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The Ambulance Driver's Perspective

5 ways you're not getting everything out of your cardiac monitor

Follow these EMS tips to measure mean arterial pressure, monitor sepsis, rule out DKA and ensure high-quality CPR

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At a recent EMS refresher, a room full of paramedics professed astonishment that you could do a 15-lead, 18-lead, and yes, even a 24-lead EKG with their [cardiac monitor](#), and many of them had no idea why you should. Nor did they grasp that they could use the capnograph for anything more than looking for "shark fins" or confirming tube placement; that the waveform for your pulse oximeter is called a plethysmograph and can be interpreted to yield valuable clues about the patient's condition; or for that matter, that a [manual BP cuff works just as accurately upside down](#).

On a class break, one medic, a sales rep lamented, "Man, I can tell you from experience that most medics don't utilize half the features we have in our monitors. Half don't care, and the other half just didn't pay attention during the in-service."

We're in an age where most adults carry around in their pockets a smartphone that can access the sum total of human knowledge, with more computing power than the machines we used to put a man on the moon ... yet mainly used to text and look at cat pictures. I suppose it's not surprising, then, that we barely use half the functions of our cardiac monitors.



Follow these simple tips, and you can wring a lot more functionality out of your monitor/defibrillator. (Photo/Wikimedia Commons)

Here are five ways you can wring more functionality from your cardiac monitor.

1. USE THE MAP

It's no secret that, when we need accuracy the most, NIBP machines are woefully inaccurate. In fact, they may even be as inaccurate as human ears, and may overestimate systolic pressures in hypotensive patients by as much as 20%. Yet, the accuracy of NIBP mean arterial pressure is comparable to invasive arterial lines [1]. That's because NIBP machines actually measure [MAP](#) directly, and calculate systolic and diastolic pressure from it.

Ditch the systolic blood pressure, and titrate your treatment efforts to a MAP > 65 mmHg. If you want [even greater accuracy](#), attach monitor leads, pulse oximeter and NIBP cuff on the same patient. Modern prehospital monitors screen those numbers against each other to rule out erroneous readings.

2. SURF THE WAVES

The ECG waveform isn't [the only useful waveform on your monitor](#). Plethysmography and waveform capnography are useful surrogates for metabolism and perfusion. We all use etCO₂ on respiratory patients, but did you know that it is a reliable surrogate for lactate monitoring in [sepsis](#) and highly accurate in detecting or ruling out DKA? [2-7].

It can also help identify fluid responsiveness, as can your pulse oximeter plethysmograph (roughly half the hypotensive patients we give fluid bolus to are incapable of increasing their cardiac output with those boluses) [8].

This is a capability that pulse oximeter manufacturers are only beginning to exploit. [Masimo's](#) newest fingertip pulse oximeter, the Mighty Sat, calculates a Pleth Variability Index, a useful parameter in detecting central hypovolemia and the degree of shock [9-12].

3. USE YOUR CPR ASSIST FEATURES

My agency uses a stopwatch and metronome to [ensure high-quality CPR](#), but the features of the [Physio Control](#) Lifepak 15 make it redundant. The monitor screen has a clock with digital seconds display, and an audible CPR metronome. It's as simple to use as "OK, everybody watch the clock on the monitor. We're doing compressor switch, rhythm check and defib on the even-numbered minutes, and med pushes on the odd-numbered minutes. At 1:45 of a compression cycle, I'm going to charge the defibrillator and count down to zero ... " And face it, the CPR metronome is much less embarrassing than explaining why the CPR playlist you're playing from your phone includes "Another one bites the dust" or Drowning Pool's "Let the bodies hit the floor."

4. USE YOUR CODE SUMMARY AND EVENT RECORDER MORE EXTENSIVELY

Make sure your cardiac monitor is synchronized with your dispatch clock, and remind everybody to time-stamp every intervention by pressing the EVENT button on the monitor. We all know what a pain it is to document a resuscitation.

It's much easier to reconcile times and interventions if everything is printed right there on your Code Summary, and imports directly into your ePCR. You can even configure custom pick lists with specific monitor displays and event options for cardiac arrest, [STEMI](#), DKA, sepsis and so on.

5. MOVE THOSE ELECTRODES AROUND

As EMS educator Bob Page likes to say in his Multi-Lead Medics course, "Lead II, you've got no clue." Likewise, I've heard countless paramedics explain the necessity of a 12-lead by saying, "We're gonna get a look at your *whole* heart."

Actually, you're not. You're just getting twelve different views of the left ventricle. If you want to know about the right ventricle, lateral wall of the left ventricle, posterior wall, [or highlight atrial activity, you need more leads than 12](#). Move around to learn more about your patient.

Follow these simple tips, and you can wring a lot more functionality out of your monitor/defibrillator.

Read next: [Learn how to read a MAP](#)

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About the author

Kelly Grayson, NRP, CCP, is a critical care paramedic in Louisiana. He has spent the past 24 years as a field paramedic, critical care transport paramedic, field supervisor and educator. He is president of the Louisiana Society of EMS Educators and a board member of the LA Association of Nationally Registered EMTs.

He has an Associate of General Studies degree from Louisiana State University at Eunice, Nunez Community College. Kelly has been recognized as the 2016 Louisiana Paramedic of the Year, 2002 Louisiana EMS Instructor of the Year and 2002 Louisiana AHA Regional Faculty of the Year, and with the 2012 Maggie Award for Best Regularly Featured Web Column/Trade and the 2014 Folio Eddie Award for Best Online Column.

He is a frequent EMS conference speaker and contributor to various EMS training texts, and is the author of the popular blog [A Day In the Life of an Ambulance Driver](#), "[En Route: A Paramedic's Stories of Life, Death and Everything In Between](#)," and "[On Scene: More Stories of Life, Death and Everything In Between](#)." You can follow him on Twitter ([@AmboDriver](#)), [Facebook](#), [LinkedIn](#), or email him at kelly@ambulancedriverfiles.com. Kelly is a member of the [EMS1 Editorial Advisory Board](#).

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