Agency: Commerce, Community and Economic Development

Grants to Named Recipients (AS 37.05.316)

Grant Recipient: Girdwood Volunteer Fire Department

Project Title: **Project Type:** Equipment and Materials

Girdwood Volunteer Fire Department - CPR Resuscitation Devices

State Funding Requested: $25,559 **House District:** Anchorage Areawide (11-27)
One-Time Need

Brief Project Description:

Emergency Medical Service Equipment LucasII Mechanical Cardio Pulmonary Resuscitation (CPR) Device.

Funding Plan:

Total Project Cost:	$33,331
Funding Already Secured:	($7,772)
FY2015 State Funding Request:	($25,559)
Project Deficit:	$0

Funding Details:

2014 - Manufacturing Discount granted by PhysioControl at 20% off list price total discount $4972

2014 - Girdwood Fire Department approves funding 10% of total project cost or $2800

Detailed Project Description and Justification:

Girdwood Volunteer Fire Department is requesting funding for two automated cardiopulmonary resuscitation (CPR)devices. The Lucas II is a battery operated piston strapped on a backboard secured to the patient's chest during cardiac arrest. Unlike traditional CPR, once positioned properly, the Lucas II device allows consistent and uninterrupted CPR all the way into the emergency room and cardiac surgery suite. Once the Lucas II device is strapped on a patient, it isn't removed even as the hospital performs emergency surgery on the patient. Obtaining this device will dramatically change cardiac arrest survivability.

In the past, out of hospital cardiac arrest patients who had a coronary artery blockage too severe to allow the heart to be restarted would not be transported to the hospital. The difficulty of providing manual, uninterrupted CPR sufficiently to circulate blood to the brain and vital organs for the length of time needed to transport patients to the hospital is not realistic and make any further treatment unlikely, especially in rural Alaska. The use of high quality mechanical CPR devices now allows a patient to be transported while maintaining circulation. This scenario is not a futuristic dream: it is happening right now in cities across the country and in Anchorage. Patients in complete cardiac arrest who would have been left for dead just a few years ago are now surviving. The Lucas II has a mechanical chest compression rate of 100 compressions per minute that provides the patient the best possible chance for survival and meets the best recommendations of the American Heart Associate. Without the uninterrupted top quality CPR provided by the Lucas II many victims of sudden cardiac arrest will not survive.

Contact Name: Vivian Stiver
Contact Number: 465-4861

For use by Co-chair Staff Only

$25,559 Approved

11:56 AM 5/13/2014

Anchorage Fire Department ambulances all use the highly portable Lucas II Device, funded through the legislature in fiscal year 2011, and are reporting improved outcomes through use of the device. The Girdwood Fire Department has not received funding for these devices for our two ambulances, Medic 41 and Medic 42. The total cost of two Lucas II Devices, as quoted by the manufacturer, is $28,359.

Project Timeline:

Being that this is critical life saving medical equipment it is our hope to have two of the LucasII devices in service by August of 2015. Web are ready to purchase immediately upon receipt of funds and have already contacted two highly regarded emergency physicians to provide training. No funds will be needed for this training, and it will be completed within the first 3 months of receiving funding for all responders of all levels at Girdwood Fire Department.

Entity Responsible for the Ongoing Operation and Maintenance of this Project:

Girdwood Fire Department

Grant Recipient Contact Information:

Name:	Terry L. Kadel
Title:	EMS Deputy Chief
Address:	PO Box 915
	Girdwood , Alaska 99587
Phone Number:	(907)783-2511
Email:	kadeltl@muni.org

Has this project been through a public review process at the local level and is it a community priority? [X] Yes [ ] No

For use by Co-chair Staff Only:

11:56 AM 5/13/2014

Contact Name: Vivian Stiver
Contact Number: 465-4861

Girdwood Volunteer Fire Department

P.O. Box 915 Girdwood, Alaska 99587 Phone 783-2511 Fax 783-3122 E-Mail fire@girdwoodfire.com
A non-profit corporation Tax ID 92-0164627

February 7, 2014

Senator Cathy Giessel
745 W. 4th Avenue Suite 220 Ro
Anchorage, Alaska 99501

Dear Senator Giessel:

Girdwood Volunteer Fire Department is requesting funding for an automated cardiopulmonary resuscitation (CPR) machine. The Lucas II is a battery operated piston strapped on a backboard secured to the patient's chest during cardiac arrest. Unlike traditional CPR, once positioned properly, the Lucas II device allows consistent and uninterrupted CPR all the way into the emergency room and cardiac surgery suite. Once the Lucas II device is strapped on a patient, it isn't removed even as the hospital performs emergency surgery on the patient. Obtaining this device will dramatically change cardiac arrest survivability.

In the past, out of hospital cardiac arrest patients who had a coronary artery blockage too severe to allow the heart to be restarted where they collapsed were not even transported to the hospital. The difficulty of providing uninterrupted CPR of a sufficient quality to circulate the brain and vital organs for long enough to get the patient to surgery made any further treatment unfeasible, especially in rural Alaska. The use of high quality mechanical CPR now allows a patient to be transported for emergency catheterization of the coronary artery to restore blood flow to the heart muscle tissue while maintaining circulation. This scenario is not a futuristic dream: it is happening right now in cities across the country and in Anchorage. Patients in complete cardiac arrest who would have been left for dead just a few years ago are now surviving to walk out of the hospital. The Lucas II has a mechanical chest compression rate of 100 compressions per minute that provides the patient the best chance for survival possible and meets the best recommendations of the American Heart Associate. Without the uninterrupted top quality CPR provided by the Lucas II many victims of sudden cardiac arrest will not survive.

Anchorage Fire Department ambulances all use the highly portable Lucas II Device, funded through the legislature in fiscal year 2011, and are reporting improved outcomes through use of the device. The Girdwood Fire Department has not received funding for these devices for our two ambulances, Medic 41 and Medic 42. The total cost of two Lucas II Devices, as quoted by the manufacturer, is $28,359.

The Lucas II device is a necessity for the challenging, road based transport of patients in our extensive service area south of Anchorage. Traditional CPR is intensive and requires medics to quickly switch places to maintain proper depth and rate. Every break in CPR, no matter how slight, decreases likelihood of survival. With times from 9-1-1 call to arrival at the hospital of at least 1 hour in our service area, a mechanical CPR device is necessary. Furthermore, the fully automated Lucas II device allows ambulance personal to remain seated and buckled-up during the dangerous Seward Highway patient transport. In addition, the Lucas II is compact enough to fit in the confines of a helicopter ambulance, a space too small to make traditional CPR possible.

Modern technology and positive outcomes, not passionate use of outdated techniques, saves lives. At Girdwood Fire Department we have recognized the imperative for the Lucas II devices on our ambulances. The small size and battery operated nature of the device allows portability, as well as rapid recharge and reuse.

As a busy resort community, cardiac calls are among our most serious responses. We provide top-notch care during our long transport times through commitment to training, progressive and current techniques, and modern equipment. Yet, without the addition of two Lucas II devices to our ambulances we are unable to extend this level of care to victims of sudden cardiac death will allow residents and visitors in our service area to have increased access to care, and increased survivability during a cardiac event.

The demographic of heart attack victims includes men and women, old and young. The Lucas II device is strapped directly to the chest of the patient and can be used on individuals from young adulthood to retirement, of varying weight and body type. The ability to provide uninterrupted CPR with the Lucas II Device extends to anyone, even in difficult and off-road situations.

Training on the Lucas II Device will be supervised by Dr. Cadogan and Dr. Levy, both of Alaska Regional Hospital. Training will extend to all members of the Girdwood Fire Department, preparing them for this modern and increasingly universal trend in advanced cardiac care.

All road and rail visitors to the Kenai Peninsula pass through the Girdwood Fire Department service area. The purchase of these two Lucas II devices will extend life saving ability to not just our service area of the Turnagain Arm Communities, but also the numerous visitors to the Kenai Peninsula and the Chugach National Forest each year.

Please consider allocating funds from CAPSIS for the purchase of two Lucas II Devices for the Girdwood Fire Department in Fiscal Year 2015.

Thank You,

William D. Chadwick
Fire Chief

ANCHORAGE FIRE DEPARTMENT

Headquarters
100 East 4th Avenue
Anchorage, Alaska 99501
Phone (907) 267-4936 / Fax (907) 267-4977

Dan Sullivan
Mayor

P. Chris Bushue
Fire Chief

February 6, 2014

William Chadwick
Fire Chief
Girdwood Volunteer Fire Department
Girdwood, Alaska

Dear Chief Chadwick:

Girdwood Volunteer Fire Department does an outstanding job caring for the sick and injured a great distance from Anchorage. I know that the miles separating Girdwood from definitive care in Anchorage can lead to desperate situations in such cases as cardiac arrest. Mechanical compression devices for CPR can provide a vital bridge in such instances. I advocate the use of mechanical compression in this situation for two reasons: 1) reliable, high quality CPR freeing personnel for other life-saving interventions and 2) provider safety: it is simply unacceptably dangerous for our crews to do CPR in a moving ambulance.

We have found the Physio-Control Lucas 2 to be the best current device and is the only type we use in Anchorage. It is my hope that you can find funding to provide the residents of Girdwood with this technology.

Sincerely,

Michael Levy, M.D, FACEP, FACP, DABEMS
Medical Director
Anchorage Fire Department
Areawide EMS Anchorage

Girdwood Volunteer Fire Department

P.O. Box 915 Girdwood, Alaska 99587 Phone 783-2511 Fax 783-3122 E-Mail fire@girdwood.net
A non-profit corporation Tx ID 92-0164627

February 7, 2014

Dear Senator Giessel:

As the Medical Director for Girdwood Fire Department, I feel that supporting our EMS Volunteers with funding for the Lucas 2 device would be of great benefit for our critically ill subset of patients. We work in an environment with prolonged transport times and limited resources, in which case having mechanical compression devices such as the Lucas 2, which has been proven effective, and can play a vital role in providing high quality CPR to our community.

I have had personal experience with this device both in the pre-hospital setting with the Anchorage Fire Department and in the emergency department and cath lab and have been very impressed with the results. Good outcomes from cardiac arrest are dependent on the continuum of care provided both pre-hospital and in-hospital personnel.

I strongly believe this device is a step forward toward better outcomes for patients in cardiac arrest. I understand that this comes at a financial cost, but one that I feel is easily justified by the benefit provided to our community.

Sincerely,

DCa

David Cadogan, MD
Medical Director, Girdwood Volunteer Fire Department
Member, Mayors Advisory Board for EMS
Quality Medical Director, Alaska Regional Hospital

ANCHORAGE FIRE DEPARTMENT

Headquarters
100 East 4th Avenue
Anchorage, Alaska 99501
Phone (907) 267-4936 / Fax (907) 267-4977

Dan Sullivan
Mayor

Chris Bushue
Fire Chief

February 7, 2014

William Chadwick, MICP
Fire Chief
Girdwood Fire Department
Girdwood, Alaska

Chief Chadwick:

As you are aware, rescuers often perform CPR manually by compressing the chest with their arms and hands. To be effective, these chest compressions must be delivered quickly, forcefully and consistently. During manual compressions, the intensity and consistency tends to vary with each rescuer and most reach their limit of endurance within several minutes after starting manual CPR.

From 2008 through 2010, the AFD was one of four agencies from across the United States to participate in the North American LUCAS Evaluation (NALE) project to study the usability of a mechanical device during treatment of cardiac arrest. The consistency and duration of the mechanical devices were found to decrease the amount of time CPR was interrupted to change out rescuers performing manual CPR and when moving the patient from the scene to the ambulance and finally to the emergency department. An added benefit is the LUCAS device can safely perform compressions in the back of a moving ambulance without rescuers having to be standing unrestrained to manually compress the chest.

The AFD currently uses LUCAS 2 devices, partially obtained by participation in the NALE project and from the State of Alaska Legislative funding appropriation in fiscal year 2011.

Sincerely,

Erich Scheunemann, MICP
Assistant Chief
Anchorage Fire Department
100 East 4th Avenue
Anchorage, AK 99501
Office: (907) 267-5091

Girdwood Health Clinic, Inc.
PO Box 1130
Girdwood, AK 99587
Phone (907) 783-1355 Fax (907)783-1357

Friday, February 07, 2014

To the Honorable Senator Cathy Giessel:

Dear Senator Giessel

Please support the request from the Girdwood Volunteer Fire Dept. for purchase of 2 Lucas II devices to provide un interrupted CPR for victims of cardiac arrest during transport to a hospital. It is especially important for our EMS transport crews to have these life saving devices which will allow them to be safely seat belted in during transport while continuing chest compressions on their patients.

The Girdwood Volunteer Fire Dept. responds to major trauma and life threatening cardiac events for Girdwood and the Turnagain Pass area. It is not uncommon for transports to take over an hour to reach the emergency rooms in Anchorage. These devices will provide consistent high quality lifesaving compressions that save lives and improve outcomes for these victims during these long transports.

Please fund the Lucas II equipment request to enable our Volunteer EMS crews to continue their life saving work without endangering themselves as unseat belted passengers in the back of an ambulance.

With sincere appreciation for your hard work on behalf of all the communities of the Turnagain Arm area.

Kerry Dorius ANP

Executive Director

Girdwood Health Clinic

Physio-Control, Inc.
11811 Willows Road NE
P.O. Box 97023
Redmond, WA 98073-9723 U.S.A
www.physio-control.com
tel 800.442.1142
fax 800.732.0956

To: Terry Kadel
Girdwood Volunteer Fire Dept
PO Box 915
Corner of Quartz Street &
High Tower Road
Girdwood, AK 99587
Phone: (503) 783-2511
Fax: (907) 783-2332
kadeltl@muni.org

Quote#: **1-269814330**
Rev#: 2
Quote Date: 02/07/2014
Sales Consultant: Timothy Thornburg
800-442-1142 x 72658
FOB: Redmond, WA

Terms: All quotes subject to credit approval and the following terms & conditions

Exp Date: **04/15/2014**

Contract: None

Line	Catalog # / Description	Qty	Price	Unit Disc	Trade-In	Unit Price	Ext Total
1	**99576-000024 - LUCAS 2, 2.1 Chest Compression System** Includes LUCAS 2 unit with Back Plate, Carrying Bag, Two (2) Patient Straps, Stabilization Strap, 3 Suction Cups, 1 Rechargeable Battery and Instructions for Use. One year warranty.	2	$14,495.00	$2,174.25	$0.00	$12,320.75	$24,641.50
2	**11576-000055 - LUCAS 2 POWER SUPPLY WITH CORD,REDEL,US**	2	$339.00	$50.85	$0.00	$288.15	$576.30
3	**11576-000040 - LUCAS 2 BATTERY 4-PACK**	1	$2,413.00	$361.95	$0.00	$2,051.05	$2,051.05
4	**11576-000060 - LUCAS 2 BATTERY CHARGER,MAINS PLUG,US-CAN-JP**	1	$1,065.00	$159.75	$0.00	$905.25	$905.25

SUB TOTAL	$28,174.10
ESTIMATED TAX	$0.00
ESTIMATED SHIPPING & HANDLING	$185.00
GRAND TOTAL	**$28,359.10**

Pricing Summary Totals

List Price:	$33,146.00
Cash Discounts:	- $4,971.90
Tax + S&H:	+ $185.00
GRAND TOTAL FOR THIS QUOTE	**$28,359.10**

PHYSIO CONTROL

Why choose LUCAS?

Clinical Overview

LUCAS® 2 CHEST COMPRESSION SYSTEM

1

LUCAS delivers effective and consistent chest compressions with a minimum of interruptions.

At the scene

On the move

In the hospital

Better than manual CPR...

LUCAS delivers compressions according to guidelines:

- > 5cm/2" depth
- > 100 compressions per minute
- equal time for compression / decompression
- full chest recoil

LUCAS has shown to **significantly improve quality and increase consistency of compressions** compared to manual CPR, both at the scene, during ambulance or helicopter transportation, as well as in the cath lab setting.[1-3]

...with less interruptions

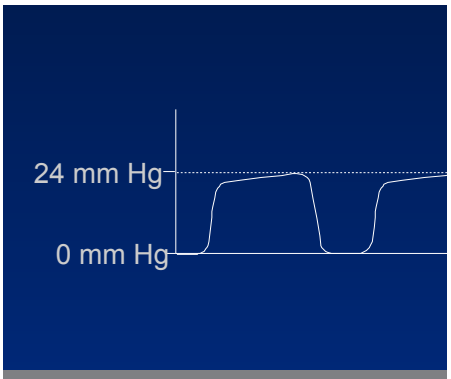
In prehospital use, at the scene and during transportation,[4, 5] LUCAS has shown to **significantly increase chest compression fractions** to around 90% compared to manual CPR.

2

LUCAS helps sustain blood circulation to the brain, the heart and vital organs.

Increased flow to the brain

>15mmHg threshold for ROSC



+20% $EtCO_2$

Increased flow to the brain

LUCAS has shown to **improve blood flow to the brain** compared to manual CPR in prehospital patients (60% increase as measured by Doppler).[6] These findings are consistent with results from experimental studies.[7] In addition, brain circulation as measured by cerebral oximetry during prolonged LUCAS compressions has shown values exceeding previously published values during manual CPR.[8]

>15mmHg threshold for ROSC

Both human[9, 10] and experimental[11, 12] studies have shown that LUCAS can **produce coronary perfusion pressures of over 15mmHg** during prolonged CPR, better than manual CPR.

+20% $EtCO_2$

LUCAS has shown to **significantly increase $EtCO_2$ levels**, compared to manual CPR in a prehospital, controlled clinical study[13] as well as in experimental studies.[7, 14]

3

LUCAS allows for lifesaving interventions.

The H's and T's

H
- HYPOXIA
- HYPOVOLEMIA
- HYDROGEN ION (ACIDOSIS)
- HYPO-/HYPERKALEMIA
- HYPOTHERMIA

T
- TOXINS
- TAMPONADE (CARDIAC)
- TENSION PNEUMOTHORAX
- THROMBOSIS, PULMONARY
- THROMBOSIS, CORONARY

Treatable causes of SCA[15]

Mechanical chest compressions during PCI

LUCAS during PCI

Treat the cause during prolonged CPR

The importance of diagnosing and treating the underlying cause (known as the H's and the T's) is fundamental to the management of all cardiac arrest rhythms.[15]

LUCAS has **helped save patients** whose cardiac arrest required treatment of the underlying cause, such as:

- coronary artery infarction treated with PCI during CPR [16-19]
- pulmonary emboli treated with prolonged CPR and thrombolysis [20-22]
- accidental hypothermia and/or submersion [23-28]
- electrolytical imbalances [29, 30]
- cardiac arrest due to anaphylactic shock[31]

Several more therapy-resistant cardiac arrests requiring long resuscitation efforts, many over an hour, have been reported with LUCAS and with **good neurological outcomes.**[32-36]

PCI during LUCAS chest compressions

Mechanical chest compressions have an **AHA class IIa** recommendation for use during emergency coronary intervention in the cath lab, based mainly on LUCAS references.[37]

4

LUCAS delivers safe chest compressions for patients and responders.

Safe for the patient

Improved safety during transit

Reduced fatigue and back pain

Safe for the patient

Autopsy studies have shown that LUCAS compressions are **safe for the patient**, with the same type of side-effects as for manual CPR. [38-41]

EMS and hospital organizations around the world have reported good, improved or neutral short term outcomes [42-48] as well as **improved neurological outcomes** [49] after implementing LUCAS.

Improved responder safety

Effective CPR is hard work, tiring and could cause injury to a rescuer's back. One study showed that ~60% of rescuers always experienced back discomfort when providing manual CPR. [50] LUCAS facilitates effective CPR and removes the issue of the "mattress effect". CPR related back injuries can be reduced among the staff.

In the case of transporting patients during ongoing CPR, rescuers can sit **safely belted** in ambulances **or harnessed** during take-off and landing in helicopters.

In the cath lab, CPR providers can stay out of the immediate X-ray field.

Referenced publications

The references in this document are a selection from over 100 publications available on the LUCAS Chest Compression System (as of March 2013).

If you want to see the comprehensive list, please ask your LUCAS sales representative for a copy of the LUCAS Reference List or the LUCAS Summarized Bibliography.

1 Putzer G, Braun P, Zimmerman A, Pedross F, Strapazzon G, Brugger H, Paal P. LUCAS compared to manual cardiopulmonary resuscitation is more effective during helicopter rescue – a prospective, randomized, cross-over manikin study. *Am J Emerg Med.* 2013 Feb;31(2):384-9.

2 Gässler H, Ventzke MM, Lampl L, Helm M. Transport with ongoing resuscitation: a comparison between manual and mechanical compression. *Emerg Med J.* 2012 Jul 25. [Epub ahead of print].

3 Wyss CA, Fox J, Franzeck F, Moccetti M, Scherrer A, Hellermann JP, Lüscher TF. Mechanical versus manual chest compression during CPR in a cardiac catherisation settting. *Cardiovascular Medicine.* 2010;13(3):92-96 (http://www.cardiovascular-medicine.ch/pdf/2010/2010-03/2010-03-005.PDF).

4 Olasveengen TM, Wik L, Steen PA. Quality of cardiopulmonary resuscitation before and during transport in out-of-hospital cardiac arrest. *Resuscitation.* 2008;76(2):185-90.

5 Maule Y. The aid of mechanical CPR; better compressions, but more importantly – more compressions… (translated from French language; Assistance Cardiaque Externe; Masser mieux, mais surtout masser plus…). *Urgence Pratique.* 2011;106:47-48.

6 Carmona Jiménez F, Padró PP, García AS, Martín RC, Venegas JCR, Naval EC. Cerebral flow improvement during CPR with LUCAS, measured by Doppler. *Resuscitation.* 2011; 82S1:30,AP090. [This study is also published in a longer version, in Spanish language with English abstract, in *Emergencias.* 2012;24:47-49].

7 Rubertsson S, Karlsten R. Increased cortical cerebral blood flow with LUCAS, a new device for mechanical chest compressions compared to standard external compressions during experimental cardiopulmonary resuscitation. *Resuscitation.* 2005;65:357-363.

8 Wagner H, Madsen Hardig B, Rundgren M, Harnek J, Götberg M, Olivecrona G. Cerebral oximetry during prolonged cardiac arrest and percutaneous coronary intervention. *ICU Director.* 2013(4);1:22-32.

9 Larsen AI, Hjörnevik Å, Bonarjee V, Barvik S, Melberg T, Nilsen DW. Coronary blood flow and perfusion pressure during coronary angiography in patients with ongoing mechanical chest compression: A report on 6 cases. *Resuscitation 81.* (2010) 493–497.

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11 Liao Q, Sjöberg T, Paskevicius A, Wohlfart B, Steen S. Manual versus mechanical cardiopulmonary resuscitation. An experimental study in pigs. *BMC Cardiovascular Disorders.* 2010;10:53 (open access; http://www.biomedcentral.com/1471-2261/10/53).

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16 Wagner H, Terkelsen CJ, Friberg H, Harnek J, Kern K, Flensted Lassen J, Olivecrona G. Cardiac arrest in the catheterization laboratory; a 5-year experience of using mechanical chest compressions to facilitate PCI during prolonged resuscitation efforts. *Resuscitation.* 2010;81(4):383-387.

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26 Rudolph SS, Barnung S Case Report: Survival after drowning with cardiac arrest and mild hypothermia. *ISRN Cardiology.* 2011; ID 895625 2 pages.

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All claims valid as of May 2013.

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GDR 3315560_A

Clinical Summary

Mechanical Chest Compressions and Simultaneous Defibrillation vs Conventional Cardiopulmonary Resuscitation in Out-of-Hospital Cardiac Arrest. The LINC Randomized Trial.

Rubertsson S, Lindgren E, Smekal D, et al. Mechanical chest compressions and simultaneous defibrillation vs conventional cardiopulmonary resuscitation in out-of-hospital cardiac arrest: The LINC Randomized Trial. *JAMA*. 2014;311:53-6.

Objective:

To determine whether administering mechanical chest compressions with defibrillation during ongoing compressions (LUCAS-CPR), compared with manual cardiopulmonary resuscitation (Manual-CPR), according to the guidelines, would improve 4-hour survival.

Intervention:

Start manual CPR. Randomize to:

- LUCAS-CPR:
  - — Apply and start the LUCAS device
  - — 3 minute compression cycles (90 s + defibrillation + 90 s), then stop for rhythm checks
- Manual-CPR:
  - — Continue manual chest compressions according to 2005 European Resuscitation Council (ERC) guidelines
  - — 2 minute compression cycles with stops for rhythm checks and defibrillation

Both groups received medications according to ERC guidelines.

Primary endpoint

- Four-hour survival after successful return of spontaneous circulation (ROSC)

Secondary endpoints

- ROSC defined as a spontaneous palpable pulse
- Arrival to the emergency room with spontaneous palpable pulse
- Survival to discharge from ICU without severe neurological impairment with a Cerebral Performance Category[1] (CPC) scale of 1 or 2
- Survival to hospital discharge with good neurological outcome (CPC 1 or 2)
- Survival 1 and 6 months after cardiac arrest with good neurological outcome (CPC 1 or 2)

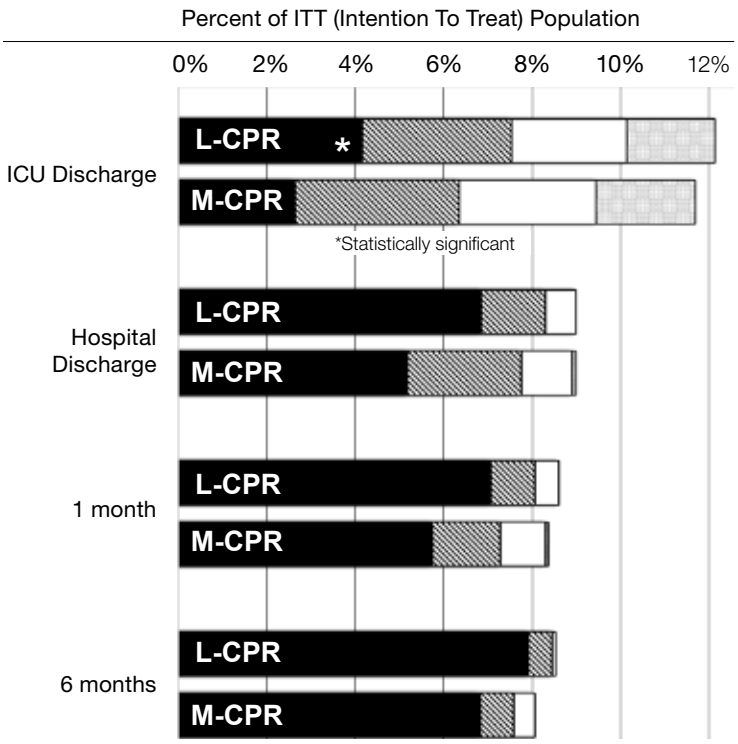
Method:

- Study was conducted from January 2008 to August 2012 in 6 European sites.
- 2,589 out-of-hospital cardiac arrest patients were randomized to treatment with LUCAS-CPR (n=1,300) or with Manual-CPR (n=1,289).
- Surviving patients were followed for 6 months and evaluated for neurological outcome using the CPC Scale. Good neurological outcome was a CPC score of 1-2.
- Patients treated with defibrillation prior to arrival of the ambulance crew or crew witnessed cardiac arrest successfully treated with the first defibrillation were excluded.

Results:

- Four-hour survival rate was 23.6% (n=307) with LUCAS-CPR and 23.7% (n=305) with Manual-CPR (risk difference -0.05%, 95% C.I. -3.3 to 3.2, p=1.00).
- ROSC defined as a spontaneous palpable pulse:
  - — 35.4% vs. 34.6% (95% C.I. -2.9 to 4.5, p=.68)
- Arrival to emergency room with spontaneously palpable pulse:
  - — 28.2% vs 27.7% (95% C.I. -3.0 to 3.9, p=.83)
- Survival with good neurological outcome (CPC 1-2) in the LUCAS-CPR and Manual-CPR was:
  - — 8.3% (n=108) vs. 7.8% (n=100) (p=0.61) at hospital discharge
  - — 8.1% (n=105) vs. 7.3% (n=94) (p=0.46) at one month
  - — 8.5% (n=110) vs. 7.6% (n=98) (p=0.43) at 6 months
- The percent of surviving patients with good neurological outcome (CPC 1-2) in relation to the overall number of survivors in the LUCAS-CPR and Manual-CPR group respectively were:
  - — 62% vs. 54% at intensive care unit (ICU) discharge
  - — 92% vs. 86% at hospital discharge
  - — 94% vs. 88% at one month
  - — 99% vs. 94% at 6 months after cardiac arrest

Neurological Outcomes



	n (%)				
	CPC 1 ■	CPC 2 ▨	CPC 3 □	CPC 4 ▫	p
ICU Discharge	54 (4.2%)	44 (3.4%)	34 (2.6%)	26 (2.0%)	0.04
	34 (2.6%)	48 (3.7%)	40 (3.1%)	29 (2.2%)	
Hospital Discharge	89 (6.8%)	19 (1.5%)	9 (0.7%)	0 (0%)	0.08
	67 (5.2%)	33 (2.6%)	15 (1.2%)	1 (0.1%)	
1 month	92 (7.1%)	13 (1.0%)	7 (0.5%)	0 (0%)	0.17
	74 (5.7%)	20 (1.6%)	13 (1.0%)	1 (0.1%)	
6 months	103 (7.9%)	7 (0.5%)	1 (0.1%)	0 (0%)	0.29
	88 (6.8%)	10 (0.8%)	6 (0.5%)	0 (0%)	

Conclusions:

There was no significant difference in 4-hour survival between patients treated with the LUCAS-CPR algorithm or those treated with Manual-CPR. The vast majority of survivors in both groups had good neurological outcome by 6 months.

LINC Discussion Points

- The large, randomized LINC trial provides the highest level of evidence that the LUCAS device can be routinely used to treat prehospital cardiac arrest patients with good survival rates and neurological outcomes. Ninety-nine percent (99%) of the survivors treated with LUCAS had a good neurological outcome at 6 months follow up. Both the absolute and relative number of patients with good neurological outcome was consistently higher in the LUCAS-CPR group, however, not reaching statistical significance difference to Manual-CPR. This data supports implementation of the LUCAS® chest compression system.
- Throughout the LINC trial activities were made to ensure the LUCAS device was compared to high quality Manual-CPR[2]:
  - Rescuers were trained twice as often as typically done; every 6 months, in both CPR methods and algorithms
  - Over 800 tests were made with rescuers at the sites to evaluate CPR performance and as well as adherence to study algorithms in a manikin setting, with immediate feedback
  - Many rescuers participating in the LINC trial stated they were motivated to provide high-quality manual CPR and “competed” with LUCAS to help save patients randomized to the Manual-CPR group. Being part of a study itself might have improved CPR skills and behavior.
- The LINC trial excluded the most viable prehospital cardiac arrest patients; the ones that had been defibrillated before the arrival of the ambulance (e.g. with an AED) as well as the ones who had a crew-witnessed cardiac arrest and were successfully defibrillated with the first shock. The overall survival rate is likely to be considerably higher when these patients are included.
- The investigator and steering committee designed an algorithm for the LUCAS-CPR group designed to minimize pre- and post-shock pauses. Thus the defibrillation was provided during ongoing CPR in the midst of each 3 minute cycle of chest compressions, e.g. each defibrillation was preceded and followed by 90 seconds of chest compressions without any interruption.
- The LINC trial also provides valuable data on the usability and reliability of the LUCAS device:
  - The LUCAS device showed a high reliability of 99.4% during the four years the study was conducted
  - 95% of patients fit the device

Putting the LINC Trial into Perspective

- Using randomization envelopes at the patient's side, as in the LINC trial, effectively reduces patient selection bias and other confounding factors. This gives the LINC trial a higher scientific value than cluster, retrospective or historically controlled studies.
  - Cluster-randomized studies run a higher risk of patient selection biases and geographical or temporal inconsistencies.
  - Retrospective analyses of contemporary use of manual and mechanical CPR run a risk of skewed survival results as it is typically more of the difficult/prolonged resuscitations that receive mechanical CPR.
  - Historically controlled studies may more truly reflect the actual effect of implementing mechanical CPR and its synergistic effects on the chain of survival, but may also include effects caused by other factors.
- The largest site participating in the LINC trial purchased their LUCAS study devices before the LINC trial results were available. They appreciated not only the effectiveness of the device, but also the many operational efficiencies and safety aspects provided to the team.
- With a mechanical compression device, there is an increased emphasis on clinical judgment, rather than rescuer fatigue and practical considerations, when deciding whether to continue or stop resuscitation efforts. Recently, positive outcomes after prolonged CPR have received attention.[3,4]
- The LINC trial is part of over 100 LUCAS publications[3] showing the LUCAS device can safely and effectively be implemented as a tool to:
  - secure consistent, continuous and high quality of chest compressions to sustain vital circulation to the heart and brain
  - facilitate safe and effective CPR during patient movement and transportation
  - facilitate prolonged CPR bridging to other lifesaving therapies or ROSC
  - facilitate emergency PCI during ongoing CPR in the cath lab to treat the cause of cardiac arrest (Class IIa AHA)
- The results from the LINC trial apply only to the LUCAS device and no other mechanical chest compression device.

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   CPC 1: Return to normal cerebral function and normal living
   CPC 2: Cerebral disability but sufficient function for independent activities of daily living
   CPC 3: Severe disability, limited cognition, inability to carry out independent existence
   CPC 4: Coma
   CPC 5: Death
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GDR 3317390_C

2-7-2014

Senator Giessel,

The Girdwood Volunteer Fire Department is requesting State of Alaska funding for the purchase of Two (2) Lucas external cardiac compression devices.

The LUCAs Chest Compression System is a safe and efficient tool that standardizes chest compressions in accordance with the latest scientific guidelines. It provides quality cardiac compressions for cardiac arrest patients during extended transports from the Girdwood/Turnagain Arm and Northern Kenai Peninsula areas to facilities with advanced level care in Anchorage.

Performing manual chest compressions of high quality is both difficult and tiring, and impossible in certain situations. The quality varies depending on who provides CPR and deteriorates quickly after only one or two minutes and is not effective when moving a patient and during long transports.

Anchorage Fire Department ambulances all carry the highly portable Lucas II Device, and are reporting improved outcomes through such use of the device.

Girdwood Fire Department has yet to receive, nor has Anchorage area wide EMS allocated funding for these devices for our two ambulances, Medic 41 and Medic 42. The total cost of two Lucas II Devices, as per the manufacturer quote, is $28,359.00.

The Lucas Device is a necessity for the challenging, road based transport of patients in the Girdwood Fire Department's extended service area. Traditional cardiopulmonary resuscitation is intensive, and requires medics to frequently switch places to prevent fatigue. Every break in manual CPR, no matter how slight, presents a decreased likelihood of survival. Where transport times can be as long as one hour or more, a mechanical CPR device is a necessity. In addition, the fully automated Lucas Device allows ambulance personal to remain seated, and buckled-up while traveling the dangerous Seward Highway.

As a community business Leader with extended family in this area, it is my wish that our local EMS be provided with the best tools for enhancing patient survival.

Thank You,

MARCO ZACCARO
OWNER
Z ARCHITECTS