

**How Northern Westchester Hospital  
Successfully Leveraged  
CareSight Analytics to Reduce  
Nuisance Alarms and Boost  
Staff and Patient Satisfaction**



**A CASE STUDY**

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Northern Westchester Hospital (NWH), a proud member of Northwell Health, provides quality, patient-centered care that is close to home through a unique combination of medical expertise, leading-edge technology, and a commitment to humanity. Located in Mt. Kisco, NY, the hospital is staffed by more than 650 physicians, 420 nurses, 105 patient care associates (PCAs), and 488 support staff. Each year NWH admits more than 10,000 patients, performs over 9,000 surgeries, and handles 30,000+ emergency room visits.

With decades of experience in the healthcare industry, CareSight—a healthcare data analytics-as-a-service company—combines technology and an experienced team to provide a comprehensive, multi-source view of alarm activity in the healthcare environment. CareSight collects data from multiple data sources, then transforms, normalizes, and delivers actionable information to clinical and management teams.

## Measurement + Collaboration = Results

Northern Westchester Hospital has an exceptional reputation for providing a high-quality patient experience. The hospital continues to evaluate all aspects of its operation with the goal of maintaining and improving their already high standards. In the last ten years, NWH has invested heavily in technology and staff to support their efforts. Led by George Weldon's team, with support from his partners at CareSight, the refinements detailed here leverage those products and services by putting measurable patient and staff outcomes front and center. Often technology is given the spotlight, but here is part of a larger orchestrated focus that makes the facility a top-tier choice for those in the community.



## Initial Goal: Improving Nursing Response Time to Patient Call Bells

Staff-to-staff and patient-to-staff communications at Northern Westchester is powered by an integration between Vocera Communications platform and Rauland's Responder 5 Nurse Call System, which is used by patients at bedside. In keeping with the objective of remaining a top-tier hospital—and breaking the 90th percentile mark in all areas—the NWH Telecommunications team, in partnership with CareSight analytics, set goals to identify and address areas where calls went into overtime, and to improve response time.

## Identifying Areas of Improvement

The Telecomm team, under the direction of George Weldon Jr., identified a few areas where the response time was not ideal, and started to work with nurse managers to raise their awareness of how many responses going past 90 seconds. One problem area was found to be the patient's bedside pillow speaker. When a patient used the speaker to summon help, the call would flow at 30-second intervals first to the nurse assigned to the patient, then to the nurse buddy or backup, and next to the charge nurse. If the call was not answered within 90 seconds, it would continue to a concierge or operator, who would answer the call but be unable to physically assist the patient.

## A Shift in Focus and a New Objective

The push to decrease call bell response time was not well received by the nursing staff, who noted the high volume of alerts they received each day. Feedback from nursing staff inspired the

Telecomm team to shift its focus from reducing response time to reducing the number of patient calls clinical staff received. The team evaluated the alerts that were routing to the nurses and clinical staff and identified the frequency of those. Results showed that a clinical staff member could potentially receive up to 100 alerts within an hour.

The concern was that any nurse who is assigned six patients and receives up to 100 alerts and alarms per hour would assuredly experience fatigue—or, at the very least, start to become numb to all the noise. A very important alarm that requires a response might go almost unnoticed by a nurse who hears so many alarms in a given hour.

This initial evaluation led to a new objective—focusing not only on the call bell response time but also ensuring that clinical staff members receive only the alerts they need. By implementing this change, Telecomm believed it would generate improved call bell response times and increase patients’ satisfaction scores.

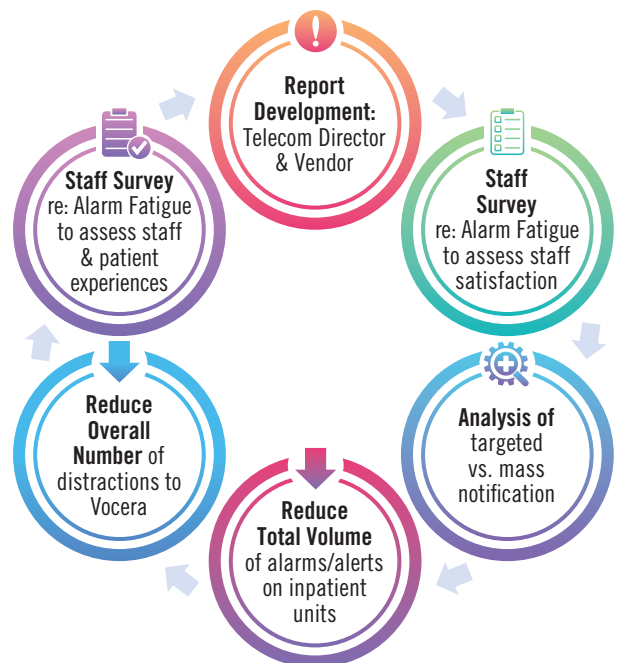
## A Clinical Alarms Committee

In March 2018, after presenting these findings to hospital leadership, Telecomm was authorized to form a Clinical Alarms Committee staffed by 14 members representing different disciplines of the hospital: intensive care, inpatient nursing, quality, legal, strategic planning, nurse and patient care associates, clinical engineering, Biomed, and nursing education.

Susana Dealmeida, Assistant Director of Inpatient Services at NWH, helped advocate for the changes on the clinical side, while the medical analytics company, CareSight, served as the data aggregator and consulting partner—the platform through which all alerts, alarms, and statistics flowed.

NWH identified two inpatient units to study for 60 days during the summer of 2018. Working with CareSight, they performed a complete overhaul and reprogramming of data sets, then

### Alarm Committee Goals:



began collecting data on user and unit distraction scores and activity trends in codes, conferencing, nuisance alarms, and call flows.

**Opportunity 1/Codes:** The first focus area was specific to the codes announced throughout the hospital on the public address system and urgently broadcast to users wearing wireless Vocera communications pendants. This urgent broadcast breaks through as a very loud alarm, so it is an immediate distraction from anything the staff is doing—receiving a call, interacting with a patient, etc. It is not only a distraction for staff, however: it’s a noise that disturbs the patients, waking them from sleep, and it cannot be silenced. Each time one of NWH’s 20+ codes was announced, an alarm would go out to 400+ people. When surveyed about this situation, one staff member noted, “I am so busy responding to other calls/alerts to my Vocera that there are times I cannot respond to the call bell in the room.” Another said simply, “There are too many alarms to focus.”

**Resolution and Measurement:** Utilizing the CareSight platform, Telecomm identified and vetted every single code through all hospital committees and determined which staff members really needed to receive the alert and respond to it. With “Code Blue,” for example, the alert would simultaneously go out to 420+ people—all the Vocera wearers throughout the organization—but fewer than 20 people actually needed to get the alert, respond, and take action. The Telecomm team modified the routing of the alerts so that only the first responders would receive it. This led to an 89% average reduction in the number of those receiving the alert and alarm—though, for some staff members, there was a 96% reduction in overall number of alarms received.

### Implementation Strategy:

Urgently Broadcasted CODEs to be routed to 1st responders only	Conference line for fall alert: Call flow redesign	Implement 5 second delay for Cord Out & Bed Exits	Redesign clinical call flow to include PCAs
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### Desired Outcomes:

Nuisance broadcasts: Reduce by 50%	Nuisance alerts: Reduce by ≥ 20%	False alarms: Reduce by ≥ 15%	Call volume to RNs & OT call instances: Reduce by 5-10%
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### Pre-Implementation Staff Survey

(198 participants)



**Opportunity 2/Conferencing:** The second area the team focused on was the conferencing feature of Vocera (push-to-talk walkie talkie style communications), which is heavily used for video monitoring. Large screens in rooms are used to observe patients who are deemed fall risks. When these patients try to get out of bed alone, a link to the room enables staff to communicate with them—to say, for example, “Please wait for the nurse” or “Please don’t get up.” This protects patients and helps ensure they don’t get out of bed without assistance. NWH’s fall-prevention conference feature was originally set up so that all nurses and PCAs on the fifth, sixth, and seventh floors would get a conference notification whenever a bed alarm went off on any of those floors. “I get alerts for patients not even on my floor that I cannot respond to,” noted one staff member on a survey. Nearly 50 people would be alerted per incident, though nearly 70% of these recipients were unrelated to the patient’s care.



**Resolution & Measurement:** The system was modified so that notifications were sent only to first responders on the floor. Fixing this problem resulted in an 86% overall reduction in inappropriate notifications—a reduction in volume as well as in the number of user recipients.

**Opportunity 3/Nuisance Alarms:** Every nurse call system has cords (often with pillow speakers attached to them) that connect to a station mounted on the wall. At its most basic level, this allows patients to initiate a request for assistance. At NWH the platform expands the basic intercom function to allow patients to directly communicate with their assigned caregivers. A safety feature of the system triggers alarms every time the cord is unplugged from stations on the wall. Every time the cord was accidentally unplugged, an alert would be sent out on everyone’s communications pendant on the floor, even if staff who unplugged it canceled the alarm within one second.

**Resolution & Measurement:** This was modified so staff members entering the patient’s room be given five seconds to cancel the alarm before it was sent out. This suggestion spurred much concern and discussion because it meant silencing a life-safety alert and alarm. The committee’s rationale, however, was that an alarm being canceled within five seconds meant a staff member was physically in the room, so an alarm would not have to be sent out. The change was implemented, leading to an average 33% reduction in false or nuisance alarms. More importantly,

the five-second delay has had no implications for patients—there has been no increase in patient falls or patient risks in the eight months since the change was put in place.

**Opportunity 4/Call Flow:** The team’s final focus was on call flow. When the patient hit the call button, the alert would go at 30-second intervals to the nurse, then the nurse buddy, and then the charge nurse. Many of these calls, however, would be delegated to PCAs, who are technicians assigned to complete certain tasks for the nurses on each inpatient floor.

**Resolution & Measurement:** Telecomm measured and analyzed every call that was received and what the patient needed: a drink of water, help to the bathroom, assistance getting out of bed, pain relief, a talk with a nurse or doctor, etc. The team then defined which staff members should be getting those calls. Calls concerning pain or the need to see a nurse or doctor were designated as “nurse-driven calls.” Calls for water, a bathroom trip, or help getting in or out of bed were “PCA-driven calls.” Telecomm found that about 70% of the calls that went into overtime (no response received within 90 seconds) were PCA-driven calls. A nurse does not need to receive these calls, yet a nurse was in every level of escalation to receive them. In fact, it was determined that the charge nurse ended up getting more calls than anyone when the calls rolled over.

Challenging this procedure during multiple presentations to senior leadership, the Telecomm team proposed that PCAs be included in the second level of escalation, and received approval to make that change. Calls are now routed from nurse to PCA to nurse buddy. Since implementation, there has been an 18% reduction in calls going to nurses.

### Final Results:

On a survey taken after the new system was implemented, one staff member noted, “I find it more manageable to respond to my patient calls faster.” Said another: “I am able to reply to my patient assignment calls now, rather than waiting for the RN to delegate a task.” A third echoed those sentiments: “My perception of alert/ alarm fatigue and overall distraction level on the job improved with the volume reduction levels.”



**“I find it more manageable to respond to my patient calls faster.” –RN**

Since the alarms fatigue initiative began, scores on patient satisfaction surveys have also shown marked improvement: "Quiet at Night" scores have risen from the 50th to the 63rd percentile, and "Response to Call Bells" scores have gone up from the 79th to the 86th percentile.

## SUMMARY OF OUTCOMES:

### Codes

Average 89% reduction in unnecessary code notifications  
 415 staff members receiving alert down to an average of 44

### Conferencing

86% reduction of inappropriate conference blasts going to clinical staff  
 Average of 70 staff members receiving 35 alerts/day down to an average of 18 to 27

### Nuisance Alarms

33% reduction in false alarms going to clinical staff  
 9,457 fatigue-causing alarms removed.  
 Five-second delay will prevent over 20,000 non actionable alarms annually.

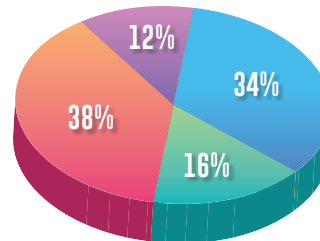
### Call Flow

18% reduction overall in calls to RN codes  
 RN-RN Buddy-Charge RN vs. RN-PCA-RN Buddy: 18% reduction of patient calls to the RN by including the PCA

## Post-Implementation Staff Survey

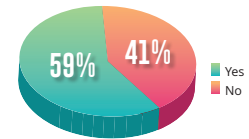
(142 participants)

Of the alerts/alarms, which had the highest reduction/greatest improvement towards reducing distractions when you're at work?

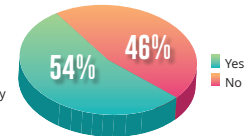


■ Urgent Broadcasts/CODEs ■ Bed Exit/Cord Out Five Second Delay  
 ■ Video Monitor/Conference Blasts ■ Patient Calls from Pillow Speaker

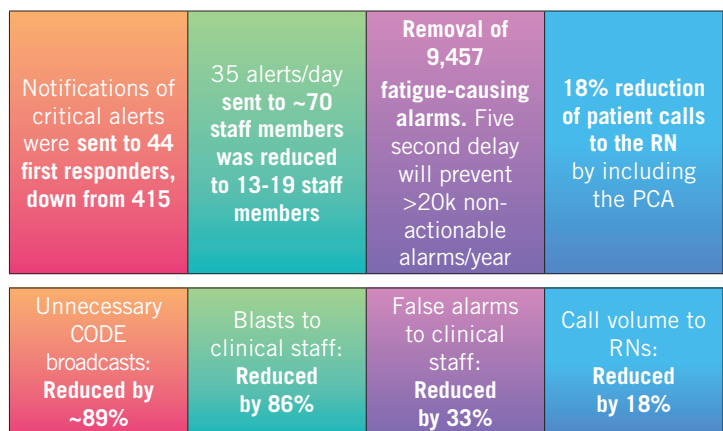
Do you feel less overwhelmed/more focused on the task at hand with the reduction of "noise" during your shift?



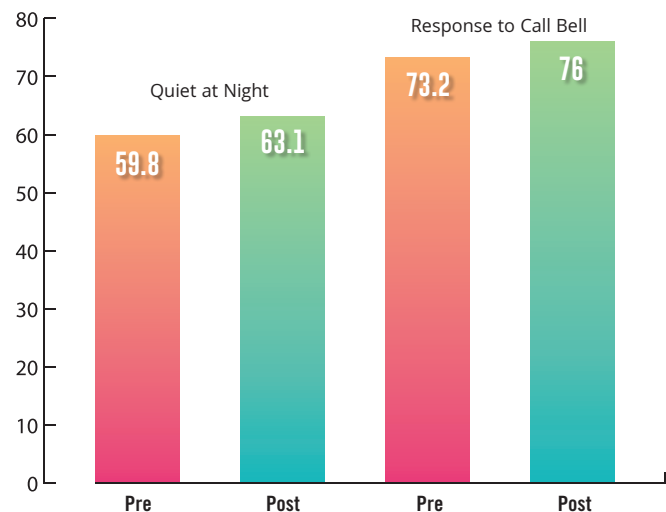
Have you noticed any difference in volume of alerts/alarms?



## Achieved Outcomes:



## 2018 Pre/Post Implementation Patient Satisfaction Scores





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