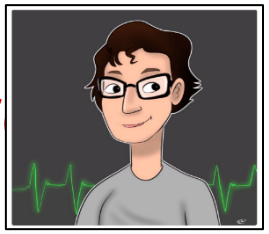
Using Digital Strategies to Impr
Resuscitation Outcomes

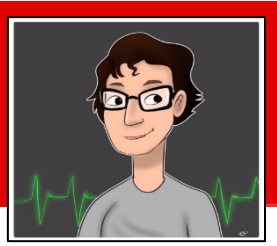


Marion Leary MPH MSN RN FAHA

Director of Innovation Research, Center for Resuscitation Science
Innovation Specialist, Penn Nursing

Center for Resuscitation Science
Department of Emergency Medicine
Penn Medicine

Financial Disclosure



-American Heart Association, Grant Support; Scientific Committee; Guidelines Writing Group; Digital Strategies Writing Group; Education Summit Education Innovation Working Group

-Laerdal Foundation, Grant Support; In-Kind Support

-Medtronic Foundation, Grant Support

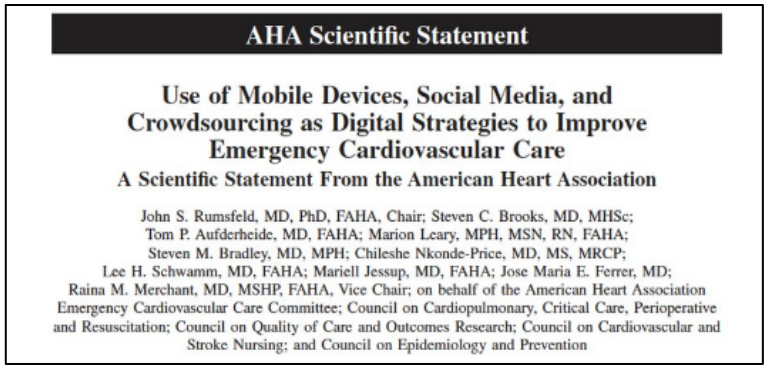
-Physio-control, In-Kind Support

-ImmERge Labs, Ownership

-Off label use of some tech will be discussed

Innovation Strategies

Recent scientific statements urge *the use of technology, digital strategies and innovation* to improve awareness, response, & outcomes

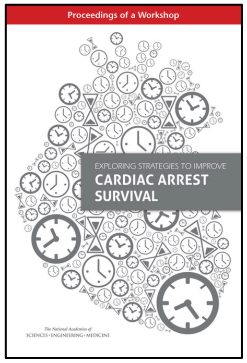


AHA Scientific Statement

Use of Mobile Devices, Social Media, and Crowdsourcing as Digital Strategies to Improve Emergency Cardiovascular Care

A Scientific Statement From the American Heart Association

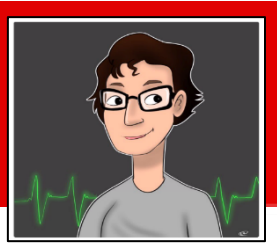
John S. Rumsfeld, MD, PhD, FAHA, Chair; Steven C. Brooks, MD, MHSc; Tom P. Aufderheide, MD, FAHA; Marion Leary, MPH, MSN, RN, FAHA; Steven M. Bradley, MD, MPH; Chileshe Nkonde-Price, MD, MS, MRCP; Lee H. Schwamm, MD, FAHA; Mariell Jessup, MD, FAHA; Jose Maria E. Ferrer, MD; Raina M. Merchant, MD, MSHP, FAHA, Vice Chair; on behalf of the American Heart Association Emergency Cardiovascular Care Committee; Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation; Council on Quality of Care and Outcomes Research; Council on Cardiovascular and Stroke Nursing; and Council on Epidemiology and Prevention



Emerging Technologies and Devices

Recent progress in science, engineering, health informatics, and mobile technologies has created the potential to revolutionize treatments and care delivery in the field of cardiac arrest and resuscitation. The committee was charged with evaluating the "research, technology transfer and innovation, and implementation gaps," as well as promising new strategies that have the potential to improve cardiac arrest outcomes (see Box 1-1).

Innovation Strategies



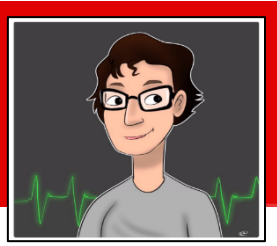
- **Mobile Devices/Apps**

- **Wearables**

- **Technology**

Created by Adrien Coquet
from Noun Project

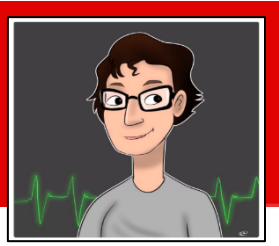
Mobile Devices & Applications

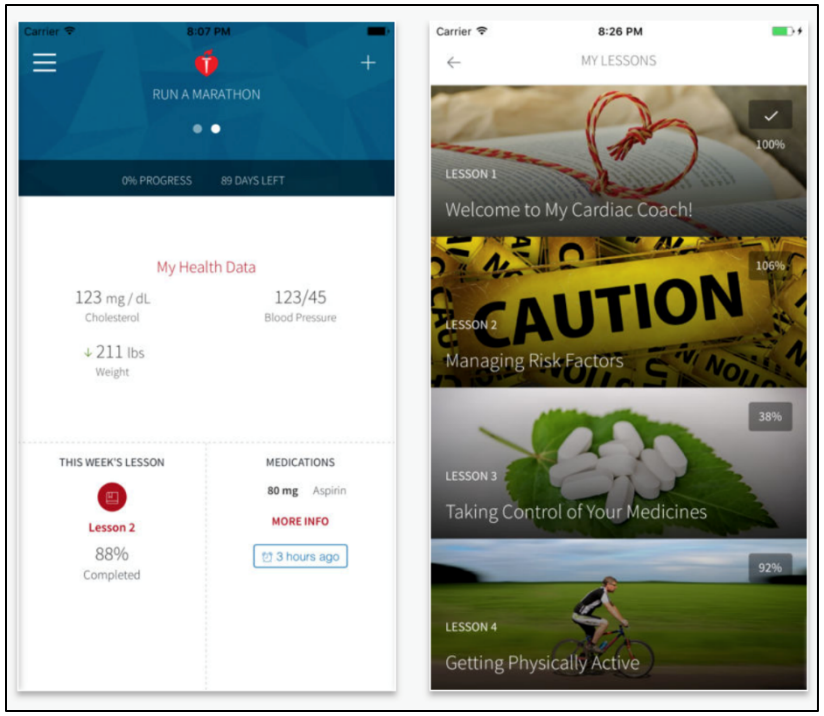


Mobile devices include smartphones, tablet computers, digital cameras etc.

Mobile application is a computer program designed to run on a mobile device.

Mobile Apps





Patients

Families

Providers

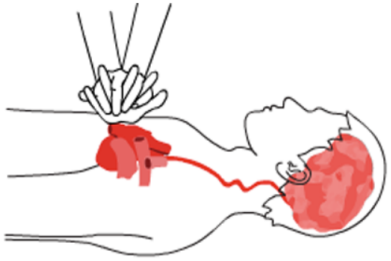
Mobile Apps

First Aid by American...
Health & Fitness
★★★★½ 72
OPEN

1 Check for breathing by scanning the body for normal breathing for no more than 5-10 seconds.

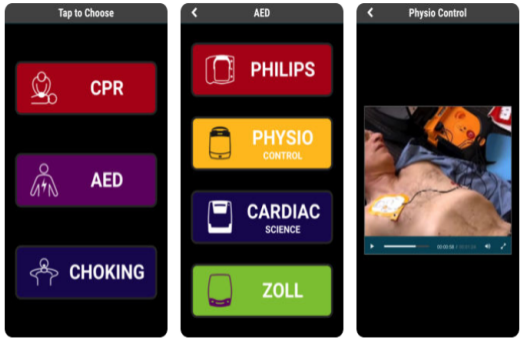
2 Call 911 as soon as possible, or get someone else to do it. If you notice normal breathing, go to Unresponsive Breathing in the Related First Aid section.

3 If the person is not breathing or only gasping, start chest compressions. Place the heel of one hand on the center of the chest and the heel of the other hand on top of the first, lacing your fingers together.

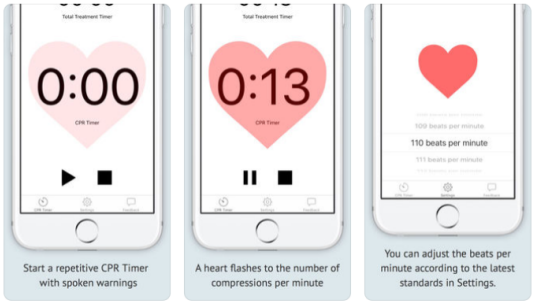


4 Push firmly downwards in the middle of the chest and then release. Push hard and fast

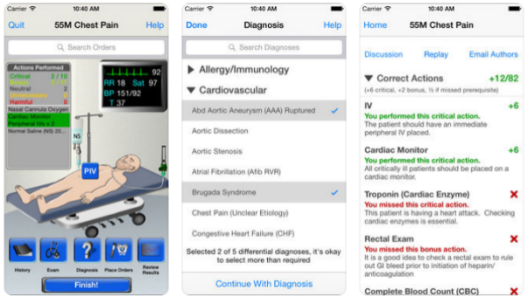
Resuscitate! CPR AED...
Medical
★★★☆☆ 16
GET



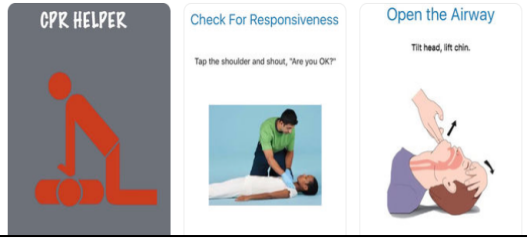
CPR Timer
Medical
★★★★☆ 7
GET



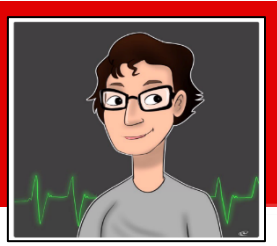
Resuscitation!
Medical
★★★★½ 231



CPR Helper
Medical
GET



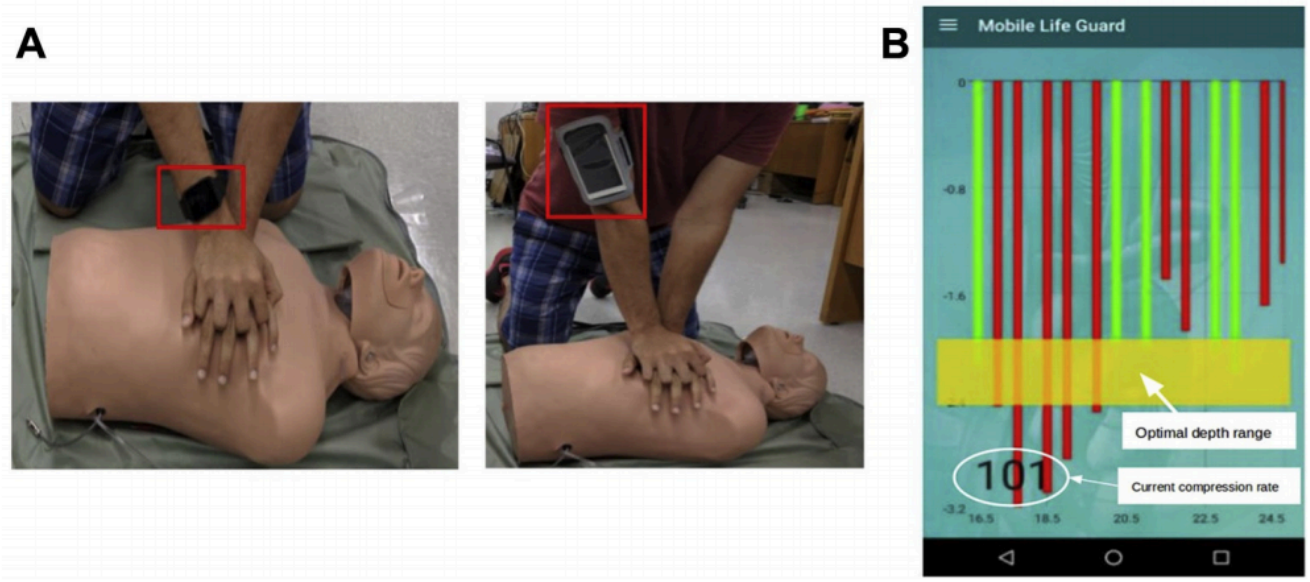
Mobile Devices



Article in Press

Real Time Mobile Device Assisted Chest Compression During Cardiopulmonary Resuscitation

Satyam Sarma, MD, Hakiza Bucuti, MS, Anurag Chitnis, MS, Alex Klacman, MSN, Ram Dantu, PhD



Mobile Devices

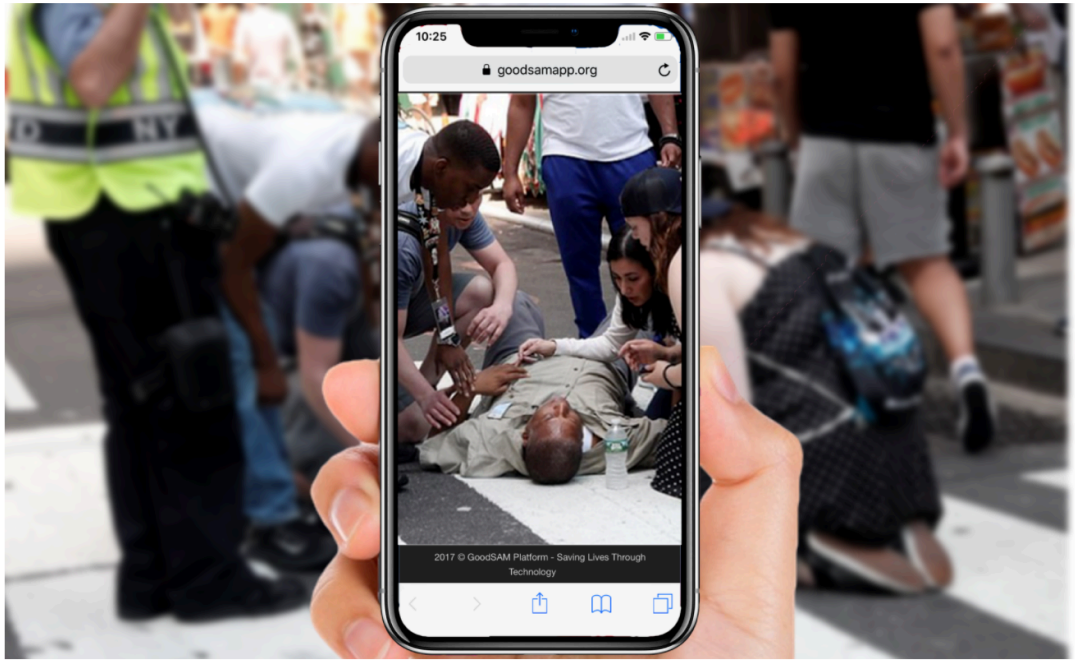
Instant-on-scene™

A revolution in emergency triage and dispatch

GoodSAM

A community of lifesavers

A revolution is about to occur in emergency call handling and triage. Until now we have relied on audio assessment of emergencies through the emergency (999/911/000) phone number. But most calls are made from mobile phones which have a wealth of inbuilt technology to aid triage decisions. The GoodSAM Instant-on-Scene™ module sends a text containing a link*, that opens the caller's camera so that the call handler / clinical advisor can see for themselves what the caller is trying to describe.



A better understanding of the clinical urgency means better resource management - faster help to those who need it most as well as better, more confident advice to those whose situation is not urgent.

"Remote Triage" can be of the scene (e.g. number of vehicles in an accident / size of the fire) or the patient (pale / in distress etc).

Mobile Devices

Resuscitation. 2017 Oct 24. pii: S0300-9572(17)30674-3. doi: 10.1016/j.resuscitation.2017.10.020. [Epub ahead of print]

The Use of Trained Volunteers in the Response to Out-of-Hospital Cardiac Arrest - The GoodSAM Experience.

Smith CM[1], Wilson MH[2], Hartley-Sharpe C[3], Gwinnutt C[4], Dicker B[5], Perkins GD[6].

GoodSAM

A community of lifesavers

Operating Internationally, **GoodSAM** (Good Smartphone Activated Medics) is the world's most advanced emergency alerting and dispatching platform. The app allows alerters to dial the emergency services, and at the same time notify nearby medically qualified responders of a medical emergency. By alerting responders of an emergency, GoodSAM connects those in need with those who have the skills to provide critical help before the emergency services arrive.

We are saving lives in the community. Join us: download the GoodSAM Alerter app today.

Download on the App Store

ANDROID APP ON Google play

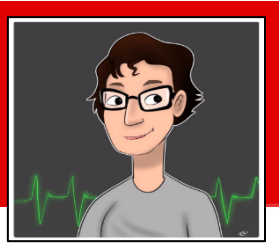
- GoodSAM crowdsourcing mobile phone based app system
- Alerts trained individuals of a nearby cardiac arrest
- Can be activated by 999 or Emergency Services

Mobile Device

PulsePoint mApp:

- Mobile app connects to the 911 Call Center
- Geolocates CPR ready bystanders
- Sends text message alert via the mobile app
- Shows were closest known AED is located

Mobile Devices



The NEW ENGLAND JOURNAL of MEDICINE

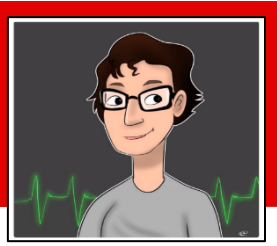
ORIGINAL ARTICLE

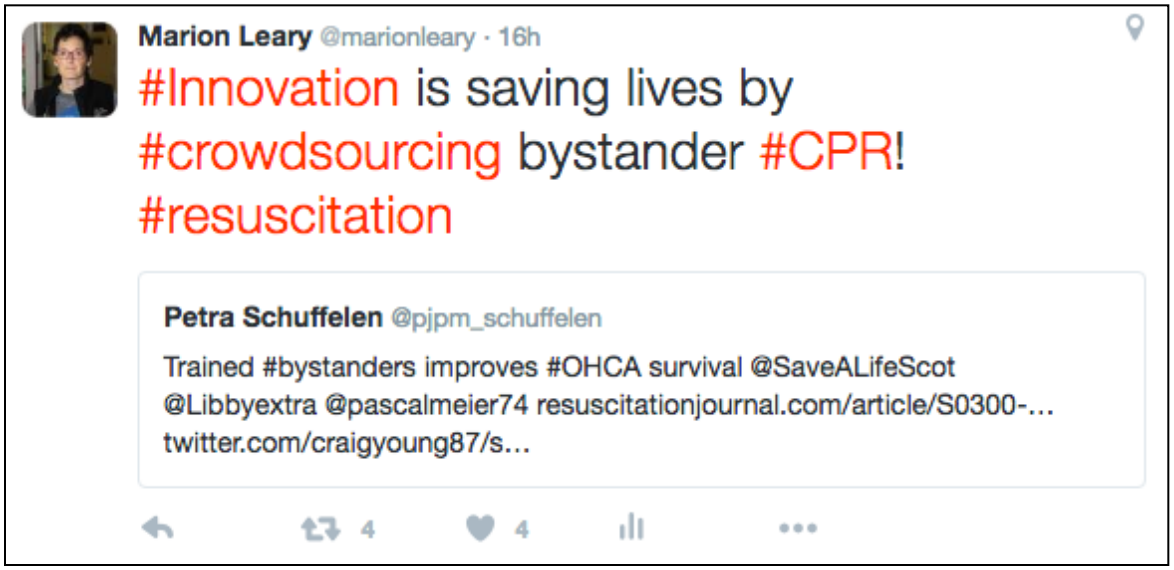
Mobile-Phone Dispatch of Laypersons for CPR in Out-of-Hospital Cardiac Arrest

Mattias Ringh, M.D., Mårten Rosenqvist, M.D., Ph.D., Jacob Hollenberg, M.D., Ph.D., Martin Jonsson, B.Sc., David Fredman, R.N., Per Nordberg, M.D., Hans Järnbert-Pettersson, Ph.D., Ingela Hasselqvist-Ax, R.N., Gabriel Riva, M.D., and Leif Svensson, M.D., Ph.D.

- Mobile app notified lay volunteer responders of a cardiac arrest victim in their vicinity
- Dispatched lay volunteers to the victim to initiate CPR
- ***Significantly increased rates of bystander-initiated CPR (62% vs 48% p<0.001)***

Mobile Devices

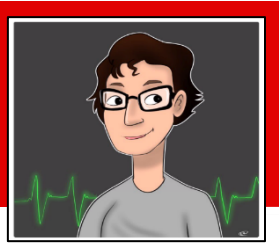




- Text messages (TM) to trained volunteers
- 1546 emergency calls from April 2012 – April 2014 in Dutch providence
- 833 attempted resuscitation cases of which 422 activated TM-alert system
- ***Survival was 16% in those with no TM responder and 27% with at least one TM responder (p=.014)***

Mobile Devices

Mobile Devices



Marion Leary
@marionleary

Impressive #CPR awareness experience w/ immersive #VirtualReality via #GoogleCardboard blog.cprsavesvr.com #CPRsavesVR @LaceyFireDist3

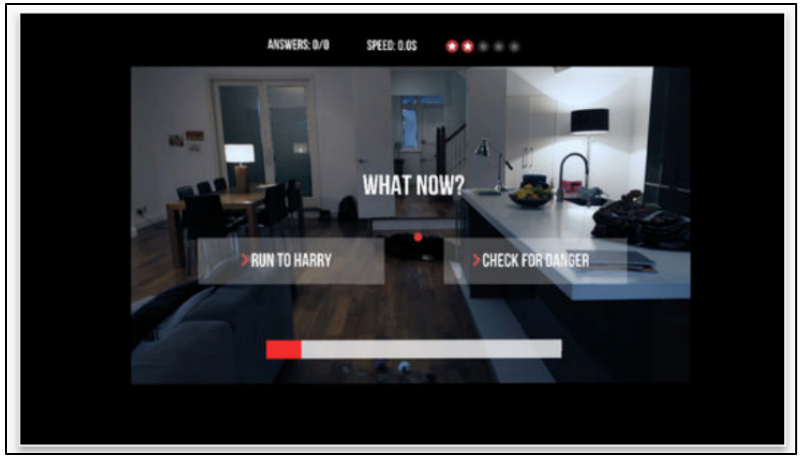
CPRsaves VR
Learn CPR in VR today!!
blog.cprsavesvr.com

Mobile Devices

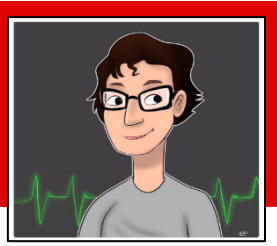
ResusCouncilUK @ResusCouncilUK ·Oct 16

We brought **#LifesaverVR** to @ukparliament for #RestartAHeart day - but you can play it anywhere, any time on mobile! LifesaverVR.Org.Uk

11 17

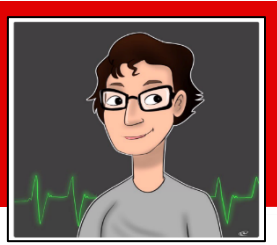


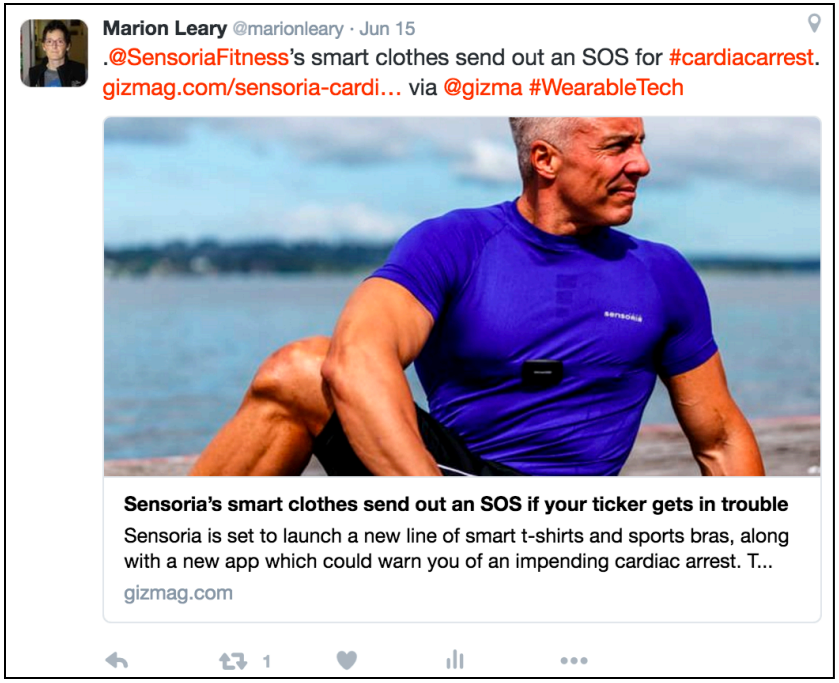
Wearables



Wearable devices include glasses, watches, activity monitors, clothing, contact lenses etc.

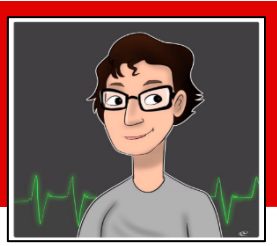
Wearables



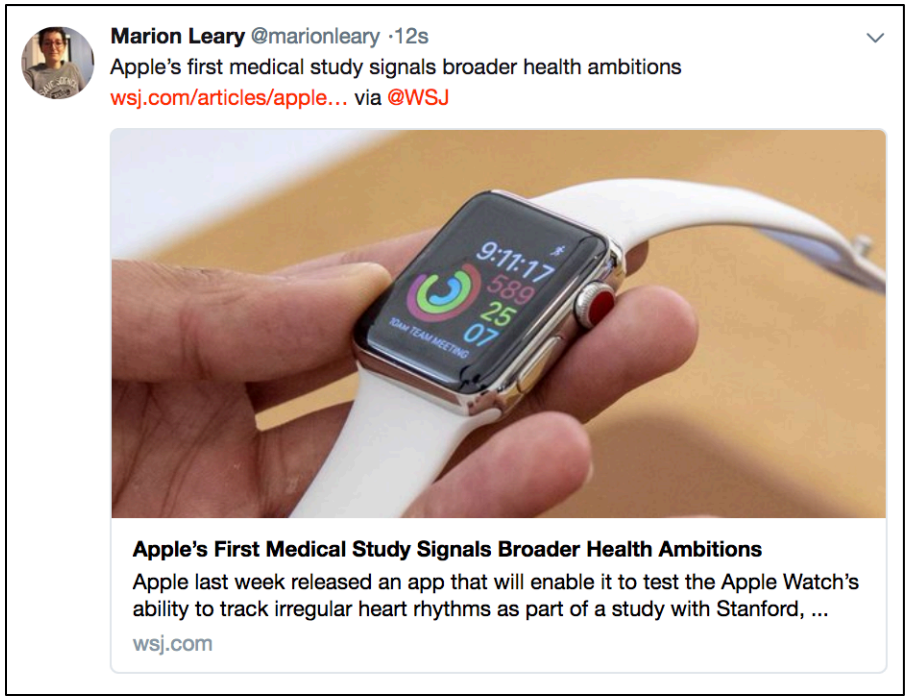

Marion Leary @marionleary · Jun 15
.@SensoriaFitness's smart clothes send out an SOS for #cardiacarrest. gizmag.com/sensoria-cardi… via @gizma #WearableTech
Sensoria's smart clothes send out an SOS if your ticker gets in trouble
Sensoria is set to launch a new line of smart t-shirts and sports bras, along with a new app which could warn you of an impending cardiac arrest. T...
gizmag.com
1


Marion Leary @marionleary · 34s
I am not a fan of Dr Oz but I am a fan of #wearables that can detect #cardiacarrest
iBeat: The Smartwatch That Can Save Your Life
A 24/7 heart monitoring smartwatch that can immediately notify your family and 911 in an emergency.
indiegogo.com

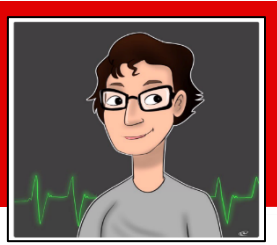
Wearables




renata's eyepatch @_jamestgreen · Oct 13
Never thought a stupid lil wrist computer I bought 2 years ago would save my life. Saw my ❤ rate go up, ended up being a pulmonary embolism
45-189
61
425
11K
32K


Marion Leary @marionleary ·12s
Apple's first medical study signals broader health ambitions
wsj.com/articles/apple… via @WSJ
9:11:17
589
25
07
Apple's First Medical Study Signals Broader Health Ambitions
Apple last week released an app that will enable it to test the Apple Watch's ability to track irregular heart rhythms as part of a study with Stanford, ...
wsj.com

Wearables

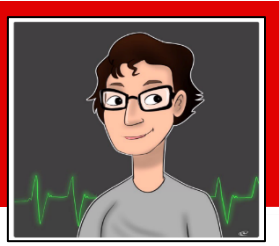


Randomised clinical simulation designed to evaluate the effect of telemedicine using Google Glass on cardiopulmonary resuscitation (CPR)

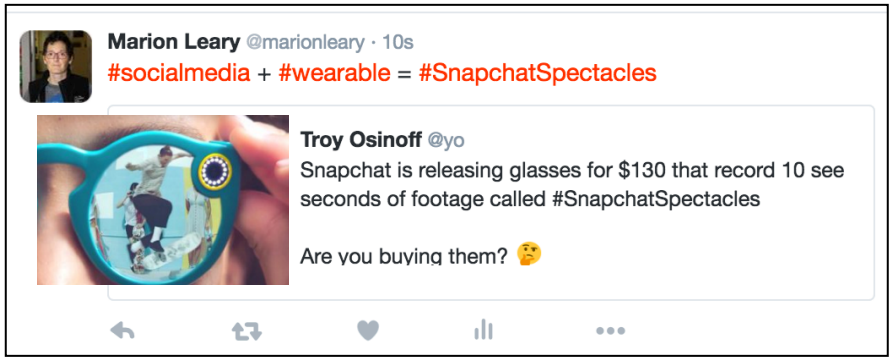
Nuria Pérez Alonso,[1] Manuel Pardo Rios,[1] Laura Juguera Rodriguez,[1] Tomas Vera Catalan,[2] Francisca Segura Melgarejo,[3] Belen Lopez Ayuso,[4] Carolina Martínez Riquelme,[5] Joaquin Lasheras Velasco[4,6]

- Telemedicine via Google Glass (GG) during simulated cardiac arrest compared with no GG
- ***Statistically significant increase in successful defibrillation (100% v 75%, p=.0005) and CPR times (213 sec v 250 sec, p=0.004)***

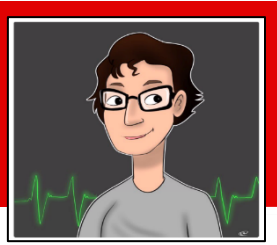
Wearables




Marion Leary @marionleary · 9s
Up close with @oakley Radar Pace, the wearable that may help you forget Google Glass mashable.com/2016/09/21/oak… via @mashable #wearables
Up close with Oakley Radar Pace, the wearable that may help you fo...
These smart sunglasses have a friendly, built-in trainer to help you achieve your fitness goals.
mashable.com


Marion Leary @marionleary · 10s
#socialmedia + #wearable = #SnapchatSpectacles
Troy Osinoff @yo
Snapchat is releasing glasses for $130 that record 10 see seconds of footage called #SnapchatSpectacles
Are you buying them?

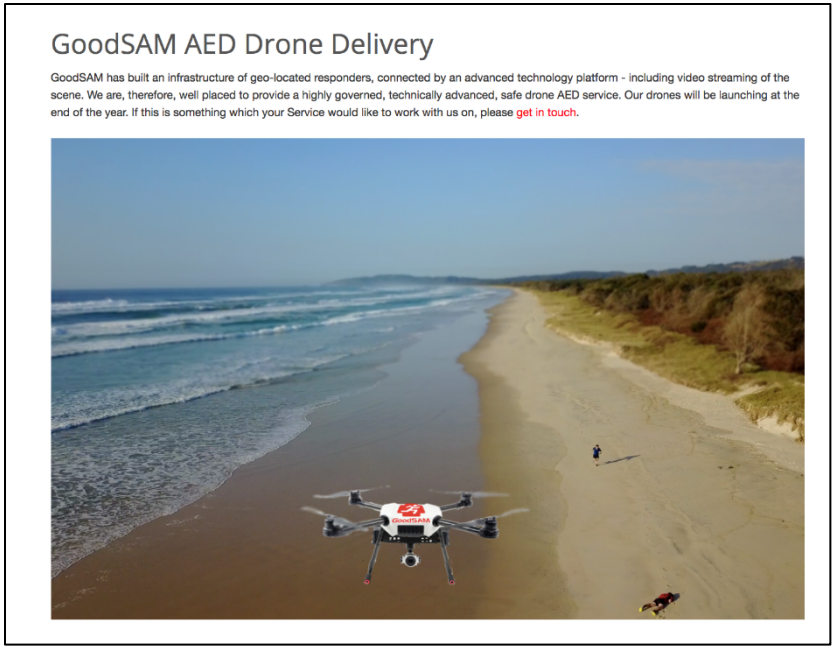
Technology



Machinery and equipment developed from the application of scientific knowledge

Drones


Marion Leary
@marionleary
It's a bird, it's a plane, no it's a life-saving AED!
@SCAA @HeartCPR
Flying defibrillator that can reach speeds of 60mph revealed
A Dutch student has revealed a prototype 'ambulance drone', a flying defibrillator able to reach heart attack victims within precious life-saving minutes.
dailymail.co.uk


GoodSAM AED Drone Delivery
GoodSAM has built an infrastructure of geo-located responders, connected by an advanced technology platform - including video streaming of the scene. We are, therefore, well placed to provide a highly governed, technically advanced, safe drone AED service. Our drones will be launching at the end of the year. If this is something which your Service would like to work with us on, please get in touch.

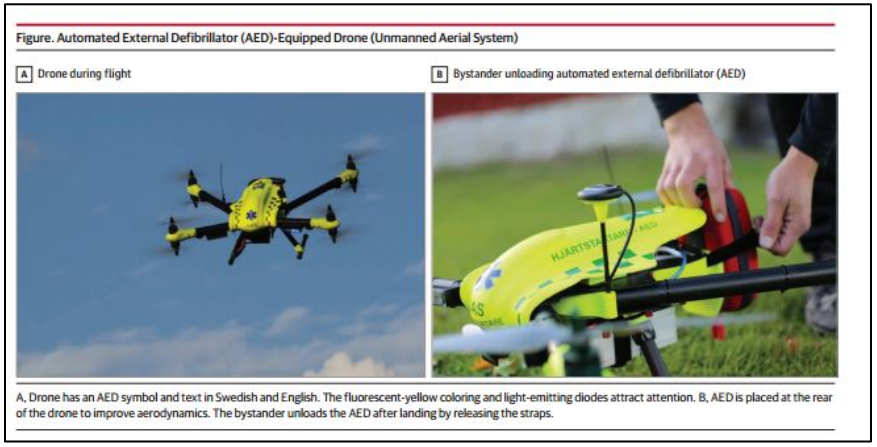
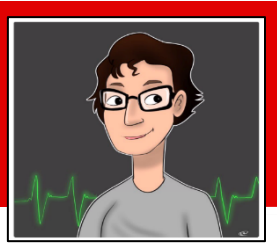


Figure. Automated External Defibrillator (AED)-Equipped Drone (Unmanned Aerial System)
A Drone during flight
B Bystander unloading automated external defibrillator (AED)
A, Drone has an AED symbol and text in Swedish and English. The fluorescent-yellow coloring and light-emitting diodes attract attention. B, AED is placed at the rear of the drone to improve aerodynamics. The bystander unloads the AED after landing by releasing the straps.

Drones



ORIGINAL RESEARCH ARTICLE

Optimizing a Drone Network to Deliver Automated External Defibrillators

Justin J. Boutilier, Steven C. Brooks, Alyf Janmohamed, Adam Byers, Jason E. Buick, Cathy Zhan, Angela P. Schoellig, Sheldon Cheskes, Laurie J. Morrison, Timothy C. Y. Chan

- Using EMS stations as drone facilities reached 80% of cardiac arrests within 1 min

ORIGINAL RESEARCH Open Access

Unmanned aerial vehicles (drones) in out-of-hospital-cardiac-arrest

A. Claesson[1*], D. Fredman[1], L. Svensson[1], M. Ringh[1], J. Hollenberg[1], P. Nordberg[1], M. Rosenqvist[2], T. Djarv[1], S. Österberg[1], J. Lennartsson[3] and Y. Ban[3]

- In all cases, the drone arrived before EMS in 32% of cases and saved 1.5 min
- In rural cases the drone arrived before EMS in 93% of cases and saved 19 min

Voice Activation

Alexa can tell you the steps for CPR, warning signs of heart attack and stroke

By AMERICAN HEART ASSOCIATION NEWS

— “Alexa, ask American Heart … how do I perform CPR?”

— “Alexa, ask American Heart … what are the warning signs of a heart attack?”

— “Alexa, ask American Heart … what are the warning signs for stroke?”

Connect

Connect

@marionleary

marionleary

marionleary

Marion_Leary

http://marionleary.strikingly.com/