

# Implementing a 12-lead Program

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All over the country, EMS systems are making the transition to 12-leads. They're purchasing Lifepak 12's, ZOLL M Series, or other 12-lead monitors, and bringing in experts like Gary Denton, Tim Phalen, Cindy Tait, Bob Page, et al. to take their paramedics to the next level of emergency cardiac care.<sup>[1]</sup>

Ask almost any organization about their 12-lead program, and they'll tell you a story about a patient who presented to EMS with chest discomfort, received a pre-hospital 12-lead ECG, was fast tracked to the cath lab or thrombolytic therapy in the emergency department, and had a wonderful outcome. They might show you the before and after 12-leads, or even the before and after angiograms. When we see this, we can't help but be impressed. After all, we got into EMS to make a difference. A case like this restores our faith in the EMS system, and it makes us look good in the eyes of the community.

But are stories like this a fair representation of our 12-lead programs? Oftentimes, on closer inspection, we find out that one of the best paramedics was working that day. Everyone's favorite emergency physician was on duty. The cath team had just finished an elective procedure and the cardiologist was sitting in the emergency department when the patient rolled through the door. Did the 12-lead program make the difference, or were the stars in perfect alignment? It takes a lot of courage to answer this question honestly. It's so much safer, and so much more gratifying to pat ourselves on the back. In our quest to look good for our chiefs and City Hall, it's all too easy to lose sight of the reason we exist, which is to improve patient outcomes *consistently*. This requires an ongoing commitment to quality improvement. This is no time to rest on our laurels. We've come a long way, but there's still a long way to go.

Since I first started teaching Acute Coronary Syndromes and 12-lead ECG's in April of 2000, I've been talking to people all over the country about their 12-lead programs. I find it interesting that I hear the same story almost everywhere I go. The hospital isn't listening to EMS. It seems like everyone thinks that their organization is falling behind, and EMS must be more progressive elsewhere in the country. In every case, the breakdown seems to happen between EMS and the receiving hospital. Why should this be true all over the country? What are we doing wrong? I've come to the conclusion that a 12-lead program, in order to be successful, will necessarily contain four main components. They are education, consensus building, process development, and feedback.

1.) Education. Paramedics need to be taught to acquire, interpret, and transmit a 12-lead ECG. They should also receive advanced training in the management of acute coronary syndromes, so they fully understand why they are performing a 12-lead in the pre-hospital environment. It's a good idea to include the doctors and nurses. The goal here is build a team. Get everyone on the same page whenever you can. It might be worth your while to bring in an expert for the initial training. After that, it will be up to your Medical Control Physician and EMS training officer to maintain, and ideally increase, everyone's level of understanding. The most important thing is to make sure the skills don't erode.<sup>[2]</sup>

2.) Consensus Building. Identify all of the key stakeholders in the process. You will need the support of your Medical Control Physician, EMS administrator, EMS training officer, forms control officer, the director of the emergency department, emergency physicians, emergency nurses, paramedics and EMTs. Keep in mind that this is not an all-inclusive list. It might be wise to include the unit secretaries at the emergency department, especially if they are in charge of the fax machine. It's always helpful to include the cardiologists at the hospital. They remember the "time is muscle" mantra when everyone else seems to forget. In short, you want to cover all of the bases. The importance of this cannot be overemphasized. If you fail to include any one of these "buying influences", there is a possibility that they will confound the process.<sup>[3]</sup>

The Medical Control Physician is your best asset for communicating with the physicians at the hospital. In the corporate world, this is known as "like rank" selling.<sup>[4]</sup> Depending on your organizational structure, your administrator may be the only one who can bridge the gap between training and operations in the event that a power struggle ensues. The EMS training officer will have to believe in the project in order to devote the necessary time and effort to educate the line personnel.

3.) Process Development. Interestingly, teaching paramedics to interpret a 12-lead ECG is the easiest part of establishing a 12-lead program.<sup>[5]</sup> The hardest part is convincing your paramedics that it's worth their while. Too many times they've been ignored on the radio, denied orders for Morphine, or had their ECGs thrown on the little silver table next to the patient's bed in the ER, never to be seen again. This all serves to build resentment between paramedics and hospital personnel, or paramedics and the administrators who fail to address the problem. The end result is a 12-lead program that doesn't work, or worse, a demoralized workforce. None of this is conducive to quality patient care, and it's totally avoidable. By carefully building consensus with all key stakeholders in advance, you will become part of a dynamic process instead of an outsider looking in.

You can perform a 12-lead ECG with the first set of vital signs, fill out a chest pain checklist, start an IV (or two), and execute your ACS protocol flawlessly, but it won't have the impact it should if it's not incorporated into existing clinical pathways in the emergency department. Case in point: faxing a 12-lead to the emergency department means nothing if no one's reading the 12-lead at the other end. It's not enough to purchase 12-lead monitors and throw them on the trucks. To have a real impact, we need to be included in the emergency department's chest pain protocols. We need to make recommendations, but we also need to listen.

The emergency physician has a very difficult and complex job. He needs to quickly and accurately identify those patients at substantial risk, select the correct treatments and medications, triage the patient to the correct unit in the hospital, and avoid unnecessary admissions to ICU/CCU, while being careful not to send a patient with ACS home to die.<sup>[6-8]</sup> Oftentimes in our quest to increase our own scope of practice, we fail to fully appreciate the burden of this responsibility. Some EMS systems have even gone so far as to abandon the idea of a 12-lead program after failing to win the necessary support to administer pre-hospital thrombolytics. It's unfortunate that some of us in EMS are so shortsighted.

The pre-hospital administration of thrombolytic therapy, especially in areas with reasonable transport times, is debatable.<sup>[9-13]</sup> Thrombolytic therapy requires an extensive review of contraindications<sup>[13]</sup> and there are still a significant number of patients who experience serious complications.<sup>[14]</sup> In spite of this, a pre-hospital 12-lead ECG has been shown to significantly reduce door to treatment intervals<sup>[15,16]</sup> and was recently classified as a Class I intervention by the AHA.<sup>[17]</sup> Eventually, medical science will probably come up with the "magic bullet" for patients experiencing an acute heart attack; a therapy or combination of therapies that will dissolve an acute thrombosis while creating a minimum of undesirable side effects.<sup>[18]</sup> When they find it, those EMS services with a functional 12-lead program in place will be the first to implement these treatments in the pre-hospital setting. Those without will be rushing to catch up.

4.) Feedback. It's absolutely imperative that you create mechanisms to monitor the progress of your program. This may take the form of direct feedback from stakeholders, forms review, retrospective analysis of ACS patients,<sup>[19]</sup> case studies, and other quality improvement mechanisms.<sup>[20]</sup> The thing to remember is that there will be problems that need to be addressed. New processes tend to be fragile, and you need to be very vigilant in the first weeks of implementation. If your 12-lead program starts out on the wrong foot, and you're not there to correct the problems, your personnel will read you loud and clear. This isn't something you're serious about.

This is the best chance EMS has ever had to bridge the gap between what we do in the pre-hospital setting, and what they do inside the hospital. This is our chance to foster a team approach to patient care, reduce duplication of effort, optimize resource allocation, and improve patient outcomes.<sup>[21]</sup> The benefits can go far beyond any individual patient. They can be realized in terms of a noticeable improvement in the quality of care, improved relationships between paramedics and nurses, and most importantly, increased job satisfaction. It's up to us. We can continue to reinforce stereotypes, or we can take our rightful place as respected members of the health care team. We have a blank slate to write upon. It's time to lead, follow, or get out of the way.

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#### References:

1. Gary Denton is the owner of Acute Coronary Syndrome Consultants, Inc. He recently completed a 12-lead training program with an educational grant from ZOLL, which includes cardiac biomarkers and the treatment of NSTEMI as well as STEMI. He can be reached at [www.12lead.net](http://www.12lead.net). Tim Phalen is now an independent contractor working exclusively with Medtronic Physio-Control. His website is [www.EMS12-lead.com](http://www.EMS12-lead.com). Bob Page teaches the Multi-Lead Medics class, and can be reached at [www.multileadmedics.com](http://www.multileadmedics.com).
2. Some EMS systems bring in a 12-lead specialist prior to purchasing 12-lead monitors. If there is a significant delay between the initial education, and deployment of the equipment, a refresher course is indicated.
3. Stephen E. Heiman and Diane Sanchez, *The New Strategic Selling* (New York: Warner Books, 1998) p. 92 - Going around a key buying influence is "so hazardous" that future orders are likely to be hampered by "resentment, lack of cooperation, or outright sabotage."
4. Stephen E. Heiman and Diane Sanchez, *The New Strategic Selling* (New York: Warner Books, 1998) p.119 - "Like the manager of a baseball team, you have to see to it that each base is covered by *the person most qualified to do so.*"
5. Based on my experience as an instructor in the CCEMTP Program, paramedics can be given a strong base knowledge of 12-leads in about 8 hours.
6. Eugene Braunwald, *Heart Disease – A Textbook of Cardiovascular Medicine* (Philadelphia: W.B. Saunders Co., 1997) p.1208
7. Christopher P. Cannon – *Management of Acute Coronary Syndromes* (Totowa, NJ: Humana Press, 1999) p.111

8. Branwald, Antman, et al., *ACC/AHA guideline update for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines* (Committee on the Management of Patients with Unstable Angina). 2002. Initial evaluation and management: p.7-11. Available at: <http://www.acc.org/clinical/guidelines/unstable/unstable.pdf>.
9. Eugene Braunwald, *Heart Disease – A Textbook of Cardiovascular Medicine* (Philadelphia: W.B. Saunders Co., 1997) p.1208 “It has been suggested that the streamlining of emergency department triage practices so that treatment can be started within 30 minutes, when coupled with the 15 to 30 minute transport time that is common in most urban centers, may be more cost effective than equipping all ambulances to administer pre-hospital thrombolytic therapy.”
10. Christopher P. Cannon – *Management of Acute Coronary Syndromes* (Totowa, NJ: Humana Press, 1999) p.177 “The MITI trial also showed that administration of thrombolytics occurred 33 minutes earlier in the pre-hospital group than in the hospital group, although the investigators found no significant differences in overall mortality, ejection fraction, or infarct size between the pre-hospital group and the hospital treatment group.”
11. Eric J. Topol, *Acute Coronary Syndromes 2e* (New York: Marcel Dekker, Inc., 2001) p.202 “...the greatest benefit of thrombolytic therapy is achieved when it is given within 1 to 1.5 hours after onset of chest pain. Pre-hospital thrombolysis should therefore be considered in locations where achieving this goal would not otherwise be possible. In particular, it should be considered in places where the transfer time from home to hospital is >90 min.”
12. Boersma, Akkerhuis, et al. *Primary Angioplasty v. Thrombolysis for Acute Myocardial Infarction*, (Letter to the Editor, N Engl J Med 2000) 342:890-892. “...the role of pre-hospital thrombolysis has been underestimated...When the data from all randomized trials of pre-hospital thrombolysis as compared with in-hospital thrombolysis, involving a total of 6607 patients, were combined, pre-hospital thrombolysis was associated with a gain of 1 hour (125 minutes v. 186 minutes). As a result, pre-hospital treatment was associated with a significant absolute reduction of 1.7 percent in the mortality rate at 30 days or at discharge, and an 18 percent reduction in the odds of death...”
13. *ACC/AHA guidelines for the management of patients with acute myocardial infarction*. (1999 updated guideline - web version) Pre-hospital issues: “Only a small number percentage of (5% to 10%) of patients with chest pain in the pre-hospital setting have acute MI and are eligible for thrombolytic therapy.”
14. Eric J. Topol, *Acute Coronary Syndromes 2e* (New York: Marcel Dekker, Inc., 2001) p.231 “The most devastating complication of thrombolytic therapy is intra-cerebral hemorrhage. Data collected from clinical trials and unselected populations suggest that the risk is 0.5% to 1%. At least half the patients die, and severe disability occurs in an additional 25%.”
15. *ACC/AHA guidelines for the management of patients with acute myocardial infarction*. (1999 updated guideline - web version) Pre-hospital issues: “Although pre-hospital initiated thrombolytic therapy results in earlier treatment, the time savings can be offset in most cases by an improved hospital triage with resultant “door-to-needle-time” reduced to 30 minutes or less.”
16. Christopher P. Cannon – *Management of Acute Coronary Syndromes* (Totowa, NJ: Humana Press, 1999) p.176 “Several studies have demonstrated significant reductions in hospital-based time to treatment with thrombolytic therapy for AMI patients identified prior to patient arrival with pre-hospital 12-lead ECG.”
17. *Guidelines 2000, Supplement to Circulation*, Volume 102, Number 8, August 22, 2000 “Evidence supports the contention that out-of-hospital 12-lead ECG diagnostic programs are cost-effective and may be underused. We recommend implementation of out-of-hospital 12-lead ECG diagnostic programs in urban and suburban paramedic systems (Class I).”
18. White HD, Van de Werf FJJ. *Thrombolysis for acute myocardial infarction*. (Circulation 1998) 97:1632-46 Paraphrased: An ideal thrombolytic agent would lead to rapid reperfusion, have a high sustained patency rate, be specific for recent thrombi, be easily and rapidly administered, create a low risk for intra-cranial and systemic bleeding, have no antigenicity, adverse hemodynamic effects, or clinically significant drug interactions, and be cost effective.
19. A retrospective analysis of ACS patients based on discharge diagnosis at the hospital allows an EMS service to analyze its sensitivity, as not all ACS patients present with chest discomfort. Patient confidentiality laws can make this difficult, but it is well worth the effort. If you only look at in-house data, you will never find out what your paramedics are missing.
20. The DOT NHTSA EMS QI Leadership Guide is available at [www.nhtsa.dot.gov/people/injury/ems/leaderguide/](http://www.nhtsa.dot.gov/people/injury/ems/leaderguide/)
21. Braunwald, Antman, et al., *ACC/AHA guideline update for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines* (Committee on the Management of Patients with Unstable Angina). 2002. Preamble: “It is important that members of the medical profession play a significant role in the critical evaluation of the use of diagnostic procedures and therapies in the management and prevention of disease states. Rigorous and expert analysis of the available data that document the relative benefits and risks of those procedures and therapies can produce helpful guidelines that improve the effectiveness of care, optimize patient outcomes, and favorably affect the overall cost of care through a focus of resources on the most effective strategies.”