



## Identifying performance improvement opportunities for a telemetry monitoring program

Philips collaborates with Huntsville Hospital to evaluate telemetry monitoring and alarm management

### Who/where

Huntsville Hospital, Huntsville, Alabama, USA.

### Challenge

Assess telemetry and Central Monitoring Unit (CMU) telemetry utilization and alarm management practices and identify opportunities to reduce non-actionable alarms, while standardizing alarm management processes in order to enhance patient care and safety and staff workflow.

### Solution

Philips Healthcare Transformation Services led a consulting engagement which included in-depth collection and analysis of monitoring data, onsite observations and staff interviews, and review of processes and procedures, followed by root cause analysis, best practice implementation, impact of new technology, and prioritized change recommendations.

### Opportunities for improvement

The consulting team identified and detailed 23 opportunities and recommendations for performance improvement in telemetry utilization and alarm management.

Huntsville Hospital serves as the regional referral center for North Alabama and Southern Tennessee and is a teaching facility for the University of Alabama's Family Practice and Internal Medicine residency programs. It is also home to one of only three statewide Level I trauma centers.

With the expectation of a hospital-wide installation of new telemetry equipment, Huntsville Hospital wanted to conduct an assessment of their telemetry monitoring program so processes could be optimized and in place when the new equipment arrived. They turned to Philips to provide them with expert consulting and recommendations for improvement in telemetry utilization and alarm management.

## Optimizing processes for greater efficiency

Huntsville Hospital and Philips set out together to conduct a current-state assessment to evaluate the CMU (central monitoring unit) and telemetry monitoring and alarm management practices and determine the impact of current telemetry utilization on throughput.

### The goal

Huntsville Hospital was planning an institution-wide upgrade to Philips IntelliVue MX40 patient monitors and IntelliVue Information Center iX (PIIC iX). In order to take full advantage of the new technology, consultants were asked to identify improvement opportunities in current processes so the hospital could act on improvement recommendations prior to installation.

In conversations with the consultants, the hospital chose to focus the engagement on three specific areas.

- A 25-bed cardiac step-down unit
- A 38-bed general telemetry unit
- The six station central monitoring unit (CMU).

### Assessment methodology

Philips consultants engaged with clinical staff and leadership to determine the current state of operations using a proven methodology that includes data, people, process and practice, technology, and culture. Findings from these areas were analyzed and discussed with the stakeholders to discover barriers, gaps, and inefficiencies.

What Huntsville Hospital wanted was ‘another set of eyes’ to help them understand their strengths and weaknesses. The assessment was designed to do just that. Elements of the effort included:

- **Data analytics** – Analyzed a month of telemetry data to understand the monitoring alarm history, identify potential configuration issues, and review default settings challenges
- **Stakeholder interviews** – Onsite interviews with executive leadership, physicians, quality manager, nurses and nursing leadership, and monitoring techs (MTs) helped to identify issues and understand the culture
- **Site assessment** – Current processes and alarm management protocols were analyzed for the CMU and telemetry units to determine what was working well and areas for improvement

- **Review of policies & procedures** – A thorough review of policies and procedures to determine alignment with Joint Commission recommendations
- **Observations** – Nurses and MTs were shadowed to better understand daily routines and actual practices and to observe real-time challenges

Insights from each element of the assessment provided key input into development of potential performance improvement opportunities. Every recommendation reflected industry best practices and benchmarking standards.

### Current state challenges/observations

Staff at Huntsville Hospital had been aware of the need for revitalization of the telemetry program for quite some time and the consultants found that several prior initiatives were helping to move the process forward. These included a concerted CMU focus on patient safety from leadership and MTs, a satellite monitoring station (and MT) devoted to the cardiac step-down unit, and highly engaged staff in the general telemetry unit.

After examination of assessment results, the opportunities for improvement became clear, were detailed by the consultants, and presented to hospital leadership along with recommendations.

“The assessment report allowed us to make changes based on true data and not merely what we “thought” were our problems and concerns.”

Wendy Cantrell, MSHR  
Manager, Telemetry Monitoring  
Huntsville Hospital

# Highlights

## Telemetry utilization and CMU/MTs

There was no telemetry order guidance – set criteria to assign telemetry or a review/renewal process for continuing/removing telemetry. Hence, when admitted patients were assigned telemetry, they were monitored until discharged. As a result, there was a backlog of patients requiring telemetry.

Alarm customization was reactive and driven by the MTs. An experienced MT might turn individual alarms off/on independently and those with less experience might keep all alarms in the default 'on' position. Neither scenario was covered under hospital policy at the time, but current policy indicates customization must be initiated by licensed personnel (MD/RN/LPN/APP).

Six MTs in the CMU called out nurse paging requests to a single MT who then must reach out to the nurses. With the exception of the cardiac step-down satellite station, several MTs had to monitor up to 64 sectors – 16 patients higher than the suggested maximum of 48.<sup>1</sup>

## Opportunities for improvement

Philips consultants identified 23 opportunities for Huntsville Hospital to improve their telemetry monitoring and alarm management processes. The top 10 being:

- 1 Modify medium priority arrhythmia alarm settings
- 2 Improve telemetry utilization criteria
- 3 Establish telemetry continuation/discontinuation criteria
- 4 Define instructions to reduce leads off alarms
- 5 Clarify electrode changes and skin prep procedures
- 6 Clarify customization (people & practice) roles and responsibilities
- 7 Establish an alarm committee
- 8 Modify MT alarm load and number of sectors
- 9 Create alarm settings & review: CMU consistency
- 10 Establish visual control: cardiac step-down satellite CMU station

Another key element in a successful re-evaluation of the telemetry program was a recommendation for the establishment of an Alarm Committee to provide

## Alarm volume/fatigue

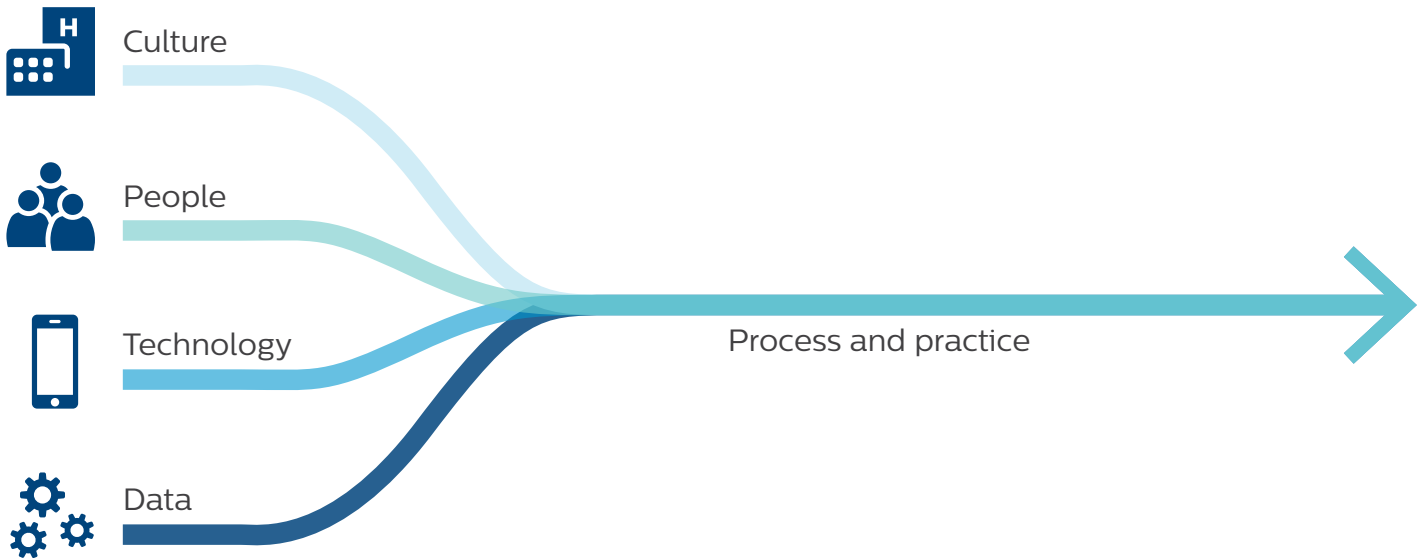
Over the month of data analyzed, the total alarms per bed in the general telemetry unit was 104 per day. If a nurse was responsible for five patients – that's more than 500 alarms per day. Alarms occurred continuously and were typically only acted upon when nurses were called by the MT from the CMU. Complicating matters, the general telemetry unit had no remote telemetry display, so nurses were 100% reliant on calls from the CMU.

In both units, only 3% of the alarms were red arrhythmia alarms. Yellow alarms (medium priority) constituted 51% and 35% respectively. Without customization, many units alarmed for everything. ECG Leads Off, Pair PVCs, and HR High were the most common alarms. If some of the medium priority alarms had been defaulted off (per the Christiana Care study<sup>2</sup>), there would have been 39,573 less CMU alarms or a 57% reduction.

oversight/steering on all proposed telemetry/alarm management projects. Committee representation should be cross-disciplinary and include providers (front line clinical staff and MTs), leadership (clinical engineering, risk management, and quality improvement) and ad hoc members as needed (pharmacy, respiratory therapy, etc.).

“With a centralized monitoring room, the noise level alone is often overwhelming to technicians. The recommended changes made an immediate difference in the noise level that was noticed and felt by all, making for a much healthier and safer work environment. We feel patients are also much safer because the technicians can focus on true and valid alarms and limit the number of notifications to RNs thereby reducing their workload.”

Wendy Cantrell, MSHR  
Manager, Telemetry Monitoring  
Huntsville Hospital



### Next steps

Upon completion of the engagement, Huntsville Hospital decided to move forward with the recommendations and will follow the AAMI Alarm Management Process Maturity Framework.<sup>4</sup> They have moved past Level 1 (Unmanaged Process) to Level 2: Managed Process with a willingness to pilot changes. They'll achieve Level 3: Defined Process when they complete the pilot and show objective evidence that nonactionable/false alarms have been reduced

and can be sustained. With Level 4: Evidence-Based, Organization-Wide Management, Huntsville Hospital will have a cohesive, institution-wide process in place with consistent performance improvement metrics.

When the equipment upgrade is ready for implementation, Huntsville Hospital's telemetry monitoring program will be positioned to optimize the new technology.

### Learn more

Philips Healthcare Transformation Services provide end-to-end, patient-centric solutions across the care continuum. Our customized consulting and education services are designed to improve clinical care and operational effectiveness while contributing to the financial stability of your enterprise.

For more information, please visit [www.philips.com/healthcareconsulting](http://www.philips.com/healthcareconsulting).

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