



# Sensor Based Medical Alarms: What Your EMS Agency Should Know!

National Public Safety Telecommunications Council (NPSTC)  
National Association of State EMS Officials (NASEMSO)  
EMS Communications Working Group

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## What are Sensor Based Medical Alarms?

There are a variety of medical and telemetry sensors being used outside of hospitals to monitor a patient's health status. While some devices must be taken to a physician's office to access the stored data, newer type devices are connected to the Internet and can transmit patient data daily or in real time. One example of this emerging technology is the Mobile Personal Emergency Response Systems (mPERS). This technology has been marketed and advertised for situations where the user has "fallen and can't get up!" They include devices which can summon assistance in an emergency, using a pendant or locket. Sensors embedded in the technology can automatically detect a fall and then determine if the patient is motionless. mPERS devices typically send alerts to third party monitoring companies which will validate the problem and determine the type of response needed. Family members and friends respond to most calls and only a small percentage of these alerts result in a notification to the Public Safety Answering Point (PSAP) for EMS response.

Other examples of sensor based medical alarm technology include these options:

- Physicians are prescribing personal monitoring equipment for certain patients, including cardiac monitoring, and in-home sensor systems that monitor a patient's blood pressure, pulse rate, and other vital signs.
- Apnea monitors for babies may be sent home with parents and can provide real-time monitoring by third party vendors.
- Researchers are developing a contact lens that will monitor a patient's blood glucose. The sensor will connect to a patient's smart phone and collect near continuous data on the patient's blood sugar readings throughout the day to help better manage their diabetes.
- Personal health and fitness trackers are becoming more sophisticated and are increasingly integrated with the user's smart phone. These sensors may also be linked to third party monitoring for at-risk patients.

## What's Happening Now?

- Home health monitoring is a growing industry designed to track patients for compliance with prescribed medications and to provide care following discharge from a hospital. Many at home monitoring systems transmit medical telemetry for review by nurses or specialists. These monitoring systems may detect treatment emergent conditions that require EMS response. For example, a cardiac monitor may detect a life threatening heart arrhythmia.
- Some mPERS devices will automatically detect a patient's fall and trigger an alert to a private call center. These sensors can activate an alert even if the user is injured or unconscious.

- Many mPERS devices are now connected to cellular networks allowing their users to be anywhere in their community. EMS may receive a call about a patient who has pressed their help button far beyond the boundaries of their residence.
- PSAPs may receive calls from mPERS providers reporting a “person down” including instances in which there is no voice contact with the party needing assistance. In some cases minimal information is available on the patient (e.g., it is not known what type and color clothing they are wearing) and the location of the patient may be estimated based on incomplete data.

### **What’s on the Horizon?**

- Next Generation 9-1-1 (NG9-1-1) will allow sensors and devices to communicate directly with the 9-1-1 network. Public safety agencies may allow medical alert data to bypass a third party monitoring center and come directly to the PSAP.
- Physicians and hospitals strive to reduce hospital readmission and unnecessary office visits. Sophisticated devices are being designed to closely monitor at-risk patients thus limiting the need for frequent return checkups. These new technologies will likely allow for interoperability with the NG911 network, allowing patient data to be instantly shared with a PSAP.
- FirstNet, the nation’s new Public Safety Broadband Network, will allow PSAPs to send patient telemetry data directly to EMS units and to hospital Emergency Departments.
- New patient monitoring systems may be programmed to automatically alert the PSAP of a life threatening condition. For example: A diabetic patient’s contact lens may detect a life threatening hypoglycemia and transmit a data alert directly to the PSAP for immediate EMS response. A woman with a history of heart disease may be wearing a medical sensor bra which will monitor a 12 lead ECG for early signs of ischemia or heart rhythm abnormality. In some cases, a data alert may be sent directly to the PSAP.

### **What Should Your EMS Agency Do?**

- Educate your PSAP about these new types of mPERS services and systems.
- Coordinate with your PSAP, law enforcement, fire departments, and other agencies to develop a comprehensive response policy for each of the various call types coming from third party monitoring centers (e.g., call with voice confirmation of an emergency, sensor alert indicating a fall with no voice contact, etc.). Determine under which conditions an EMS response should be generated for mPERS alerts or other sensor based alarms.
- Add “sensor based alerts” to your agency’s Quality Assurance monitoring program to ensure that these events are captured and receive adequate review.
- Begin discussions within your agency, and with the PSAP, on proper management of new types of biomedical sensor alerts that will be possible following the implementation of NG9-1-1. This includes local and regional decisions regarding direct transmission of medical alerts to the PSAP. Should a data alert for a patient in V-FIB go to a third party monitoring center before the PSAP is alerted?
- Monitor national public safety organizations, including NASEMSO and NPSTC, to keep up to date on these evolving technologies.