



The Value of Repeat Vital Signs



I'm just going to say it: We should repeat vital signs more often in urgent care. But from the odd looks I get whenever I work with a new medical assistant, I realize that asking for vitals to be rechecked isn't common practice among my colleagues; it may even

be frankly contrarian. So, before I lose you, I'll concede that one set of vital signs is more than enough for the vast majority of our patients.

However, there are two scenarios when repeating vital signs can help protect our patients—and ourselves—from looming badness:

1. If there is one (or more) significantly abnormal value
2. If the patient has a high-risk complaint and/or poor underlying health status and initially normal vitals

Repeating vital signs in these scenarios dramatically improves our ability to delineate between emergencies and non-emergencies.

In the simplest conceptual terms, a medical emergency is a situation where the natural history of a condition is rapid decline without intervention. The appendix ruptures without surgery in cases of appendicitis. Myocardium infarcts without reperfusion when patients suffer a coronary occlusion.

In true cases of emergency, patients deteriorate over time and their vitals will follow suit.

This is why the delta is what matters most. Worsening vital signs dramatically increase the probability of an emergent diagnosis, whereas vitals that normalize conversely reduce the chances of an emergency.

The latter is what we observe much more often in UC. A young man presents anxious and in pain after twisting his ankle and his initial blood pressure is 170/100 with a heart rate of 120. But after a negative x-ray, ibuprofen, and ice, he's feeling calmer and more comfortable. You repeat the vitals and his pulse is 65 and blood pressure is 110/70. His catecholamine surge has simmered, and the vitals reflect this.

Or you see a 6-year-old boy with a fever of 39°C and heart rate of 160. Sure, the tachycardia is probably related to the fever from a common viral illness. But without giving an antipyretic and repeating his vitals, how can you be certain? In a vaccinated and well-appearing child, a benign diagnosis is assuredly more likely, and you'd expect his temperature and

pulse to improve in such cases. If they don't, that's meaningful and should prompt reconsideration of the presumptive diagnosis. But, if we never recheck his heart rate, a single recorded pulse of 160 will be a damning data entry for the rare cases which turn out to be early sepsis or myocarditis.

The Hazards of Abnormal Vitals

A number of emergency department-based studies support the notion that abnormal vital signs at discharge are harbingers of negative outcomes.^{1,2} The number of abnormal vital signs has also been shown to be correlated with risk of subsequent hospital admission after ED discharge.³

It's also worth noting that even if we don't intervene, abnormal vital signs should normalize in patients without serious acute pathology. This is due a statistical phenomenon called *regression toward the mean*. We've all seen this unfold, but it's important to give it a name and recognize it.

Regression Toward the Mean

I first learned about regression toward the mean (RTM) as a wide-eyed medical student during a frigid January in the ED of Hurley Hospital in Flint, MI. I recall working with a grizzled, gray-haired attending named Dr. Barish. He swore at me and had a glass eye, but he was a great teacher. Shortly into my time with Dr. Barish, I noticed that he repeated the vitals on every patient he was discharging if the previous values weren't normal. Each time the tech returned to report the new vital signs, they'd always improved.

"How'd you know his blood pressure was going to be better?" I asked after our tech recited a near normal blood pressure in a young man with a URI who had previously been quite hypertensive.

"It always is," he replied curtly. "It's called regression toward the mean. Look it up!"

I did, and learning about this phenomenon has been one of the more powerful principles affecting my ability to assess patients for the presence of emergent conditions.

Simply put, RTM states that, in a stable patient, a recheck of any abnormal vital sign is more likely to be closer to normal than the previous value. This is because all vital signs fluctuate moment to moment—even when the patient in front of you is perfectly healthy. Each of these vital signs will produce some-

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thing like a standard normal distribution of readings if measured continuously. You probably know this better as a “bell curve.” The laws of probability state that, in a patient without significant pathology, if one measurement is extreme (ie, far from the mean) then the next measurement is more likely to be closer to, or regress toward, the mean. And the more extreme/abnormal the first observation is, the more likely it is that the next value will be closer to normal.

This phenomenon isn’t limited to vital signs. For example, RTM offers an explanation, outside of superstition, why uttering the words “quiet” when the clinic is slow predictably precedes a subsequent rush of patients. Urgent cares tend to be busy places. If a center is relatively empty at any given moment, chances are it will naturally get busier in short order. (Feel free to share this with your staff next time you’re unfairly maligned for a burst of work coming after you let the “Q word” slip.)

Similarly, we’ve all seen dismayed parents try to explain how their child, who is now doing cartwheels in the exam room, was crying inconsolably with ear pain at home. The decision to seek care was made at the peak of pain intensity and subsequently the pain intensity has regressed toward the mean level for a mild infection.

Pain intensity for benign medical issues will most often improve without treatment. Importantly though, RTM occurs with repeat measurements in any normal distribution of data, so if pain or vitals are worsening with repeat checks this suggests the “mean” for that patient is concerningly outside the normal range. This is why persistent “pain out of proportion” (POOP) is a red flag pattern for serious and life-threatening diagnoses.

High-Risk Scenarios

This brings me to the second group for whom it is essential to repeat vital signs: patients with high-risk complaints and/or poor underlying health status. These are the patients with complaints for which an emergent diagnosis must be considered (eg, chest pain, abdominal pain, syncope, etc.).

For each of these presentations, there are both benign and dangerous conditions in the differential. Additionally, patients of advanced age or with severe immunocompromise or chronic, multisystem organ disease have an increased likelihood of serious pathology, regardless of their complaint.

Patients with a reasonably high risk of a dangerous diagnosis don’t belong in UC, but that doesn’t mean that such patients never show up at our doorstep. In assessing which patients with high-risk complaints require immediate referral to the ED, vital signs represent the most valuable objective data

readily available. If the patient is stable, we have some time to gather more information. If they’re not, we need to get them out right away.

Checking for trends in vitals represents a simple tool with the most potential for quickly differentiating emergent and nonemergent presentations. In a stable patient, abnormal vital signs should improve when repeated. This is actually the definition of clinically stable. I often hear the phrase “vitals are stable” used to describe patients when only a single set of vitals has been taken. But stability cannot be determined with fewer than two data points.

Imagine an asthmatic patient presents with shortness of breath and wheezing, for example. If their respiratory rate improves from 36 to 20 with a nebulizer treatment, you can feel reassured that they probably have a mild (and UC-manageable) asthma exacerbation. But if the respiratory rate, oxygen saturation, and/or heart rate worsen, then they are unstable, by definition, and dangerous conditions such as pulmonary embolism or heart failure warrant further consideration.

Identifying unstable patients is an essential skill for ensuring patient safety in UC because we can’t definitively care for such patients. If there’s a hint that a patient is at risk of short-term decompensation, our priorities must immediately shift away from making a provisional diagnosis toward supporting the patient until they can get to the local ED. Unstable patients almost always need more resources than we have to offer.

Urgent care is an ideal setting for taking care of most stable patients with acute issues. But for patients with abnormal vital signs and higher-risk scenarios, it’s worthwhile to make sure the situation is truly stable and that the patient is in the right place to get care. The good news is that it doesn’t take much to make sure of this. We just need to pay attention to abnormal vitals, use the basic tools we have, and take just a little extra time to ensure things aren’t going in the wrong direction. ■



Joshua W. Russell, MD, MSc, FCUCM, FACEP
 Editor-in-Chief, *JUCM*, *The Journal of Urgent Care Medicine*
 Email: editor@jucm.com • Twitter: @UCPracticeTips

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