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# Improving Cardiac Arrest Outcomes with Hands-Only CPR

Ethan Witt  
*University of Vermont*

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# Improving Cardiac Arrest Outcomes with Hands-Only CPR

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**Ethan Witt**  
**The Robert Larner, M.D. College of Medicine**  
**at The University of Vermont**  
**Rotation 6, December 2018 – January 2019**  
**Stowe, Vermont**  
**Project Mentor: Katherine Marvin, M.D.**

# A Solution for Barriers to Pre-hospital Bystander Care for Cardiac Arrest

2a

Bystander CPR is one of the most effective and necessary components of cardiac arrest management, increasing the survival rates by two to three times.<sup>(7)</sup> However, rates of bystander CPR are inadequately low.<sup>(6)</sup> There are several reasons for bystander hesitancy to perform CPR:

- Concerns for disease transmission through mouth-to-mouth ventilation
- Poor skills retention
- Lack of confidence
- Fear of litigation<sup>(5)</sup>

**Only 15-30% of sudden cardiac arrest victims receive bystander CPR!**<sup>(1)</sup>

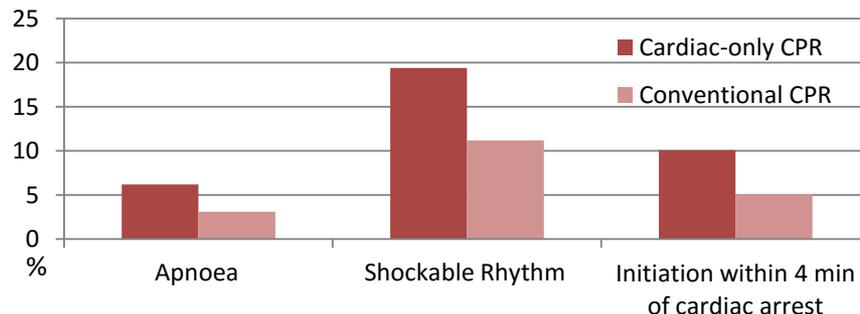
# A Solution for Barriers to Pre-hospital Bystander Care for Cardiac Arrest

2b

## Hands-only CPR has been found to be an effective intervention in the management of cardiac arrest.

- A study by the SOS Kanto study group found that “Cardiac-only resuscitation by bystanders is the preferable approach to resuscitation for adult patients with witnessed out-of-hospital cardiac arrest, especially those with apnoea, shockable rhythm, or short periods of untreated arrest.”<sup>(6)</sup>
- Hoeyweghen et al found that, while hands-only CPR was inferior to conventional CPR, **both were superior to no intervention, even when performed incorrectly.**<sup>(3)</sup>
- Instructions for hands-only CPR are easier to deliver by dispatchers and easier to recall in an actual emergency.
- Animal models have shown that the addition of ventilations to chest compressions do not improve survival.<sup>(5)</sup>
- Urban et al surveyed 532 subjects and found that while only 23.3% had prior knowledge of hands-only CPR, **77.8% would be willing to perform it on a stranger.**<sup>(8)</sup>
- Good Samaritan Laws in Vermont protect a layperson who is volunteering to deliver emergency medical care in the form of “reasonable assistance”.<sup>(2)</sup>

Cardiac Arrest Patients with a Favorable Neurological Outcome <sup>(6)</sup>

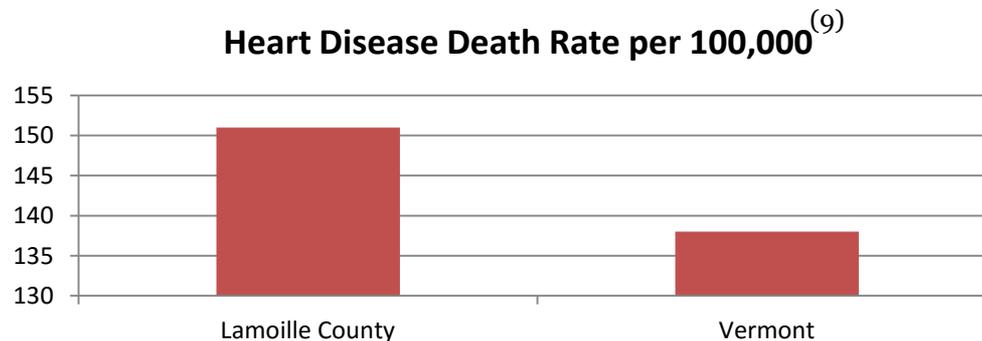


# Heart Disease in Lamoille County

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According to the Vermont county profiles for health professions for 2015, the heart disease death rate in Lamoille County is 151 per 100,000 residents. This represents a leading cause of death in Lamoille County and is significantly higher than the Vermont heart disease death rate of 138 per 100,000 Vermonters.<sup>(9)</sup>

Due to the high death rate from heart disease it is essential to educate as many citizens as possible about the benefits of bystander CPR. This has the potential to decrease mortality for the Lamoille County population, as well as decreasing the financial cost and increased morbidity for patients who have worse outcomes after receiving inadequate pre-hospital care.



# Community Perspective

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## **Katherine Marvin, M.D.**

*Medical Doctor at Stowe Family Practice, Stowe, VT*

Dr. Marvin expressed interest in the project and surprise at the efficacy of hands-only CPR. She was enthusiastic about organizing a demonstration of hands-only CPR at her children's school.

## **Carrie Wilson**

*Principal of Bishop Marshall School, Morristown, VT*

“This opportunity has provided our community with knowledge which may help to save a life in a medical event that might occur at home, school, or in a public place. I’m so grateful that Ethan took the time to demonstrate this vital skill. Thank you!”



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# Intervention and Methodology

5a

With the help of Dr. Marvin, I organized two demonstration events: one at Shaw's Supermarket in Stowe, VT, and one at Bishop Marshall School in Stowe, VT. The materials at each demonstration included:

- 1 Resusci Anne CPR mannequin
- 1 poster describing the process of hands-only CPR
- 2 fliers printed from the AHA website containing:
  1. a two step description of hands-only CPR
  2. detailed information on the impact of cardiac arrest and CPR and encouragement to become formally certified
- A list to track the county of residence for those utilizing the demonstration

**CPR SAVES LIVES**

*If you see an adolescent or adult collapse:*

1. Make sure the scene is safe
2. Call 911
3. Push hard and fast on the center of the chest

STOWE FAMILY PRACTICE

The University of Vermont  
LARNER COLLEGE OF MEDICINE

**Hands-Only CPR**

CPR CAN DOUBLE OR EVEN TRIPLE A PERSON'S CHANCE OF SURVIVAL.

Learn the two simple steps:

- 1 Call 911
- 2 Push hard & fast in the center of the chest

To learn, watch the 90-second Hands-Only CPR video at [heart.org/handsonlycpr](http://heart.org/handsonlycpr)

#CPRSAVESLIVES

**Hands-Only CPR | FACT SHEET**

**Why Learn Hands-Only CPR?**

Cardiac arrest, an electrical malfunction in the heart that causes an irregular heartbeat (arrhythmia) and disrupts the flow of blood to the brain, lungs, and other organs, is a leading cause of death. Each year, more than 350,000 U.S. residents are hospitalized because of cardiac arrest, which occurs at the lowest of rates.

When a person has a cardiac arrest, survival depends on immediately receiving CPR from someone nearby. According to the American Heart Association, about 60 percent of people who suffer out-of-hospital cardiac arrest die, especially if performed immediately, can double or triple a cardiac arrest victim's chance of survival.

**Be the Difference for Someone You Love**

If you are called on to give CPR in an emergency, you will most likely be trying to save the life of someone you love: a child, a spouse, a parent or a friend.

**70%**

After 40 percent of out-of-hospital cardiac arrests happen in homes.

After 40 percent of people who experience an out-of-hospital cardiac arrest receive bystander CPR, but they may never have professional help nearby.

**Hands-Only CPR has been shown to be as effective as conventional CPR for cardiac arrest at home, at work or in public.**

Hands-Only CPR has just been shown to be as effective as conventional CPR for cardiac arrest at home, at work or in public.

Call 911 if you see a person who has collapsed.

Push hard and fast in the center of the chest to the best of your ability.

**Music Can Save Lives**

Using equipment include "Music Alone" by the New Orleans "Only in Law" by Broadway featuring Jay-Z, "The Beat" and "The Rhythm" or "Walk the Line" by Johnny Cash. People that have confidence performing Hands-Only CPR and are more likely to continue the correct chest compressions to the best of a bystander's ability. Other songwriting CPR, you should push on the chest at a rate of 100 to 120 compressions per minute, which is the same as the music.

**Take 90 Seconds to Learn How to Save a Life**

Watch the 90-second video. Visit [heart.org/handsonlycpr](http://heart.org/handsonlycpr) to watch the Hands-Only CPR instructional video and share it with the equipment needed to give the Hands-Only CPR to a real person. Hands-Only CPR is a simple, easy-to-learn skill that can save lives. Share the AHA message to encourage bystander CPR and encourage people to become formally certified. You can find a CPR class near you at [heart.org/handsonlycpr](http://heart.org/handsonlycpr).

NOTE: The AHA still recommends CPR with compressions and breaths for infants and children and adults of advanced age, including on people who collapse while in a bathing position.

To learn more, visit [heart.org/handsonlycpr](http://heart.org/handsonlycpr)

# Intervention and Methodology

5b

Dr. Marvin and I engaged interested community members in a conversation about CPR and assessed their knowledge of hands-only CPR. If they wanted more information, we provided a demonstration including:

- Education as to the efficacy of hands-only CPR compared to conventional CPR
- Clarification that this method of CPR is only appropriate for teenagers and adults
- Clarification that conventional CPR training is required for management of pediatric cardiac arrest
- Information as to why CPR training is important from a community health perspective
- Information about Good Samaritan laws in Vermont
- A brief description of the process involved in administering effective hands-only CPR
- A demonstration of effective technique
- The opportunity to practice CPR on a mannequin
- Clarification that this was a demonstration only and they were receiving no certification by participating

The county of residence was recorded for every person who was interested in talking about hands-only CPR and the total number of participants was noted for each event.



This photograph was used with permission from  
Jeremy Gilmond

# Results

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## Shaw's Supermarket Participants

Stowe, VT

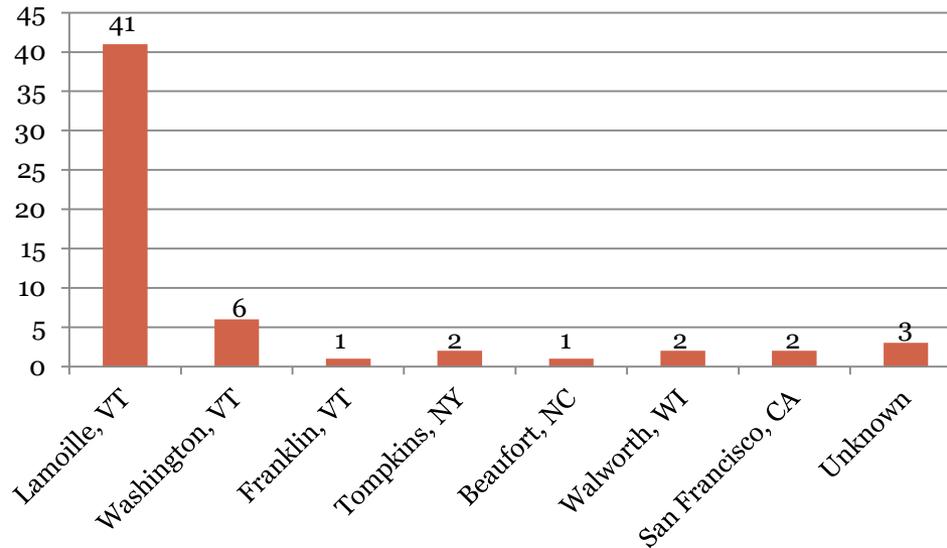
28

## Bishop Marshall School Participants

Stowe, VT

30

### 58 Total Participants Separated by County of Residence



# Evaluation of Effectiveness and Limitations

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## **Evaluation of Effectiveness:**

- Determine the total number of deaths from cardiac arrest in Lamoille County from 2018 representing the death rate prior to the intervention. Compare this number to the total number of deaths from cardiac arrest in Lamoille County in 2019 representing the death rate after implementation of the intervention. The effectiveness of the intervention of hands-only CPR demonstrations can be assessed by a change in death rate from 2018 to 2019.

## **Limitations:**

- The total number of people participating in the demonstrations was likely too low to observe a county-wide effect on the death rate from heart disease.
- We did not distinguish between participants who practiced CPR on a mannequin and those who only spoke with us. Additionally, we had no way to track people who may have been interested, but only read our poster without engaging us.
- The total amount of time spent with each participant in the demonstration varied drastically depending on the level of interest of the participant.
- Several young participants from Bishop Marshall School were too small in stature to effectively administer CPR on a teenager or adult.

# Future Interventions and Projects

8a

## **Partner with Copley Hospital, the American Heart Association, and/or the American Red Cross:**

A more concerted effort could be made to partner with any of the above organizations to coordinate formalized training sessions for hands-only CPR in Lamoille County. Events could be advertised through local newspapers, schools, healthcare facilities, EMS, fire departments, and social media to train as many people as possible.

## **Coordinate with local schools to make them aware of hands-only CPR training kits for teachers:**

The American Heart Association has relatively inexpensive hands-only CPR training kits which schools can purchase for their teachers to train their classes in hands-only CPR. These kits allow teachers to instruct 10-20 students at a time with training materials provided by the kits. This could be an exciting project because it would target a large population at a young age.

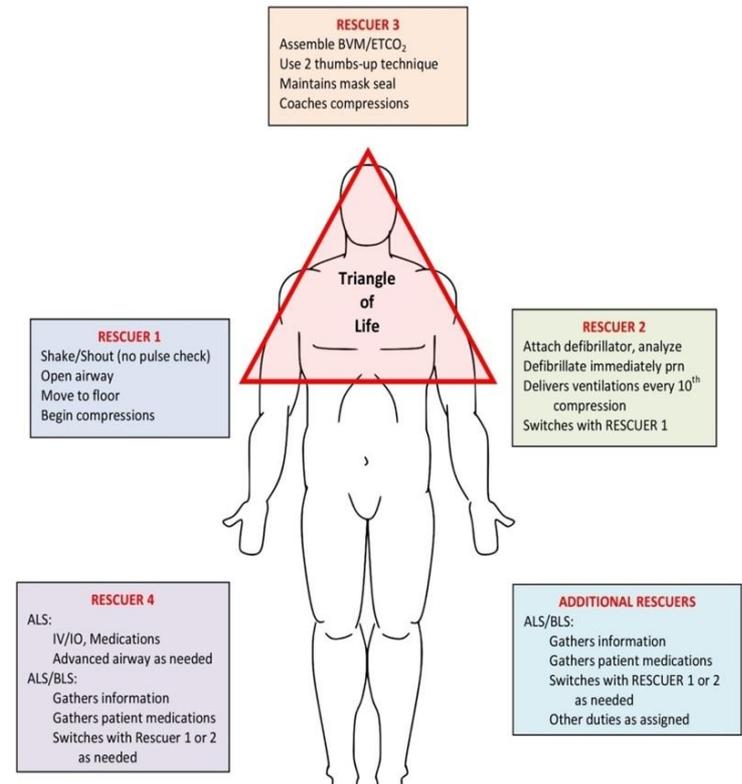
# Future Interventions and Projects

8b

## Expand the scope of the project to include the method by which EMS and hospitals manage cardiac arrests:

Santa Barbara County in California drastically altered the methods by which their fire and ambulance crews managed cardiac arrest patients in the field. Between 2012 and 2015, they saw **an increase in the percentage of survival to hospital discharge after a bystander-witnessed cardiac arrest with a shockable first rhythm from 26.9% to 57.9%**. This was likely due to a concerted county-wide effort to train as many citizens as possible in hands-only CPR and the transition to a continuous high-quality chest compression model for EMS crews.<sup>(4)</sup>

## Rescuer Roles<sup>(4)</sup>



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