Abstract The use of Unmanned Aircraft Vehicles (UAV) or “Drones” has been used for a long time for many different reasons. The health care industry should be on the top of the list and that has not been the case. That is why this project was created, to assess the need on the population of Miami-Dade County, FL for Automated Electrical Defibrillator (AED) to be carried by Drones and attend emergency situations as a necessary service. While the Federal Aviation Administration (FAA) has implemented firm regulations on UAV registration, height and location restrictions of the flights; there is a waiver that can be applied and has been approved in the past for other fields, not as important as saving someone’s life. The data was collected through a survey. A quantitative survey with closed questions was made to gather information about the need of Ambulance Drone Services in the Miami-Dade County, FL population. A total of 100 responded to the survey. One hundred percent of the population of Miami-Dade County in FL, agreed in the need of a faster service than an ambulance to attend SCA and did express their interest in the need of AED to be carried by UAVs to emergency sites. Eighty nine percent of the population agreed in their interest in having trained volunteers in their neighborhood to perform CPR and their interest in AEDs to be carried by an UAV to attend SCAs. Both results were statistically significant with a p<0.05. This results proof the interest in the population of Miami-Dade County, FL the need for a faster service to attend SCA that is in fact the first cause of death in this community.

Index Terms— Automated Electrical Defibrillator (AED), Sudden Cardiac Arrest (SCA), Unmanned Aerial Vehicle (UAV), Bystander.

I. INTRODUCTION

Medical services and patient care have evolved over decades. Every year new treatment guidelines and best technologies are developed to improve patient quality of life.

Sudden Cardiac Arrest (SCA) is the leading cause of death in Miami-Dade County, claiming the lives of nearly 1,000 people every day, or about 335,000 every year (SCA Foundation, 2017). SCA survival rates drop 7 to 10 percent every minute without defibrillation, and brain damage begins in just 4 to 5 minutes. Ninety-five percent of those who suffer SCA die because cardiopulmonary resuscitation (CPR) and defibrillation usually occur too late. Immediate CPR and defibrillation are the most effective treatments. The American Heart Association (2015) estimates that the survival rate after cardiac arrest would increase by 20 percent and that 40,000 more lives would be saved each year with a more consistent application of effective bystander CPR and prompt use of an Automatic External Defibrillator (AED).

Unfortunately, until now efforts have not been sufficient, resulting in unsatisfactory outcomes. As clinicians, our duty is to look for possible gaps in the system and contribute to modify the current negative results. Implementing new ambulance drone services will decrease the time of arrival to emergency settings, thereby, decreasing mortality in patients presenting with SCA in the Miami-Dade County Area.

A. Background

There are many legal and infrastructure issues that need to be addressed before full-scale commercialization of ambulance drones can be implemented. To prevent any difficulties during flight operations, clearance from the Federal Aviation Administration (FAA), regulatory institutions, as well as defining the flight levels are primordial to prevent any difficulties on further operations (FAA, 2017). Extensive tests need to be conducted to completely assure the safe and efficient operations of all the processes related to the used of ambulance drones.
Momont (2014) developed a sample of a drone that has a compact storage able to transport an AED in it. The drone was developed primarily to provide supplies to the people on the emergency setting and provide advanced life support. The advantages of this sample are the reduction on time of arrival of the AED in the case of cardiac arrests. Despite the different limitations currently existing, the project is still in progress and it is estimated that by 2017 this project will be able to be implemented in the UK. In 2015, an ambulance drone design was developed by Argo design model in Texas, U.S.A., providing an emergency support in rural community that increased the speed of what is used now. It was designed to provide a medical care during traffic accident sites that would be inaccessible by road. This clearly demonstrates the need for the evaluation of another route of access to emergency sites faster and more efficient than the ones already in use.

B. Problem Justification

Every year, more than 350,000 out of hospital cardiac arrests occur in the USA, with a bystander CPR rate of 46.1% and a survivor rate of 12%. Around seventy percent of out of hospital cardiac arrests occur in homes. Unfortunately, only about 46% of people who experience an out of hospital cardiac arrest get the immediate help that they need before professional help arrives (AHA, 2017). Thousands of people die because of ambulance delays. The time taken by ambulance to reach a patient depends on a lot on the route, distance and the traffic route.

Helicopter support is working in certain places, but it is costly and requires open 75 space for landing (Shahbaz, S). There should be an alternative way to support the patient to survive long enough for the ambulance to arrive. The Ambulance Drone Support System could provide support to a patient long enough for the ambulance to come and take matters in hand from there.

When a person has a cardiac arrest, survival depends on the immediate application of CPR from someone nearby. Almost 90% of people who suffer out of hospital cardiac arrests die (AHA, 2017). CPR, especially if performed in the first few minutes of cardiac arrest, can double or triple a person’s chance of survival. Although time is critical for these patients to receive appropriate treatment, and rapid emergency medical services (EMS) response, intervention, and transport to the nearest hospital is indispensable for positive outcomes. Reducing cost and time of arrival will increase the life expectancy of patients suffering SCA.

The United States has a huge potential for solving emergencies rapidly, although many techniques can still be improved. The use of Healthcare Apps and Ambulance Drone Services as a way to increase life expectancy is definitely an option that should be evaluated. In 2015, 68% of Americans were reported to have smartphones (Anderson, 2015). Analyzing the results of this study, it can be inferred that for every person who doesn’t have a smartphone, 2 people would be available to contact the Drone Services, and those who don’t have a smartphone can benefit from the App of those who use this technology. This would reduce the timeframe of getting service from a Drone as compared to the time needed for the arrival of an Ambulance. According to Pew Research Center, 63% of U.S. adults use their phones to go online, and cellphone carriers now generate more revenue from data fees than from voice calls. Seventy-seven percent of these smartphone owners have downloaded apps in the past (Kenneth Olmstead, 2015). Today’s consumers are spending over 85 percent of their time on their smartphones using native applications, but the majority of their time (84 %) is spent using just five non-native apps they have installed from the App Store (Sarah Perez, 2015). According to Makovsky (2015), Americans are ready and willing to use health apps and wearable devices to improve their personal health. In another study, it was also found that 88% of Americans would be willing to share their personal information to improve care and treatment options (Kelton, 2015). Of note, 52% of that population used mobile apps related to the cardiovascular system (Sunnie Southern, 2015).

II. REVIEW OF LITERATURE

When a person has a cardiac arrest, survival depends on immediately getting CPR from someone nearby. Almost 90% of people who suffer out of hospital cardiac arrests die (AHA, 2017). If CPR is performed in the first few minutes after a cardiac arrest, the chances of survival of a person can double or triple. Though time to treatment is critical for these patients, as well as rapid emergency medical services (EMS) response, intervention, and transport to specialized medical facilities it is also essential to create awareness in the community for a rapid emergency medical service response.

Although in the past the main focus for development of UAVs was on military applications, recent technology make UAVs affordable and easy to maneuver, allowing UAVs to go “mainstream” (Kim, 2016). Worldwide, people are trying to find innovating and stimulating ways to use UAV for non-military applications. Several attempts have been developed globally to address the CPR needs. In 2014, Momont created an Ambulance Drone Service with a defibrillator that promised to strengthen the survival rate and help ensure that patients arrive at the nearest hospitals alive. The drone was designed the drone to track emergency mobile calls and use a GPS to navigate. The logistics on the scene consisted of an operator, like a paramedic, who can watch, talk and instruct those helping the victim by using an on-board camera connected to a control room via a live stream webcam.

Despite the legal issues regarding its use, Momont (2014) planned to have and operational emergency drone
network across the Netherlands in five years. “I hope it will save hundreds of lives in the next five years” (Momont, 2014).

The benefit of the Ambulance Drone Support System would be the possibility to support a patient long enough for the ambulance to take the matter in their hands from there on. Drones can be outfitted with additional sensors, cameras, and onboard microprocessors to autonomously self-stabilize, follow designated paths, and detect objects. New computer vision and machine learning algorithms have been developed and experimentally tested to navigate drones in narrow environments and in areas where GPS signals are non-existent.

Each government has responded to increasing the controls of UAVs by publishing their own rules and regulations. Although it is uncertain what level of government is best suitable to regulate the UAV, the rules imposed may overlap and conflict or be in disagreement with federal rules. Regulations of UAVs often mention the need to protect public health, safety, and well-being and address concerns in areas such as privacy and trespassing.

Although the Federal Aviation Administration (FAA) regulates drone use near airports, there are other potential hazards that can increase concern about the associated increased drone use. Meanwhile, there has been a decrease in UAVs costs and a subsequent increase in development of UAV applications, therefore, increased interactions between drones and roadway users will sure be observed in the near future.

For the US to fulfill the need for drones to become first responders there needs to be a certified program to comply with the requirements imposed by the FAA for pilots to provide a legal license. In 2015, the Miami Dade College (MDC) created a course for future drone pilots and for the first-time MDC brought drones for education use. Dr. Orlando Villaverde who has a master’s degree in aeronautical science stated, “We are one of the first colleges to enter this field”. As Dr. Villaverde describes more than 50 countries are using drones already guided by an onboard computer or remote control, and encourages new generations to become leaders in this industry (WV, 2015). If the pilot becomes licensed to conduct an UAV, it can fly in Class G airspace as long as they follow all the operating requirements in the Rule (Part 107) described further.

The mechanism by which the drones work will be described subsequently as related to the transportation, delivery, and implementation of the AED.

1) Transportation of the AED

For a UAV to be flown automatically out of the pilot’s visual field, the delivery system must provide collision warning sounds and lights, and a stable video-link. Claesson (2016) stated that the UAVs should be set up automatically with dual communication in the EMS, and navigated with map support. Further automatic flights can decrease the task interference as well as the workload of the host operating system. Automated flights can also be carried out through a pilot requesting flight permission for an UAV to be flown manually with a video connection.

2) Drone delivery of the AED

According to Claesson (2016), three techniques were tested for the drone delivering the AED. Latch release from low altitude appeared to be the best method for delivering the AED, as well as landing the UAV on flat surface. These techniques appeared to be safer for bystanders than for parachute release.

Implementation of the AED

During the onsite delivery of the AED, there might be a risk of damage when released to the ground or into the water. According to Claesson (2016), precautions must be made to avoid causing harm to bystanders or to the environment, precautions must be made. Releasing the equipment from approximately 4 meters of height represents a low risk for people to get hurt from the rotors of the UAV. Adequate packaging of the AED may be needed to prevent it to fall apart. Landing on a flat surface using appropriate warning sensors, lights and sounds may be important to attract attention. Bystanders should be knowledgeable about the fact that the UAVs is arriving to the emergency site by the dispatch center. The dispatcher should avoid interruption of CPR; rather wait for the AED to be available in the vicinity informed by the bystander. For easy bystander access, the AED should be placed on top and the propellers should be shut off after landing.

In February 2017, Caterpillar Ventures assisted entrepreneurs with the regulatory compliance and security features needed to scale drone operations, unfortunately project was done to enterprises targeting construction services instead of healthcare services. This is a great opportunity to focus Caterpillar Ventures support toward healthcare services that might be more beneficial for the Miami-Dade County community (Caterpillar Ventures, 2017).

A. Proposed Project for the USA

The Ambulance Drone can get an AED to a patient within a 12 square kilometer (4.6 square miles) zone within a minute, increasing the chance of survival from 8 percent to 80 percent (The UK, 2016). The Ambulance Drone Services will inspire Miami-Dade County population to provide life-saving support to victims of Sudden Cardiac Arrest using a simple Mobile App. Instead of relying on a CPR trained bystander to be in the exact location needed at the exact time, the Ambulance Drone Services App alerts nearby volunteer rescuers simultaneously with the dispatch of a Drone with an AED within one minute and local paramedics shortly afterward. The App directs these citizens, with a live
map, to the nearest CPR trained volunteer as well as the nearest Drone with AED. This will greatly improve the odds that CPR will be getting started, and an AED will be provided, within the first few minutes after a cardiac arrest.

The Institute of Medicine (2013) noted, that throughout the United States, the delivery of emergency care across the health care system is divided, which could influence the appropriateness and quality of care provided for cardiovascular emergencies. The Federal Aviation Administration (FAA) and the Obama administration have imposed tight controls on new technologies in saving lives. Ambulance Drone Services is a project that would be ideal in permitting the immediate arrival to an emergency scene due to cardiac arrests and myocardial infarctions. The FAA has been slow to provide guidelines for legal commercial drone usage and is largely missing out on the potential of implementing new ambulance drone services. The last regulations on small unmanned aircrafts were updated in June 2016. What if we could, with just 2 clicks arrange for a volunteer neighbor to assist the emergency, start doing CPR and be able to request the Ambulance Drone Services? There is a waiver that can be applied and has been approved previously for other companies, such as cinematography and other areas of usage. The implementation of this new technology can increase efficacy, availability, and decrease cost and time of arrival to emergency settings.

According to Kim (2016), while there are drone regulations near airports stated by the Federal Aviation Administration (FAA), there is still a concern due to potential hazards associated with increased drone use. Due to the further development of UAS applications, there is a consequential decrease in the costs of further applications. There will also be an increased interaction between drones and roadway users.

**Operational Limitations**

According to the FAA (2016) Part 107, some of the regulations for unmanned aircraft are:

- Unmanned aircraft must weigh less than 55 lbs (25 kg).
- Visual line-of-sight (VLOS) only.
- At all times the small unmanned aircraft must remain in close vicinity to the remote pilot in command.
- Small unmanned aircraft may not operate above any person.
- Daylight only operations, or civil twilight with appropriate anti-collision lighting.
- Maximum altitude of 400 feet above ground level (AGL).
- Minimum weather visibility of 3 miles from control station.
- Most of the restrictions discussed above are **waivable** if the applicant demonstrates that his or her operation can safely be conducted under the terms of a certificate of waiver.

According to Momont, using drones to deliver defibrillators could be just scratching the surface of the potential to improve emergency responses. Pulver states that drones, like most other emergency vehicles are subject to extreme weather conditions. Drones are smaller and lighter than other manned aircraft and are more susceptible to turbulence, icing, and extreme cold. Another topic to highlight is that there are still issues concerning the integration of unmanned aerial vehicles, in civil airspace. An example was presented by Pulver where the United States military service lost two Predator drones due to ice and turbulence in 2003.

There are known and still to be discovered factors that potentially contribute to cardiac arrest survival. Nevertheless, novel approaches are available to ensure needed technology is available near a potential cardiac arrest patient.

The Ambulance Drone Services model does not explicitly provide any backup coverage, though some areas overlap. It is quite common that Fire/EMS stations are staffed with more than one unit and therefore can respond to simultaneous events. The current model only allows for one incident within each drone coverage area to receive treatment. It remains to be seen how frequently this situation occurs and whether the cost-benefit factor is enough to implement. Along these lines, without empirical data, it is difficult to estimate the time it takes for a drone to be back in service after serving a patient. Some of the major considerations related to recovery time are battery life and charge time, medical equipment replacement, and damage to the drone.

Finally, although a timely response is crucial for cardiac arrest survival, it is not the sole factor in cardiac arrest survival rates. There are many other factors such as the time of patient discovery, whether cardiopulmonary resuscitation (CPR) was performed by bystanders and the fitness level of the patient.

The viability of this project would be more accepted if the project was accepted in other communities decreasing death from sudden cardiac arrest.

### III. METHODOLOGY

This capstone project represents a numerical descriptive study. Sudden Cardiac Arrest (SCA) is the leading cause of death in Miami-Dade County, claiming the lives of nearly 1,000 people every day, or about 335,000 every year (SCA Foundation, 2017).

The data was collected through a survey. Population was invited and participation was voluntary. This is a quantitative survey with closed ended questions made to gather information about the need of Ambulance Drone Services in the general population.

The survey was made through an online service called Survey Monkey. A consent form was written explaining the
purpose of this survey, and its academic purpose, and the information was totally confidential. One hundred people received the survey and all of them responded successfully to all the questions.

Several professionals from the healthcare business read and validated the survey. They were asked if the content of the survey was clear and understandable and if the questions had significance for the purpose of the research. The first nine questions represent the essential elements the study. The last question represents demographic data, categorizing the sample age ranges.

Nominal and Ordinal data was collected and then analyzed to obtain the results knowing the origin source of the information. Pearson chi square and P values were used to obtain the results.

IV. RESULTS AND ANALYSIS

One hundred people received the survey, the response rate for this study was one hundred percent (100 participants) concluded the survey.

Table 1
Question 1. Did you know that one of the primary causes of death in the USA is due to cardiac arrest?

<table>
<thead>
<tr>
<th>Answers</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

According to the results observed in Table, 70% of the population has knowledge about the primary causes of death in the USA. As mentioned before Sudden Cardiac Arrest (SCA) is the leading cause of death in the USA, 30% of Miami-Dade population had no knowledge, which means there is the need to create awareness in this population. As mentioned above, Sudden Cardiac Arrest (SCA) is the leading cause of death in Miami-Dade Country, claiming the lives of nearly 1,000 people every day, or about 335,000 every year (SCA Foundation, 2017).

Table 2
Question 2. Did you know that Cardiopulmonary Resuscitation (CPR) is an emergency procedure done to manually preserve intact brain function after a person has a cardiac arrest?

<table>
<thead>
<tr>
<th>Answers</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>No</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Even though the population has knowledge about the fact that CPR is the emergency procedure for cardiac arrests as mentioned in Table and Figure 2, 60% of the total population responded not knowing how to perform CPR to someone in need as observed in Table 3. However, a considerable amount, 40% did answer positively to this question. So, for every 2 people that become a CPR volunteer, potentially 3 lives will be saved when suffering a cardiac arrest. Almost 90% of people who suffer out of hospital cardiac arrests die (AHA, 2017), due to the fact of not receiving CPR in a short period of time.

Table 3
Question 3. Do you know how to perform CPR? If YES, would you be willing to provide CPR on somebody who had a cardiac arrest nearby?

<table>
<thead>
<tr>
<th>Answers</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>No</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4
Question 4. Would you be interested in having trained volunteers in your own neighborhood who could perform CPR in case of an emergency?
If the values of agree and strongly agree were added, the total percent of the population that would be interested in having a trained volunteer in their neighborhood would be of 89% percent as described in Figure 4. As described before, when a person has a cardiac arrest, survival depends on immediately getting CPR from someone nearby.

### Table 5
**Question 5. Did you know that often when the ambulance arrives to the emergency site, it is already too late?**

<table>
<thead>
<tr>
<th>Answer</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>No</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

There is a 70% of the population that has no knowledge about the delay in ambulance services when arriving to SCA emergencies as viewed in Table 5. It is known that ambulances arrive to emergency sites usually over 5 min after the initial approach. This lapse time is a considerable amount of time for brain death to occur.

### Table 6
**Question 6. Would you be interested in an emergency system that will arrive faster than an ambulance to the emergency site?**

<table>
<thead>
<tr>
<th>Answers</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Ninety nine percent of the population would be interested in an emergency system that will arrive faster than an ambulance to the emergency site as described in Table 6. This highly defines the interest in the population of Miami-Dade County in a new emergency system that will potentially be much faster in arriving to emergency site and attend the emergencies.

### Table 7
**Question 7. How would you feel if this emergency system was activated through an Online App?**

<table>
<thead>
<tr>
<th>Answers</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfortable</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Somewhat Comfortable</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

According to Table 7, one hundred percent of the population agreed that they will feel comfortable with the fact of activating an emergency service via Online App. This means that the population of Miami-Dade County is ready for further changes in technology on how to attend emergency situations. This is consisted with the literature review done, were consumers spent over 85 percent of their time on their smartphones using native applications, but the majority of their time (84%) is spent using non-native apps installed from the App Store (Sarah Perez, 2015). It was also found that 88% of Americans would be willing to share their personal information to improve care and treatment options (Kelton, 2015). Of note, 52% of that population used mobile apps related to the cardiovascular system (Sunnie Southern, 2015).

### Table 8
**Question 8. Have you heard about “Drones” or Unmanned Aerial Vehicles (UAV) used for Healthcare Services?**

<table>
<thead>
<tr>
<th>Answers</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>No</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Although there has been a huge variety of experimental ways drones have been used for healthcare services, non-are at this present time in practice. So, nobody knows exactly how this system can work in real life. Even though all of these procedures have been pretty experimental, 80% of the population of Miami Dade County, does express having heard about the usage of “Drones” for healthcare services as seen in Table 8.

### Table 9
**Question 9. Do you think there is the need for Drones with an Automated Electrical Defibrillator (AED) to attend emergency situations?**

![Q9. Do you think there is the need for Drones with an Automated Electrical Defibrillator (AED) to attend emergency situations?](image)
In concordance with the study, as seen in Figure 9, 99% of the population of Miami-Dade County strongly agreed with the need for “Drones” to carry AED into emergency sites. As mentioned, SCA survival rates drop 7 to 10 percent every minute without defibrillation, and brain damage begins in just 4 to 5 minutes. Ninety-five percent of those who suffer SCA die because cardiopulmonary resuscitation (CPR) and defibrillation usually occur too late (AHA, 2016).

### Table 10

**Question 10. What is your age range?**

<table>
<thead>
<tr>
<th>Answers</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 25</td>
<td>17</td>
</tr>
<tr>
<td>26 - 35</td>
<td>34</td>
</tr>
<tr>
<td>36 - 45</td>
<td>14</td>
</tr>
<tr>
<td>46 - 60</td>
<td>18</td>
</tr>
<tr>
<td>61 or older</td>
<td>17</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

#### Analysis Result
To analysis these results a few relationships will be compared and evaluated in a table described below.

### Table 11

*Does the population of Miami-Dade County, FL understand the need to implement an emergency system faster than an ambulance and if needed, Automated Electrical Defibrillator (AED) to be carried out by Drones to emergency sites?*

<table>
<thead>
<tr>
<th>Do you think there is the need for Drones with an Automated Electrical Defibrillator (AED) to attend emergency situations?</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Disagree</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Neutral</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>100</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>80</td>
</tr>
</tbody>
</table>

\[X^2 = 98.000, (p = 0.001)\]

In Table 11, which also resulted to have a statistical significance (p < 0.05), showed a relationship between the interest on the population of Miami-Dade County, FL in having trained volunteers in their own neighborhood who could perform CPR and the need for AED to be carried out by Drones to the emergency sites. There is an 80% of the population that strongly agree in fact with both scenarios, but there is a 10% that strongly disagree with volunteers nearby performing CPR, but strongly agree with the AED to be carried out by Drones to the emergency site (there is a possibility that the people that answered in disagreement with the use of trained volunteers for these services, are not fully available to attend these kind of emergencies).

### V. CONCLUSIONS AND RECOMMENDATIONS

Sudden Cardiac Arrest is one of the most common causes of Emergency Delay Fatalities world-wide, therefore, one of the most prominent and important aspects to look for improvement. The use of UAV or “drones” to deliver an AED in out of hospital cardiac arrest may be safe and feasible. By using a model appropriate for placement of UAVs in the Miami-Dade County, FL, an AED compact drone may have the potential to reduce time to defibrillation in out of the hospital cardiac arrest. "Let’s use drones for a good purpose, let’s use drones to save lives,” Momont, (2014) states.

Although, the device needs further technical development, without empirical data, it is difficult to really calculate how this process will work in real life. There are many considerations that still need to be studied due to the difficulty to estimate the time it takes for a drone to be back in service after serving a patient. Other important terms are the battery life and charge time, medical equipment replacement, and damage to the drone. Even though there is no knowledge of how productive or even counterproductive this system might be in clinical reality, another technical device needs to fit into the chain of survival.

Further studies might be needed to determine the costs of this service, if the health insurance companies might need
to increase their monthly quotes and if the population or the government is willing to cover these financial issues.

REFERENCES


Author Yone Scaramelli, MD, MS