PHYSIO CONTROL

LUCAS™ CHEST COMPRESSION SYSTEM

CASE STUDY

Teamwork and attention to detail at every level of care enhances patient outcomes at Allina

The Setting

A humble three-story brick building in St. Paul's historic downtown area belies the sophistication, forward-thinking and commitment of Allina Medical Transportation. Inside, the committed administrative and dispatch staff are at the heart of this stellar emergency medical services (EMS) system that provides care to 11 counties in both urban and rural Minnesota.

With more than 460 employees and 92 vehicles (60 of them ambulances), Allina EMS is one of the region's largest ambulance and medical transport services. Allina EMS personnel make approximately 60,000 ambulance responses per year, with 79 percent of their business being 9-1-1 emergency calls. On average, they make more than 2,000 daily radio, phone and other transactions, and nearly 200 daily ambulance and inter-facility calls. The largest employer in Minnesota, the Allina system also includes about 80 clinics, 11 hospitals, and a cluster of specialty care services, such as hospice, home oxygen and medical equipment, laboratory and pharmacy, in addition to ambulance and dispatch services.

Dr. Charles Lick, Medical Director

Allina EMS is a nonprofit agency funded almost entirely by user fees, with 52 percent of revenues from Medicare and Medicaid. Due to the faltering economy, charity care increased from 11 percent last year to 16 percent the last quarter of 2008.

From a Public Access Defibrillation Program to a Powerful Lifesaving Protocol

Founded in the 1920s, Allina EMS evolved into a leader at the forefront of advances in emergency medical care practices and protocols over the years. The Allina EMS team believes this is due to physician leadership and an environment that supports innovation, along with world-class cardiologists in the area and the agency's commitment to the more than 80 communities it serves.

Don Kostohryz, paramedic, with the "Allina Survival Kit": LUCAS Chest Compression System, LIFEPAK 12 Defibrillator/Monitor and ResQPOD®

Brian LaCroix, president of Allina Medical Transportation, the system's EMS division, and a paramedic himself, explained that all healthcare organizations in Minnesota are required to be nonprofit, and as such do not pay taxes. In turn, they are expected to demonstrate a community benefit. As part of their commitment to the community's health, Allina EMS has helped place more than 1200 automated external defibrillators (AEDs) through the Heart Safe Program founded in 2001 by Dr. Charles Lick, medical director. The successes resulting from this program led Allina EMS to expand its in-field cardiac-related therapies and treatments by giving their medics the LUCAS Chest Compression System. LUCAS is designed to provide mechanical chest compressions to a patient in cardiac arrest.

Under Dr. Charles Lick's medical direction, Allina was an early implementer for a number of EMS treatments, including amiodarone, Vasopressin, the ResQPOD Impedance Threshold Device, and quick adoption of the latest American Heart Association CPR guidelines. In 2007 the trial with the LUCAS Chest Compression System began, with 30 devices. That same year, Allina hospitals began cooling treatment of cardiac arrest patients who had return of spontaneous circulation (ROSC) in order to help preserve neurological function. Currently there are 35 LUCAS devices deployed in ambulances and six LUCAS devices in Allina hospitals' emergency departments (EDs).

Dr. Lick said, "First responders like it [LUCAS]. It does a better job [than manual compressions].'" The first time they see LUCAS, their eyes get big, and then they step back and think, 'Oh, that's how I'm supposed to have been doing CPR for the last 20 years?'"

"It used to be everyone focused on a particular task. With LUCAS, I delegate. It's amazing. Codes run better."
Steve Hagstrom, Paramedic and Clinical Coordinator

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"In the past, EMS personnel would feel discouraged traveling to the scene of a cardiac arrest, knowing the patient most likely wouldn't survive," said Steve Hagstrom, paramedic and clinical coordinator. "We used to feel good about doing everything right, but the patients still usually died. With LUCAS we know that if we do everything right the patient can survive."

Hagstrom also said that Allina used to have a few cardiac arrest survivors a year, and currently they have several a month. "Now paramedics ask, "If I didn't get the patient back, why not?" and also pointed out that personnel reacted very positively to LUCAS. "They can put it on in as little as 15 seconds," he said.

Tim Burke, public relations manager, said that EMS personnel think about "taking care of what's up here," indicating the brain by pointing to his head. "Medics worry about the patient's insurance and about creating a burden on the family. It's gone from that thinking to 'this person could leave the hospital.'"

Susan Long, director of clinical and support services, said, "Change can be hard at times but the addition of the LUCAS device to our ambulance equipment has been wonderful. Crews and first responders love it—it makes the scene of a cardiac arrest go smoother and provides better CPR than we can provide manually…." After first trialing another chest compression device, Allina chose the LUCAS Chest Compression System because they found it lighter to carry and easier to use and maintain.

Susan Long, Director of Clinical and Support Services

"To say LUCAS is well received is a huge understatement," said LaCroix. "It helps people feel they are part of something really special – and move a needle [SCA survival rates] that hasn't been moved in 40 years."

Improved patient outcomes led to more protocol changes

Brian LaCroix, President

Allina is fortunate in that all their facilities are fully integrated with one medical records system. This makes it easy to follow patient outcomes through discharge from the hospital, and is an incredible advantage for measuring outcomes. Their data shows that LUCAS is contributing to positive patient outcomes.

Dr. Lick said, "Allina compared our data from the first six months of 2007 before LUCAS was implemented, with data collected the first six months of 2008 with LUCAS in use. There was initially an overall five percent increase in survival with LUCAS, to hospital discharge neurologically intact. In one subset—with downtime less than 10 minutes, no asystole as the presenting rhythm, and transport to an Allina hospital—LUCAS has improved neurologically intact survival 18% (from 31% to 49%)."

Allina EMS recently changed its protocol to include an additional 15 minutes of CPR before calling a code (45 minutes total). The reason is because since implementing LUCAS, they are seeing more patients who return to ROSC after extended CPR and who are doing well after leaving the hospital. "The theory is that it takes a while to prime the pump and get the heart restarted. We've had a number of these types of cases," Dr. Lick said. Hagstrom noted that EMS personnel have embraced the protocol change. Without LUCAS, he doubts they would be as receptive, and they would think, "Oh no, more fatigue for what cause?" He added, "It used to be everyone focused on a particular task. With LUCAS, I delegate. It's amazing. Codes run better."

Details make a difference in saving lives

Attention to detail is one factor contributing to Allina's reputation for excellence in prehospital and hospital care. They have exceptional door-to-balloon (D2B) times. They are participants in "Take Heart America," a national, four-city demonstration project designed to increase survival from SCA by implementing lifesaving details throughout the chain of survival. Dr. Lick said, "LUCAS is a critical link in the 'Take Heart' initiative."

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Charles Lick, MD, Medical Director

"The first time they see LUCAS, their eyes get big, then they step back and think, 'Oh, that's how I'm supposed to have been doing CPR for the last 20 years?'"

Charles Lick, MD, Medical Director

Allina EMS also uses what they call "Pit Crew CPR Protocol," in which everyone is assigned a role, similar to mechanics in the pit crews for race cars. Dr. Lick said, "Dr. Robert Tober of Naples Florida EMS pioneered this concept, and Allina EMS expanded on it." A "CPR Bag," contains a printed protocol for ventricular fibrillation, and on the opposite side, another for ventricular tachycardia, along with drugs appropriate for treating each arrhythmia. Everything is organized in an intuitive way so it is readily available when needed. Allina also has protocols for asystole and pulseless electrical activity (PEA). They reported that all these protocols have improved survival rates.

Hagstrom explained that Allina EMS personnel added two grommets on the front of the LUCAS carrying case so a plastic tag can be inserted to alert medics the device is inspected and ready to go. Pyxis, an automated supply system, helps them store and track LUCAS. Allina EMS personnel added a felt tipped pen in each LUCAS bag to enable medics to mark the original placement of the device on the patient's chest so they can check positioning during the code.

Strengthened relationships for a system-wide approach

Kristin A. Williams and David Maximovich,
Allina EMS Personnel

Perhaps an unexpected benefit of having LUCAS onboard is the strengthening of relationships between EMS, fire, police and hospital staff. Dr. Lick said, "We have a great partnership between first responders (police and fire) and ALS. Allina EMS doesn't have the equipment to fill the air tanks [for LUCAS] so we work with local fire departments to refill them. This partnership with us helps first responder teams in their own communities, by being part of something effective and good." Hagstrom also noted that LUCAS has strengthened relationships with hospital emergency department staff, who like the benefits LUCAS provides.

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Barb Unger, RN, director of six cardiovascular emergency programs at Abbott Northwestern Hospital, said, "We instituted the therapeutic hypothermia process in 2006. Over 125 patients have benefited from this collaborative model for resuscitation. Cath lab staff and nurses received specific training on how to use the LUCAS device."

She noted that teamwork and attention to detail at every level of care add up to make a significant difference for patients experiencing acute coronary syndromes. For example, at her recommendation medics now remove a patient's lower body clothing on the way to the hospital so the patient can be immediately prepped for the cath lab upon arrival. Allina paramedics are instrumental in teaching other EMS teams how to care for patients experiencing acute cardiac problems, she noted.

Unger reported that "A recent case from Allina's Buffalo Hospital received the benefit of the LUCAS device for close to 50 minutes before the patient had an established rhythm. A gentleman in his 80s collapsed in the parking lot of Buffalo Hospital. Care was initiated at the hospital, including cooling, and the patient was then transferred directly to Abbott Northwestern's cath lab for simultaneous treatment of STEMI and therapeutic hypothermia. Even after the lengthy use of LUCAS, this man walked out of the hospital both cardiac and neurologically intact.

Allina EMS, ED staff, intensivists and cardiologists working together have contributed to great outcomes for this very critically ill group of patients. We continue to see unbelievable outcomes from cardiac arrests with this extremely well developed system."

Summary

The addition of LUCAS to Allina Medical Transport has elevated the level of care for both the provider and the patient.

- Medics are energized by the benefits offered by LUCAS. They embraced protocol changes that increased time for compressions rather than thinking, “Oh no, more fatigue for what cause?”
- Medics are more positive and proactive in cardiac arrest cases, as they now believe there is a significant chance these patients can have a good outcome.
- Prehospital and hospital care are integrated. Attention to detail at every level of care adds up to a significant difference for patients experiencing acute coronary syndromes.
- There are many pieces to the puzzle of success and small details and careful follow-through on everyone’s part makes a significant difference in saving time and saving lives.
- The system is seeing cardiac arrest patients “walk out” [of the hospital] and return to their lives neurologically intact.

The energy and enthusiasm Allina EMS personnel have for their work is almost palpable. It is sure to carry them far as they strive to save more lives in their communities in the years to come.

“To say LUCAS is well received is a huge understatement. It helps people feel they are part of something really special—and move a needle [SCA survival rates] that hasn’t been moved in 40 years.”

Brian LaCroix, President

Statements attributable to individuals in this case study reflect the opinion of the individual and do not necessarily reflect the opinions of Physio-Control. For information about specific product claims and labeling, refer to the device operating instructions.
Photographs courtesy of Allina Medical Transportation and Physio-Control, Inc.

For further information please contact your local Physio-Control representative or visit www.physio-control.com

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