The Alarm Safety Handbook

Strategies, Tools, and Guidance

ECRI Institute

The Discipline of Science. The Integrity of Independence.

chapter **1**

Making Alarm Management a Patient Safety Priority

KVO APNEA LOW
HIGH HEART RATE
CHECK ZERO
PROBE OFF LEADS OFF VFIB VENT FIB
HR LOW EXTREME TACHY ECG ARTIFACT
ASYSTOLE AFIB
OUT OF RANGE
ECG LEADS OFF
DECREASED MV
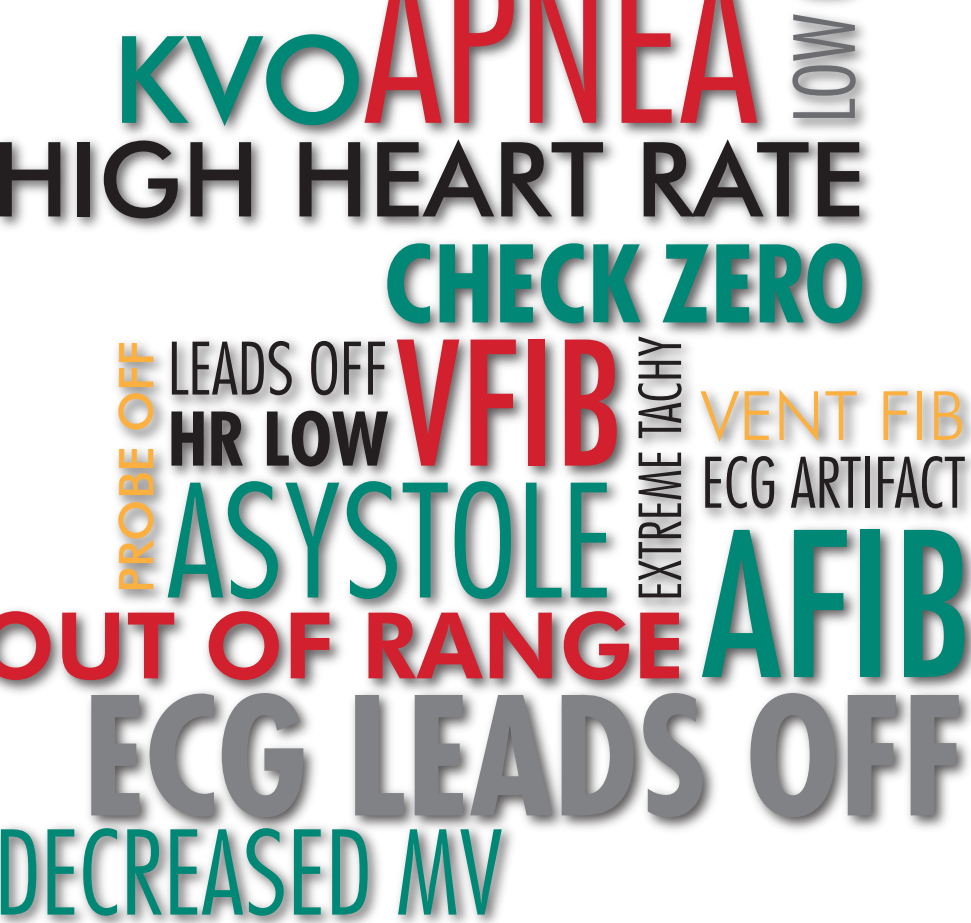
The Scope of the Hazard— Looking Beyond Alarm Fatigue

The beeping, chirping, and pinging of medical device alarms form the soundtrack of many patient care areas. These tones are critically important safety features that can make the difference between timely, life-saving interventions and serious injury or death. For example:

▷ Physiologic monitors alarm to warn caregivers when the patient's heart rate, blood pressure, or blood oxygenation falls outside specified alarm limits or when an abnormal heart rhythm develops.

▷ Ventilators alarm to warn of breathing circuit disconnections or occlusions.

▷ Infusion pumps alarm when air is in the line or a drug bag is empty.

▷ Bed-exit alarms notify the caregiver when a patient has gotten out of bed and may be at risk of falling.

These are just a few of the many devices and conditions that can generate clinical alarms to keep patients safe. In addition, nurse call systems and other technologies used in the care area issue audible tones to inform healthcare workers that the patient or some circumstance needs their attention.

However, it *is* possible to have too much of a good thing. Excessive numbers of alarms—particularly alarms for conditions that aren't clinically significant or for conditions that could be avoided, such as alarms that result from poor contact between an ECG electrode and the patient's skin—can lead to alarm fatigue, and ultimately patient harm. That is:

▷ Clinical staff can become overwhelmed, unable to respond to all alarms or to distinguish among simultaneously sounding alarms.

▷ They can become distracted, with alarms interrupting their thought processes or diverting their attention from other important patient care activities.

▷ They can become desensitized, possibly missing an important alarm because the sounds cease to be distinct or because too many previous alarms proved to be insignificant.

In addition, the noise from excessive alarms can hinder a patient's ability to rest and recuperate, it can increase anxiety among family members, and it can create a more stressful work environment for staff. Such factors may prompt caregivers to take unsafe actions, such as decreasing the alarm volume to an inaudible level or even turning off the alarm completely.

Beyond alarm fatigue, patients could be put at risk if any of the following occurs:

▷ An alarm does not activate when it should. This may occur, for example, if the patient is not connected to the device properly, if the device is not configured correctly for the care area or patient, or if the alarms have been inappropriately silenced or suspended.

▷ The alarm signal is not successfully communicated to staff. The reason may be as basic as the patient's door being closed or nurses at one end of a long corridor being unable to hear or see alarms originating at the other end. Or the problem could be much more complex, resulting from some fault in a complicated alarm notification chain involving information transfer through multiple technologies.

▷ The alarm signal does not include sufficient information about the alarm condition—for example, if an ancillary alarm notification system does not communicate the nature or priority of the alarm.

▷ The caregiver who receives the alarm signal is unable to respond in a timely fashion. If the patient's nurse is unable to leave another patient, and no backup coverage has been established, an alarm could go unheeded.

▷ Clinical staff do not respond to the alarm for some other reason. This might occur, for example, if staff are unclear about who has responsibility for responding to the alarm or are unaware of the importance of a particular alarm.

Any of these conditions could lead to a clinical alarm hazard—that is, the failure of staff to be informed of a valid alarm condition in a timely manner or to take appropriate action in response to the alarm.