat them in a sub-acut manner and keep ER rooms and beds open for more serious patients."

While the concept was straightforward, implementation raised critical questions. How could EMS and hospital staff reliably identify qualifying patients? How would they coordinate, track, and document these non-traditional handoffs? And most importantly, could this be done safely?

With high call volumes and hospital capacity continuously strained, Ahmad Abodeeb, EMS Battalion Chief – Clinical at Cy-Fair, saw an opportunity to rethink how low-acuity patients were transferred to local emergency departments.

THE SOLUTION

In February 2025, Cy-Fair FD partnered with two local hospitals to roll out its Door-to-Lobby protocol. The process empowered EMS crews to use Pulsara to coordinate and transport certain low-acuity patients directly to the ED lobby, bypassing the need for an immediate hospital bed. In order for patients to qualify for door-to-lobby transport, strict clinical criteria had to be met to ensure no urgent intervention was required.

Following the guidelines Chief Abodeeb and his team created, paramedics ensured patients met specific vital sign conditions and had low acuity complaints, including

CY-FAIR FIRE DEPARTMENT TX

BACKGROUND

Cy-Fair Fire Department, located just outside Houston, Texas, is a forward-thinking agency with a long, successful history of providing Fire, EMS, and incident response services to the citizens of northwest Harris County. Cy-Fair FD's EMS department responds to over 25,000 medical calls annually, is a leader in hospital-EMS collaboration, and has been a trusted user of Pulsara across multiple service lines for over a decade.

KEY RESULTS

Since launching the Pulsara + Door-to-Lobby program in early 2025, Cy-Fair FD EMS has seen:

- Average offload times for lobby patients reduced from 45 minutes to just 10.2 minutes (a 77% improvement)
- 120+ successful lobby transports
- Rapid expansion from 2 to 4 participating hospitals
- The program's success has inspired other regions to replicate it.

VIEW STUDY

EMS OFFLOAD TIMES

Time Saved with Door-to-Lobby Program

pulsara

St. Bernards Medical Center

Jonesboro, Arkansas

CASE STUDY

pulsara

ST. BERNARDS MEDICAL CENTER

Arkansas Stroke Team Improves Sub-60-Minute Door-to-Needle Rate by an Average of 48%

St. Bernards Medical Center is a 381-bed acute-care hospital in Jonesboro, Arkansas, and a regional leader in emergency care and behavioral health services.

Due to its commitment to excellence in stroke care, the St. Bernards stroke team holds an AHA Gold Plus Stroke rating and the Advanced Primary Stroke Certification from The Joint Commission.

KEY RESULTS

Since engaging consistent Pulsara usage for stroke cases in early 2023, St. Bernards has seen impressive improvements to treatment times including:

- Reaching the 60-minute door-to-needle benchmark 48% more often on average
- 30-minute door-to-needle time met in an average of 43% of cases,
- Record DTN time of 18 minutes

THE CHALLENGE

St. Bernards' stroke team has long held treatment time reduction as a top priority, but consistently achieving low door-to-needle (DTN) times remained a difficult benchmark.

"We could see that we needed to work on improving our door-to-needle times. That starts with reducing door-to-CT times, which can be a challenge," said Joanne Sullivan, RN, SCRN, ASC-BC, CPAHA, Stroke Program Coordinator.

While Arkansas provided Pulsara to facilities across the state in 2020, the platform was primarily used by St. Bernards' cardiology program for STEMI alerts. The ER was still receiving stroke activations through phone calls, with limited possibility for early assessment, coordination, and CT preparation.

As the team honed in on getting average thrombolytic treatment times below 45-60 minutes, it became clear that communication and EMS to ED workflows needed to be refined.

THE SOLUTION

After seeing success with consistent Pulsara usage in the STEMI program, St. Bernards made a decisive move in 2023 to prioritize using Pulsara for stroke care. The initiative brought together EMS, emergency department RNs, CT teams, and neurologists with a shared focus on efficiency and communication.

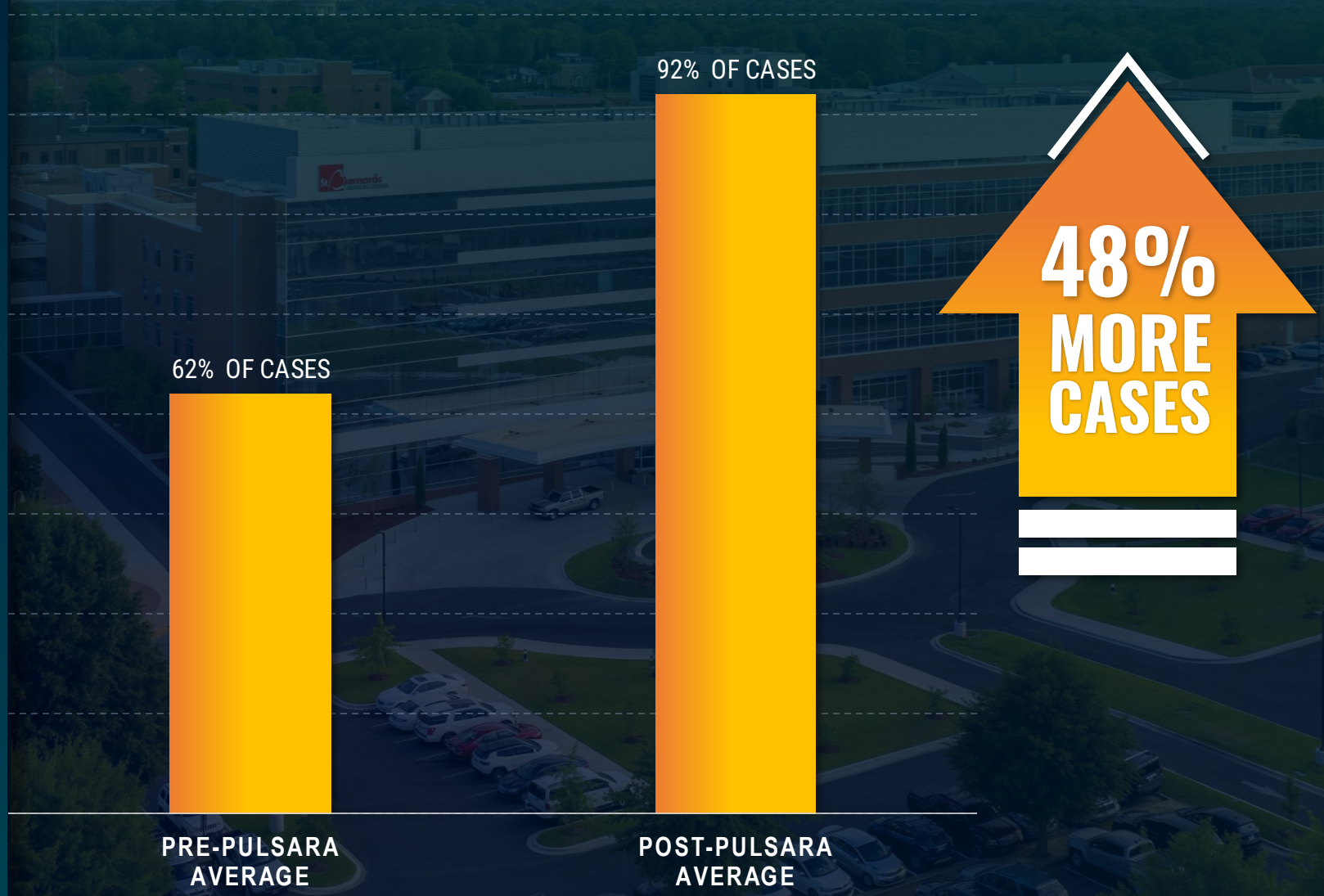
"Everyone was on board because they had realized how well it had worked with our STEMI program," said Brittney Yancy, RN, ED Stroke Coordinator. "We have a really competitive ER, so once we tell our nurses that we want to improve our stroke program, they want to jump in and get those good door-to-needle times."

VIEW STUDY

STROKE

DOOR-TO-NEEDLE TIME

Cases Treated Within 60 Min or Less



pulsara

CHI St. Joseph Health EMS

Bryan, Texas

CASE STUDY

pulsara

CHI ST. JOSEPH HEALTH EMS

Texas EMS Provider Leverages Wristbands with Pulsara to Manage Large-Scale Pre-Planned Events

THE CHALLENGE

For years, St. Joseph Health EMS had managed medical response for the Texas Renaissance Festival, an event that draws hundreds of thousands of guests each year. Ahead of the 2023 festival, however, St. Joseph Health was informed that the event would be looking elsewhere for its medical service needs. Then, just a few weeks before the festival was scheduled to begin, St. Joseph Health was notified that the alternative options weren't equipped to handle the high volume of the event after all.

Billy Rice, St. Joseph Health's market director of EMS and Air Med 12, said, "About a month before the festival, they realized it wouldn't work. They called us and asked us to help." While the task of managing an event with over 40,000 daily attendees would seem daunting to any provider on such short notice, St. Joseph Health EMS was committed to serving their community. "Of course," Rice said, "it's our people and our county, so we stepped up and pulled it off."

With a total of over half a million guests during the festival's eight consecutive weekends, St. Joseph Health EMS had to be prepared to efficiently triage and document hundreds of daily patient cases amid the chaos of the festival. Traditional emergency management methods would surely fall short in such a demanding scenario. "In years past, it would be very difficult to know how many people you had in the tent, who was being treated, and their acuity level," said Rice. "We were doing everything on paper and a few laptops. Real-time situational awareness didn't really exist."

With only a month to gather and organize resources before the event, St. Joseph Health needed an emergency management system that was easy to use, readily available, and could scale to fit the needs of the EMS teams.

THE SOLUTION

At the time, St. Joseph Health had partnered with Pulsara to help manage large-scale pre-planned emergencies. Pulsara is a healthcare communications and logistics platform that facilitates incident management, patient tracking, and care coordination between healthcare providers. While Pulsara alone would be an effective tool in scenarios like the Texas Renaissance Festival, it also enabled St. Joseph Health EMS to utilize a new emergency resource provided by the State of Texas: barcode wristbands.

The wristbands, each tagged with a scannable barcode, were introduced statewide

CHI St. Joseph Health

St. Joseph Health EMS is the emergency service provider linked to the St. Joseph Health Regional Hospital Emergency & Trauma Center in Bryan, Texas. As one of the highest-accredited emergency facilities in their region, St. Joseph Health's EMS teams are dedicated to providing the highest standard of emergency care across the counties they serve.

KEY RESULTS

- St. Joseph Health EMS used Pulsara and Texas's emergency wristbands to triage and track hundreds of patients during large-scale pre-planned incidents.
- 150 daily patients during the Texas Renaissance Festival.
- Over 200 patients during a single concert.

VIEW STUDY

EVENT MANAGEMENT

Triage and Track High Patient Volumes

225
200
175
150
125
100

200 PATIENTS DURING CONCERT

150 DAILY PATIENTS

TEXAS RENAISSANCE FESTIVAL

COUNTRY MUSIC CONCERT

pulsara

Hilo Benioff Medical Center

Hilo, Hawaii

CASE STUDY

pulsara

HILO BENIOFF MEDICAL CENTER

Hawaii Medical Center Reduces Average Door-to-Needle Time by 41%

THE CHALLENGE

Seeing nearly 600 stroke cases per year, Hilo Benioff Medical Center is one of the leading stroke care centers in the state of Hawaii. With patients spread across rural areas and multiple islands, patient transportation takes up much of the critical treatment window for stroke cases. This makes efficient door-to-needle treatment times a top priority, striving for a less than 60-minute average door-to-needle time. Hilo Benioff was already seeing an average DTN time of 58 minutes, but stroke coordinator Caitee McAllister knew there was still room to improve.

"The problem in our state as a whole is access to specialty services," McAllister said, "especially in the neighboring islands." HBMC, for example, does not have a thrombectomy center and utilizes telestroke services before administering Tenecteplase treatments. Connecting to neurologists from Queen's Medical Center on Oahu has been a significant bottleneck for Hilo Benioff's stroke treatment times. "In order to activate neurologists to see the patient, you have to call the transfer line," McAllister explained. "The transfer line calls you back—it can take up to 20 minutes before they connect to the TeleStroke camera—and then once they connect and they do their exam, several minutes later, we prepare and administer the Tenecteplase."

With the process of contacting neurologists and evaluating the patient often taking up over half of the 60 minute door-to-needle treatment goal, Hilo Benioff Medical Center needed faster and more efficient lines of communication to both prehospital EMS teams and neurologists from other facilities.

THE SOLUTION

Thanks to a rural healthcare grant, Queen's Medical Center in Honolulu implemented Pulsara, a healthcare communication platform that excels at connecting prehospital and hospital teams throughout stroke care. After successfully implementing Pulsara on Oahu and in North Hawaii, neurologists from Queen's brought Hilo Benioff Medical Center on board.

Hilo Benioff Medical Center

With 166 total beds and one of the busiest ERs in the state, Hilo Benioff Medical Center (HBMC) is the largest facility in the Hawaii Health System Corporation and the leading provider of inpatient and outpatient care on Hawaii Island. HBMC operates as a Level III Trauma Center as well as a Primary Stroke Center. Since intensive and specialized medical care is sparse across the surrounding islands, Hilo Benioff has time-sensitive patients that often travel long distances from rural areas, including over the water.

KEY RESULTS

- Since implementing Pulsara for prehospital and hospital stroke care in October 2024, Hilo Benioff Medical Center saw impressive improvements in tenecteplase treatment times including:
- 24 minute (41.2%) reduction in average door-to-needle time when using Pulsara
- Contrast of average door-to-needle times down from 59 minutes to 34.1 minutes with Pulsara usage

VIEW STUDY

STROKE

DOOR-TO-NEEDLE

Faster Treatment Times

pulsara

Baptist Health North Little Rock

Little Rock, Arkansas

CASE STUDY

pulsara

BAPTIST HEALTH - NORTH LITTLE ROCK

Arkansas Hospital Reduces Average Door-In-Door-Out Time by 42%

Baptist Health

Baptist Health Medical Center - North Little Rock in Little Rock, Arkansas, is a 225-bed medical center that sees a large stroke volume every month. It is a sister facility to Baptist Health Medical Center, also located in Little Rock. Baptist Health North Little Rock is a certified primary stroke center (PSC), meeting the requirements for necessary staffing, infrastructure, and capability to treat most emergent stroke patients. Additional functions of a PSC may be to act as a resource center for other facilities in their region, including being a main transfer site for stabilized patients from an ASR. This can include offering guidance for triage of patients, providing expertise about managing particular cases, making diagnostic tests or treatments available to patients treated initially at an ASR, and being an educational resource for other hospitals and health care professionals in a city or region. Baptist Health North Little Rock aims to become thrombectomy-capable by the end of 2024.

THE CHALLENGE

When Baptist Health Medical Center - North Little Rock needed to communicate about incoming stroke patients or transfer an LVO patient to their sister facility, the team was using a call system. "In the past, they'd give the thrombolytic and then have to make a lot of phone calls to get everyone the information. You may or may not know EMS was bringing the patient, depending on whether or not they called in before they came," said Sharon Aureli, RN, BSN, MSN, SCRN, CNOR, RNFA, CNL, Neuro Program Line Manager for the Baptist Health System. "When it came to transferring stroke patients, we previously didn't even have our Access Center, so it was a matter of making phone calls to try to get patients where they needed to be. Things were delayed."

THE SOLUTION

In 2020, the State of Arkansas launched an initiative to improve treatment times for time-sensitive emergencies. Many organizations adopted Pulsara, a mobile healthcare communication platform that unites care teams on one secure communication channel.

When Aureli returned to Baptist Health as the Neuro Program Line Manager and found out about the initiative to use Pulsara for STEMI, she became one of the first in Arkansas to implement it for stroke at Baptist Health Medical Center in Little Rock, and then Baptist Health - North Little Rock.

Pulsara allows EMS and hospital staff to communicate about patients in an accessible patient channel that's visible to all care team members. Everyone can communicate instantly with a centralized view of the patient's demographics, secure team

KEY RESULTS

- 42% decrease in average door-in-door-out time for stroke transfers
- EMS pre-alerting with Pulsara saves time for hospital staff
- Receiving patient's name, DOB, and meds list helps staff prepare
- Integration with RAPID AI allows fast review of patient scans
- Access Center uses Pulsara for smoother transfer process

ground or air, whichever is faster and safest for the patient. "Gone are the days where the doctor has to look for the phone number

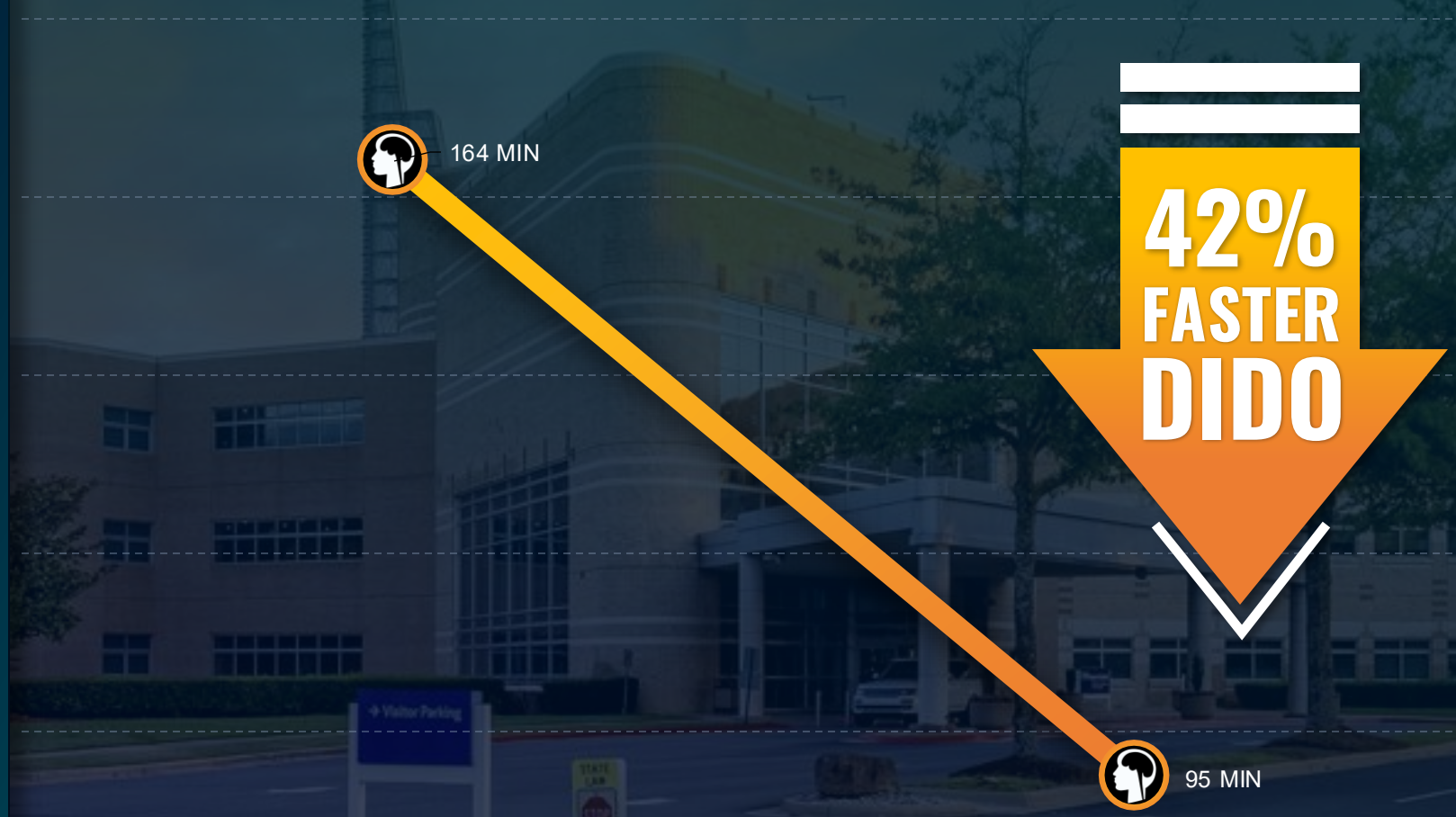
"No one knew that the process was supposed to replace the old way. They were making phone calls and doing Pulsara," said Launius.

VIEW STUDY

STROKE

TIME TO TREATMENT

Improved Door-In-Door-Out Times



pulsara

Metropolitan EMS (MEMS)

Little Rock, Arkansas


CASE STUDY

pulsara

METROPOLITAN EMS (MEMS)

How MEMS is Leveraging Communication Technology to Improve Outcomes for Behavioral Health Patients

THE PROBLEM

In the wake of the COVID-19 pandemic, MEMS faced a new challenge: a growing number of pediatric behavioral health cases. Between 2022 and 2023, mental health calls accounted for 10% of MEMS' overall call volume, with a noticeable surge in pediatric mental health cases. MEMS was transporting every behavioral health patient under 18 to Arkansas Children's Hospital, creating a bottleneck in the emergency department as patients wait to be transferred to a behavioral health facility.

Mack Hutchison, Clinical Manager for MEMS, explains: "Many of these patients do not need medical clearance and can occupy a room in the ED for up to 24 hours before a bed is found for them at a behavioral health facility."

Hutchison had an idea: what if those that didn't need medical clearance could be routed directly to a behavioral health facility, relieving pressure on the ED and getting patients care more quickly?

THE SOLUTION

Hutchison convened a task force to identify criteria that would enable EMS to bypass the ED when appropriate for behavioral health patients under 18. They settled on the following criteria: "Does the patient have an injury that needs medical attention? Is there an Ingestion? Chronic Medical Diagnosis? Is the patient acutely ill?" If the answer is "no" to all of those questions, MEMS may transport the patient directly to a behavioral health facility.

The protocol was approved by the Arkansas Emergency Physicians Foundation (MEMS Medical Authority) and Arkansas Children's Hospital. But there was still the issue of communication: How would paramedics communicate with staff at both the hospital and behavioral health facilities? "Pulsara, of course," said Hutchison.

"Using Pulsara, we get the right patient to the right place, the first time."

THE CUSTOMER

metroems.org

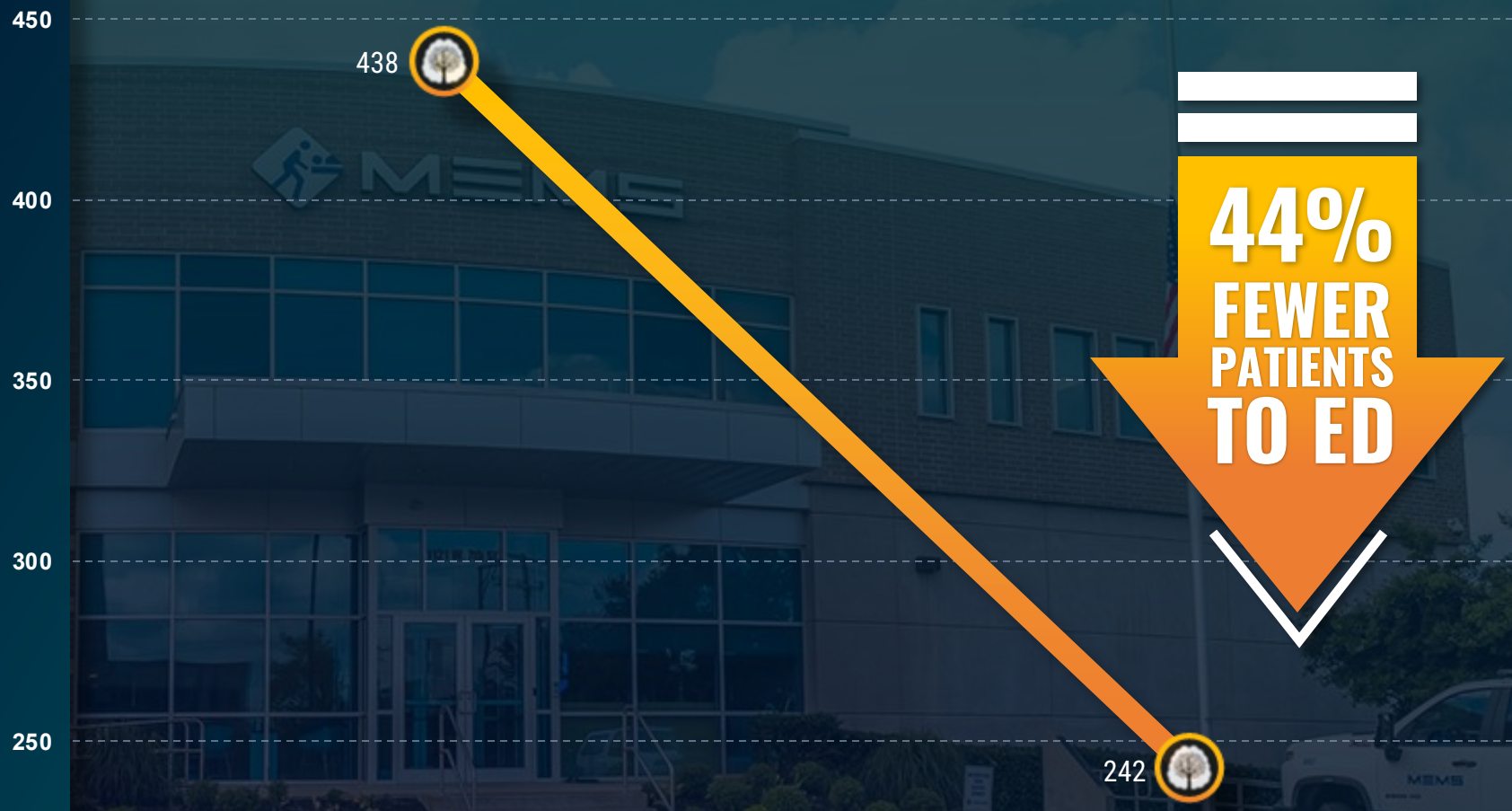
Metropolitan Emergency Medical Services (MEMS) is a public, non-profit EMS entity serving Little Rock, Arkansas, and its surrounding counties. The organization's service area covers approximately 1,800 square miles and nearly half a million Arkansans. MEMS transports around 77,000 patients each year.

In 2020, MEMS adopted Pulsara to improve communication with area hospitals for time-sensitive emergencies such as stroke, STEMI, and trauma. Since then, the platform has helped decrease treatment times for patients. One of MEMS' hospital partners, Baptist Health Medical Center - Little Rock, reported a 58% improvement in door-to-puncture times for stroke patients.

VIEW STUDY

BYPASS THE ED

Better Pediatric Behavioral Health Care



pulsara

Baptist Health Medical Center

Little Rock, Arkansas

CASE STUDY

pulsara

BAPTIST HEALTH MEDICAL CENTER

Arkansas Hospital Reduces Average Door-to-Puncture Time by 58% in Five Months

THE CHALLENGE

When Sharon Aureli, RN, BSN, MSN, SCRN, CNOR, RNFA, CNL, returned to Baptist Health as the Neuro Program Line Manager, she was eager to continue improving care for patients by streamlining the team's communication.

At the time, the stroke team was being notified about incoming patients through phone calls and text messages. The operator would use the paging system to activate a code stroke, and then an additional IVR code stroke as needed. Members of the stroke team would receive the page, which contained only the patient's location, via text or phone call. Though the system worked on a basic level, Aureli knew that a more sophisticated communication system could help their teams reduce treatment times. "I always think there's room for improvement," she said.

THE SOLUTION

In 2020, the State of Arkansas launched an initiative to improve treatment times for time-sensitive emergencies. To that end, many organizations adopted Pulsara, a mobile healthcare communication platform that unites care teams on one secure communication channel. Pulsara organizes communication about each patient in an accessible patient channel that is visible to all members of the care team. Care teams can assemble around a single patient and communicate instantly, reducing the need for phone calls and replacing radio reports, faxes, and pagers with secure team messaging, photos, and live audio and video calls.

Like many other hospitals in Arkansas, Baptist Health joined the initiative to improve STEMI care. Aureli secured approval to use Pulsara for stroke, becoming one of the first in the state of Arkansas to do so. In October of 2021, Baptist Health's stroke teams went live with Pulsara.

Baptist Health

Baptist Health Medical Center in Little Rock, Arkansas is an 843-bed medical center and certified Comprehensive Stroke Center. It is the largest private not-for-profit hospital in the state of Arkansas, and provides comprehensive services using the latest in innovative technology. Baptist Health Medical Center - Little Rock has received the Get With the Guidelines® - Stroke Gold Plus Achievement Award from the American Heart Association. In 2019, the hospital was named to the Target: Stroke Elite Plus Honor Roll for its focus on improving acute ischemic stroke care.

VIEW STUDY

STROKE

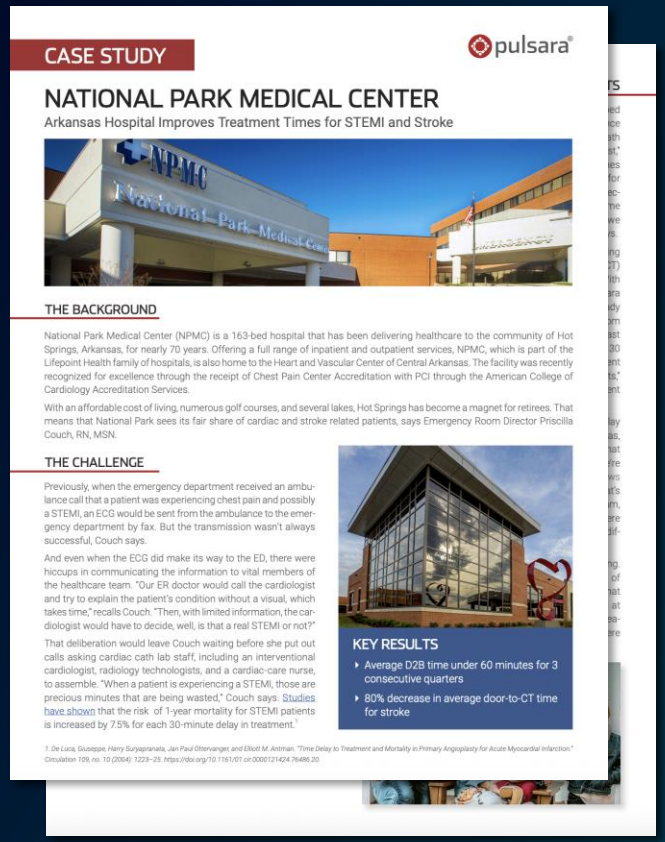
DOOR-TO-PUNCTURE

Faster Stroke Treatment

pulsara

National Park Medical Center

Hot Springs, Arkansas



CASE STUDY

pulsara

NATIONAL PARK MEDICAL CENTER

Arkansas Hospital Improves Treatment Times for STEMI and Stroke

THE BACKGROUND

National Park Medical Center (NPMC) is a 163-bed hospital that has been delivering healthcare to the community of Hot Springs, Arkansas, for nearly 70 years. Offering a full range of inpatient and outpatient services, NPMC, which is part of the Lifepoint Health family of hospitals, is also home to the Heart and Vascular Center of Central Arkansas. The facility was recently recognized for excellence through the receipt of Chest Pain Center Accreditation with PCI through the American College of Cardiology Accreditation Services.

With an affordable cost of living, numerous golf courses, and several lakes, Hot Springs has become a magnet for retirees. That means that National Park sees its fair share of cardiac and stroke related patients, says Emergency Room Director Priscilla Couch, RN, MSN.

THE CHALLENGE

Previously, when the emergency department received an ambulance call that a patient was experiencing chest pain and possibly a STEMI, an ECG would be sent from the ambulance to the emergency department by fax. But the transmission wasn't always successful, Couch says.

And even when the ECG did make its way to the ED, there were hiccups in communicating the information to vital members of the healthcare team. "Our ER doctor would call the cardiologist and try to explain the patient's condition without a visual, which takes time," recalls Couch. "Then, with limited information, the cardiologist would have to decide, well, is that a real STEMI or not?"

That deliberation would leave Couch waiting before she put out calls asking cardiac cath lab staff, including an interventional cardiologist, radiology technologists, and a cardiac-care nurse, to assemble. "When a patient is experiencing a STEMI, those are precious minutes that are being wasted," Couch says. Studies have shown that the risk of 1-year mortality for STEMI patients is increased by 7.5% for each 30-minute delay in treatment.[1]

KEY RESULTS

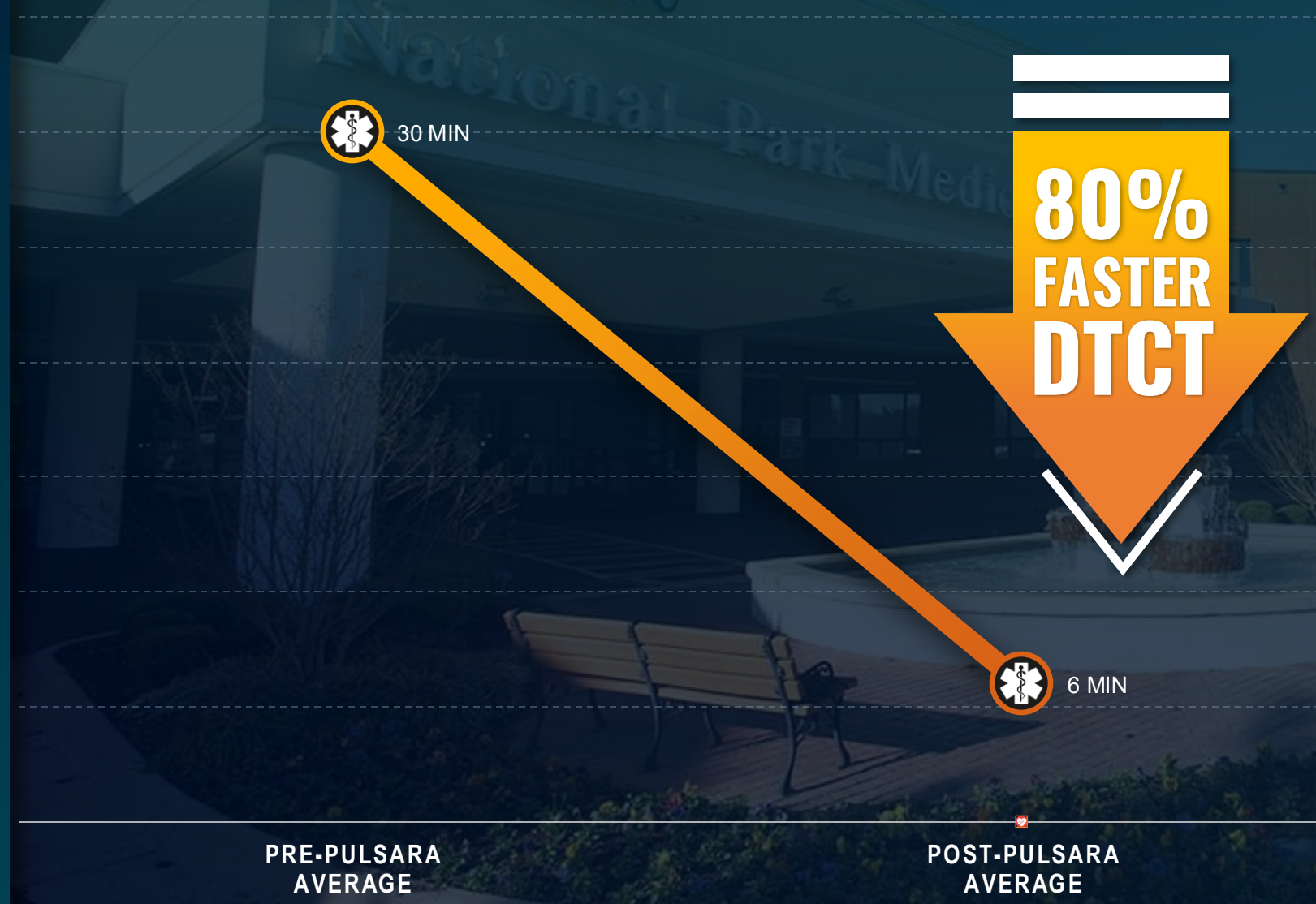
- Average D2B time under 60 minutes for 3 consecutive quarters
- 80% decrease in average door-to-CT time for stroke

1. De Luca, Giuseppe, Harry Suryapranata, Jan Paul Ottervanger, and Elliott M. Antman. "Time Delay to Treatment and Mortality in Primary Angioplasty for Acute Myocardial Infarction." Circulation 109, no. 10 (2004): 1223–25. https://doi.org/10.1161/01.cir.0000121424.76486.20.

VIEW STUDY

DOOR-TO-CT TIME

Improved Times for Stoke and STEMI



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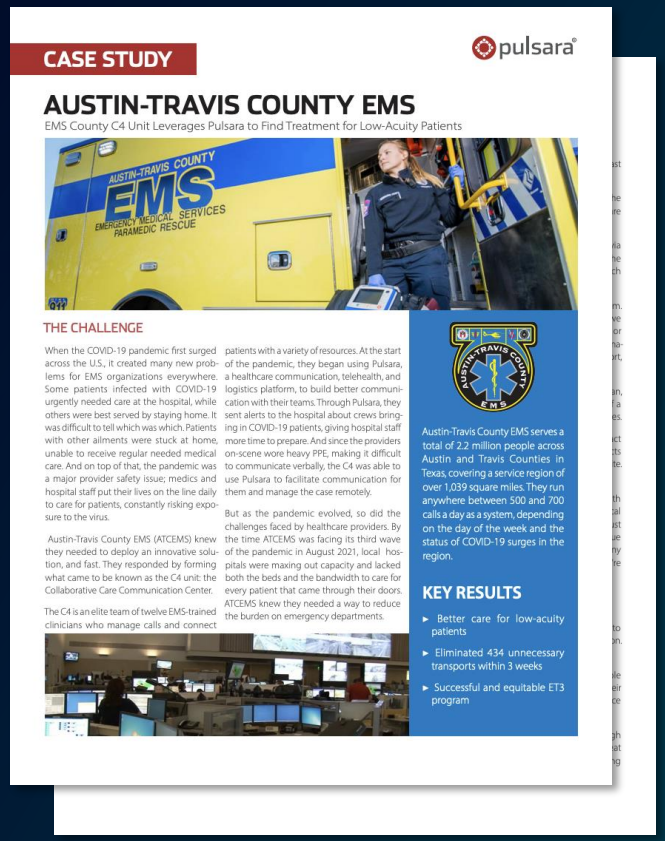
Austin-Travis County EMS

Austin County & Travis County, TX


CASE STUDY

pulsara

AUSTIN-TRAVIS COUNTY EMS

EMS County C4 Unit Leverages Pulsara to Find Treatment for Low-Acuity Patients

THE CHALLENGE

When the COVID-19 pandemic first surged across the U.S., it created many new problems for EMS organizations everywhere. Some patients infected with COVID-19 urgently needed care at the hospital, while others were best served by staying home. It was difficult to tell which was which. Patients with other ailments were stuck at home, unable to receive regular needed medical care. And on top of that, the pandemic was a major provider safety issue; medics and hospital staff put their lives on the line daily to care for patients, constantly risking exposure to the virus.

Austin-Travis County EMS (ATCEMS) knew they needed to deploy an innovative solution, and fast. They responded by forming what came to be known as the C4 unit: the Collaborative Care Communication Center.

The C4 is an elite team of twelve EMS-trained clinicians who manage calls and connect patients with a variety of resources. At the start of the pandemic, they began using Pulsara, a healthcare communication, telehealth, and logistics platform, to build better communication with their teams. Through Pulsara, they sent alerts to the hospital about crews bringing in COVID-19 patients, giving hospital staff more time to prepare. And since the providers on-scene wore heavy PPE, making it difficult to communicate verbally, the C4 was able to use Pulsara to facilitate communication for them and manage the case remotely.

But as the pandemic evolved, so did the challenges faced by healthcare providers. By the time ATCEMS was facing its third wave of the pandemic in August 2021, local hospitals were maxing out capacity and lacked both the beds and the bandwidth to care for every patient that came through their doors. ATCEMS knew they needed a way to reduce the burden on emergency departments.

Austin-Travis County EMS serves a total of 2.2 million people across Austin and Travis Counties in Texas, covering a service region of over 1,039 square miles. They run anywhere between 500 and 700 calls a day as a system, depending on the day of the week and the status of COVID-19 surges in the region.

KEY RESULTS

- Better care for low-acuity patients
- Eliminated 434 unnecessary transports within 3 weeks
- Successful and equitable ET3 program

VIEW STUDY

COMMUNITY TELEHEALTH

Fewer Transports and Better Care

450
440
430
420
410
400

434

434 FEWER TRANSPORTS IN THREE WEEKS

FEWER PATIENTS TRANSPORTED TO ED

LOW-ACUITY PATIENTS

pulsara

Overlake Medical Center

Seattle, Washington


CASE STUDY

pulsara

OVERLAKE MEDICAL CENTER

Facility Cut Stroke Treatment Times by 30 Percent

THE CHALLENGE

As a thrombectomy-capable facility with a large staff of specialists, nurses, and more, Overlake Medical Center sees ~900 acute stroke cases per year. With this volume, providing time-sensitive care is of the utmost importance to producing positive patient outcomes. Overlake knew they needed a streamlined means of communication to help make existing stroke workflows more efficient. "With so many people in the system, unnecessary team members were being alerted for a stroke case, which added extraneous noise as they cared for patients," said Overlake Medical Center's Stroke Team leaders.

For example, the ED would send a page out to all hospital staff, including infusion nurses. This untargeted alert could needlessly pull nurses away from providing much needed IV assistance to other patients. Additionally, team members who were needed, such as neurologists and cath lab specialists, often weren't alerted in real time, since the message came through as a missed phone call or page.

OVERLAKE MEDICAL CENTER & CLINICS

Overlake Medical Center in Bellevue, Washington is a 349-bed hospital serving the Puget Sound region since 1953. The hospital treats more than 245,000 outpatients and 18,000 inpatients each year, and is a Joint Commission-certified Advanced Stroke Center.

KEY RESULTS

- Streamlined HIPAA compliant activations
- Reduced door-to-needle (DTN) times for TPA patients by 31%
- Decreased door-to-groin puncture for LVO patients by 24%
- Coordinated Care Communication

Using Pulsara, Overlake staff connects patients with their families via live video.

VIEW STUDY

STROKE

TIME TO TREATMENT

TPA & LVO Treatment Times Improved

130
110
90
70
50
30
10

106 MIN

81 MIN

45 MIN

31 MIN

24% FASTER DOOR-TO-NEEDLE TPA

31% FASTER DOOR-TO-GROIN LVO

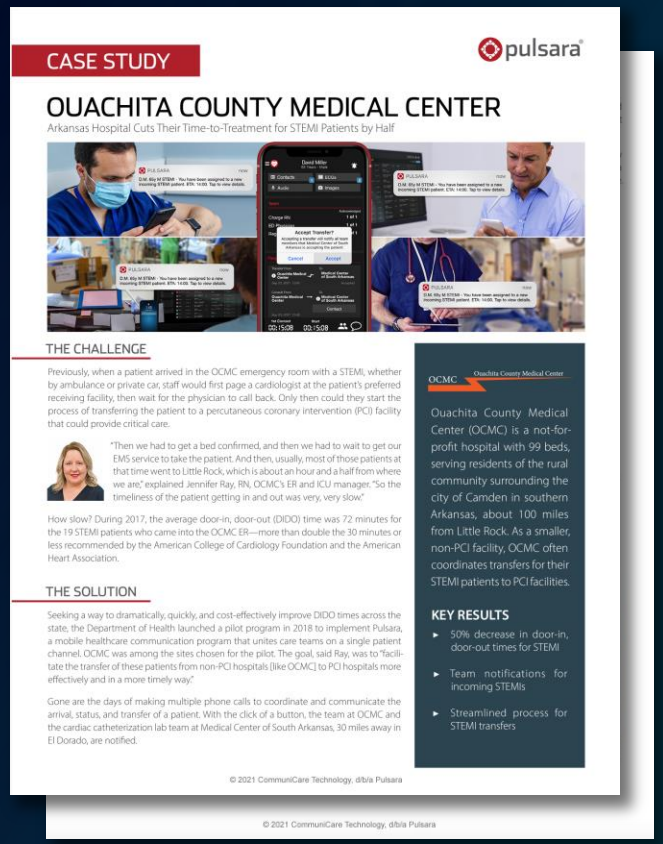
PRE-PULSARA AVERAGE

POST-PULSARA AVERAGE

pulsara

Ouachita County Medical Center

Camden, Arkansas


CASE STUDY

pulsara

OUACHITA COUNTY MEDICAL CENTER

Arkansas Hospital Cuts Their Time-to-Treatment for STEMI Patients by Half

THE CHALLENGE

Previously, when a patient arrived in the OCMC emergency room with a STEMI, whether by ambulance or private car, staff would first page a cardiologist at the patient's preferred receiving facility, then wait for the physician to call back. Only then could they start the process of transferring the patient to a percutaneous coronary intervention (PCI) facility that could provide critical care.

"Then we had to get a bed confirmed, and then we had to wait to get our EMS service to take the patient. And then, usually, most of those patients at that time went to Little Rock, which is about an hour and a half from where we are," explained Jennifer Ray, RN, OCMC's ER and ICU manager. "So the timeliness of the patient getting in and out was very, very slow."

How slow? During 2017, the average door-in, door-out (DIDO) time was 72 minutes for the 19 STEMI patients who came into the OCMC ER—more than double the 30 minutes or less recommended by the American College of Cardiology Foundation and the American Heart Association.

THE SOLUTION

Seeking a way to dramatically, quickly, and cost-effectively improve DIDO times across the state, the Department of Health launched a pilot program in 2018 to implement Pulsara, a mobile healthcare communication program that unites care teams on a single patient channel. OCMC was among the sites chosen for the pilot. The goal, said Ray, was to "facilitate the transfer of these patients from non-PCI hospitals [like OCMC] to PCI hospitals more effectively and in a more timely way."

Gone are the days of making multiple phone calls to coordinate and communicate the arrival, status, and transfer of a patient. With the click of a button, the team at OCMC and the cardiac catheterization lab team at Medical Center of South Arkansas, 30 miles away in El Dorado, are notified.

OCMC Ouachita County Medical Center

Ouachita County Medical Center (OCMC) is a not-for-profit hospital with 99 beds, serving residents of the rural community surrounding the city of Camden in southern Arkansas, about 100 miles from Little Rock. As a smaller, non-PCI facility, OCMC often coordinates transfers for their STEMI patients to PCI facilities.

KEY RESULTS

- 50% decrease in door-in, door-out times for STEMI
- Team notifications for incoming STEMIs
- Streamlined process for STEMI transfers

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VIEW STUDY

STEMI

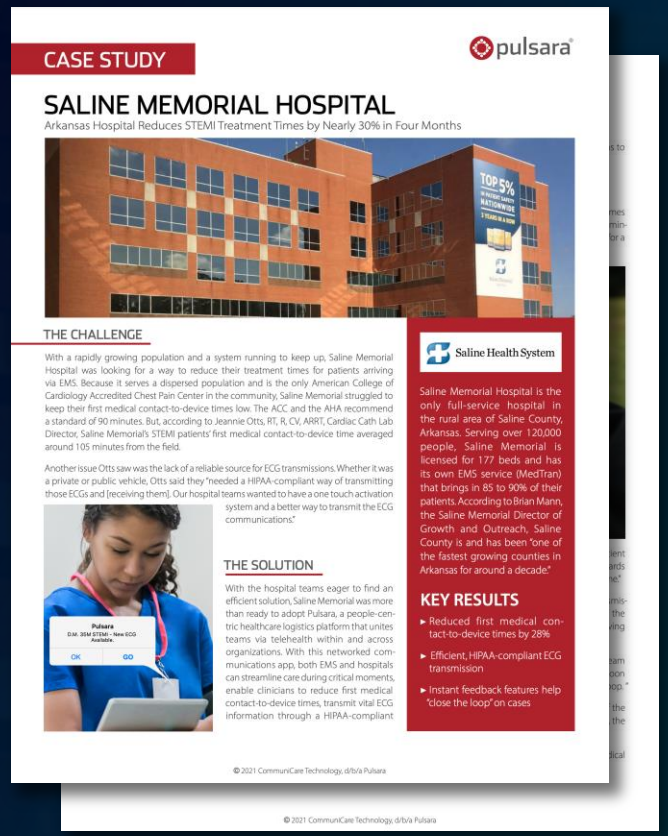
DOOR-IN-DOOR-OUT

Faster Treatment Times

pulsara

Saline Memorial Hospital

Benton, Arkansas


CASE STUDY

pulsara

SALINE MEMORIAL HOSPITAL

Arkansas Hospital Reduces STEMI Treatment Times by Nearly 30% in Four Months

THE CHALLENGE

With a rapidly growing population and a system running to keep up, Saline Memorial Hospital was looking for a way to reduce their treatment times for patients arriving via EMS. Because it serves a dispersed population and is the only American College of Cardiology Accredited Chest Pain Center in the community, Saline Memorial struggled to keep their first medical contact-to-device times low. The ACC and the AHA recommend a standard of 90 minutes. But, according to Jeannie Otts, RT, R, CV, ARRT, Cardiac Cath Lab Director, Saline Memorial's STEMI patients' first medical contact-to-device time averaged around 105 minutes from the field.

Another issue Otts saw was the lack of a reliable source for ECG transmissions. Whether it was a private or public vehicle, Otts said they "needed a HIPAA-compliant way of transmitting those ECGs and [receiving them]. Our hospital teams wanted to have a one touch activation system and a better way to transmit the ECG communications."

THE SOLUTION

With the hospital teams eager to find an efficient solution, Saline Memorial was more than ready to adopt Pulsara, a people-centric healthcare logistics platform that unites teams via telehealth within and across organizations. With this networked communications app, both EMS and hospitals can streamline care during critical moments, enable clinicians to reduce first medical contact-to-device times, transmit vital ECG information through a HIPAA-compliant

Saline Health System

Saline Memorial Hospital is the only full-service hospital in the rural area of Saline County, Arkansas. Serving over 120,000 people, Saline Memorial is licensed for 177 beds and has its own EMS service (MedTran) that brings in 85 to 90% of their patients. According to Brian Mann, the Saline Memorial Director of Growth and Outreach, Saline County is and has been "one of the fastest growing counties in Arkansas for around a decade."

KEY RESULTS

- Reduced first medical contact-to-device times by 28%
- Efficient, HIPAA-compliant ECG transmission
- Instant feedback features help "close the loop" on cases

VIEW STUDY

TIME TO TREATMENT

First Medical Contact-to-Device

STEMI

pulsara

UCHealth Mem Hosp Central

Colorado Springs, Colorado

CASE STUDY

pulsara

UCHEALTH MEMORIAL HOSPITAL CENTRAL

Streamlined Communication Saves Time for Trauma Patients

THE CHALLENGE

As a tertiary care center and Level I trauma facility, the trauma team at UCHealth Memorial Hospital Central had their patient care process dialed in. However, there was one part of their process they weren't satisfied with: their communication system.

The team was receiving notifications through an alarm dispatch system, which ran through the hospital operators and was then manually managed by each individual service line. UCHealth's Associate Nurse Manager, Nikki Schroeder, BSN, RN, CEN, TCRN, described their process: "Prehospital providers would call in to our ED charge nurse, relay pertinent information, and then the ED charge nurse would determine what level of activation was required. To notify our hospital team, the charge nurse would give the information to our unit clerk, and our unit clerk would page our 811 paging system. That's how the trauma surgeon, the ICU, and the whole trauma team got notified."

Even though the delay only lasted a few minutes, it took up valuable time that the trauma team needed to prepare for incoming patients. Very little information about the patient was transmitted ahead of time, which made it difficult for the team to mobilize the correct resources before the patient's arrival. And as with most paging systems, it was impossible for the charge nurse on duty to tell whether team members had received and seen their notifications.

While the system worked, the UCHealth team felt it could be faster. In an effort to keep improving their process for their patients, UCHealth's trauma team decided it was time to leverage networked communications and streamline their healthcare logistics with Pulsara.

uchealth

UCHealth Memorial Central is a tertiary care center and Level I trauma facility in Colorado Springs, Colorado, with a trauma registry volume of approximately 2500 patients a year. UCHealth's Colorado Springs location boasts an accredited chest pain center and the only comprehensive stroke center in southern Colorado. Prior to COVID-19, the Memorial Central campus was the busiest ED in the state of Colorado.

KEY RESULTS

- Trauma team notified 5-7 minutes faster
- Trauma surgeons at bedside 5.8 minutes faster
- 39% decrease in door-to-CT times for strauma

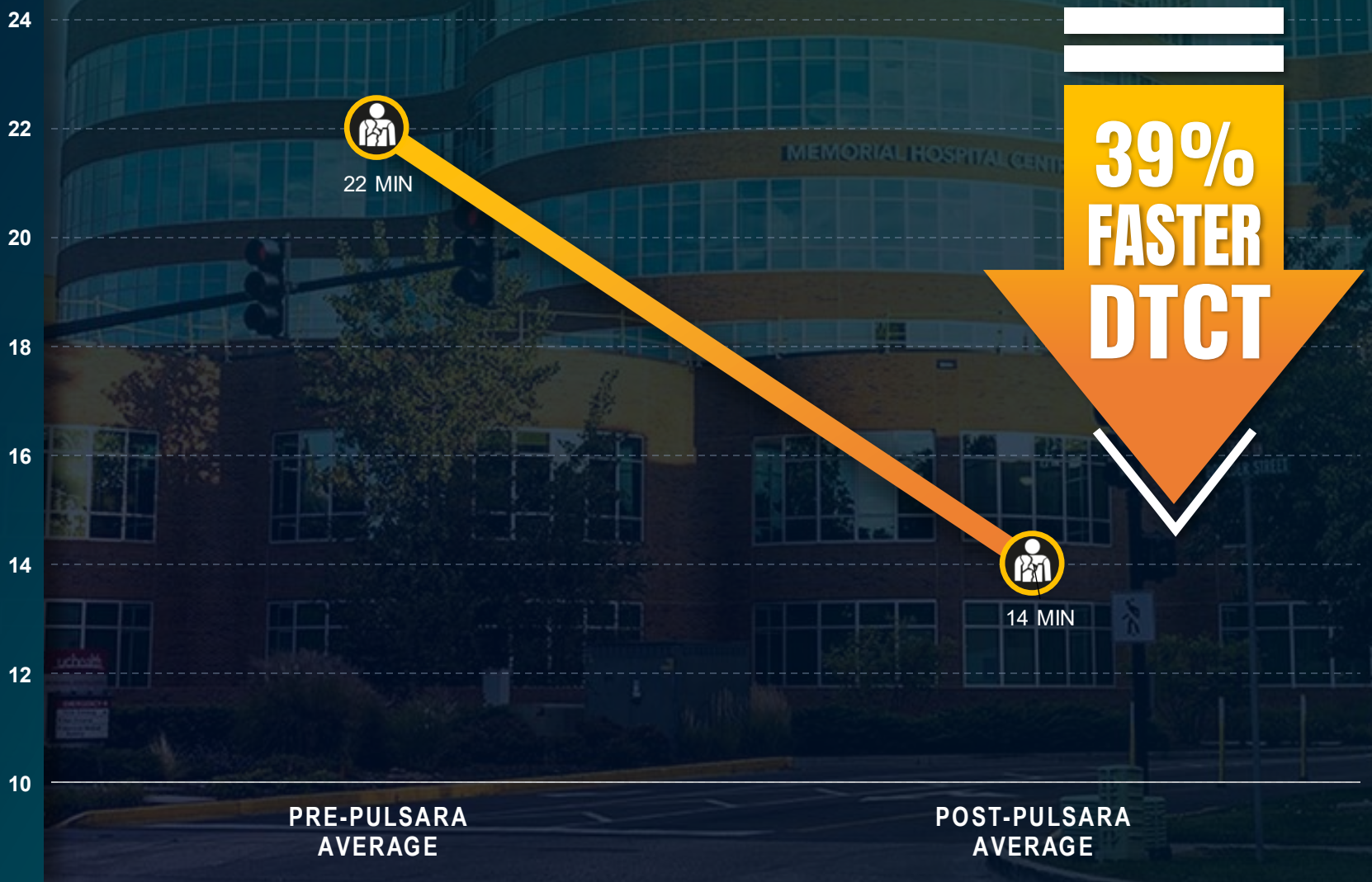
ahead of that, our unit clerks were having to call the surgeons before they even paged 811 to get the surgeons to the bedside. When we first implemented Pulsara, the Pulsara notifi-

about how we've been able to integrate it and implement it from the notification standpoint. With our volume and our acuity of traumas, it's working very, very well."

VIEW STUDY

DOOR-TO-CT TIME

Faster Trauma Treatment Times



pulsara

EvergreenHealth Medical Center

Seattle, Washington


CASE STUDY

pulsara

EvergreenHealth

Seattle-Area Medical Center Achieves Record Door-to-Puncture Times with Pulsara

THE CHALLENGE

As a two-hospital healthcare system, EvergreenHealth serves a population of nearly 850,000 residents—and over the past few years, their teams and service lines have grown accordingly.

EvergreenHealth's stroke teams were using pagers and audio calls to coordinate care. However, as both the hospitals and the stroke program grew, they began straining the limits of what former standard technologies could support.

"As we were growing the service line, bringing on EvergreenHealth Monroe, considering the freestanding ED, and bringing more neurohospitalists into our program, there was potential for communication to continue to become more fragmented," said RN Nurse Navigator for EvergreenHealth's Stroke Center, Meg Briggs, BSN, RN, SCRN. "You can imagine what it was like with the neurohospitalists spanning three sites, having to keep it all together."

And on top of all the growth, patients' acuity was only getting higher, meaning that more patients required more intensive and time-critical care. "Anything we can do to streamline communication and care with high acuity, that's a win," Briggs explained.

EvergreenHealth

EvergreenHealth is a two-hospital healthcare system and freestanding emergency department in Kirkland, Washington, and is part of a public hospital district serving north King County and south Snohomish County. Their main campus is a 318-bed medical center and Level III Trauma Center located in Kirkland, with a second 72-bed campus in Monroe. EvergreenHealth serves nearly 850,000 residents and offers care in 70 clinical specialties.

KEY RESULTS

- Record low 46-minute door-to-puncture time
- 41% decrease in door-to-puncture time over 1 year
- Improved team communication with photos and messages

Having the ability to instantly message between team members has significantly reduced the amount of time spent

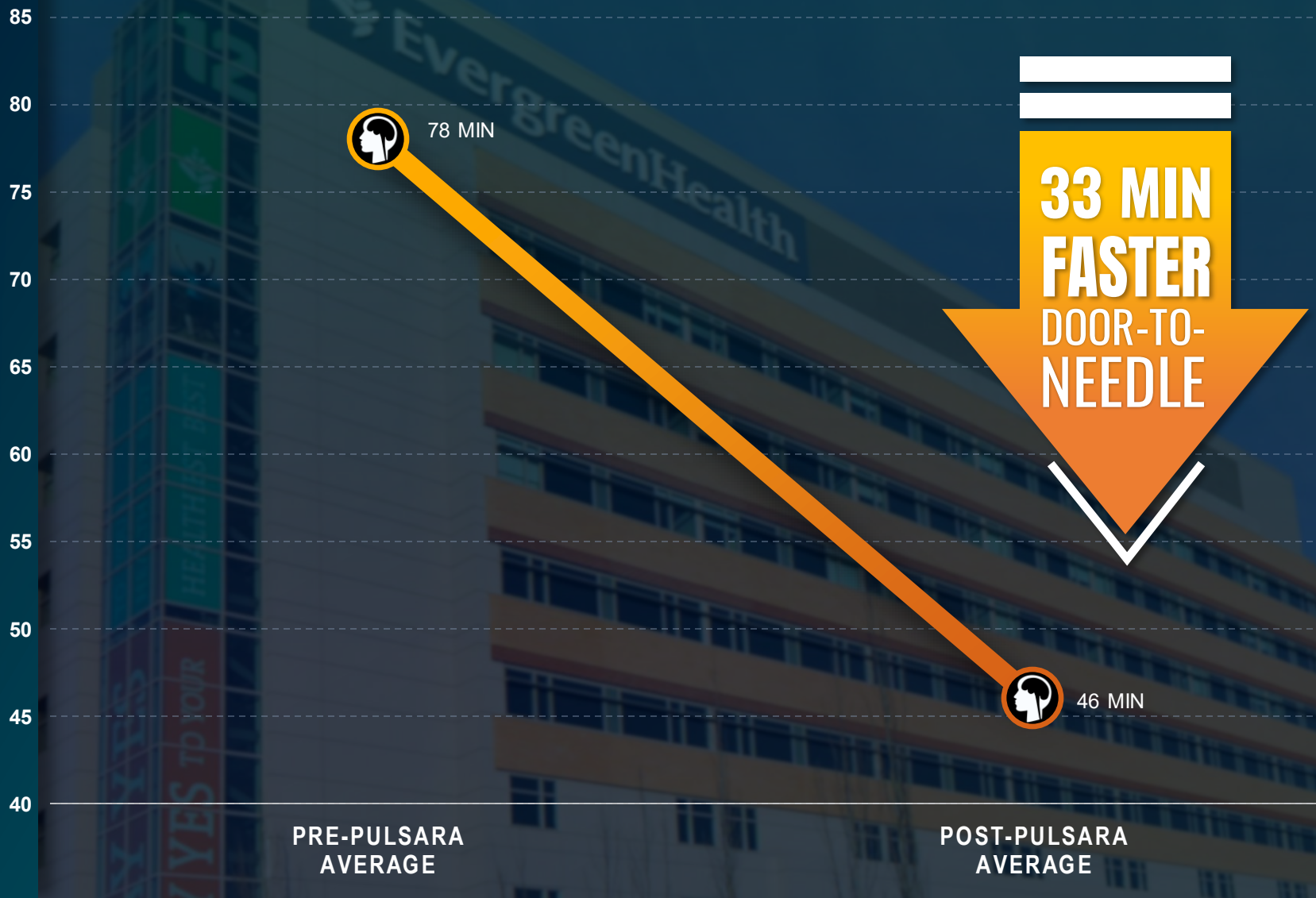
a very intuitive, easy technology—and I'm not super techy. It's about the teamwork. Teamwork improves patient outcomes. Period."

VIEW STUDY

STROKE

TIME TO TREATMENT

Door-to-Puncture Times Improved by 41%



pulsara

Latrobe Regional Hospital

Melbourne, Australia

CASE STUDY

pulsara

LATROBE REGIONAL HOSPITAL

Revolutionizing Patient Care in Australia with Networked Communication

THE PROBLEM

For Latrobe Regional Hospital (LRH), streamlining communication was the biggest focus, both to improve patient care and to strengthen collaboration across its healthcare system. Up until the beginning of 2020, they used a combination of phone calls and pagers to interface among Emergency Services, ED, and hospital staff—resulting in inefficiencies and challenging communication for caregivers.

"I think the willingness of the ambulance to actually ring prior to Pulsara was a big thing," said Carolyn Beltrame, an Emergency Nurse at LRH. "They knew that a lot of the time, the phone would be busy, or difficult for us to answer."

But even when the ambulance did connect with hospital teams, communication was often faulty. "Due to spotty reception, we could miss a patient's name or not get their date of birth right," said Mark Scammell, Operations Community Engagement Liaison Coordinator at Ambulance Victoria. "Upon patient arrival, [we were] scrambling for the right details and pulling their old notes."

Latrobe wanted a technology solution that could scale to meet patient needs and centralize communication for all of its departments, staff, and partners.

THE CLIENT

www.lrh.com.au

Latrobe Regional Hospital (LRH), located 150 kilometres east of Melbourne, Australia, is one of the region's largest employers with more than 1900 staff. A purpose-built teaching hospital caring for a population of more than 260,000 people.

The LRH Emergency Department is a 30 bed unit with 12 short-stay beds and sees approximately 30,000 people a year.

HIGHLIGHTED RESULTS

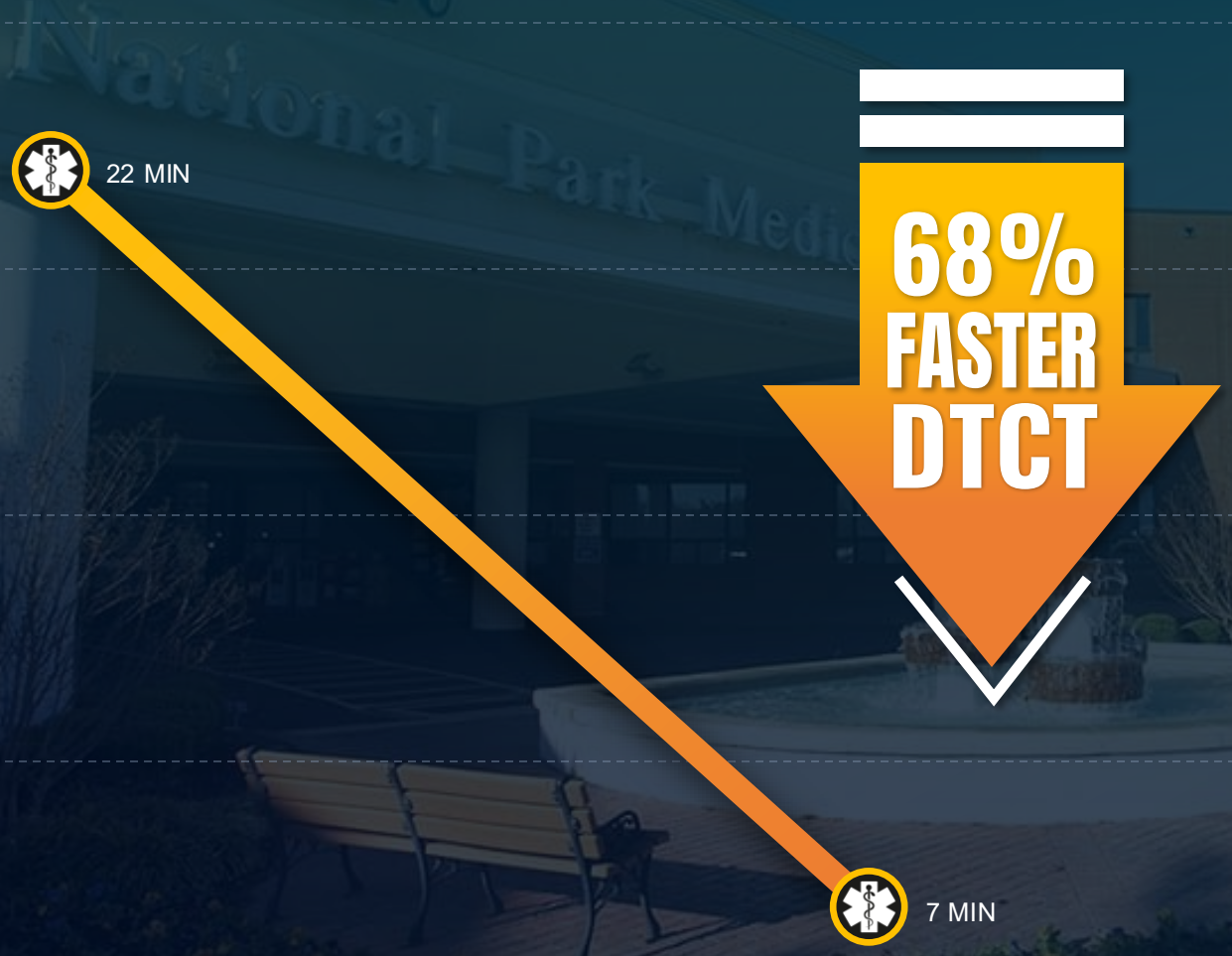
- Door-to-CT times improved from 22 minutes on average to approximately 7 minutes, a 68% improvement.

One particular case type that has benefited from the improved communication at LRH is stroke.

VIEW STUDY

DOOR-TO-CT TIME

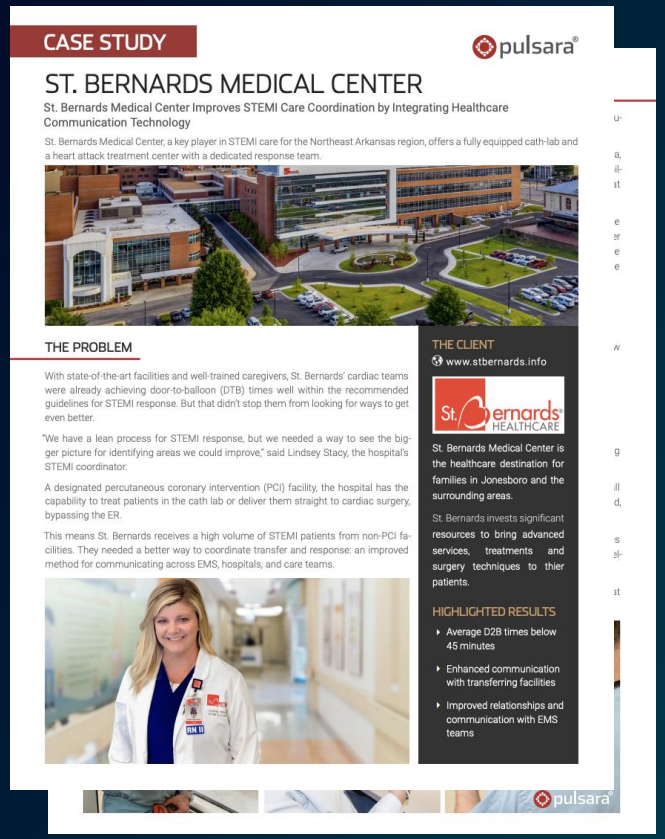
Improved Times for Stoke and STEMI



pulsara

St. Bernards Medical Center

Jonesboro, Arkansas


CASE STUDY

pulsara

ST. BERNARDS MEDICAL CENTER

St. Bernards Medical Center Improves STEMI Care Coordination by Integrating Healthcare Communication Technology

St. Bernards Medical Center, a key player in STEMI care for the Northeast Arkansas region, offers a fully equipped cath-lab and a heart attack treatment center with a dedicated response team.

THE PROBLEM

With state-of-the-art facilities and well-trained caregivers, St. Bernards' cardiac teams were already achieving door-to-balloon (DTB) times well within the recommended guidelines for STEMI response. But that didn't stop them from looking for ways to get even better.

"We have a lean process for STEMI response, but we needed a way to see the bigger picture for identifying areas we could improve," said Lindsey Stacy, the hospital's STEMI coordinator.

A designated percutaneous coronary intervention (PCI) facility, the hospital has the capability to treat patients in the cath lab or deliver them straight to cardiac surgery, bypassing the ER.

This means St. Bernards receives a high volume of STEMI patients from non-PCI facilities. They needed a better way to coordinate transfer and response: an improved method for communicating across EMS, hospitals, and care teams.

THE CLIENT

www.stbernards.info

St. Bernards HEALTHCARE

St. Bernards Medical Center is the healthcare destination for families in Jonesboro and the surrounding areas.

St. Bernards invests significant resources to bring advanced services, treatments and surgery techniques to thier patients.

HIGHLIGHTED RESULTS

- Average D2B times below 45 minutes
- Enhanced communication with transferring facilities
- Improved relationships and communication with EMS teams

pulsara

VIEW STUDY

STEMI

DOOR-TO-BALLOON TIME

Faster Average Treatment Times

60 MIN

50 MIN

45 MIN

40 MIN

30 MIN

20 MIN

AVG D2B <45 MIN

AVERAGE D2B WITH PULSARA

pulsara

CHRISTUS Good Shepherd Health

Longview, Texas

pulsara

Case Study: CHRISTUS Good Shepherd Health System

Unified Communication Greatly Improves Outcomes for Texas Stroke Patients

For seven years, a leading hospital system in Longview, Texas, has integrated a mobile healthcare communication technology with existing protocols to exceed national benchmarks for stroke treatment.

BACKGROUND

CHRISTUS Good Shepherd Medical Center – *Longview* in Longview, Texas, strives to provide superior care to its patients. A Joint Commission-certified primary stroke center, the hospital responds to an average of 60 time-sensitive stroke cases per month.

PROBLEM

Standardizing the time and communication channel in a stroke case is essential to creating life-saving outcomes. Every second counts when the brain is deprived of oxygen and all of the different care teams must be united to deliver appropriate treatment.

Jennifer Reeves, RN, MSN, ASC-BC

Jennifer Reeves, RN, MSN, ASC-BC, the stroke program coordinator at CHRISTUS Good Shepherd, has worked for eight years to support her team and patients by creating efficiencies in stroke care processes. Part of that role includes identifying current gaps and improvement opportunities.

"Shortening treatment times is critical to the quality of life and recovery of the patients," noted Reeves. She and her team focus on improving workflows and streamlining care to treat and rehabilitate stroke patients.

"One challenge we found was that everybody providing care was looking at their own clocks, which weren't necessarily in sync," said Reeves. "I may be looking at the time on my watch and the charge nurse could be looking at the one on the computer."

Beyond the challenge of everyone looking at a different clock, the team was also on different communication channels, none of which were interoperable with each other. This meant missing information and miscommunication in cases when clarity was needed the most.

SOLUTION

Reeves helped to implement Pulsara—a mobile collaborative communication platform that unites healthcare teams. In March 2013, the technology went live across the entire patient care team, including members from the EMS, ED, nursing, CT and neurology departments.

Without changing any established protocols, CHRISTUS Good Shepherd simply replaced legacy communication tools, such as pagers and phone calls, with a mobile, device-based app that streamlines sharing of critical patient information. The use of the app's universal clock ensured all of the responders were "on the same page."

With Pulsara, the entire care team activates stroke cases at one single point in time and receives all additional alerts and information simultaneously. This created a new level of cohesion in CHRISTUS Good Shepherd's stroke care processes.

"It cut down on the excessive word of mouth and allowed us to use one tool to communicate and one clock to refer to," said Reeves.

RESULTS

Since 2013, CHRISTUS Good Shepherd has diligently used Pulsara to improve patient care. In 2019, the hospital and its EMS partners successfully activated 472 stroke cases and achieved the following metrics:

- When EMS uses Pulsara, the stroke team is activated an average of 8 minutes BEFORE patient arrival versus 12 minutes AFTER patient arrival without Pulsara. That's a total of a 20-minute time savings for the stroke team to prepare and mobilize resources.
- 46-minute average door-to-needle for patients receiving tPA, down from 110-minute average time pre-Pulsara, a 59% decrease.
- 100% of all door-to-needle in under 60 minutes, 87% in under 45 minutes and 58% in under 30 minutes.

Recognizing their excellent stroke care practices, the American Stroke Association honored CHRISTUS Good Shepherd with the Target Stroke Elite Plus Quality Achievement Award in 2019.

The CHRISTUS Good Shepherd – *Longview* team hopes to share its success with other healthcare facilities in the area to build an even stronger system of care for stroke patients and continue to improve outcomes, together.

For additional studies, video demonstrations, and further information, visit our website at www.pulsara.com.

VIEW STUDY

STROKE

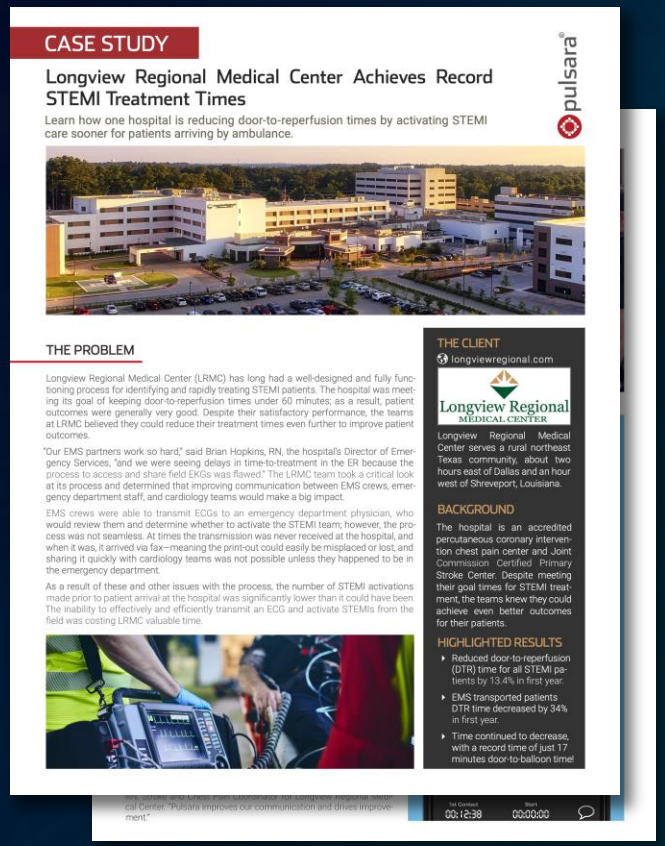
DOOR-TO-NEEDLE TIME

Improved Treatment Times for tPA

pulsara

Longview Regional Medical Center & Regional EMS Providers

East Texas


CASE STUDY

Longview Regional Medical Center Achieves Record STEMI Treatment Times

Learn how one hospital is reducing door-to-reperfusion times by activating STEMI care sooner for patients arriving by ambulance.

THE PROBLEM

Longview Regional Medical Center (LRMC) has long had a well-designed and fully functioning process for identifying and rapidly treating STEMI patients. The hospital was meeting its goal of keeping door-to-reperfusion times under 60 minutes; as a result, patient outcomes were generally very good. Despite their satisfactory performance, the teams at LRMC believed they could reduce their treatment times even further to improve patient outcomes.

"Our EMS partners work so hard," said Brian Hopkins, RN, the hospital's Director of Emergency Services, "and we were seeing delays in time-to-treatment in the ER because the process to access and share field EKGs was flawed." The LRMC team took a critical look at its process and determined that improving communication between EMS crews, emergency department staff, and cardiology teams would make a big impact.

EMS crews were able to transmit ECGs to an emergency department physician, who would review them and determine whether to activate the STEMI team; however, the process was not seamless. At times the transmission was never received at the hospital, and when it was, it arrived via fax—meaning the print-out could easily be misplaced or lost, and sharing it quickly with cardiology teams was not possible unless they happened to be in the emergency department.

As a result of these and other issues with the process, the number of STEMI activations made prior to patient arrival at the hospital was significantly lower than it could have been. The inability to effectively and efficiently transmit an ECG and activate STEMIs from the field was costing LRMC valuable time.

THE CLIENT

longviewregional.com

Longview Regional Medical Center

Longview Regional Medical Center serves a rural northeast Texas community, about two hours east of Dallas and an hour west of Shreveport, Louisiana.

BACKGROUND

The hospital is an accredited percutaneous coronary intervention chest pain center and Joint Commission Certified Primary Stroke Center. Despite meeting their goal times for STEMI treatment, the teams knew they could achieve even better outcomes for their patients.

HIGHLIGHTED RESULTS

- Reduced door-to-reperfusion (DTR) time for all STEMI patients by 13.4% in first year.
- EMS transported patients DTR time decreased by 34% in first year.
- Time continued to decrease, with a record time of just 17 minutes door-to-balloon time!

VIEW STUDY

DOOR-TO-REPERFUSION

With and Without EMS Transport

STEMI

70 MIN
60 MIN
50 MIN
40 MIN
30 MIN

60 MIN
56 MIN
52 MIN
40 MIN
36 MIN

23 MIN FASTER WITH EMS

33 MIN FASTER ALL PATIENTS

PRE-PULSARA AVERAGE

YEAR ONE AVERAGE

YEAR TWO AVERAGE

pulsara

Saint Mary's Regional Health System & Pope County EMS

Russville, Arkansas

pulsara

Pulsara Case Study: Arkansas Healthcare System

19% DECREASE IN TREATMENT TIMES

Arkansas Healthcare System Uses New Communication Approach to Improve STEMI Patient Outcomes

How a hospital and EMS agency collaborated to decrease average Door-to-Device (DTD) treatment time by 19 percent in four months.

BACKGROUND

Saint Mary's Regional Health System is a Joint-Commission-accredited Level III Trauma Center, located in Russellville, Arkansas. The 170-bed hospital has delivered care to the River Valley community for the past 90 years, and alongside Pope County EMS since 1967.

Saint Mary's and Pope County EMS have a long-standing relationship built on a shared value of putting patients first. As the only hospital and EMS agency serving their region, they together perform emergency response for 28,000 patients annually.

PROBLEM

The healthcare system wanted to improve the critical care process for STEMI patients from start to finish.

With that goal in mind, they identified two areas of opportunity: removing inconsistencies in the communication chain and finding a way to transmit 12-lead ECGs before patient hand-off.

SOLUTION

Knowing how critical efficient response and immediate activation of treatment for heart attack cases are to successful outcomes, the healthcare system realized using outdated technology such as pagers and phone calls would not enable them to meet their goal. It was obvious that a more progressive communication platform was needed.

Pope County EMS Director, Doug Duerr, learned about Pulsara — a mobile technology platform that streamlines patient care by connecting teams across organizations — while attending a state governor's advisory council meeting.

The technology caught his attention because "it was HIPAA-compliant and offered the ability to send 12-lead ECG data straight from the field."

He knew this would benefit both patients and personnel, creating positive strides in communication, quality improvement, patient outcomes, and data reporting. Equally important, it could integrate with hospital counterparts to accelerate the pre-hospital response for STEMI cases and help teams better prepare for patient arrival and appropriate intervention.

Duerr shared Pulsara and its capabilities with his colleagues at Saint Mary's for consideration as a system-wide communication tool for the EMS, emergency department, and cardiology teams.

Saint Mary's Chief Nursing Officer (CNO), Carol Gore, was immediately supportive of the platform's implementation. "It's interactive and allows the entire patient care team to communicate, whether it's EMS to the ED, EMS to the ED and Cath Lab, or to physicians," she said.

By June 2019, the technology was incorporated into the hospital's STEMI activation workflow and processes. While hospital staff education and training were underway, EMS partners were also setting up Pulsara on mobile devices for use in the field.

RESULTS

Saint Mary's and Pope County EMS' successful implementation of Pulsara resulted in a 19 percent improvement for the average STEMI DTD time.

From January to May 2019, 11 patients were treated with a 78-minute DTD time using the former process. After introducing Pulsara, 27 patients were treated with a 63-minute average DTD time from June to September 2019, a 19 percent decrease.

"The impact Pulsara has on timing and allowing cardiology to get the blood vessel opened is huge for our patients," said Gore.

Beyond these impactful time-saving achievements, Saint Mary's and Pope County EMS have seen other benefits from the networked communications Pulsara enables. Now, teams who were once siloed into their own organizations or departments within those organizations are unified around shared information centered on what matters most: the patient.

Motivated by these achievements, the healthcare system is expanding its use of Pulsara with more case types such as stroke, sepsis and trauma — all to expedite critical treatment when even seconds make a difference.

For additional studies, video demonstrations, and further information, visit our website at www.pulsara.com.

VIEW STUDY

STEMI

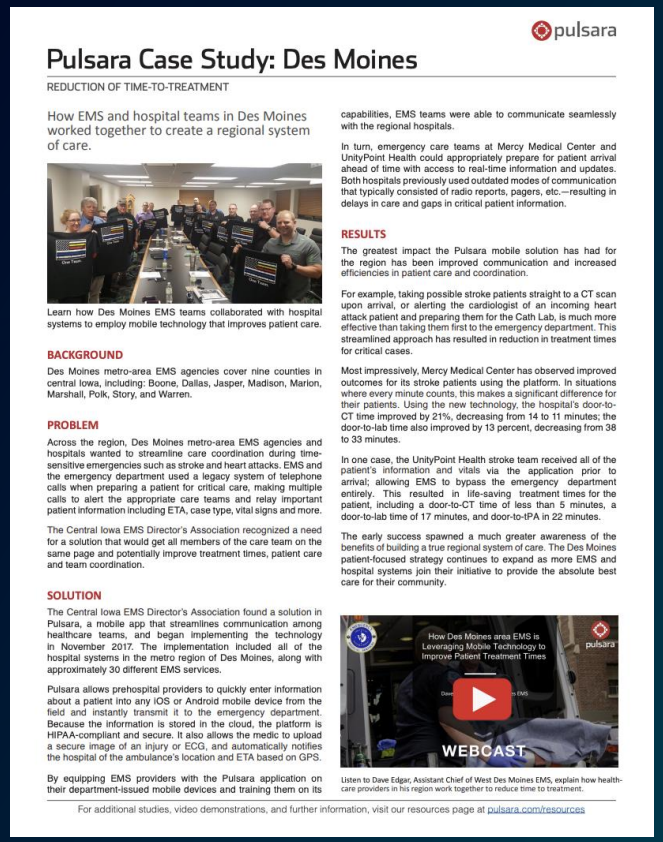
DOOR-TO-DEVICE TIME

More Cases Completed in Less Time

pulsara

Des Moines Metro Area

Des Moines, Iowa



pulsara

Pulsara Case Study: Des Moines

REDUCTION OF TIME-TO-TREATMENT

How EMS and hospital teams in Des Moines worked together to create a regional system of care.

Learn how Des Moines EMS teams collaborated with hospital systems to employ mobile technology that improves patient care.

BACKGROUND

Des Moines metro-area EMS agencies cover nine counties in central Iowa, including: Boone, Dallas, Jasper, Madison, Marion, Marshall, Polk, Story, and Warren.

PROBLEM

Across the region, Des Moines metro-area EMS agencies and hospitals wanted to streamline care coordination during time-sensitive emergencies such as stroke and heart attacks. EMS and the emergency department used a legacy system of telephone calls when preparing a patient for critical care, making multiple calls to alert the appropriate care teams and relay important patient information including ETA, case type, vital signs and more.

The Central Iowa EMS Director's Association recognized a need for a solution that would get all members of the care team on the same page and potentially improve treatment times, patient care and team coordination.

SOLUTION

The Central Iowa EMS Director's Association found a solution in Pulsara, a mobile app that streamlines communication among healthcare teams, and began implementing the technology in November 2017. The implementation included all of the hospital systems in the metro region of Des Moines, along with approximately 30 different EMS services.

Pulsara allows prehospital providers to quickly enter information about a patient into any iOS or Android mobile device from the field and instantly transmit it to the emergency department. Because the information is stored in the cloud, the platform is HIPAA-compliant and secure. It also allows the medic to upload a secure image of an injury or ECG, and automatically notifies the hospital of the ambulance's location and ETA based on GPS.

By equipping EMS providers with the Pulsara application on their department-issued mobile devices and training them on its capabilities, EMS teams were able to communicate seamlessly with the regional hospitals.

In turn, emergency care teams at Mercy Medical Center and UnityPoint Health could appropriately prepare for patient arrival ahead of time with access to real-time information and updates. Both hospitals previously used outdated modes of communication that typically consisted of radio reports, pagers, etc.—resulting in delays in care and gaps in critical patient information.

RESULTS

The greatest impact the Pulsara mobile solution has had for the region has been improved communication and increased efficiencies in patient care and coordination.

For example, taking possible stroke patients straight to a CT scan upon arrival, or alerting the cardiologist of an incoming heart attack patient and preparing them for the Cath Lab, is much more effective than taking them first to the emergency department. This streamlined approach has resulted in reduction in treatment times for critical cases.

Most impressively, Mercy Medical Center has observed improved outcomes for its stroke patients using the platform. In situations where every minute counts, this makes a significant difference for their patients. Using the new technology, the hospital's door-to-CT time improved by 21%, decreasing from 14 to 11 minutes; the door-to-lab time also improved by 13 percent, decreasing from 38 to 33 minutes.

In one case, the UnityPoint Health stroke team received all of the patient's information and vitals via the application prior to arrival; allowing EMS to bypass the emergency department entirely. This resulted in life-saving treatment times for the patient, including a door-to-CT time of less than 5 minutes, a door-to-lab time of 17 minutes, and door-to-tPA in 22 minutes.

The early success spawned a much greater awareness of the benefits of building a true regional system of care. The Des Moines patient-focused strategy continues to expand as more EMS and hospital systems join their initiative to provide the absolute best care for their community.

Listen to Dave Edgar, Assistant Chief of West Des Moines EMS, explain how health-care providers in his region work together to reduce time to treatment.

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VIEW STUDY

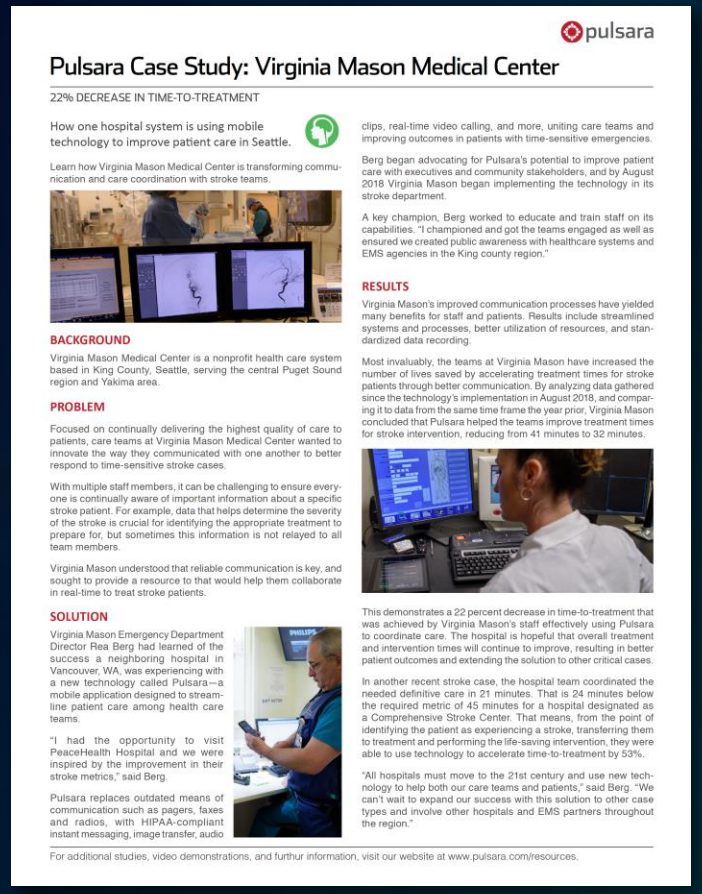
DOOR-TO-CT TIME

Faster High-Acuity Treatment Times

pulsara

Virginia Mason Medical Center

Seattle, Washington



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Pulsara Case Study: Virginia Mason Medical Center

22% DECREASE IN TIME-TO-TREATMENT

How one hospital system is using mobile technology to improve patient care in Seattle.

Learn how Virginia Mason Medical Center is transforming communication and care coordination with stroke teams.

BACKGROUND

Virginia Mason Medical Center is a nonprofit health care system based in King County, Seattle, serving the central Puget Sound region and Yakima area.

PROBLEM

Focused on continually delivering the highest quality of care to patients, care teams at Virginia Mason Medical Center wanted to innovate the way they communicated with one another to better respond to time-sensitive stroke cases.

With multiple staff members, it can be challenging to ensure everyone is continually aware of important information about a specific stroke patient. For example, data that helps determine the severity of the stroke is crucial for identifying the appropriate treatment to prepare for, but sometimes this information is not relayed to all team members.

Virginia Mason understood that reliable communication is key, and sought to provide a resource to that would help them collaborate in real-time to treat stroke patients.

SOLUTION

Virginia Mason Emergency Department Director Rea Berg had learned of the success a neighboring hospital in Vancouver, WA, was experiencing with a new technology called Pulsara—a mobile application designed to streamline patient care among health care teams.

"I had the opportunity to visit PeaceHealth Hospital and we were inspired by the improvement in their stroke metrics," said Berg.

Pulsara replaces outdated means of communication such as pagers, faxes and radios, with HIPAA-compliant instant messaging, image transfer, audio clips, real-time video calling, and more, uniting care teams and improving outcomes in patients with time-sensitive emergencies.

Berg began advocating for Pulsara's potential to improve patient care with executives and community stakeholders, and by August 2018 Virginia Mason began implementing the technology in its stroke department.

A key champion, Berg worked to educate and train staff on its capabilities. "I championed and got the teams engaged as well as ensured we created public awareness with healthcare systems and EMS agencies in the King county region."

RESULTS

Virginia Mason's improved communication processes have yielded many benefits for staff and patients. Results include streamlined systems and processes, better utilization of resources, and standardized data recording.

Most invaluably, the teams at Virginia Mason have increased the number of lives saved by accelerating treatment times for stroke patients through better communication. By analyzing data gathered since the technology's implementation in August 2018, and comparing it to data from the same time frame the year prior, Virginia Mason concluded that Pulsara helped the teams improve treatment times for stroke intervention, reducing from 41 minutes to 32 minutes.

This demonstrates a 22 percent decrease in time-to-treatment that was achieved by Virginia Mason's staff effectively using Pulsara to coordinate care. The hospital is hopeful that overall treatment and intervention times will continue to improve, resulting in better patient outcomes and extending the solution to other critical cases.

In another recent stroke case, the hospital team coordinated the needed definitive care in 21 minutes. That is 24 minutes below the required metric of 45 minutes for a hospital designated as a Comprehensive Stroke Center. That means, from the point of identifying the patient as experiencing a stroke, transferring them to treatment and performing the life-saving intervention, they were able to use technology to accelerate time-to-treatment by 53%.

"All hospitals must move to the 21st century and use new technology to help both our care teams and patients," said Berg. "We can't wait to expand our success with this solution to other case types and involve other hospitals and EMS partners throughout the region."

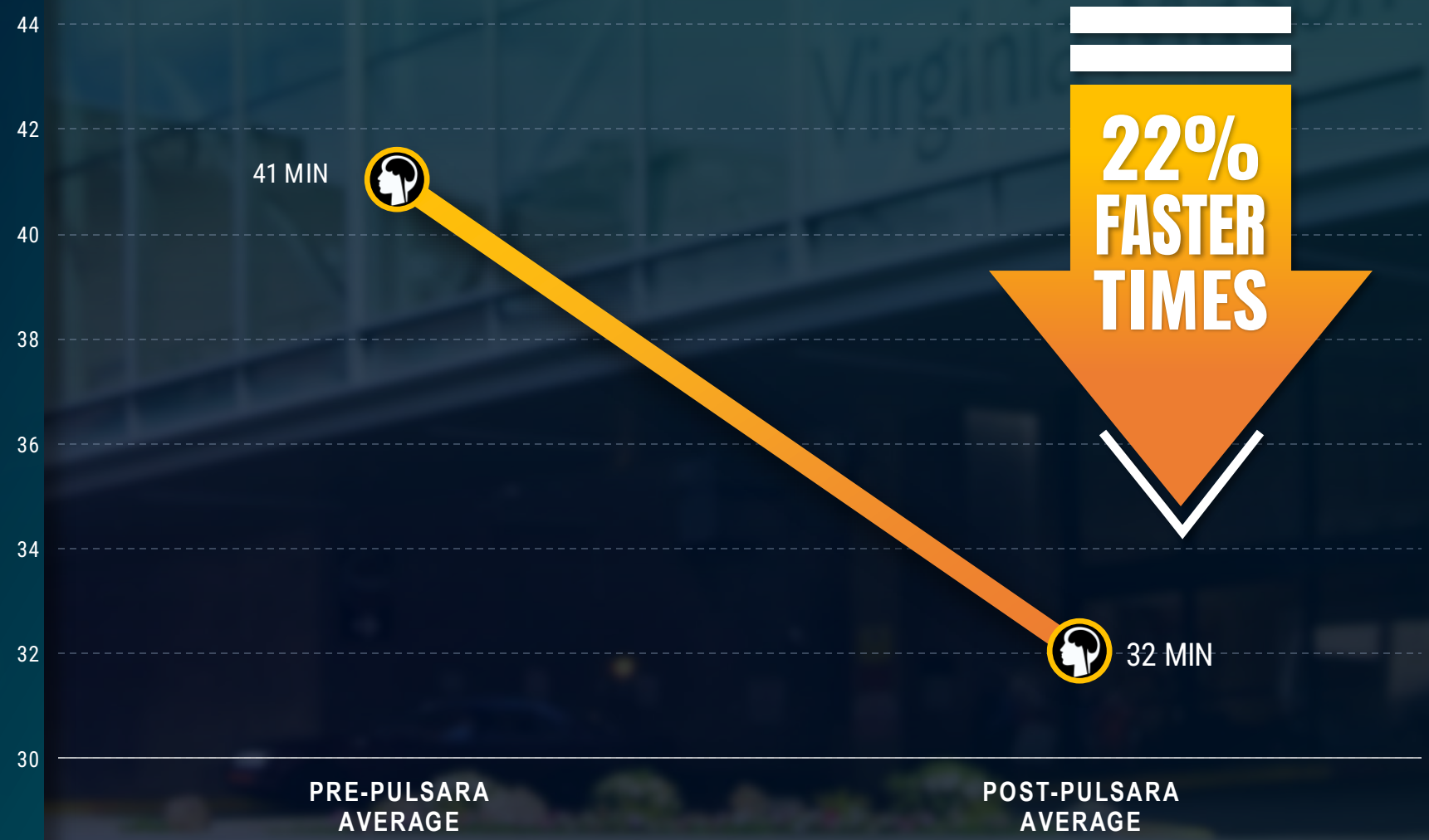
For additional studies, video demonstrations, and furthur information, visit our website at www.pulsara.com/resources.

VIEW STUDY

STROKE

TIME TO TREATMENT

Improvement In Treatment Times



pulsara

Cy-Fair EMS & North Cypress Medical Center

Cy-Fair Houston, Texas

pulsara

Pulsara Case Study: Cy-Fair Volunteer Fire Dept

REDUCTION OF CARDIAC TIME-TO-TREATMENT

How one EMS and hospital system worked together to cut door-to-balloon time for STEMI patients.

Cy-Fair Volunteer Fire Department (VFD) in Houston, Texas, implemented a new solution to streamline communication between the field and hospital teams – improving critical care for its STEMI patients.

BACKGROUND

Cy-Fair VFD's EMS division services a bustling 155 square miles of unincorporated Harris County outside of Houston's city limits, one of the nation's fastest growing areas.

PROBLEM

Responding to approximately 25,000 911 calls each year, with over 200 STEMI cases annually, the agency needed a way to better manage communication and improve response. Cy-Fair VFD identified that its performance for cardiac patients was below community standards. Exchange of data between the EMS service and North Cypress Medical Center – a 175-bed hospital covering the Northwest Houston region – was almost non-existent.

To initiate STEMI activations, EMS personnel were calling under the assumption that necessary patient information was being recorded by ED staff. But in reality, status and other important information from the field wasn't being effectively tracked.

Cy-Fair VFD estimated that the door-to-balloon time for STEMI patients was 90 minutes or less for only 60% of cases—well short of their goal of 90%. Both the EMS and hospital sides knew communication and data reporting needed to improve significantly.

SOLUTION

Mark Price, Quality Coordinator for Cy-Fair VFD, and his colleagues were determined to change the way the department activated STEMI cases in the field. After learning of Pulsara at a national EMS leadership conference, the agency approached North Cypress Medical Center about collaborating to improve communication between EMS and the hospital during these critical, time-sensitive cases.

Once activated from any mobile device, Pulsara instantly alerts all members of the critical care team, ensuring that everyone remains updated in real time. The team is notified and ready to go when the patient is, EMS knows whether they are taking the patient to the emergency department or straight to the cath lab, and pre-registration information is provided before arrival – shortening the patient's journey to definitive treatment.

Both hospital and EMS leaders immediately recognized the potential to improve communication and patient care, and they moved forward with testing the platform in November, 2014.

RESULTS

With Pulsara, Cy-Fair's EMS providers were able to provide North Cypress Medical Center's care teams with real-time, accurate patient information, which allowed the hospital to improve coordination and preparation.

By December 2015, just a year after implementing Pulsara, the EMS and hospital teams were achieving 90-minute door-to-balloon time with 85% of STEMI patients – a 25% improvement from 2014.

One of the most successful cases resulted in a record door-to-needle time for a 60-year-old man with a 100 percent occlusion. Using Pulsara, EMS activated the ER, cath lab, and cardiologist simultaneously within four minutes of patient contact. The patient arrived at North Cypress Medical Center just a few minutes later, where the care team performed life-saving interventions immediately, opening the occluded artery just 31 minutes (including an 8 minute transport time) after EMS first arrived at his side.

As a result of the drastic improvement, Cy-Fair received the American Heart Association's Mission: Lifeline EMS Gold Plus Award – a national recognition for EMS agencies that meet high standards of performance.

"Pulsara gave us the opportunity to see where our downfalls were and provide quality improvement to actually address the issues that were there," Price noted.

Additionally, relationships between EMS personnel and hospital staff improved, with the ability to now provide timely feedback throughout the patient journey. Having the feedback loop from Pulsara also led many of the EMS personnel to further educate themselves on the criteria for activating the STEMI team in order to reduce the number of false activations.

Cy-Fair has implemented Pulsara for stroke activation and is testing its use for all patients transported to North Cypress. The department has also begun implementation with a second hospital in the area, Cypress Fairbanks Medical Center – all to ensure continued positive outcomes for its patients.

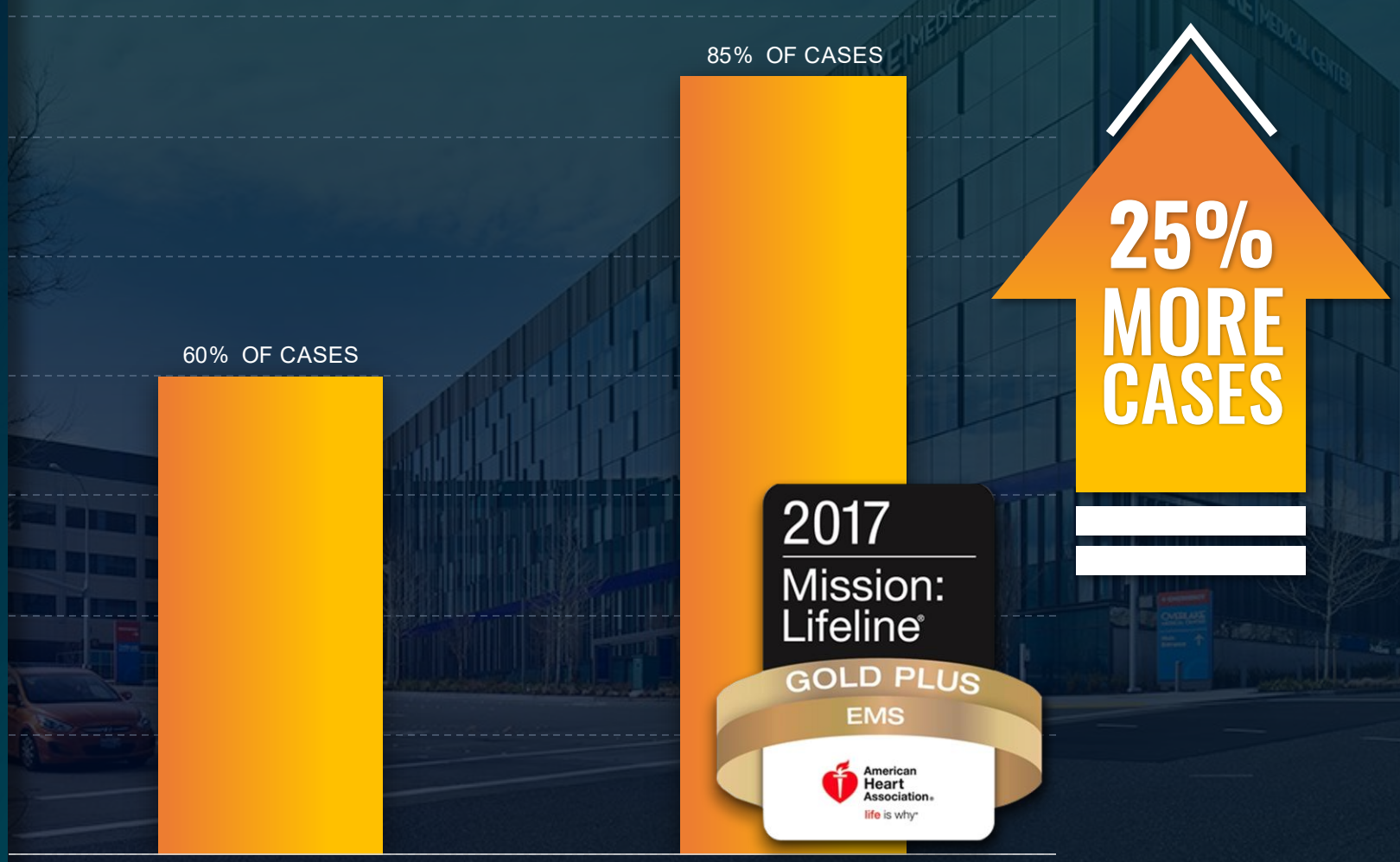
For additional studies, video demonstrations, and furthur information, visit our website at pulsara.com.

VIEW STUDY

STEMI

DOOR-TO-BALLOON TIME

Cases Completed Within 90 Min or Less



pulsara

St. Elizabeth Healthcare
Edgewood, Kentucky

pulsara

Pulsara Case Study: St. Elizabeth

REDUCTION OF CARDIAC TIME-TO-TREATMENT

How one hospital cut its door-to-balloon time for STEMI patients.

A Cincinnati-area health care system significantly cut down its time to treatment for cardiac cases using Pulsara.

BACKGROUND

St. Elizabeth Healthcare, based in Edgewood, Kentucky, serves a population of more than 400,000 across the Greater Cincinnati area, stretching from Northern Kentucky to Indiana and Ohio. St. Elizabeth is sponsored by the Diocese of Covington and is a member of the Mayo Clinic Care Network.

PROBLEM

Organizing a high-level response team for cardiac care is difficult. The process is typically akin to the game of telephone, with multiple calls and spoken reports going to and from the life squad, the ED, the physician on call, individual members of the cath team, room schedulers and the set-up team. At St. Elizabeth, like most health systems in the U.S., there was no overarching way to organize all the different team members and stakeholders, which could cause delays in treatment and disorganization behind the scenes.

In addition, working with many different EMS agencies with varying levels of in-the-field technology created a vast discrepancy among the amount and quality of the information the hospital received for each patient brought in.

St. Elizabeth was invited to participate in a research study called Leadership Saves Lives, led by Yale Global Health Leadership Institute. The goal of the study was to reduce inpatient heart attack deaths by influencing organizational culture. This involved creating a collaborative team of physicians, administrators, front-line staff, and pre-hospital representatives that worked together to address the issue of heart attack deaths from all angles.

SOLUTION

One of the significant recommendations from the team was for St. Elizabeth to adopt the Pulsara app. Pulsara is a technology that connects all stakeholders in a health care event such as a heart attack.

Once triggered by EMS in the field or by the emergency department in the hospital, the app instantly sends the patient's EKG to the cardiologist and alerts the on-call cath lab team. Within seconds, everyone who will interact with the patient is on the same page, preparations can be made, and ultimately, time to treatment is reduced.

St. Elizabeth is putting the Pulsara app in the hands of all Northern Kentucky EMS agencies willing to participate in the program. Several agencies joined initially, and others are still coming on board.

"This single point of instantaneous information speeds communication and creates a team of people all working together to literally beat the clock," said Mohanjit Brar, a cardiologist with the St. Elizabeth Heart & Vascular Institute. "The app includes a countdown clock so that everyone knows how they are doing against the benchmark time of 90 minutes."

This is particularly useful on evenings and weekends, Brar added, as it helps ensure that on-call physicians and staff are on their way to the hospital more quickly.

RESULTS

After adopting the recommended changes in the process of responding to heart attack patients from Leadership Saves Lives, including the implementation of Pulsara, the time from first medical contact to the moment of artery-opening treatment dropped 30 percent. Average times dropped from 103 minutes in the first quarter of 2016 to just 72 minutes in January 2017. This surpasses the national benchmark (set by the American Heart Association) of 90 minutes.

One of the other changes made in the process was to optimize the cardiologist call schedule for St. Elizabeth. This reduced hand-offs between doctors, as the interventional cardiologist now gets the call directly via Pulsara for every heart attack patient.

The Pulsara app includes a reporting feature that provides immediate feedback on the outcome at the close of the case to all involved. In addition, EMS coordinators provide a written report to all stakeholders, including the EMS teams, on the process, times, and more detailed patient outcomes within 48 hours. The report offers stakeholders the ability to identify opportunities for improvement as well as celebrate successes in a way not possible before.

The stronger feedback loop facilitated by the app and the coordinators was well received by EMS agencies, both as a way to highlight wins and identify ways to circumvent barriers.

"Pulsara gave us a platform to communicate and to facilitate consistency across 40 EMS agencies," said Vera Hall, chief nurse executive at St. Elizabeth. "It was so beneficial, first and foremost to our patients, and it continues to provide a better environment to foster partnerships."

For additional studies, video demonstrations, and further information, visit our website at pulsara.com.

VIEW STUDY

FASTER TREATMENT

First-Contact-to-Treatment Times

STEMI

110 MIN
100 MIN
90 MIN
80 MIN
70 MIN
60 MIN

103 MIN

72 MIN

AHA STANDARD

30% FASTER TIMES

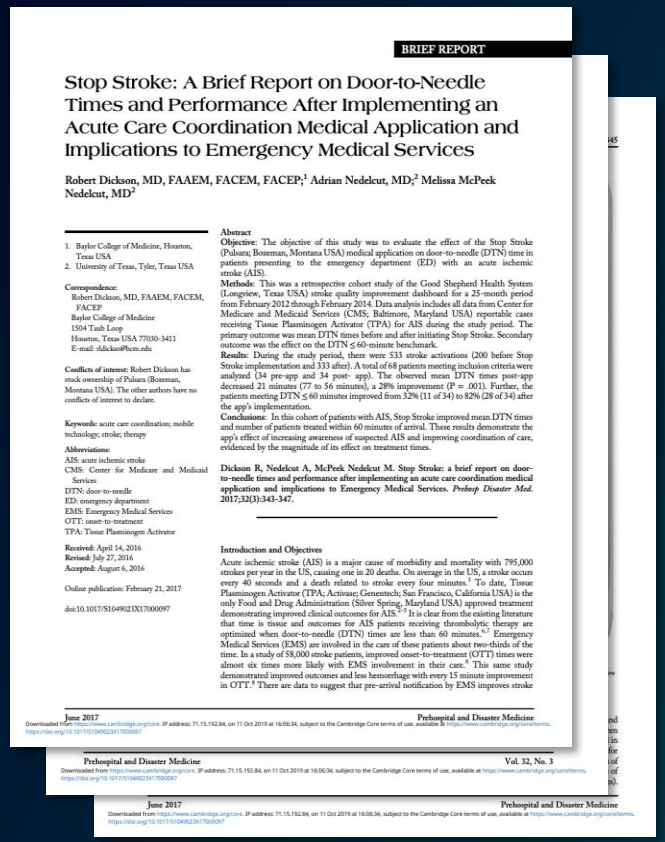
PRE-PULSARA AVG

POST-PULSARA AVG

pulsara

Stop Stroke Door-To-Needle Study

Longview, Texas



BRIEF REPORT

Stop Stroke: A Brief Report on Door-to-Needle Times and Performance After Implementing an Acute Care Coordination Medical Application and Implications to Emergency Medical Services

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Conflicts of interest: Robert Dickson has stock ownership of Pulsara (Bozeman, Montana USA). The other authors have no conflicts of interest to declare.

Keywords: acute care coordination; mobile technology; stroke; therapy

Abbreviations:
AIS: acute ischemic stroke
CMS: Center for Medicare and Medicaid Services
DTN: door-to-needle
ED: emergency department
EMS: Emergency Medical Services
OTT: onset-to-treatment
TPA: Tissue Plasminogen Activator

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Abstract

Objective: The objective of this study was to evaluate the effect of the Stop Stroke (Pulsara; Bozeman, Montana USA) medical application on door-to-needle (DTN) time in patients presenting to the emergency department (ED) with an acute ischemic stroke (AIS).

Methods: This was a retrospective cohort study of the Good Shepherd Health System (Longview, Texas USA) stroke quality improvement dashboard for a 25-month period from February 2012 through February 2014. Data analysis includes all data from Center for Medicare and Medicaid Services (CMS; Baltimore, Maryland USA) reportable cases receiving Tissue Plasminogen Activator (TPA) for AIS during the study period. The primary outcome was mean DTN times before and after initiating Stop Stroke. Secondary outcome was the effect on the DTN ≤ 60-minute benchmark.

Results: During the study period, there were 533 stroke activations (200 before Stop Stroke implementation and 333 after). A total of 68 patients meeting inclusion criteria were analyzed (34 pre-app and 34 post- app). The observed mean DTN times post-app decreased 21 minutes (77 to 56 minutes), a 28% improvement (P = .001). Further, the patients meeting DTN ≤ 60 minutes improved from 32% (11 of 34) to 82% (28 of 34) after the app's implementation.

Conclusions: In this cohort of patients with AIS, Stop Stroke improved mean DTN times and number of patients treated within 60 minutes of arrival. These results demonstrate the app's effect of increasing awareness of suspected AIS and improving coordination of care, evidenced by the magnitude of its effect on treatment times.

Dickson R, Nedelcut A, McPeek Nedelcut M. Stop Stroke: a brief report on door-to-needle times and performance after implementing an acute care coordination medical application and implications to Emergency Medical Services. *Prehosp Disaster Med.* 2017;32(3):343-347.

Introduction and Objectives

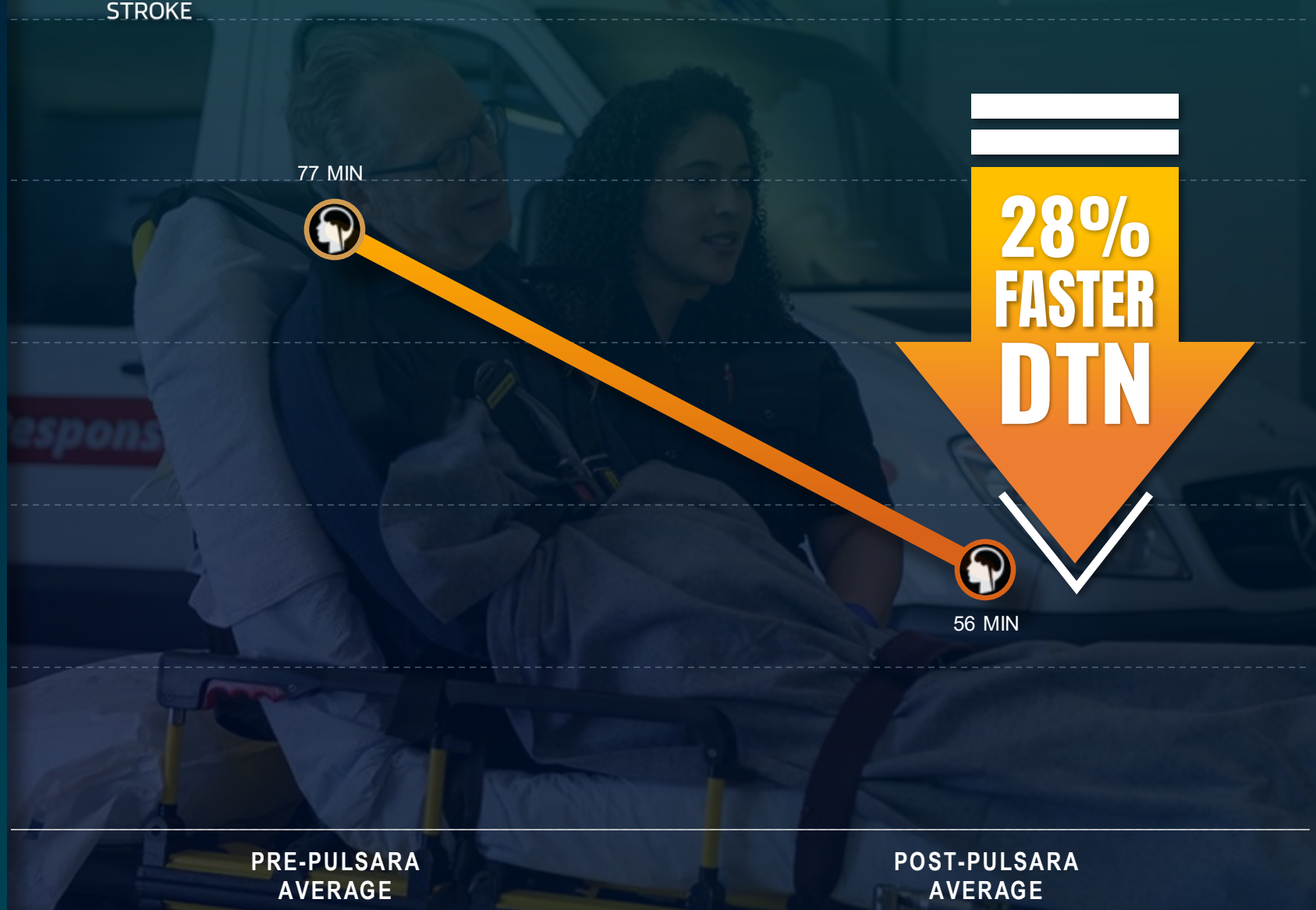
Acute ischemic stroke (AIS) is a major cause of morbidity and mortality with 795,000 strokes per year in the US, causing one in 20 deaths. On average in the US, a stroke occurs every 40 seconds and a death related to stroke every four minutes.[1] To date, Tissue Plasminogen Activator (TPA; Activase; Genentech; San Francisco, California USA) is the only Food and Drug Administration (Silver Spring, Maryland USA) approved treatment demonstrating improved clinical outcomes for AIS.[2-5] It is clear from the existing literature that time is tissue and outcomes for AIS patients receiving thrombolytic therapy are optimized when door-to-needle (DTN) times are less than 60 minutes.[6,7] Emergency Medical Services (EMS) are involved in the care of those patients about two-thirds of the time. In a study of 58,000 stroke patients, improved onset-to-treatment (OTT) times were almost six times more likely with EMS involvement in their care.[8] This same study demonstrated improved outcomes and less hemorrhage with every 15 minute improvement in OTT.[8] There are data to suggest that pre-arrival notification by EMS improves stroke

VIEW STUDY

STROKE

TIME TO TREATMENT

Improvement In Door-to-Needle Times



pulsara

St. Dominic Hospital

Jackson, Mississippi

pulsara

Pulsara Case Study: St. Dominic

REDUCTION OF DOOR-TO-NEEDLE TIME

How one hospital cut its door-to-needle time for stroke patients.

Using an innovative communication platform, a primary stroke center improved the quality of care for stroke patients.

BACKGROUND

St. Dominic Hospital is a 400 bed primary stroke center in Jackson, Miss. The soon-to-be comprehensive stroke center currently sees about 1100 stroke patients per year from all over the state, from transfers to "drip-and-ships." These patients are treated for a variety of strokes including ischemic strokes, hemorrhagic strokes and TIAs.

Wendy Barrilleaux has been the director of the program for four years. The stroke team includes six nurse practitioners, several neurologists and interventionalists, as well as emergency room and radiology staff. She recently adopted an innovative communication platform that allows all of the staff, as well as EMS providers, to connect with each other and share critical patient information.

PROBLEM

St. Dominic Hospital was looking to improve their door-to-needle time. The previous year's goal was to reduce the time to below 60 minutes, which was a success. While an average of less than 60 minutes is a praiseworthy time, when dealing with stroke patients, every second counts. "Time is tissue" is the oft-repeated mantra. In their effort to continually improve, this year St. Dominic aimed to reduce that time down to 45 minutes.

In addition, the previous stroke activation process really didn't start until the patient was at the hospital. This limited the amount of time that could be shaved off of the door-to-needle time and created tension among the staff. EMS would call in, but nothing would happen until the patient reached the hospital.

Then, there would be a lot of calling around to different people in the hospital passing information along. Some team members complained they didn't have the right information at the right time.

SOLUTION

Pulsara first came to Barrilleaux's attention at an international stroke conference in 2014. Unfortunately, at that time, the stroke program didn't have the budget to accommodate the implementation of the platform. However, when the cardiac program was looking for a solution to replace the one they used to transmit EKGs, they asked Barrilleaux if she had heard of a company called Pulsara.

"Pulsara was comparable in price," she said, "we got lucky." Pulsara's robust features could meet the needs of both departments, making it an ideal choice from a performance and budget angle.

"The implementation was very easy, especially compared to other implementations we've done in the past," said Barrilleaux. "With Pulsara, EMS activates [the stroke team via Pulsara] and we have the entire team ready in the ER, we have all the information we need. We just scan the patient and make a decision.

We can tell a lot from the app: if they're an IV tPA candidate or if we can cancel the stroke early, for example, if the patient resolves en-route to the hospital."

RESULTS

The results of the implementation were almost immediate. Since implementing Pulsara in June, door-to-needle time in the stroke program has decreased by an average of ten minutes.

From January to June, under the old system, the door-to-needle time hovered around 54 minutes. In the months since implementing Pulsara, that number has dropped to an impressive 44 minutes.

For interventional stroke cases, the hospital's goal is to have a door-to-puncture time of less than 120 minutes at least 75% of the time. The average door-to-puncture time was 107 minutes.

Prior to adopting Pulsara, St. Dominic was below the 120 minute threshold in 67.5% of cases. Once they adopted Pulsara, that number jumped to 86.6%, with an average door-to-puncture time of 98 minutes.

"The results were tremendous," said Barrilleaux.

In addition, Barrilleaux noted that EMS professionals appreciate the instant feedback that Pulsara provides. Previously, EMS would drop off the patient and often not hear back for weeks, if it all.

Now, they get an instant notification with treatment information. Within an hour, they know how the patient fared. "They really enjoy that," said Barrilleaux.

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VIEW STUDY

STROKE

TIME TO TREATMENT

DTN and DTP Times Improved

150
130
110
90
70
50
30
10

19% FASTER DTN

DTP BELOW 120 MIN GOAL

107 MIN

45 MIN

31 MIN

PRE-PULSARA AVERAGE

POST-PULSARA AVERAGE

pulsara

Ambulance Victoria and Bendigo Health Hospital

Melbourne, Australia

Improving acute cardiac and stroke treatment times by streamlining multi-disciplinary communication

Bagot KL,[1,2] Bladin CF,[1,2] Bernard S,[3] Vu M,[3] Smith K,[3] Budge M,[4] Nadurata V,[4] & Cadilhac DA[1,2]

Background

- Rapid treatment of patients with suspected acute stroke or cardiac events involves pre-hospital (paramedics) and hospital clinicians from multiple departments including: emergency, medical, neurology or cardiology, radiology or catheterisation laboratory.
- Clinicians repeat patient details using multiple communication methods (phone, fax, pager, face-to-face) and record details in various systems (Figure 1).
- Inefficient communication may contribute to treatment delays for these time-critical conditions.

Figure 1: Pre-Pulsara® communication flow

Aim

To determine if a smartphone communication app improves management timelines for patients with suspected acute stroke or cardiac events.

Methods

- A pilot study with a 6 month pre-post historical control design was used. Participants were patients with a suspected acute stroke or cardiac event in a Victorian regional hospital and 11 Ambulance Victoria (AV) branches.
- The Pulsara® Stop Stroke™/STEMI™ smartphone app (Pulsara www.pulsara.com) was deployed to paramedics, and hospital clinicians and departments. Pulsara® is designed for secure, two-way, real-time communication with all personnel receiving the same information simultaneously (Figure 2), including photos (e.g., drivers licence for pre-registration, medication lists; Figure 3), estimated time of arrival and case summary post-treatment delivery.
- Clinical care process times (hospital arrival, assessment, treatment) were captured from usual AV and hospital systems.

Figure 2: Pulsara® communication flow

Figure 3: Pulsara app screen shots: a) select patient condition, b) enter patient symptoms, c) adding images (e.g., drivers licence) or messages, d) alert ED.

Results

- Pulsara was activated by AV (n=45) and Hospital (n=23).
- Cohorts were similar for suspected stroke (pre/post: n=107/176 patients; median age 80/77 years; 49%/48% male) but an older, fewer male suspected cardiac pre cohort (pre/post: n=11/24 patients; median 71/60 years; 67%/79% male).
- Median minutes and interquartile ranges reported.

✓ Faster AV metrics when Pulsara used:

- Hospital arrival to triage time 2 & 3 minutes faster, p<.002
  STEMI: pre n=11, 5 mins (2,7), post n=14, 3mins (.2,4)
  Stroke: pre n=28, 7 mins (4,14), post n=42, 4 mins (2,7)
- Hospital arrival to off-stretcher 5 & 8 minutes faster, p<.01
  STEMI: pre n=11, 12 mins (7,35), post n=14, 7 mins (4,12)
  Stroke: pre n=28, 20 mins (13,31), post n=42, 12 mins (4,14)
- Hospital arrival to departure 10 minutes faster, p=.006
  Stroke: pre n=28, 55 mins (44,62), post n=42, 45 mins (35,52)

✓ Reduced times for hospital processes recorded:

- Stroke door-to-CT completed 23 minutes faster, p=.00
  pre n=48, 46 mins (28,76), post n=33, 23 mins (16,40)
- Stroke door-to-needle times 33 minutes faster, p=.02
  pre n=5, 111 mins (84,113), post: n=9, 78 mins (61,91); more patients <60 minutes: pre 0/5 (0%), post 2/8 (25%)
- STEMI Door-to-balloon times faster by 28 minutes
  compared to VCOR hospitals with pre-notification n=717, 55 mins (40,76), Pulsara n=5, 27 mins (26,31)

Conclusion

- The Pulsara® app was implemented for the first time outside of America, and was well - utilised by paramedics and hospital clinicians.
- Pilot results indicated faster timelines for the delivery of care to patients with acute stroke or acute cardiac events. These changes improved AV and hospital metrics.
- A 12-month trial is now underway involving two regional hospitals in Victoria and 25 AV branches.

VIEW STUDY

STROKE

TIME TO TREATMENT

Improvement In DTN and DTCT Times