

# Telemetry Monitoring

## Indications and Strategies to Reduce Overuse



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### KEYWORDS

• Telemetry • Appropriateness use criteria • Alarm fatigue • Process improvement

### HOSPITAL MEDICINE CLINICS CHECKLIST

1. Telemetry is frequently used in the monitoring of complicated medical patients without rigorous evidence supporting its use.
2. Clear indications for telemetry use among patients cared for by hospitalists include acute coronary syndrome, acute pulmonary edema, atrioventricular block, acute stroke, and ventricular arrhythmias/prolonged QTc.
3. Conditions where telemetry may be considered reasonable practice include syncope, atrial fibrillation, electrolyte abnormalities, subacute congestive heart failure (CHF), and the use of QTc-prolonging drugs.
4. There is no evidence supporting the use of telemetry in atypical chest pain, pulmonary embolism, and numerous other noncardiovascular conditions.
5. Inappropriate telemetry monitoring may lead to alarm fatigue and patient harm.
6. The success of strategies to mitigate unnecessary telemetry monitoring depends on close collaboration between nurses and physicians, institutional support, and effective champions.

### BACKGROUND

#### *How was telemetry discovered?*

Telemetry remains among the few widely used medical technologies not developed originally for the purposes of providing clinical care. More than 50 years ago, telemetry was developed by the National Aeronautics and Space Administration as a monitoring device to observe human physiology in space, particularly to monitor remotely the

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Hosp Med Clin 6 (2017) 295–306

<http://dx.doi.org/10.1016/j.ehmc.2017.03.001>

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physiologic parameters of astronauts who left the spacecraft on a spacewalk.<sup>1</sup> This technology (first used on the Gemini IV flight in 1965, where it failed to reveal anything of interest) became the prototype of what later became telemetric monitoring. It soon found a new home in medicine, initially in intensive care units, and after the technology advanced to the point of being portable, on medical floors as well.

*Was telemetry subjected to rigorous testing prior to its ubiquitous adoptions?*

The origins of telemetry are important to keep in mind because this technology never received the rigorous testing associated with cardiovascular devices, such as defibrillators and pacemakers. As a consequence, its benefits were never tested in initial controlled trials and its broad adoption across the country occurred before any randomized trials could be conducted on its efficacy. Because of these limitations, there have been ongoing concerns about inappropriate application of telemetry, specifically use in conditions not requiring it.

*How were guidelines for telemetry use developed?*

The absence of clear evidence about the role of telemetry has given rise to periodically updated guidelines from the American Heart Association (AHA) about its appropriate indications for various medical conditions.<sup>2</sup> In addition, several studies have been performed more recently looking at its efficacy for specific indications. Together, this body of support provides ample information to guide a clinician's decision on whether to use telemetry for certain hospitalized patients. Despite these guidelines, telemetry remains frequently overused and is the target of numerous efforts to reduce its unnecessary use.<sup>3</sup>

*How are the telemetry guidelines applicable to the practice of hospital medicine?*

The existing current guidelines are extremely comprehensive, covering patients undergoing open heart surgery, invasive cardiac procedures, and patients on general medical-surgical inpatient units. Many of the conditions listed in those guidelines include patient populations, which are less commonly encountered by hospitalists. Therefore, for the purpose of providing the most germane information to practicing hospitalists, this discussion is limited to conditions most likely to be encountered by hospitalists in their most common work setting of a general medical floor.

## OVERVIEW OF TELEMETRY

*How many types of telemetry monitoring are there?*

There are 3 types of cardiac events that physicians who use telemetry in the care of their patient can evaluate (some with additional accompanying software)<sup>2</sup>:

1. Arrhythmia (or standard) monitoring: this is the most basic type of telemetry, which tells providers what the rhythm is.
2. ST segment monitoring: in this type of telemetry, there is real-time, continual analysis of the ST segment by additional computer software. This type of monitoring is reserved for patients with high risk of acute coronary syndrome. In older studies (and before the advent of the troponin assay), ST segment monitoring was believed to detect new myocardial ischemia earlier than the traditional methods of the time. Its relevance in today's world is unclear. This type of monitoring is rarely used outside critical care units.

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