



## **Heart Safe Communities: Increasing Pre-Ambulance CPR/AED Use Through Community Based Initiatives**

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**MN Resuscitation  
Consortium**

UNIVERSITY OF MINNESOTA

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# DISCLOSURES

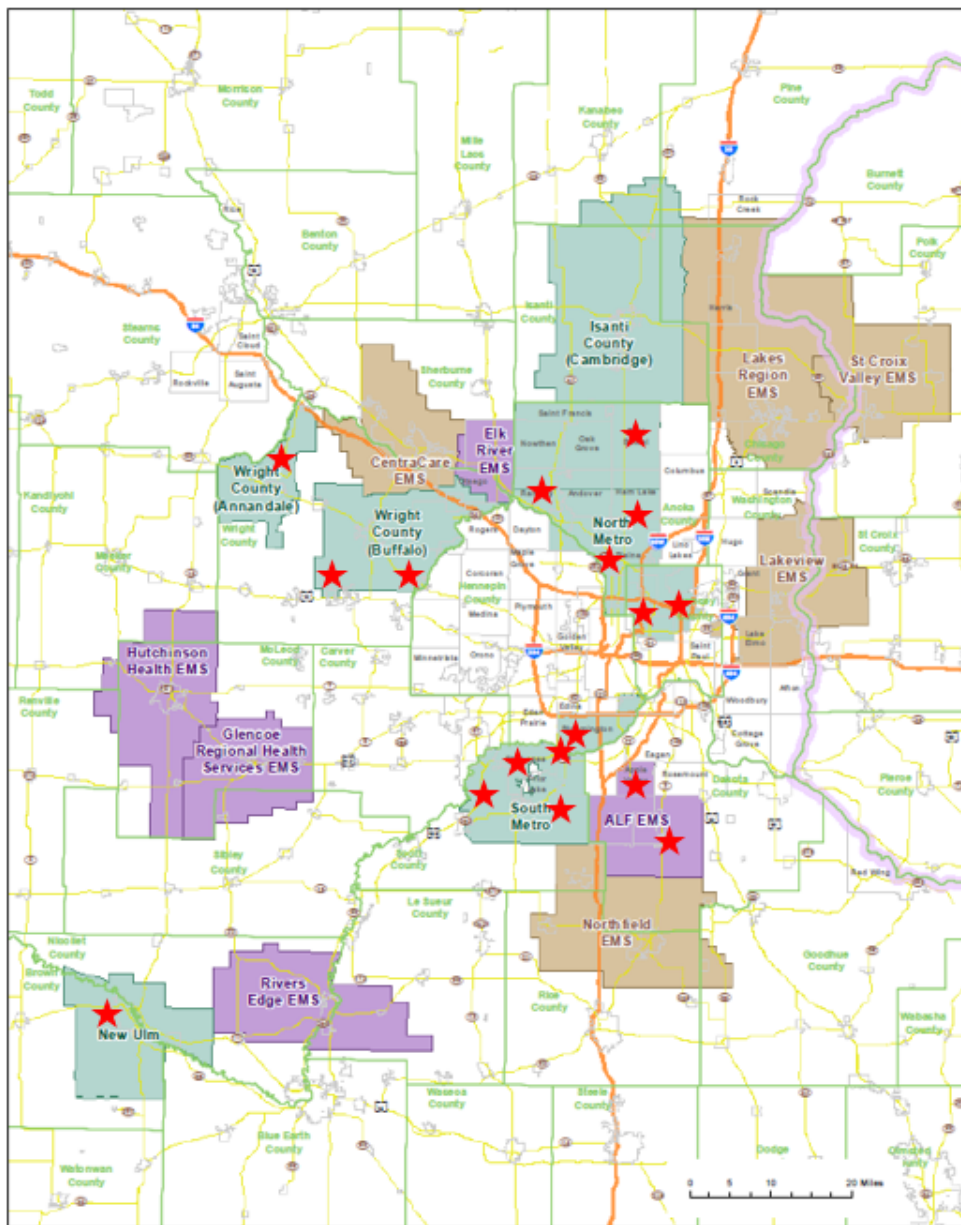
- No conflicts of interest associated with this work
- No financial support that could have influenced its outcome

# Heart Safe Communities Program




- Communities apply and complete action plan in partnership with Heart Safe staff, local law enforcement and first responders
- Heart Safe Communities help communities and organizations:
  - Educate community members about sudden cardiac arrest and improving heart health
  - Raise money to place AEDs in the hands of emergency medical service, fire and police personnel, and to make AEDs available in businesses, schools and other gathering spaces
  - Train people how to use AEDs and perform CPR
- Started in 2010 at Allina Health EMS, expanded to entire state in 2011
- Partnership with American Heart Association, Minnesota Department of Health, and MN Resuscitation Consortium to manage and expand program



MINNESOTA DEPARTMENT OF HEALTH || AMERICAN HEART ASSOCIATION || MN RESUSCITATION CONSORTIUM



**Allina Health EMS Primary Response Areas**

 PSA Licensed by Allina Health EMS  
 PSA under Allina Health EMS Contract  
 PSA Dispatch Service Areas

- 46 Minnesota communities designated Heart Safe as of July 2016
- 17 communities (★) within Allina Health EMS (AH-EMS) service area
- As of 2017, more than 1 million Minnesotans live or work in a Heart Safe Community.



# Research Question

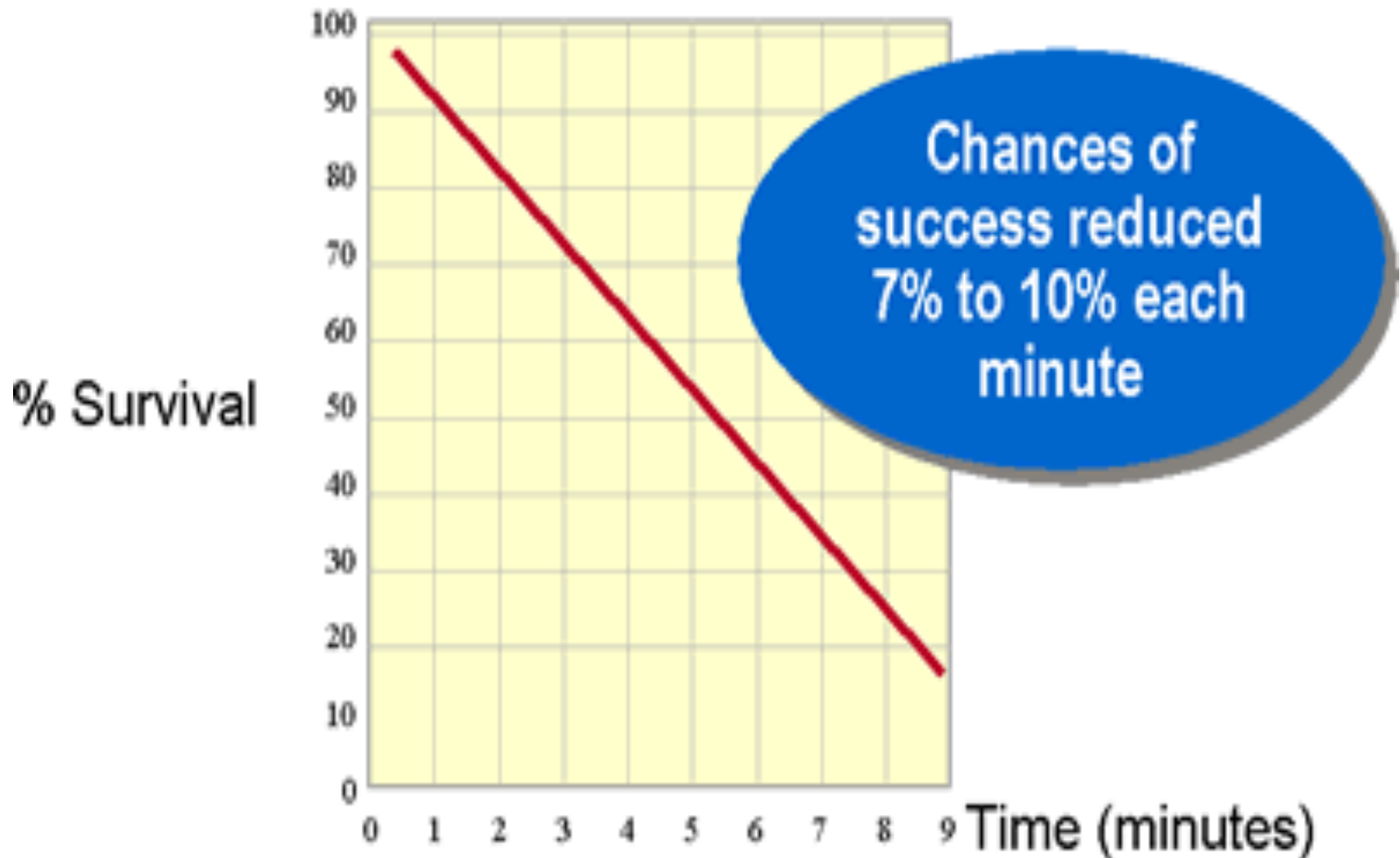
- Has the Minnesota Heart Safe (HS) Communities program increased the delivery of CPR and use of AEDs by bystanders and first responders prior to ambulance arrival?



# Early CPR

- Doubles +++ Survival
- NEJM 2015
- Swedish Study
- 30,000 OHCA 1990-2011
- **CPR** prior to EMS – **10.5%** 30 day survival
- **NO CPR** prior to EMS – **4%** 30 day survival
- $P < 0.001$  OR 2.15

# The Case for *Early* Defibrillation



# Setting and Data



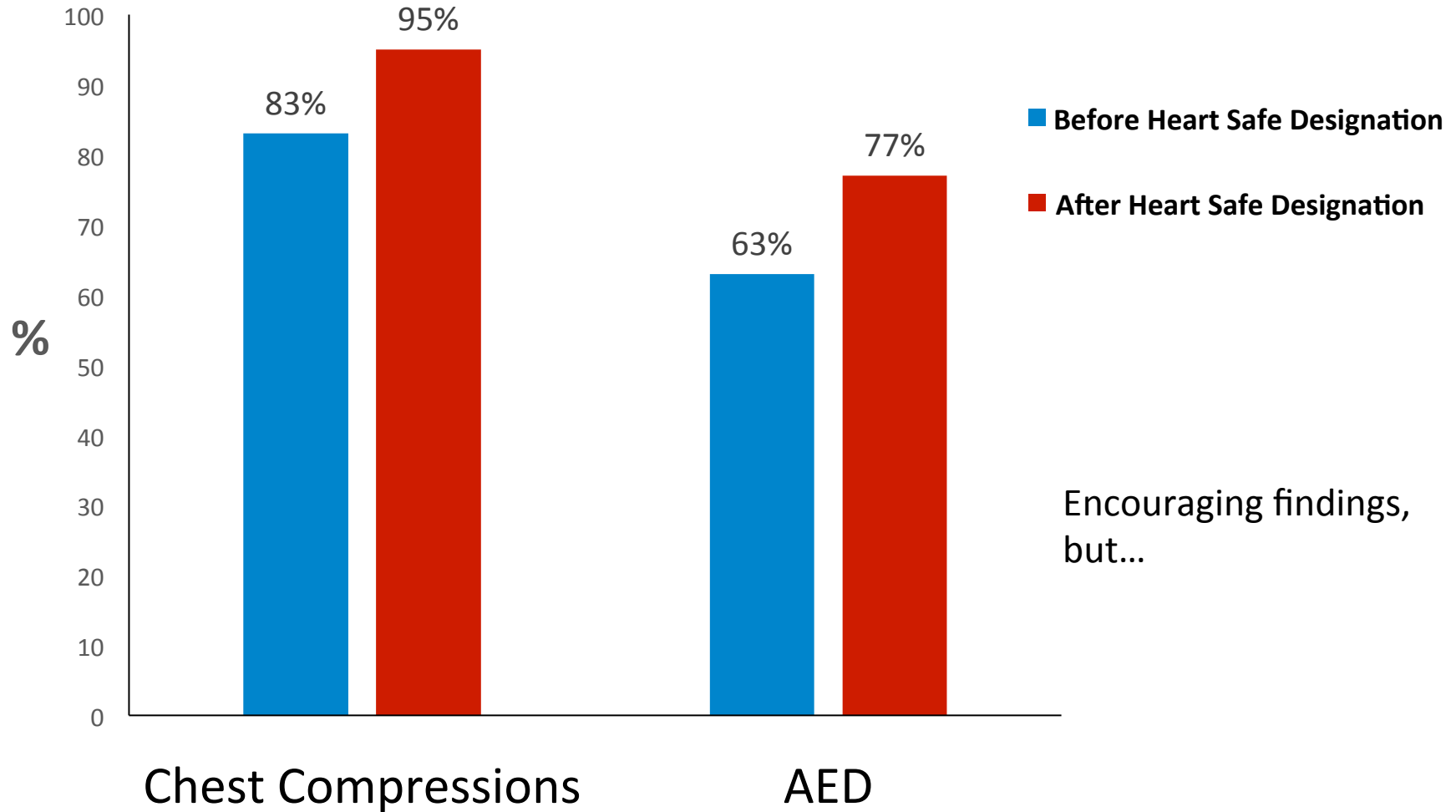
- Allina Health Emergency Medical Services (AH-EMS)
  - Private ambulance service
  - Serves 120 communities in MN
  - 100,000+ calls annually
  - Treats approximately 550 out-of hospital cardiac arrests (OHCA) each year



# Study Design

- Primary analysis: comparison of pre-ambulance CPR and AED use before and after the community received Heart Safe designation
- Sources of Data: MN Cardiac Arrest Registry to Enhance Survival (CARES) and Heart Safe Program data
  - AH-EMS OHCAs account for approximately 25% of the events submitted to MN CARES annually
- All OHCAs treated in the 17 HS communities in AH-EMS service area were considered for analysis
  - Excluded:
    - Unwitnessed arrests
    - Arrests witnessed by EMS (occurring after ambulance arrival)
    - Events in patients <18 years of age

## Patient Received Intervention BEFORE Ambulance Arrival



# Results

## CPR and AED use among non-EMS witnessed out-of-hospital cardiac arrests in designated Heart Safe communities, before and after designation

	Before Heart Safe Designation (n=120)	After Heart Safe Designation (n=174)	Odds Ratio (95% CI)
Who first initiated CPR?			
Bystander	33% (39)	34% (59)	
First responder	50% (59)	61% (107)	
EMS	17% (20)	5% (8)	
CPR initiated prior to EMS arrival	83%	95%	4.23 (1.80, 9.98)
Who first applied AED?			
Bystander	3% (4)	6% (10)	
First responder	60% (72)	71% (124)	
EMS	37% (44)	23% (40)	
AED applied prior to EMS arrival	63%	77%	1.94 (1.16, 3.24)

CPR=cardiopulmonary resuscitation; AED=automated external defibrillator; EMS=emergency medical services

- Most improvement happening among first responders
- Suggests that bystander CPR and AED use may need to become area of focus for HS program
  - Rate of bystander CPR in MN is estimated to be lower than the national average

# Conclusion

- Heart Safe Communities initiative did increase the delivery of CPR and use of AEDs by bystanders and first responders prior to ambulance arrival.

# Limitations of this Study

- Short timeframe limits sample size
- Homogeneous communities included
  - Non-urban locales with populations <90,000
  - Self-selected to participate in Heart Safe
- Always possible that other campaigns or interventions not directly related to the Heart Safe program may have influenced early CPR and AED use
- Analysis of outcomes restricted to whether Heart Safe improves adherence for pre-ambulance response

# Next Steps

- State-wide and/or national analysis of Heart Safe Communities
  - Include additional years of follow-up
  - More complete analysis of outcomes
- Investigate characteristics that make communities successful
- Continued attention to addressing rates of bystander CPR in MN
  - New technologies and innovative approaches

# Thank you!

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