Does the PulsePoint app affect cardiac arrest survivability in the City of Rogers

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Certification Statement

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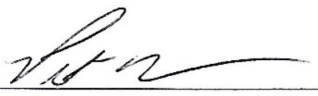
Signed: 

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Abstract

Bystander-initiated cardiopulmonary resuscitation (CPR) is considered a vital component of surviving a sudden cardiac arrest. In an effort to recruit lay citizens to perform this action, the Rogers Fire Department (RFD) subscribes to a smartphone app called PulsePoint. PulsePoint, when installed on a civilian's phone, will alert them when a cardiac arrest occurs in their vicinity and recruit them to perform CPR prior to the fire departments arrival. The problem was that the RFD had not determined the impact of the PulsePoint app on cardiac arrest survivability within the city. The purpose of this research was to determine if the app was being used by the citizens of Rogers and if its use has affected cardiac arrest survival. This research was conducted using the descriptive research method to answer the following questions: a) How aware is the general public of the availability and capabilities of the PulsePoint app? b) How willing is the general public to respond and perform CPR on someone they do not know? c) How does the Rogers Fire Department's survivability rate compare to other departments who also subscribe to the app? In order to answer these questions, data collection instruments were created to survey the citizens of Rogers as well as other fire departments in the United States who also use PulsePoint. The research revealed that while the citizens of Rogers indicated a willingness to perform bystander CPR, there was lack of awareness of the PulsePoint app. Furthermore, surveys revealed that practices in Rogers appeared to coincide with practices of other departments. The recommendations were for the RFD to increase marketing of the PulsePoint app to the public, expand community CPR instruction, and modify their medical reporting software to record instances when bystander CPR was performed due to a PulsePoint alert.

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Introduction

Sudden cardiac arrest occurs outside of a hospital setting to over 326,000 Americans each year (American Heart Association News, 2018). Unfortunately for many Americans, chances of surviving an arrest depend largely upon the city they reside in. Cities with well-established emergency medical services employing programs to improve cardiac arrest outcomes typically see a significantly higher survival rate than those without.

The Rogers Fire Department (RFD) has for years made a conscientious effort to maintain current best-practices to improve cardiac arrest outcomes for their citizens. One such practice is to promote bystander-initiated cardiopulmonary resuscitation (CPR) on sudden cardiac arrest victims as well as public usage of automated external defibrillators (AED's). To accomplish this, the RFD subscribes to a smartphone app called PulsePoint which will alert the general public when a cardiac arrest occurs in their immediate vicinity and enlist them to respond and begin CPR prior to the fire department's arrival. The app also provides these lay responders with the location of the closest publicly assessible AED for expediated deployment.

The problem is that the RFD has not determined the impact of the PulsePoint app on cardiac arrest survivability within the city. The purpose of this research is to determine if the app is being used by the citizens of Rogers and if its use has affected cardiac arrest survival. This research will be conducted using the descriptive method to answer the following questions: a) How aware is the general public of the availability and capabilities of the PulsePoint app? b) How willing is the general public to respond and perform CPR on someone they do not know? c) How does the Rogers Fire Departments' survivability rate compare to other departments who also subscribe to the app?

Background and Significance

The City of Rogers is located in the northwest corner of Arkansas within the state's most affluent region and is home to approximately 70,000 residents (QuickFacts Rogers city, Arkansas, 2017). The city is one of the fastest growing in the state and has become a regional hub for shopping, dining, and business. In fact, Money Magazine recently voted Rogers as the 14th best place to live in America ("The Best Places," 2018).

The city is protected by the Rogers Fire Department (RFD) which is an all-career department employing over 140 personnel within seven stations. The RFD provides all-hazard fire and rescue services as well as advanced life support emergency medical care and responds to over 7000 calls for service annually. In 2015 the RFD became one of only three departments nationwide to receive an Insurance Services Office (ISO) rating of 1 while being accredited by both the Commission on Fire Accreditation International and the Commission on Accreditation of Ambulance Services (City of Rogers, n.d.). These accomplishments highlight the RFD's mission statement to provide exceptional risk-related services to its customers. In keeping with this, the RFD places a very high priority on improving cardiac arrest outcomes within the city and strives to be among the best in the nation with survival rates.

The RFD utilizes the Utstein template to report cardiac arrest survival statistics on a monthly basis. This formula is an internationally recognized template for comparing emergency medical services (EMS) system efficacy by standardizing definitions and creating a template for agencies to uniformly report survival statistics. Under this template, a survival is defined as when a patient whom suffered a bystander-witnessed cardiac arrest with an initially shockable cardiac rhythm (ventricular fibrillation or ventricular tachycardia) is resuscitated and delivered to the emergency room with a pulse and blood pressure (Perkins et al., 2015).

To improve cardiac arrest responses, the RFD has spent the last several years studying best-practices, implementing policy with specific response algorithms, purchasing new equipment, implementing new training, and has subscribed to PulsePoint. One of the aforementioned best-practices for cardiac arrest survival is early cardiopulmonary resuscitation (CPR) and defibrillation. The PulsePoint smartphone app is designed to address this practice and utilize willing citizens to begin CPR and/or defibrillation well prior to the fire department's arrival. If a citizen chooses to download the app, he/she will be notified when CPR is needed within their immediate vicinity in a public place. This notification happens simultaneously with the fire department dispatch, shows the exact location of the victim, and provides the location of the closest publicly-assessible automated external defibrillator (AED). As of January 1, 2019, the app has been downloaded by 3,013 people with 1,650 having CPR alerts enabled (the app provides the option for those using to shut CPR notifications off). At this time, the general public is not notified when a cardiac arrest occurs within a private residence.

The Executive Analysis of Community Risk Reduction course taught at the National Fire Academy was the inspiration for this applied research project. Part of the course curriculum includes instruction for fire officers to identify and measure man-made and natural risks within their communities. Once these risks are identified, the course moves into developing community partnerships to implement programs designed to mitigate targeted risks (United States Fire Administration, 2018). This research will show how the Rogers Fire Department recognizes the importance of community risk reduction, and as the course teaches, has attempted to implement community programs addressing a risk that affects well over 300,000 Americans annually.

Furthermore, this effort within the community serves as a key component to achieve the United Stated Fire Administration's goal of reducing fire and life safety risk through

preparedness, prevention, and mitigation efforts. More specifically the initiative to expand fire and life safety public education and prevention initiatives, including the use of social media, to reach all segments of the population (United States Fire Administration, 2014).

It should be stated though, that while use of the PulsePoint app has potential to save lives, it does come with significant cost to taxpayers. There is a one-time startup fee of $10,000 as well as a recurring annual service fee based on the size of the population served. This fee is $8,000 annually for the City of Rogers ("Implementing PulsePoint," n.d.). With that said, the city also incurs indirect costs related to marketing and promotional materials. This research is intended to determine the level of benefit the City of Rogers is receiving from its subscription and to recommend how the use of the app can be improved if necessary.

Literature Review

The literature review for this project was conducted primarily through medical journals, magazine articles, and documents produced by the American Heart Association and other organizations. A review of the history and functionality of PulsePoint was conducted as well as cardiac arrest statistics in the United States. The main focus, however, was to determine best practices in cardiac arrest management.

In medical terms, a cardiac arrest is defined by the American Heart Association (AHA) as "…the cessation of cardiac mechanical activity, as confirmed by the absence of signs of circulation" (Benjamin et al., 2018, p. 355). While this definition is not practical to be used by laypersons, it is currently what is used professionally to study cardiac arrest survivability and develop best practices. Knowing, however, that most cardiac arrests are not witnessed by medical professionals, the AHA guides laypersons to begin cardiopulmonary resuscitation (CPR)

if they cannot feel a pulse within 10 seconds on a person who is not responding or breathing (Hazinski et al., 2015, p. 10).

Sudden cardiac arrest (SCA) can affect people of every demographic in every community across the country. In fact, it is now estimated to be the third leading cause of death in the United States (Institute of Medicine, 2015, p. 1). With survival rates as low as 10% nationally, the effects of SCA can be devastating especially in communities with poor emergency medical systems in place (American Heart Association News, 2018). A study conducted in Oregon from 2002 to 2004 estimated that SCA contributed to 2 million years of potential life lost for males and 1.3 million years lost for females. It is also estimated that of those who survive a cardiac arrest nationwide, 18% leave the hospital with moderate to severe functional impairment leading to a shortened life span (Benjamin et al., 2018, p. 358).

The AHA's chain of survival is the most recognized and accepted algorithm for treating sudden cardiac arrest. As of 2015, the AHA recognized that incidences of out-of-hospital cardiac arrest (OHCA) require different steps of action than in-hospital cardiac arrest and has split the traditional chain accordingly. The links in the OHCA chain of survival are now; a) Recognition and activation of the emergency response system, b) Immediate high-quality CPR, c) Rapid defibrillation, d) Basic and advanced emergency medical services, and e) Advanced life support and post-arrest care (Hazinski et al., 2015, p. 4). It is the first three stages that have become the main focus for EMS systems to improve cardiac arrest survival in their communities. The AHA contends that the large variation in survival rates within states across the country is largely related to the level of bystander participation with early recognition, CPR, and defibrillation. Furthermore, they state that for every 30 people who receive bystander CPR, one more life can be saved (Sasson et al., 2013, p. 1342).

While there is an infinite number of reasons a bystander may refrain from assisting with CPR or defibrillation, fear and lack of knowledge are the most cited reasons across the country. Many jurisdictions are now promoting "hands-only" CPR to the public to help overcome these obstacles. The AHA markets this as a method with only two simple steps: call 911 and push hard and fast. The marketing materials are designed to help every citizen believe they can easily learn this method and save a life. Familiar songs are also suggested to help keep the right pace during compressions. According the American Heart Association, studies show that hands-only CPR can be just as effective as conventional CPR when performed at home, work, or in public (American Heart Association, n.d.).

To further assist with early recognition and subsequent CPR and defibrillation, many EMS systems have explored the use of social media, smartphone apps, and short message service (SMS) systems to alert lay responders of a cardiac arrest in their vicinity. The Sudden Cardiac Arrest Foundation recently released a position statement endorsing such technology stating that "By engaging the public in a novel way, mobile technology creates a new conversation around the importance of being CPR and AED trained" (Sudden Cardiac Arrest Foundation, 2018, para. 6). In the same document, the foundation formally endorses the use of the PulsePoint smartphone app for this purpose.

Likewise, the AHA released a statement in 2016 acknowledging what most studies of OHCA have in common; delays in the initiation of bystander CPR. They argue that this is true despite national programs involving public awareness and education as well as published clinical practice guidelines from established authorities. The statement suggests that using mobile devices, social media, and crowdsourcing is a promising solution to provide "just in time" information to improve cardiovascular outcomes from cardiac arrest, heart attack, and stroke.

Further acknowledging that when EMS response times can be greater than five minutes in many communities, the emerging smartphone technology could have a tremendous impact on cardiac arrest victims. No longer would someone have to hope a bystander trained in CPR happens to see them fall and is willing to help. Additionally, with the mapping of AED locations, there is the potential for significantly faster application (Rumsfield et al., 2016).

The PulsePoint Foundation began development of their app in 2009 and is currently being used in over 3,400 communities in the United States. When a jurisdiction adopts the app, it becomes integrated with their dispatch center and an alert is send to civilian phones within walking distance of a cardiac arrest in a public location. This alert occurs simultaneously with the emergency services dispatch, ensuring the most expedient lay rescuer response. Additionally, there is a free companion app (PulsePoint AED) which allows the registration and mapping of every public automated external defibrillator (AED) within a jurisdiction. With this activated, the app will also notify lay responders of the closest AED to the cardiac arrest in progress. This app is currently only for use in public locations, however, PulsePoint has also recently released a "verified responder" app in which professionally certified responders such as off-duty emergency medical technicians can be alerted to cardiac arrests in private residences (PulsePoint website, n.d.).

There have been many studies across the globe over the past several years to verify the impact of early recognition and bystander CPR and AED use on sudden cardiac arrest victims. One such study published in 2017 analyzed five years of data collected in North Carolina from 2010 to 2014. In 2010 several initiatives focused on the early steps of the chain of survival were taken to improve cardiac arrest survival both at home and in public. These included steps such as hands-only CPR training for the community and families of those hospitalized with

cardiovascular disease, AED training for school staff members, and training for 911 dispatchers to recognize cardiac arrest and provide CPR instruction to callers. The study found that these initiatives not only resulted in people receiving more bystander CPR and defibrillation but showed higher survival rates with favorable neurological outcomes both at home and in public (Fordyce et al., 2017).

A similar study published in 2015 was conducted in Sweden using ten years of data to determine the effect of bystander CPR on cardiac arrest survival. The study ultimately concluded that the 30-day survival rate for those receiving bystander CPR was more than twice as high as those who did not. Furthermore, the research found that even with bystander CPR occurring, the time from recognition of cardiac arrest to start of compressions was directly related to survival. The longer it took for a bystander to initiate CPR, the lower the survival rate. This would suggest that programs designed to educate the public on recognition of cardiac arrest in addition to CPR training can positively affect cardiac arrest survival. Finally, in a subset of the data, instances were compared when CPR was given by a trained bystander as opposed to a bystander receiving telephone CPR instruction from a 911 dispatcher. Here, the survival rate was 5% higher with those who did not receive telephone instructions, further reinforcing the value of public CPR training (Hasselqvist-Ax et al., 2015).

A good example of how significant a trained populace can be is found in King County, Washington where cardiac arrest survival is among the best in the country. King County focuses extensive training of EMS personnel with crucial elements of the chain of survival and also extensively trains the public in hands-only CPR. King County boasts a 75% bystander performed CPR rate which is well over the national average of 46%. Similarly, in Arizona, there is a statewide response system for treating cardiac arrest victims. There, hands-only CPR was

introduced through television ads and public service announcements and taught as a basic first aid technique rather than a complicated medical procedure. As a result, the level of bystander participation increased fourfold over the last ten years and Mesa has an outstanding survival rate of 56% (American Heart Association News, 2018).

Similar to what was found in Arizona and Washington, Malta-Hansen et al. (2015) released a study from North Carolina showing that after a statewide educational program on resuscitation there was an increase in bystander and first-responder CPR and AED usage. The study was designed to compare survival rates when bystanders and first-responders intervened against those when no intervention was done prior to EMS arrival. What they found was that bystander-initiated CPR (as opposed to first responder or EMS CPR) was most significantly related to survival with favorable neurological outcomes. Malta-Hansen et al. (2015) also noted that while bystander-initiated defibrillation increased in frequency, the overall number of defibrillations remained low. The positive outcomes seen with bystander-initiated CPR and first-responder-initiated defibrillation together suggests that survival rates with favorable neurological outcomes would be significantly higher if AED's were more readily available and accessible to bystanders (Malta Hansen et al., 2015).

Similarly, an eight-year study from Japan showed that bystander defibrillation with public-access AED's had a significant association with neurologically intact survival despite a low frequency of occurrence. In contrast, neurologically intact survival was not increased when defibrillation was delayed until EMS arrival during the study period. This resulted in a recommendation to determine the most likely public locations a cardiac arrest may occur and placement of lay responder accessible AED's accordingly (Nakahara et al., 2015). Likewise, Moller-Hansen et al. (2017) suggest that placement of AED's in public locations such as airports,

sports facilities, casinos, offices, and other locations can increase OHCA survival rates up to 74%. They also referenced a 10-year study in Denmark where strategically placed public-access AED's were registered with the dispatch center so that their locations can be transmitted to responders. As a result, there was an increase of defibrillation use from 1.2% to 15.3% over the study period with significant corresponding survival (Moller-Hansen et al., 2017).

While many studies regarding improving portions of the chain of survival focus on survival to hospital discharge or 30 days after, one significant study conducted in Denmark researched brain function one year after survival. Between 2001-2012 patients were studied one year after surviving a cardiac arrest and outcomes compared with whether or not that patient received bystander CPR and/or defibrillation. The study concluded that patients who received bystander CPR had significantly lower rates of brain damage, nursing home admission, or death within the year after their cardiac arrest. Patients who also received bystander defibrillation showed even better outcomes. The study also noted within this time period in Denmark, many initiatives were undertaken to increase lay responder participation including widespread CPR training, widespread dissemination of public-access AED's, dispatcher assisted CPR instruction, and the development of a national registry of all public AED locations which is linked to the dispatch center and available to people calling 911 (bystanders can get AED location and instruction from dispatchers or locate them with a smartphone app). The study ultimately found that not only did this system improve 30-day survival but drastically improved quality of life for those that survived beyond one year (Kragholm et al., 2017).

While the above-mentioned study showed survival outcomes from a comprehensive cardiac arrest response program, Ringh et al. (2015) completed a study in Stockholm specifically looking at mobile phone dispatch of lay rescuers to assist with public cardiac arrests. In their

study, a GPS based mobile phone alerting system was set up allowing dispatchers to alert CPR-trained lay rescuers (within 500m of a cardiac arrest) simultaneously with the EMS dispatch. In a comparison between cardiac arrests incidents that received a lay rescuer alert (intervention group) and a control group of those that did not, there was a 14% higher rate of bystander CPR with the intervention group. Although this increase was shown in a relatively small study population, it is significant considering bystander CPR is typically associated with three times the survival rate as without. The study also suggests that with the increased number of lay rescuers responding to cardiac arrest incidents, civilian AED usage could also be increased with more publicly accessible AED's. Furthermore, knowing that approximately two-thirds of cardiac arrests happen within the home, development of a program where lay responders can be dispatched into private residences should be considered (Ringh et al., 2015).

A final study to consider was conducted in Switzerland where short message service (SMS) alerts were compared to smartphone app alerts for those responding to cardiac arrest incidents. The target population had an existing 3-tier response system to cardiac arrest incidents where an ambulance is simultaneously dispatched with a first responder network consisting of first responders (fire and police) and CPR-trained lay responders. The first responder network is alerted by an SMS text message that must be answered before the dispatch center can provide the address of the incident (privacy laws prevent the address from being disseminated via text message). Under this system, the first responder units carried AED's and were predominately the first to arrive at an incident. Lay rescuers normally arrived next while the ambulance typically arrived up to five minutes later. To conduct the study, the first responder network was split into two groups where all first responders continued to receive SMS message alerts and most lay rescuers started receiving an alert through a GPS enabled smartphone app. A

significant find of the study was a dramatic shift in who arrived fist at incidents. Lay rescuers not only began arriving first on scene, they were arriving up to 30% faster when alerted by the smartphone app as opposed to an SMS text. Additionally, the study showed there was a 70% increase in the number of lay rescuers responding overall. Most significantly though, the approximately 2-minute faster initiation of CPR from app alerted responders resulted in a significantly higher survival rate among victims. It should be noted, however, that this was mostly seen in victims with an initially non-shockable rhythm who do not benefit from an early arrival of an AED. The overall results of this study strongly support the efficacy of smartphone based alerting systems for first responders (Caputo et al., 2017).

The literature reviewed herein illustrates considerable support for the practices currently being performed by the Rogers Fire Department. Strong evidence has been presented to show programs designed to increase bystander participation at cardiac arrest events (including RFD's use of smartphone technology) can double or triple survival in a given community. Furthermore, RFD's use of dispatcher-assisted CPR instruction as well as the registration of all public AED locations is also strongly supported. In summary, while the literature supports the effectiveness of RFD's cardiac arrest response practices in theory, this paper will attempt to determine if RFD is applying them effectively.

Procedures

The research for this project began at National Emergency Training Center library and was continued online through medical journals, scholarly articles, and websites of subject matter experts such as the American Heart Association. The research conducted was intended to explore best practices in out-of-hospital cardiac arrest management and determine if the Rogers

Fire Department's use of PulsePoint is in line with these practices. The research findings also served to help develop the data collection instruments used for this project.

The descriptive research method was chosen to answer the following questions: a) How aware is the general public of the availability and capabilities of the PulsePoint app? b) How willing is the general public to respond and perform CPR on someone they do not know? c) How does the Rogers Fire Departments' survivability rate compare to other departments who also subscribe to the app? Consideration was given to various data collection instruments and the creation of survey's was deemed appropriate to gather the information sought.

To address the first two questions a survey was created (appendix A) using the online program Survey Monkey (www.surveymonkey.com) to elicit responses from the general public. The questions were designed to determine what percentage of the surveyed population is aware of the app, if they are willing to perform CPR, and if not, what barriers could be overcome to change their behavior. Care was taken in the wording of these questions to avoid ambiguity and researcher bias. Prior to dissemination, the survey was administered to a test audience of laypersons for feedback. The surveys were administered in two different ways in an attempt to capture a higher number of responses.

First, the survey was posted on the Rogers Fire Department Facebook page with a request for citizens to take two minutes and complete the brief survey. The Facebook page is currently followed by over 8,770 citizens and 100 responses were collected. There are several limitations with this method of collecting data. In a city of nearly 70,000 residents, the small number of responses cannot be considered representative especially considering the audience is limited to those connected on Facebook. Furthermore, it is impossible to know how many followers of the page are actually affiliated with the city. It should be noted that attempts were also made to post

this survey on the official City of Rogers website as well as the city's Facebook page. These attempts were unsuccessful, and the survey was not posted.

The second collection method involved interacting with citizens and administering the survey's face to face. This researcher, dressed in fire department uniform, greeted citizens while shopping and requested a few minutes of their time to answer the survey questions in the form of an interview. Two locations were chosen for data collection within the city loosely based on demographic profiles of the area. It should be noted, however, that the surveys were not intended to differentiate responses based on any demographic category. This was done as an attempt to capture a representative audience of the city as a whole. The fist location chosen was a Walmart store in a section of town that is predominantly Caucasian with generally higher income. This location was visited twice for one hour each time. The survey was administered once during week in the middle of the workday and a second time in the evening also during the week. The second location was a Neighborhood Market store in a different section of the city. This section has a considerably larger Hispanic population and is generally a lower income area. This location was also visited twice for one hour each time, once during the work day and once in the evening. In total 141 responses were collected from this method. Data collected in this fashion also has several limitations. As with internet surveys, this was limited to the population who chooses to shop at these stores and represents only a small fraction of the city's population considering the short amount of time the surveys were administered. Another potentially significant limitation is inherent when citizens are interviewed by someone in an official uniform. Though care was taken not to ask questions in a leading or intimidating manor, it is reasonable to believe that not all responses were honest. The researcher acknowledges there may

be false positives considering survey participants may not want to admit they would not help another citizen or perform CPR.

The third question was also addressed through a Survey Monkey created survey (appendix B) intended to elicit information regarding how other fire departments make use of the PulsePoint app. The questions were designed to discover how (or if) other fire departments track survival statistics related to PulsePoint usage, how they market PulsePoint to the general population, and if there are other community programs used in conjunction with the app. The survey was administered using social media and email through the International Association of Fire Chiefs (IAFC). A link to the survey was posted to four Facebook groups composed of students and alumni in the National Fire Academy's Managing Officer Program and Executive Fire Officer Program with a request that only those from fire departments using the PulsePoint app respond. These groups collectively have 719 members (at the time of writing), however, it is unknown how many duplicate memberships there may be. A link to the survey was also disseminated via email through a newsletter sent by the Executive Fire Officer Section of the IAFC. Target population of this newsletter is unknown. Collectively, these methods yielded only 31 responses. The most obvious limitation herein is the small sample size considering the number of fire departments in the country. The results may also be limited by who specifically answered the survey from a department. It is reasonable to believe the answers provided for any given department may not accurately represent their actual practices or data if the respondent did not have all the information available at the time of the survey. As with the first survey, care was taken to avoid leading questions and the survey was administered to a test group of peers for feedback prior to release.

Results

Research Question 1

The first research question intended to determine the level of public awareness of the PulsePoint app. The survey used to elicit this information was administered to 100 respondents online and 141 in person, for a total survey population of 241 citizens. The first survey question sought to ensure that all respondents had ties to the city. Of the respondents, 100% answered that they either live in, work in, or frequently visit the City of Rogers. The next two survey questions directly addressed the level of awareness and participation with the app. When asked if the survey population has heard of PulsePoint, 37% answered in the affirmative. This further breaks down to 29% of respondents asked in person were aware of PulsePoint while a greater 48% of online respondents indicated they are aware of the app. The same respondents were then asked if they have the app currently installed on their phone; 13% of in-person respondents and 39% of online respondents also indicated yes for a total survey population of 24% having the app on their phone.

Research Question 2

The second research question intended to discover how many citizens are willing to perform bystander CPR and what interventions could be used to increase the level of participation. The remaining survey questions addressed this directly and began with a baseline of prior CPR training. Of the total population, 25% indicated they have had hands-only CPR training, 32% indicated they have previously been CPR certified, 17% indicated they have had both hands-only CPR training and a certificate, while the 47% of the respondents indicated they have had neither.

The respondents were then asked if they were willing to perform bystander CPR on a stranger. Fifty-five percent of online respondents and 68% of in-person respondents answered yes for a total survey population of 63% indicating that they would perform CPR. A total of 6% indicated that they would not perform CPR and the remaining 31% indicated that they are unsure what they would do.

The next three questions were then directed only to those who indicated "no" or "unsure" on the previous question (would you perform CPR on a stranger). These questions intended to discover what interventions may influence their decision to perform CPR. The following three questions received 106, 118, and 114 responses respectively. When the respondents were asked if they would not perform CPR because they did not know how to do it, 62% indicated yes, 23% stated no, and 15% indicated there was another reason. Of those who chose to indicate a reason, seven stated they were afraid of liability or being sued, four indicated they physically cannot perform CPR due to disability, and one indicated that her work schedule would prevent her from responding the majority of the time. The respondents were then asked if they would be willing to perform CPR if they were assisted with instructions by a 911 dispatcher. Here, 80% of the respondents stated they would perform CPR while 4% still would not and 16% remained uncertain. Finally, they were asked if they would decide to perform CPR after being trained to do so by the fire department. Eighty-two percent indicated that they would, 5% said no, and 13% remained uncertain.

Research Question 3

The final research question was intended to determine how the Rogers Fire Department's survival rates and usage of PulsePoint compared to other departments throughout the country. The online survey to elicit these answers received 31 responses; 23 from all-career departments,

seven from combination departments, and one response from a volunteer department. Of these departments, 12 indicated they have under 100 personnel, 12 have 100-499 personnel, three have 500-999, and three more employ over 1,000 personnel. The survey was directed to be answered only by those currently subscribing to PulsePoint.

In survey questions directly related to the research question, 71% of responding departments indicated they track cardiac arrest survival rates within their city. Of these departments, 12 provided comments in the survey regarding their survival rates. The comments (as they appear in the survey) are as follows: “42% for December 18”, “37% unwitnessed all”, “39.3% for 2018”, “13”, “65”, “ROSC 40-45%, discharge from hospital 21%”, “23%”, “64%”, “idk”, “Survival rates are tracked by a local, private ambulance service through Cardiac Arrest Registry to Enhance Survival (CARES). Our community survival rate for non-trauma arrests in 2017 was 16.9%. Previous years are similar.”, “approximately 33%”, and “10”.

The next question asked if these other departments use the Utstein template to determine their survival statistics. This was intended to identify departments in which a direct survival comparison could be made to the Rogers Fire Department. Eleven of the departments indicated in the affirmative. The departments indicating that the Utstein template is used correlate with survival rates of 37%, 65%, 64%, 16.9%, 33%, and 10% for an average of 37.7%. Six of the departments which indicated they do not use the Utstein template provided the following information on how they calculate survival rates: “ROSC [return of spontaneous circulation]”, “ROSC as reported by the hospital”, “not sure if the program use. It’s coordinated between the EMS/Q&A division and the Office of the Medical Director”, “go to the hospital and go home”, and “I’m not sure if we use the above formula. Our saves are defined by hospital discharge and being neurological intact”.

The remainder of the survey questions sought to elicit information specifically about how the other fire departments make use of the PulsePoint app as well as any other community programs coinciding with its use. First, departments were asked if they know how many of their citizens have downloaded the app. Of the 31 departments, 28 indicated that they do not know how many of their citizens have the app. The three departments whom had statistics shared the following: “1,050 downloads, 29,000 residents”, “22,000 PulsePoint followers, 520,000 population”, “2,000 downloads, 250,000 people”.

Next, they were asked if they have compared their current cardiac arrest statistics with those statistics prior to implementing PulsePoint. Again here, 28 departments indicated they have not attempted a comparison. When asked to elaborate on comparison results, the following seven comments were shared: “Not enough time”, “We attempt to monitor this. We have seen a bigger impact with our Verified Responder program”, “No difference. Have not had bystander CPR initiated by PulsePoint to date”, “just started program in October”, “System is too new, only been implemented for a few months”, “no change”, “I’m not at a high enough level to have seen those numbers, though I’m guessing that our chief officers have had that discussion with our private ambulance service”.

Departments were then asked if they have attempted to track how many workable cardiac arrests have involved CPR performed by bystanders alerted by the app. Here, 6 of 31 departments indicated that they have attempted to track this. The following comments were provided when asked to elaborate on what was found: “2”, “We average about 35 activations a month. Not always clear if the bystander came from app activation or other notification.”, “None”, “Too early to tell”, “Not enough time”, “Minimal impact”, “Don’t know how to go

about that", "Not sure if we have", and "We have had three alerts that I am aware of in the last three months. All were found to be non-cardiac related emergencies after our arrival."

When asked next if their departments are implementing other community programs to coincide with PulsePoint, 11 of 31 indicated in the affirmative. The following responses were recorded in regard to companion community programs: "AED locations", "Extensive AED program. CPR in the schools is now mandatory. Verified responder now over 430 participants. Cardiac campaigns, eat healthy like firefighter, "take the car out of cardiac" early 911 notification campaigns and many other messages.", applied for Pulse Point grant (cost too high for us) in the process of gathering information, we became a HEARTSAFE community.", "Hands only CPR Community AED Program", "We are encouraging it's use during all CPR classes", "Mechanical compression device", "Hands only CPR training", "HeartSafe CPR training offered quarterly through our cities Parks and Rec department.", "HeartSafe Fargo is a partnership between my department and a local hospital that provides AEDs at a discounted rate to area business to improve access to early defibrillation. The program also supports CPR training in the community.", "Monthly free community CPR classes", "Hands-only CPR at public events".

Finally, the departments were asked how they market PulsePoint to their communities. Here, 13 of the departments indicated that they do not do any marketing related to the PulsePoint app. Of the remaining respondents, the following responses were received regarding marketing practices: "Fire department home page only", "All types of media and mass media. All social media. Print media. Our websites and partner agencies websites. Ongoing and extensive.", "Social Media Campaign", "We cover this app during all CPR classes.", "App creators talked on the news about it", "Banners at stations, handouts, social media", "Social media and local news",

"Social media", "All forms of media", "Social media campaign", "Initially with press releases and social media. Nothing has been done marketing wise in at least 2 years though.", "Local news stories and links from the website.", "Since launch, it is mostly just word of mouth and regularly discussing the app through social media channels.", and "Departments social media pages."

The results found, limited as they are, appear to support this researcher's speculation that there is a general lack of awareness of the PulsePoint app in the City of Rogers. However, on a positive note, a high percentage of citizens indicated that they would be willing to perform bystander CPR if called to do so. Furthermore, the remainder of the survey population provided useful feedback to assist RFD in creating strategies to further improve the level of bystander intervention. Finally, surveys of other departments revealed that the RFD's practices are similar to others who also subscribe to the PulsePoint app. This point will be explored further in the discussion section and recommendations for system improvement will be made based on the literature reviewed.

Discussion

When considering one's likelihood of surviving a sudden cardiac arrest, there are many moving pieces that must function flawlessly together in a coordinated effort from recognition of the event to recovery in the hospital. As Dr. Robert Neumar points out "your chances of surviving a cardiac arrest shouldn't depend on which city you live in, or which EMS system responds or which hospital you go to…" (American Heart Association News, 2018, para. 3). The American Heart Association recognizes this and acknowledges that despite over 40 years of creating best practice guidelines for emergency cardiovascular care surrounding the widely accepted chain of survival, life-saving systems of care do not exist in many communities

throughout the country. Furthermore, there is incredible disparity in cardiac arrest survival statistic where some systems report rates up to five times higher than others (Neumar et al., 2015). Robert Graham, chair of the study committee and director of the national program office for Aligning Forces for Quality at George Washington University, further discusses the unacceptably low cardiac arrest survival rated in the united states:

> Although breakthroughs in understanding and treating cardiac arrest are promising, the ability to deliver timely interventions and high-quality care is inconsistent. Cardiac arrest treatment is a community issue, requiring a wide range of people to be prepared to act, including bystanders, family members, first responders, emergency medical personnel, and health care providers. ("Report: U.S. Out-of-Hospital," 2015, para. 3)

In an article from the American Heart Association news, Dr. Clifton Callaway agreed with the above statements when he facetiously commented that survival rates will not simply improve by "having faster ambulances or taller hospitals" (American Heart Association News, 2018, para. 6). The article goes on to describe how the "chain of survival" is best addressed through well-coordinated response systems that is structured at all levels from recognition of cardiac arrest through post-arrest care. King County, Washington is regarded as the best example of such a system and is home to the "Resuscitation Academy". This academy teaches jurisdictions how to create a comprehensive response system to improve survival within their communities; A system which considers the role of bystanders as the most essential element. This is emphasized by Dr. Calloway's final statement in the article "All the chain of survival steps have to work well… but they rely on the general public to know what to do" (American Heart Association News, 2018, para. 28).

In 2010 the Rogers Fire Department (RFD) took stock of their current practices in cardiac arrest management and discovered that the likelihood of surviving a cardiac arrest in Rogers was dismally under 2%. The RFD intended to undergo a whole system renovation and sent representatives to Seattle, WA to attend the aforementioned Resuscitation Academy. With the practices and information learned, the RFD began the first steps of a new cardiac arrest response plan in May 2011. This plan consisted of high-performance CPR training for ambulance and fire crews (an algorithm listing specific jobs for each crewmember during a cardiac arrest response) as well as a community-wide rollout of a hands-only CPR campaign. Prior to this time, bystander CPR or defibrillation was not emphasized in Rogers and citizen participation was unknown. A significant benefit to this hands-only technique, as found in many studies, is a drastic increase bystander CPR due to the removal of civilian fears. Fear of performing CPR correctly or fear of infection from mouth-to-mouth resuscitation are the two most common barriers preventing bystanders from acting. These fears have been shown to be successfully allayed with this simple technique that has been recommended by the AHA since 2008 (Sasson et al., 2013). Furthermore, studies have demonstrated that hands-only CPR performed by bystanders has shown no difference in neurological outcomes of survivors as compared to conventional CPR. In fact, survival rates increase due to a higher level of CPR being performed prior to EMS arrival (Institute of Medicine, 2015). The push for hands-only CPR in Rogers began with fire department personnel teaching the technique in community centers, civic groups, public events, and schools. Community training practices such as these are currently recommended by the AHA and as Neumar et al. (2015) explain, CPR education should be incorporated in schools to engage receptive middle and high schoolers as well as targeting community groups where CPR is least likely to occur (Neumar et al., 2015). Presently, however,

CPR instruction in Rogers has been reduced to once annually in middle schools and as requested in private businesses.

An effort to further increase bystander participation was taken by the RFD in September of 2014 when the city subscribed to the PulsePoint app. With this app, Rogers hoped not only to increase bystander CPR but also with citizen application of an AED. A large study from the Resuscitation Outcomes Consortium found that AED's are applied in only about 2% of all public out-of-hospital cardiac arrest incidences (Rumsfield et al., 2016, p. 90). This is a very significant finding considering how much literature there is showing significantly improved neurological outcomes when survivors of a cardiac arrest had an AED applied prior to EMS arrival. The AED registry feature of PulsePoint allows the fire department to add and instantly update the locations of all public AED's within the city. These locations are immediately available to any bystander responding to a call for CPR from the app as well as to dispatchers who can inform 911 callers without the app (PulsePoint website, n.d.).

The RFD rolled out PulsePoint with a significant public education campaign. The campaign began on the local news with an official press conference at city hall, where a PulsePoint banner still hangs today on the wall of the city council meeting room. At the time, PulsePoint ads appeared on an electronic billboard on the major interstate coming into Rogers as well as on social media pages and various community events. Today, however, there is virtually no marketing taking place to continue public awareness of the app with the exception of sporadic mentions on the fire departments Facebook page. In addition, as mentioned above, community-based teaching of hands-only CPR has also been reduced since its introduction to the city. The research questions contained in this project intended to discover the impact PulsePoint has had

on the city by determining the general public's level of awareness and usage of the app as well as willingness to provide bystander CPR.

The first research question was addressed through surveys and interviews of the general public within the city. This researcher acknowledges that the data generated came from an exceptionally small sample of the population and therefore cannot be used for any direct inferences. However, differences seen between data collected in person with data collected online can be at least suggestive of where awareness could be improved. The survey data showed that approximately half of the respondents who follow the fire departments Facebook page are aware of the PulsePoint app, contrasting with only 29% of those interviewed in person. This finding suggests that current marketing practices (or lack thereof) favor those connected online. Another point to consider is that the number PulsePoint subscribers who follow the RFD account for less than 5% of the city's population, further indicating a potential lack of general awareness. While it is not possible through this research project to differentiate the percentage of the overall population who know of the app and chose not to download it, the data collected shows that within the survey population 36% of those who stated they know what it is did not download it.

All taken into consideration, these results show that further efforts to raise awareness are warranted. In an article for FireRescue Magazine, Jim Crawford discusses how fire departments fail to change public behavior with short-lived awareness campaigns. In the article, he uses an example where sales trainees are taught that 62% of all sales occur after the sixth selling attempt to emphasize the importance of repeated exposure to messages. Specifically, in terms of public safety behavior, he states citizens need to see the message repeatedly before they remember it and then be made to feel as though they are part of something bigger than themselves before they

embrace it and change their behaviors (Crawford, 2012). The Resuscitation Academy echoes this point in their Community CPR Toolkit which provides instruction for creating a strong community of citizens willing to perform bystander-initiated CPR. They contest that for any public CPR program to be successful, the educational messages must be ongoing, sustainable, and regularly present throughout the community (The Resuscitation Academy, 2012). The RFD would be well served to continue public awareness messages with this in mind.

The second research question was intended to determine the level of CPR training among the citizens of Rogers, their willingness to perform CPR on a stranger, and what interventions may improve CPR participation. As with the first research question stated above, the sample size generated by this project cannot be considered representative of the population at large. When the public was asked if they would be willing to perform CPR on a stranger, 63% of those surveyed indicated that they would. This statistic (if representative of the general population) is encouraging for the city considering Sasson et al. (2013) suggest that bystander CPR varies greatly by location and typically occurs in anywhere from 10% to 65% of all incidences in the United States. They further point out, however, that even despite public education campaigns and AHA recommendations, bystander CPR is only actually performed on one-fourth of all out-of-hospital public cardiac arrests (Sasson et al., 2013). Currently, in Rogers, it is difficult to differentiate the percentage of those who state they would perform CPR from those who actually have. The PulsePoint Foundation provides statistics of how many downloads there are in a given city as well as how many alerts have been enabled, but they do not currently have a way to track how many alerts result in a bystander performing CPR due to the alert. Furthermore, while the medical reporting software at RFD does provide for paramedics to record when bystander CPR was performed, that data should be considered unreliable and very likely under-reported.

Currently, bystander CPR is not a required field in the reporting software and may be skipped. Therefore, for the information to be included in the report, the paramedic must volunteer it. It is common for non-required information fields in the software to be left blank. With this considered, bystander CPR rates in Rogers cannot reliably be compared with the national averages.

Examining this further, lack of CPR training was found by the Institute of Medicine (IOM) to be one of the most significant barriers preventing timely bystander CPR from taking place. In fact, they state that less than 5% of the United States population ever receives any formal training (Institute of Medicine, 2015). Similarly, in this research project, lack of CPR training was cited by 62% of respondents as the reason they would not perform CPR (or that they were unsure if they would). When questioned further, respondents reported the next most significant reason for not performing CPR was fear of liability or being sued for not performing CPR correctly. This is a significant finding considering the IOM also found that fear of liability is very common in citizens whom have never been trained in CPR. Furthermore, they reference numerous studies that found CPR training removes these fears in most cases and drastically increases the likelihood a bystander will perform resuscitation. This was found to be especially true when the training has been within the past five years (Institute of Medicine, 2015). These findings along with this survey data reinforces that Rogers should continue, if not expand, community wide CPR training on a regular basis. This point is further emphasized by considering that 82% of survey respondents indicated that they would perform CPR after being trained by the fire department when they previously indicated they would not.

Another strategy that was nationally found to be effective in recruiting bystanders to perform CPR is a 911 system that has dispatchers trained to recognize a cardiac arrest from the

descriptions of lay callers and then to provide timely CPR instruction to untrained callers. The AHA suggests that dispatcher-assisted CPR instruction can potentially double the proportion of cardiac arrest victims who receive timely bystander CPR, saving thousands more lives per year. Under the current guideline revision, the AHA recommends dispatchers provide compressions-only CPR instruction for all cardiac arrest victims as it has been shown to be just as effective as conventional CPR and is likely to ensure greater compliance from lay responders who would not be willing to provide ventilations (Kleinman et al., 2018). Currently, in Rogers, 911 dispatchers are trained per the AHA guidelines to provide CPR instruction to callers and 80% of survey respondents indicated that it would cause them to perform CPR when they initially would not.

The third research question was intended to explore the practices of other fire departments who also subscribe to PulsePoint. Of the 31 responses received, approximately 40% are career departments of a similar size to the RFD. It was a surprising finding that almost 30% of these departments who stated they currently subscribe to PulsePoint, do not track cardiac arrest survival rates in their communities. Of the departments who do track survival rates, 11 state they currently use the Utstein reporting formula. The AHA supports use of Utstein reporting guidelines as a means of standardizing reporting data to compare the efficacy of EMS response systems and discover best practices from their successes or failures. The reporting template includes data collected on the initial cardiac rhythm encountered, whether or not bystanders performed CPR or applied an AED, and if circulation was restored. However, in terms of reporting survival rates for an individual agency, a patient who was considered to have "survived the event" suffered a witnessed cardiac arrest with an initially shockable rhythm (ventricular fibrillation or ventricular tachycardia) and had a pulse at arrival to the hospital emergency department. Long term survival (survival to hospital discharge or 30 days after) is

then considered to be part of the hospital's care system and is not included in the EMS agency's statistics (Perkins et al., 2015). What this means for EMS agencies is that Utstein reporting does not necessarily indicate how many patients who "survived" a cardiac arrest ever made it home from the hospital. Another complicating factor is the extreme narrowness of the inclusion criteria. An EMS agency may only have a very limited number of cardiac arrests that meet all of the inclusion criteria and therefore the survival percentage may appear skewed. For example, if an agency has four cardiac arrests that meet the criteria and three of the patients survive to the hospital, it would then appear that the agencies survival rate is 75% when in fact it may be exponentially lower when all cardiac arrest etiologies are considered. Likewise, the opposite is true; an agency may have revived several cardiac arrest victims who do not become part of their survival statistics because the template does not consider all cardiac arrest events. Considering these elements of Utstein reporting along with the fact that 65% of respondents who state various other methods of reporting their survival rates, it is not feasible to accurately compare cardiac arrest survival in Rogers to the other agencies included in the survey.

The next few questions intended to determine how well the other surveyed departments monitor their use of PulsePoint. Again, stating the limitation that the surveys may have been answered by those without requisite knowledge, it was found that only three of the departments know how many citizens have downloaded the app. The survey also overwhelmingly showed that the other departments have not attempted to track survival rates before and after PulsePoint implementation or track how many citizens have responded due to an app notification. This is consistent with research conducted at the RFD. There was no preexisting statistics showing survival rates in Rogers pre- and post- PulsePoint. A review of RFD data, in accordance with the Utstein template, revealed a survival rate of 25% in 2013 (prior to PulsePoint implementation)

and 44% in 2018. While this would appear encouraging as it is higher than the average of other surveyed Utstein departments, it is not possible with the data at hand to determine what part of this improvement is a result of PulsePoint-initiated bystander CPR. Even though some bystander-initiated CPR information is available in RFD's Utstein reports, the information as discussed has questionable reliability and is not linked in any way to PulsePoint alerts in the reporting software. Furthermore, considering the research also revealed that the PulsePoint Foundation has not incorporated a means to track how many citizens responded to an alert and performed CPR, the data does not exist.

The final survey questions intended to reveal what (if any) other community programs other fire departments have implemented to coincide with PulsePoint and how they have marketed the app to their respective communities. It is well documented in the literature review that there is no single step to improve cardiac arrest survival in a community. All of the chain of survival links must be addressed in a system wide effort. Kragholm et al. (2017) suggested that the improved survival shown in the Denmark study was not accredited solely to the increased bystander CPR and AED usage seen within the study. They credit the entire system consisting of widespread community CPR training, registration of AED locations, dispatcher-assisted CPR, and smartphone applications showing the locations of cardiac arrest victims and AED's with contributing to the overall success (Kragholm et al., 2017). This is consistent with all AHA recommendations discussed herein and reflective of the system currently seen in Rogers. Of the other departments who provided descriptions of their community programs, these programs are also a common theme and should be considered best practices.

The final aspect of research question three was to compare PulsePoint marketing practices between Rogers and the other departments. While the responses were limited, most of

the respondents indicated publicizing PulsePoint in very similar fashion to what was done at the RFD. Social media and community events were the most discussed methods; however, their reach and effectiveness are uncertain. In Rogers, despite the large initial media blitz, the number of PulsePoint downloads is quite small in comparison to the city's total population. This would suggest a marketing gap and lack of awareness of the app, especially considering Rogers' rapidly growing population. The city has grown exponentially since the inception of PulsePoint in 2014 and there are thousands of new residents who likely have not been reached.

Recommendations

The research completed is highly suggestive that there is a lack of general awareness of the PulsePoint app within the City of Rogers. While the surveyed population is relatively small, the results would appear to be corroborated by the known number of downloads compared to number of residents. Based on the research conducted and review of current literature, the following recommendations are then made to continue improving cardiac arrest survival in Rogers.

First, the RFD should consider new advertising campaigns for the PulsePoint app. The importance of bystander intervention cannot be understated as a critical element of surviving a cardiac arrest. The PulsePoint app provides Rogers with a proven tool to recruit lay rescuers and is unfortunately not being used to its full potential. While social media is regarded as a great platform to generate awareness, the research showed a lower level of awareness with those interviewed in person as opposed the online respondents. Efforts should, therefore, be taken to also emphasize reaching those who are not as connected online. The RFD should conduct further study to discover cost-effective ways to raise awareness of the app to the city at large.

Next, community CPR and AED training should be continued and expanded beyond the annual middle school presentations. Even though a high percentage of citizens indicated prior CPR training, the research has shown that it is a perishable skill which should be addressed regularly. This is especially true considering how fear and lack of confidence are cited as significant reasons bystander CPR is not performed. Furthermore, while teaching CPR in schools reaches a large audience, the most appropriate citizens in a given area are not being targeted. As Sasson et al. (2013) suggest, community CPR should be delivered regularly to high cardiac risk neighborhoods and tailored to that neighborhood's specific context and needs (Sasson et al., 2013). The RFD should identify areas in the community to focus expanded CPR training efforts and incorporate it on a regular basis.

Finally, the research was unable to determine the effectiveness of the PulsePoint app or discover a correlation with increased bystander CPR. Therefore, further efforts should be made to determine what part PulsePoint has played in the RFD's improved survival rates. Considering the RFD has undergone improvements in their entire cardiac arrest response system, determining this will require the collection of new data specifically related to PulsePoint alerts. This researcher recommends that the RFD's reporting software be modified to make bystander CPR a required field to be filled out by paramedics as well as an additional field to record if the bystander responded due to a PulsePoint alert.

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Appendix A

General Public Survey

1. Do you live, work, or frequently visit rogers?
    a. Live
    b. Work
    c. Visit
    d. None of the above

2. Are you aware there is a free smartphone app called PulsePoint that will send you an alert when the Rogers Fire Department needs your help to save a life by performing CPR on a member of your community suffering a cardiac arrest?
    a. Yes
    b. No

3. Do you currently have the app on your phone?
    a. Yes
    b. No

4. Have you ever been taught hands-only CPR or are CPR certified?
    a. Hands-only
    b. Certified
    c. Both
    d. Neither

5. Would you be willing to perform CPR on a stranger if notified by the app to assist the Fire Department?
    a. Yes, I'm sure I would
    b. No, I definitely would not
    c. I'm not sure what I would do

6. If you answered "no" or that you are unsure, would you be more likely to perform CPR if guided by a 911 dispatcher?
    a. Yes
    b. No
    c. Unsure

7. If you answered "no" or that you are unsure you would perform CPR, is the reason because you do not know how to do CPR?
    a. Yes
    b. No
    c. Other (please specify)

8. If you would not help because you do not know how to do CPR, would you then be willing to perform CPR if you were provided training by the Fire Department?
    a. Yes, most likely
    b. No, probably not
    c. I am still unsure

Appendix B

PulsePoint Survey (for other fire departments)

1. Is your department all career, volunteer or combination?

2. How many personnel does your department have?

3. Does your department track cardiac arrest survival rates? If so, what is your current survival rate?

4. Do you use the Utstein Formula? If not, please specify how you quantify survival.

5. Do you know how many citizens in your city have downloaded the PulsePoint app and have CPR alerts activated? If so, how many and what is your total population?

6. Have you attempted to compare cardiac arrest survival rates before and after the use of the PulsePoint app? If so, how much (if any) of a difference have you seen?

7. Have you attempted to track how many workable cardiac arrests involved citizen CPR after being alerted by the app? What did you find?

8. Are you implementing any other community programs to coincide with the use of PulsePoint? Please explain.

9. How have you marketed the app to your community?

10. Please share contact information below if you are willing to assist with any follow-up information.

Thank you!