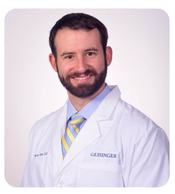
The First ECG Matters: Unlocking AED data for better clinical decisions



Dr. Mark Olaf, DO
Emergency Medical Physician
Geisinger Medical Center &
Cardiac Arrest Survivor

Sudden Cardiac Arrest is one of the few medical emergencies where the most important diagnostic data is captured before the patient ever reaches the hospital. Automated External Defibrillators (AEDs) record the first ECG, rhythm evolution, shock timing, and event chronology–all information that can directly inform downstream clinical decisions. Yet in today's system, that data is often delayed, inaccessible, or lost altogether due to cumbersome and outdated transfer processes.

As an emergency medical physician at Geisinger and a survivor of cardiac arrest, I have lived this problem from both sides. What I learned from my personal experience with cardiac arrest changed how I think about the tools we deploy and the standards we should demand of them.

I know I am lucky to be alive. Out-of-hospital cardiac arrest (OHCA) survival rates hover between 7-10% nationally, and I had the additional advantage of medical colleagues and institutional resources to help me access the AED data from my own resuscitation. Most patients have neither.

My story is remarkable in the sense that it's a privilege to be part of the 10% of survivors from OHCA, but is unremarkable in that I struggled to get my AED data after my event. My story highlights an all too common truth that patients encounter as they navigate this difficult point in their care: even when an AED saves a life, the clinical team may not receive the full diagnostic record in time to inform treatment. For hospital leaders and EMS directors evaluating AED infrastructure, the question is no longer just whether the device can deliver a shock. It's whether that device can deliver the data.

December 4, 2025: the day I became the patient

December 4th, 2025 began like most days for me. I woke up at 5am, drove to the gym, warmed up, and started my workout. In the last five minutes of the workout I apparently sat down. I recall nothing beyond that. I'm told that I had some jerking motions, but became unresponsive. There was concern for a seizure.

"The care was being done in a black box."

Some very adept hands checked my pulse and felt it fade to nothing. Those same hands quickly sprung into action. CPR followed by AED usage and defibrillation within about five minutes brought my pulse back.

After about 30 hours in the hospital and some extensive testing, we didn't know much more than we did when I had arrived. There were no answers, but certainly many questions.

The AED was brought to the hospital but couldn't be analyzed. I was discharged home. Because of my background in emergency medicine, I was lucky to know our EMS coordinator and arrange a time for the AED to be analyzed. We were lucky to have the right cables, one for the AED and one for the computer. After three failed software downloads and workarounds on a personal computer, we arrived at the moment I almost lost faith: we had to transmit the data between the two cables using IR transmitters and sensors. We had to hold the transmitter and sensor aligned until the data was transmitted.

I held my breath. The data downloaded. We opened it. Size 4 font. Squinting eyes. Careful mouse movements. Save the PDF. Email it. Don't lose it. Don't edit. Just send. Received. Opened. Ventricular fibrillation at 06:48:23. A shock at 06:48:38. Then no data. Then sinus rhythm at 06:49:43. I had my diagnosis.

"The question is no longer just whether the device can deliver a shock. It's whether that device can deliver the data."

> *"It seemed inadequate. In 2026 it was inadequate. In 1990 it would have been inadequate. We can do better."*

I had been out of the hospital for four days. It had been five days since my event. I had numerous medical tests which did not identify a cause. The one piece of data I needed most had been locked up for days. Inaccessible. Taunting. Because it was locked up, the electrophysiologists hadn't been consulted. I didn't have my care coordinated. I was offered a wearable defibrillator and an appointment in two months because my heart had stopped. No one knew why. So I wore the vest and waited. It seemed inadequate. In 2026 it was inadequate. In 1990 it would have been inadequate. We can do better. We should do better. It turns out, we can do better.

The hidden gap between field and hospital

Cardiac arrest rhythms fall into two categories: those that are treatable by defibrillation and those that aren't. Every moment a shockable rhythm goes untreated, odds of survival fall. The first rhythm recorded by the AED is the only unaltered record of which category the patient was in and what saved them.

By identifying the abnormal heart rhythm early, the AED is able to deliver the treatment. Depending on the cause of the abnormal rhythm, subsequent treatments and diagnostics are often needed. Emergency Medical Technicians alert hospitals about patient arrivals. Physicians in the Emergency Department coordinate care with specialists. Perhaps the patient needs a cardiac catheterization for a heart attack. Perhaps the patient needs intensive care unit care to recover. In my case, there was a concern for a seizure. There was also concern for a heart condition. I had never experienced either before in my life.

I had CT scans, MRIs, echocardiograms, lab tests, and a catheterization. No answers. While I'm grateful for the care I received and I know that it was all done to determine a source for my event, I also realize that through no fault of anyone caring for me, the care was being done in a black box. We didn't have the AED and we didn't have the answer. If we had had that data, I still may have had extensive testing. I would have still received great care. But the cause would have been identified much earlier and specific care could have been coordinated right away.

> *"Avive does something no manual process can match. No cables. No outdated software. No waiting."*

Despite the clinical importance of AED incident data, current workflows often prevent it from reaching hospital teams when it matters most–early. The problem is structural.

In most systems today, retrieving AED data requires physical access to the device, proprietary software, a special cable connection, and someone with the time and technical knowledge to execute the transfer. The process is cumbersome, like mine was.

These steps may occur days or weeks after the event, if they occur at all. By then, the patient has already left the cath lab or the ICU and the clinical team has long since made their initial decisions without it.

Rapid data transfer as a new model of care

For all the complexity of the data access problem, the solution Avive has built is elegantly simple. Avive's Rapid Incident Data Retrieval feature does something no manual process can match: the moment the device powers off, incident data is immediately available via an on-screen QR code. ECG recordings, shock timestamps, and event analysis–ready to scan, share and act on before the patient reaches the hospital. No cables. No outdated software. No waiting.

As both a physician and survivor, I find this significant for reasons that are clinical and personal. Clinically, it closes the exact gap I described–putting actionable data in the hands of EMS crews, emergency physicians, and cardiologists at the moment it is most useful. Personally, it represents what I needed and couldn't easily get: immediate, frictionless access to the record of my own resuscitation.

Avive's Rapid Incident Data Retrieval. Scan a QR Code after device power off to access full post-use incident report including ECG rhythm strips, shock data, and timestamps.

Building the connected future of cardiac care

As both a physician and survivor, I view the first ECG as a much more critical piece of a patient's story. During OHCA, the minutes before hospital arrival matter and can largely shape the outcome. If an AED is used, data is captured. Ensuring that that data is accessible to the clinicians who continue the patient's care is a responsibility shared across our healthcare system. Tools like the Avive Connect AED® are not just solving today's problem; but they are building for a more connected system of cardiac care.

For hospital leaders and EMS directors the mandate is clear: demand interoperability. Require that the tools you deploy don't just perform in the field–they communicate across the continuum. The data exists. The technology exists. The only remaining question is whether we will build systems that use both to their full potential.

I am lucky to be alive. I am luckier still to have had the resources to piece together my own story. My hope is that one day, no patient will have to be lucky to get the data that belongs to their care.

"For hospital leaders and EMS directors the mandate is clear: demand interoperability. Require that the tools you deploy don't just perform in the field–they communicate across the continuum."

Olaf pictured with the four women from the gym who took action, performed CPR, used an AED, and ultimately helped save his life.

About the Author

Dr. Olaf is an Associate Professor of and Vice Chair of Education for Emergency Medicine at the Geisinger College of Health Sciences. He serves as System Director of Quality for Emergency Medicine at Geisinger.

His ongoing academic and education research interests include evidence-based student advising, medical student transitions, the application of learning theory to curriculum development for medical education, and the integration of artificial intelligence into medical education and medical practice.

He has published in respected journals on topics related to medical education, resuscitation, EMS, and other areas.

He is a cardiac arrest survivor and passionate about expanding and improving access to defibrillator care and use, as well as enhancing and improving transitions of care for cardiac arrest. An advocate for patient safety and quality measures, he seeks to ensure seamless transitions of care and information.