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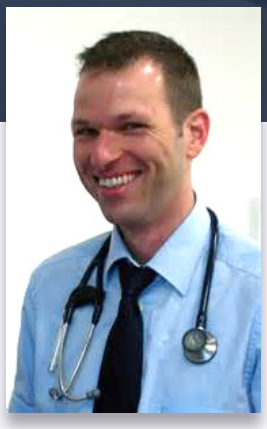
# Insights:

## Identifying potentially deteriorating patients on the general floor

### An interview with Christian Subbe M.D.



## Introduction

Chris Subbe M.D. is a consultant in Acute, Respiratory and Intensive Care Medicine at the Ysbyty Gwynedd in Bangor, Wales. An expert in the identification of critically ill patients on general wards, critical care outreach teams and Rapid Response Systems, he has long been a proponent of Early Warning Scoring (EWS), a system of scoring physiological measurements to help identify patients at risk of deterioration. In this interview, Dr. Subbe discusses the value of EWS and shares his insights about implementing an EWS solution.

**Q** What convinced you of the need for Early Warning Scoring?

**A** While at my first training post in intensive care management, I realized that the point at which I thought a patient should have been referred to intensive care was hours before that patient was actually referred. A few years later we did an audit with the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) and we found that the time between when patients' physiology became abnormal to when they arrived in ICU was up to 72 hours.[1]

In 2000, we ran a pilot study to determine the feasibility of Early Warning Scores. We concluded that the degree of vital signs abnormality summarized in an Early Warning Score related to clinical outcomes such as death and intensive care admissions, and that it was possible to create a clinically useful EWS.[2]

## Q What parameters do you include in the EWS?

**A** The same scoring system is recommended for all hospitals in the United Kingdom, and in my deanery —Wales—all secondary and tertiary care hospitals are using it. We track respiratory rates, oxygen saturation, the fraction of inspired oxygen, blood pressure, heart rate and level of consciousness. The parameters are also weighted the same in every hospital.

In the past, a lot of hospitals had used single parameter systems, in which staff is encouraged to call for help if a single parameter becomes abnormal. The values used in single parameter systems tend to be extreme. The advantage of using a multi-parameter summary score is that you pick up more changes that occur in several parameters but haven't led to a dramatic deterioration in a single parameter yet.

## Q What are the challenges of implementing an effective EWS?

**A** There are probably three areas where failures occur. The first is that the care provider doesn't record a complete set of vital signs. I think the parameter most likely to be overlooked or measured incorrectly is respiratory rate, and yet, in my opinion, it probably contains about 70% of the total risk score.

The second area is failure to escalate the risk. Even if there is a policy stating that this risk should be escalated to somebody else, it still requires an organizational culture that says that this is the right thing to do. And the third area is that even with EWS, we have to make the right decisions regarding the management of each specific patient.

## Q Since implementing EWS, what changes have you seen?

**A** The first change is better vital signs data. We've seen dramatic improvements in respiratory rate recordings; well in excess of 90% of observations will have a recorded respiratory rate. The second change is a drop-off of cardiac arrest rate. According to literature, the drop-off is in the order of 30%,[3] and in some hospitals it is considerably more. Other changes vary among hospitals, such as earlier administration of antibiotics or more referrals to intensive care. We certainly saw people being admitted to intensive care units that were less ill; not necessarily more patients but people were admitted earlier in the course of their disease and it is therefore somewhat easier to improve their outcomes.[4]

## Q You've recently implemented an automated EWS solution on two of your wards. How does that differ from manual charting?

**A** There are obviously significant differences. Respiratory rate is really interesting, because it varies, even within a minute. If you have to observe it manually for a whole minute, you're likely to make errors. Also, you have to stare at the patient's chest, which can be uncomfortable. So when we use an automated system, we see that there might be a discrepancy between the manually counted values and those measured by the automated one.

Another difference with the automated system is that it doesn't rely on the care provider to escalate the situation. Instead, the automated system sends a notification to the responder's pager, so even if the nurse is too busy or forgets to alert the Rapid Response Team, the team is alerted and will check in. Automation also removes the fear of embarrassment that might cause someone to hesitate to escalate.

## Q How has the clinical staff reacted to automated EWS?

**A** On the whole, the feedback has been very positive. The system is set up so that vital signs data from the spot-check monitors is fed to a large, flat-screen monitor in the center of the unit. The vital signs are color coded, so very abnormal signs are in red and the less abnormal signs are in orange, yellow, white and so on. People began to group around that once or twice a day and use that for handover procedures, for safety checks, and to get a quick overview of likely problems in the next hours or for the next shift. I expected a change in escalation, but I didn't anticipate this change in behavior.

In terms of philosophy of care, this is actually quite important because now that all clinicians on the floor can see each patient's data, it becomes a joint shared risk. It is no longer hidden in the notes. It is also visible to doctors who have sessions on the ward. They can use it to prioritize who they see first.

## Q What is the benefit of a front-end automated EWS solution?

**A** I want everything in real time. The moment I've got the values, I want to know whether they're abnormal or not and I want to have the opportunity to respond to them. If I don't have that at the bedside and I have to put it through an electronic patient record, that builds in extra delays without necessarily adding value at that point in time.

What is often seen with electronic patient records is the same data is missing that was missing on the paper charts. It hasn't changed the culture. The way we've implemented our automated early warning system has really changed the way that teams behave. I think that is a rare thing to happen when you're using technology, and it is very powerful.

One of the things that we're trying to do now is to program the monitor to prompt questions related to the data. For example, if the patient's blood pressure is very low, the monitor might prompt, "Have you thought about giving fluids? Have you thought about certain medications? Are you measuring urine output?" That requires that we have the information while we're with the patient.

## Q How do you manage sepsis at your facility?

**A** Sepsis is obviously one of the big drivers behind deterioration of patients in hospital. You can program automated EWS systems to detect parameters that denote systemic inflammatory response syndrome. The problem is, they're extremely unspecific, so you'll have lots of people with those parameters who haven't got sepsis, and the people who've got sepsis with those parameters might have only a very mild form. We handle this dilemma by triggering a review for sepsis at a specific level of the Early Warning Score. The review includes giving oxygen and checking the effect of oxygenation by measuring lactate, giving fluids and checking urine output, and taking cultures and giving antibiotics.

## Q How do you accommodate the natural variations in vital signs data among different patient populations?

**A** We have started to adapt the score to what we know about the patient. For example, a lot of patients with chronic obstructive pulmonary disease will breathe a bit faster than a healthy person. They will always have lower levels of oxygen, and they often have a raised heart rate. In my experience, adapting the scores may reduce the amount of nuisance alarms and therefore reduce alarm fatigue.[5]

## Q What advice would you give a colleague interested in implementing EWS?

**A** The first thing is to convince people that there is a problem. If people think they've got everything under control, you will not succeed. Next, you should have detailed discussions with the senior nursing and medical team on the ward to discuss how you want to implement EWS, who should know the degree of abnormality or the physiology, and how the information will be shared. This reassures people that they have control over how information is shared and how risk is managed. Finally, training is very important. You have to be there a lot in the beginning to engage and talk with staff and share the learning among all the people on the team.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