



Clinical paper

TAKE10: A community approach to teaching compression-only CPR to high-risk zip codes[☆]



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ABSTRACT

Objective: Bystander cardiopulmonary resuscitation (CPR) for out-of-hospital cardiac arrest (OHCA) has the ability to improve patient survival. However, the rates at which CPR occurs are suboptimal. We hypothesized that targeted CPR training in neighborhoods with low bystander CPR and high incidence of cardiac arrests would increase the incidence of bystander CPR for adult OHCA.

Methods: This study is a descriptive observation and analysis of the TAKE 10 program, which recruited City of Austin and Travis County residents to teach fellow community members compression-only CPR. Twelve zip codes in Austin and Travis County were identified as “high-risk,” based on low bystander CPR rates and high incidences of cardiac arrest. Data was collected on bystander CPR for OHCA over the study period of July 2008 to September 2013. Incidence of cardiac arrest and bystander CPR were calculated yearly and overall.

Results: Over the study period, a total of 11,242 community members completed compression-only CPR training. While there was no significant difference in the number of individuals trained in high-risk zip codes compared to the other zip codes (High-Risk [$n \pm sd$] 263 \pm 235; General 212 \pm 193; p -value 0.46), the amount of people trained in the high-risk zip codes did trend upwards over the study period. Additionally, there was an increase in percent of bystander CPR per eligible cardiac arrest in the high-risk zip codes (2009: [$n \pm sd$] 0.28 \pm 0.34 to 2013: 0.39 \pm 0.28).

Conclusions: Targeted compression-only CPR training in high-risk neighborhoods may be associated with increased bystander CPR rates over time.

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Introduction

The provision of bystander cardiopulmonary resuscitation (CPR) for out-of-hospital cardiac arrests (OHCA) can double or even triple survival.^{1,2} However, it is estimated that on average only 46% of OHCA patients receive bystander CPR, although there is huge variability in performance of bystander CPR by city.³ Prior research has shown that bystanders may not perform CPR for multiple reasons, including panicking in the moment, fear of not performing CPR properly or hurting the victim, disease transmission or legal

consequences.^{4,5} Race and socioeconomic factors also play an influential role in bystander CPR as African-American, Hispanic, and lower-income neighborhoods have lower rates of bystander CPR than white, higher-income neighborhoods.^{6,7} Data shows that for approximately every thirty individuals that undergo bystander CPR, one life is saved,¹ emphasizing that bystander CPR is an essential link in the OHCA chain of survival. Furthermore, CPR training can increase an individual's likelihood of performing bystander CPR.⁸

Prior research has shown targeted training can be conducted in areas which are most at need, such as the African-American, Hispanic and lower socioeconomic neighborhoods, and that these areas can be identified using geographical data and analytic methods.^{6,7,9} However, there are few studies that show whether CPR training programs can be targeted to high-risk areas in the community.

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We propose that geographical data can be used to identify areas with low rates of bystander CPR, higher rates of cardiac arrest, and socioeconomic factors that increase likelihood of low bystander CPR. We conducted a feasibility study to test the real-world effectiveness of targeted compression-only CPR training in the highest risk neighborhoods in Travis County, Texas. We hypothesized that the TAKE10 program would increase bystander CPR over time, particularly in high-risk zip codes.

Methods

This study is a retrospective observational analysis using data from the Cardiac Arrest Registry to Enhance Survival (CARES) and the TAKE10 Compression-Only CPR Program created in Austin, Texas. Demographics for the zip codes within Travis County were compiled using the United States Census Bureau 2010 Census. The total population of Travis County consisted of 1,024,301 people, of which 50.5% were White, 8.1% were African American or Black, 33.5% were Latino or Hispanic and 8.0% identified as another race or combination of races. Of the total number of households, 87.0% had a high school graduate degree or higher and 31.3% spoke another language besides English at home. The average median income per household was \$54,074.

For this study, we identified OHCA events in CARES between July 2008 and September 2013 and included the zip codes that were located within Travis County. The zip codes that were not entirely within the borders of Travis County were excluded as portions of their populations were outside of the jurisdiction of the Austin-Travis County EMS System. In addition, two zip codes were excluded because they were unable to be geocoded into a county using the United States Census Bureau, most likely from being labeled incorrectly in the dataset. A total of 50 zip codes were used for this analysis.

Incidence rates per year by zip code were calculated by dividing the total number of OHCA events by the total number of people living within a zip code. Census data from 2010 was used to determine the total number of people in a zip code. Bystander CPR prevalence was determined by dividing the total number of OHCA victims who had bystander CPR performed by the total number of OHCA events that were eligible for bystander CPR. Bystander CPR was defined by the CARES registry as an OHCA victim who received CPR (per EMS reports) by a lay person, lay person family member, or lay person medical provider prior to EMS arrival. The OHCA events that were eligible for bystander CPR were defined as those events that occurred prior to EMS arrival and that did not occur in locations with healthcare providers on-scene (e.g. healthcare facility, transport center, nursing home, hospital, or jail) (Fig. 1). In addition, individuals that had obvious signs of death on EMS arrival (rigor mortis or dependent lividity) or with a do not resuscitate (DNR) order were excluded from the CARES database and thus excluded from our study population.¹⁰

High-risk zip codes within Travis County were identified by the Office of the Medical Director for the Austin-Travis County EMS System. The first step in this multi-step process was calculating the rate of no bystander CPR per 10,000 people per year in each zip code. A natural break in the data provided the basis of at risk areas, which were identified as zip codes with a no bystander CPR incidence rate greater than 8.0 arrests/100,000 over a 1 year period. From this group, zip codes with large populations were identified, and twelve densely populated zip codes with high rates of no bystander CPR were labeled high-risk. We used the CARES database to obtain information on cardiac arrests in Travis County. This database includes OHCA events of cardiac etiology, defined as “presumed cardiac etiology on the basis of the clinical judgment of the care providers”¹⁰ and obtains data from 911 dispatch centers,

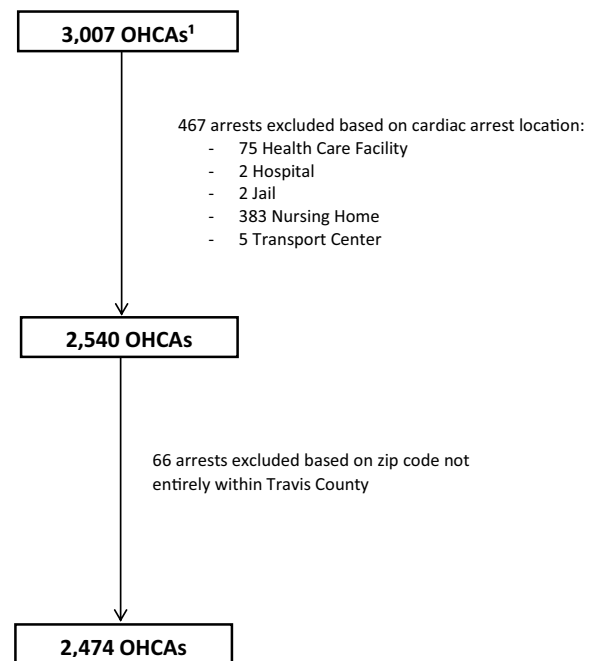


Fig. 1. Included OHCA events. ¹ OHCA: out of hospital cardiac arrests.

first responders, Emergency Medical Services (EMS), and receiving hospitals in a standardized, anonymous format.¹¹ By establishing the local epidemiology of OHCA from these three sources, the entire path of cardiac arrest care can be analyzed.

Intervention

TAKE10 is a community-based program in Austin, Texas that stands for “take 10 minutes to learn compression-only CPR.” The program is based on peer-to-peer training of compression-only CPR and is a fast and free method of training local residents (Appendix 1). TAKE10 is a project of the non-profit, Take Heart™ Austin, a Take Heart America organization dedicated to improving survival from sudden cardiac death. The TAKE10 program started as a grass roots initiative to increase bystander CPR within Austin, particularly those areas with the highest amount of cardiac arrests, lowest bystander CPR rates, and overall highest population density as indicated on area GIS maps. While the program focused recruiting efforts on these areas with the most need for bystander CPR, all zip codes within Travis County were included in the program as all areas of Travis County could benefit from a hands only CPR training program.

Take Heart™ Austin marketed the program through newspaper and television stories focused on survivors and telephone calls to community organizations; however, word of mouth became one of the most important means of exposure to the program. The 12 high-risk zip codes, based on the data above, were targeted by calling and meeting face-to face with organizations located in those zip codes to recruit future TAKE10 trainers within that zip code. Organizations were initially selected based on the likelihood of having an established connection to large segments of the community. Faith based organizations and cultural organizations comprised the majority of organizations, although other organizations, such as Habitat for Humanity, Girl Scouts, Boy Scouts, YMCA, Austin Public Libraries, Public Housing groups, and neighborhood associations were also involved. Organizations were contacted through email with follow-up via telephone calls.

Once the organizations agreed to participate, they then provided one or more individuals to become trainers, who would then

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