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This brief is one in a series of non-technical articles that discuss bystander delivery of oxygen during breathing emergencies

Oxygen Support During Cardiac Arrest

“There are more than 356,000 out-of-hospital cardiac arrests (OHCA) annually in the U.S., nearly 90% of them fatal”, according to the Sudden Cardiac Arrest Foundationⁱ. During cardiac arrest it is vital for the victim’s survival to keep oxygen-rich blood flowing to the brain and other organs until professional emergency medical services (EMS) arrive on scene.

What is a Cardiac Arrest?

According to the American Heart Associationⁱⁱ, “Cardiac arrest is the abrupt loss of heart function in a person who may or may not have been diagnosed with heart disease. It can come on suddenly, or in the wake of other symptoms. Cardiac arrest is often fatal, if appropriate steps aren’t taken immediately.”

Cardiac arrest is not the same as a heart attack. A heart attack, also called myocardial infarction, occurs when blood flow to the heart is blocked which can be fatal. Symptomsⁱⁱⁱ of a heart attack typically include nausea or lightheadedness; discomfort in the chest, back, arms or jaw, and **shortness of breath with or without chest discomfort**.

Cardiac arrest occurs when the normal heartbeat becomes abnormal, beating too quickly and irregularly. When this happens blood stops pumping from the heart to the organs and **the victim can start gasping for air or stop breathing**. Victims of cardiac arrest can die unless steps are immediately taken to get the victim’s heart pumping oxygen-containing blood to the victim’s organs.

Bystander Response to Cardiac Arrest Events

When someone is a victim of a cardiac arrest outside of the hospital, their survival most often depends on the response by bystanders who are not medical professionals. When a cardiac event occurs, bystanders should immediately call 911 so professional EMS is dispatched as-soon-as possible.

On average in the United States it takes about 8 minutes for an ambulance to arrive after 911 is alerted. Until EMS arrives, bystanders can assist the victim in several ways.



Figure 1: CPR & AED training with a manikin

If an automated external defibrillator (AED) is available, then it should be applied to the victim and activated^{iv}. An AED is a device that any bystander can use to shock the heart back into a normal rhythm.

Hands-only cardiopulmonary resuscitation (CPR) should also be started by bystanders while awaiting EMS. CPR involves manually compressing the victim's chest at a rate between 100 to 120 times a minute.^v These chest compressions force blood from the heart so the oxygen that remains in the blood circulates to organs.

Until recently, additional victim life support with emergency oxygen was not available to bystanders. The R15™ portable emergency oxygen device, however, has been cleared by the Food and Drug Administration (FDA) for bystander use during breathing emergencies, including cardiac arrest.

The Role of Emergency Oxygen During Cardiac Arrest

Because the heart is not normally pumping blood to the organs during cardiac arrest, the victim is forced towards unconsciousness where breathing can become shallow or stop. Lack of oxygen can lead to death or brain damage within 10 to 15 minutes time. The quick activation of the R15 device will make 100% oxygen available to the victim through a simple face mask that is included with the R15 device.

Researchers^{vi} have reported that, "Some ventilation occurs by chest compressions alone, provided the airways are free." During CPR as the victim's chest is repeatedly compressed and released, oxygen enriched air that is provided to the patient by the R15 device may be available for such ventilation.

It is important to note, too, that as many as 13% of cardiac arrests may now be related to opioid overdose.^{vii} In these cases, the administration of oxygen by the R15 mask before the administration of Naloxone to reverse the overdose is recommended to help **protect the victim's lung from acute injury**.^{viii}

Portable emergency oxygen delivered by bystanders now offers another level of life support for all breathing emergencies, including those occurring during heart attack and cardiac arrest, particularly when cardiac arrest is the result of an opioid overdose.

To read more articles like this one please visit
<https://rapidoxygen.com/white-papers>

ⁱ [online 01Apr19> https://www.sca-aware.org/sca-news/aha-releases-latest-statistics-on-sudden-cardiac-arrest#_ftn1

ⁱⁱ [online 01Apr19> <https://www.heart.org/en/health-topics/cardiac-arrest/about-cardiac-arrest>

ⁱⁱⁱ [online 02pr19> <https://www.heart.org/en/about-us/heart-attack-and-stroke-symptoms>

^{iv} [online 02Apr19> https://cpr.heart.org/AHA/ECC/CPRAndECC/Programs/AEDImplementation/UCM_473198_AED-Implementation.jsp

^v [online 01Apr19> [heart.org/handsonlycpr](https://www.heart.org/handsonlycpr)

^{vi} [online 01Apr19> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4862194/#CR7>

^{vii} [online 01Apr19> <https://medicalxpress.com/news/2019-03-links-cardiac-opioid-overdoses.html>

^{viii} [online 01Apr19> <https://store.samhsa.gov/product/Opioid-Overdose-Prevention-Toolkit/SMA18-4742>