

# Create a Safe Night

*An Interdisciplinary Approach to  
Risk Identification and Mitigation  
for Hospitalized Patients*



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## Abstract

**Background:** The ultimate goal and purpose of healthcare is to improve health while preventing morbidity and mortality. The optimal approach to this is through teamwork using a reliability framework. Upon review of our institution's 2012 patient safety culture survey data, we noted that the teamwork domain of the Agency for Healthcare Research and Quality (AHRQ) assessment was in the lowest decile. Our institution implemented the Crimson Analytics tool in 2013, and an analysis of inpatient mortality data revealed higher than expected mortality statistics.

**Objective:** Hospital systems and team-based care are more developed during daytime hours, leaving patients more vulnerable to adverse events (morbidity and mortality) during the overnight period. Our objective was to develop optimal transitions of care and proactive risk identification/mitigation through an interprofessional team-based approach, with resultant decrease in patient harm and improvement in safety culture.

**Methods:** In a community hospital, standardize transitions to identify “at risk” patients for nurses, physicians, and respiratory techs with subsequent interprofessional review of care plans/patient status in a centralized midevening standup briefing, subsequent proactive

rounding on “at risk” patients, use of error prevention behaviors aimed to mitigate cognitive bias, and end-of-shift reflection process.

**Results:** Inpatient mortality rates fell from a baseline level of 2.08% in April 2013–March 2015 to 1.56% during the intervention period from April 2015–March 2018. The observed/expected mortality ratio fell from 1.04 to 0.76. AHRQ safety culture data improved in the teamwork domain from 81% to 83%. A custom survey for this intervention was developed and found significant improvements in risk awareness and mitigation response, teamwork, efficiency, and—potentially—joy at work.

**Conclusion:** An interprofessional approach to high-quality transitions in care, risk identification, and mitigation, along with structured huddles and proactive rounding, can improve patient safety at night while simultaneously improving staff satisfaction, joy, and safety culture.

**Keywords:** *high reliability, transitions in care, night time, teamwork, proactive risk mitigation, interdisciplinary*

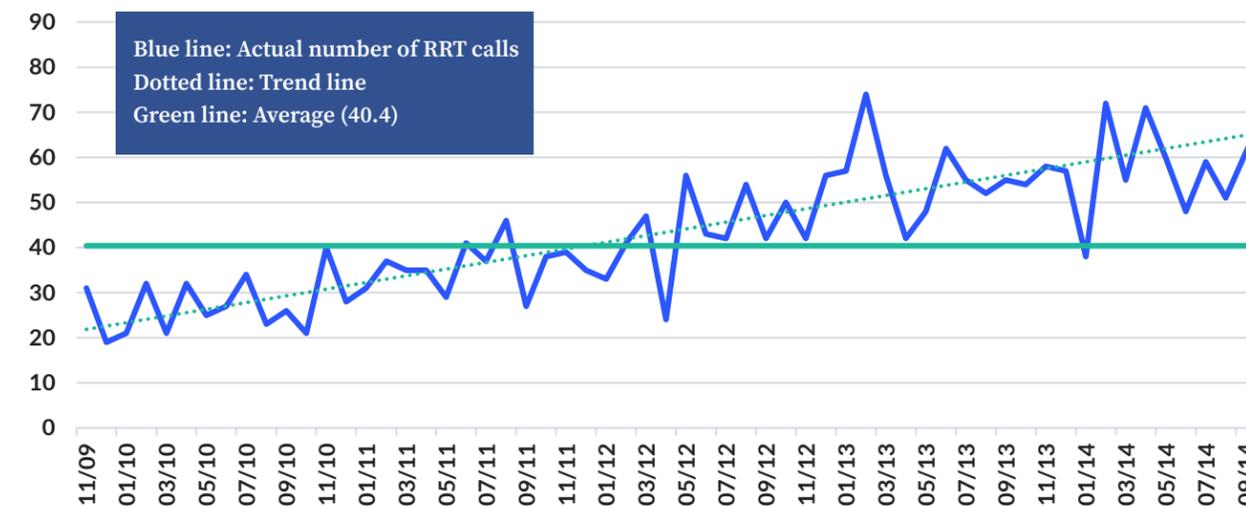


## Introduction

The ultimate goal and purpose of healthcare is to improve health while preventing morbidity and mortality. The optimal approach to this is through teamwork using a reliability framework. Upon review of our institution's 2012 Surveys on Patient Safety Culture (SOPS) data,<sup>1</sup> we noted that the teamwork domain of the Agency for Healthcare Research and Quality (AHRQ) assessment was in the lowest decile.<sup>2</sup> Our institution implemented the Crimson Analytics tool in 2013<sup>3</sup> and an analysis of inpatient mortality data revealed higher than expected mortality statistics. Baseline inpatient mortality rates (April 2013–March 2015) were 2.08% (compared to the Crimson national cohort average of 1.79% and top quartile of 1.65%). Our baseline observed/expected mortality ratio was 1.04.

Expected mortality rates were determined from Crimson comparator of risk-adjusted “like cases” in the database of over 1000 hospitals. Increased mortality occurred despite Rapid Response Team (RRT) data (Figure 1) that revealed continued month-over-month growth in activations since its inception in 2009 and during our baseline period for the Create a Safe Night Program (CSNP) intervention (April 2013–March 2015).<sup>4</sup> Additionally, multiple published articles of early warning

Figure 1. Number of Rapid Response Team (RRT) calls per month from November 2009 to March 2015 at Abington Hospital



scoring tools such as the Modified Early Warning Score (MEWS) demonstrated relatively low sensitivity and specificity for ability to identify patients at risk for clinical decline.<sup>5</sup> Finally we increasingly became aware of the tenets of high reliability. Becoming “highly reliable” will require organizations to move towards higher functioning interprofessional teams that are situationally aware of risk and are able to anticipate and mitigate potential harm before it occurs.<sup>6</sup>

With this as context, we set out to create an approach to impact interprofessional team dynamics and performance with an ultimate goal of reduction of inpatient mortality—with a particular focus on the unmet need of patient safety and risk during the overnight period.

## Methods

Our institution realized that the structures and processes for teamwork and response to patient decline were significantly more advanced and developed during

daytime hours. A goal was set to bring additional order and structure to the evening/night hours with an ultimate goal of reduction of harm at night.<sup>7,8</sup> Several focus groups and brainstorming sessions with night shift leadership were held to inform the development of the program. The CSNP was launched in April 2015 after a significant educational effort that included live, in-person didactic information sessions, memos, and distribution of PowerPoint presentations to all involved stakeholders and leaders (nursing, residents, attending physicians).

The CSNP has multiple components. Daily it begins with the identification of patients that are at risk for clinical decline in the overnight period. Borrowing from the Patient Safety Institute's I-PASS program,<sup>9</sup> we used the word “watcher” to identify these patients. Resident physicians were trained to identify watchers using clinical judgment by asking, “Which patients on my service are at most risk of having a clinical

decline overnight?” Attending physicians were trained to supervise the process, and watchers were systematically signed out to covering night float interns/residents. Watcher patients were clearly noted in a column in the electronic medical record (EMR) that allowed transparency for all staff to see the identified patients. Similarly, nurses were trained to identify watcher patients on their units who they believed had risk for clinical decline.<sup>10</sup>

A 9:30 p.m. huddle was implemented to bring covering intern night floats, nursing representatives from each floor, respiratory technicians, and the evening nurse coordinators together. During these 15–20 minute sessions, the status of each watcher was ascertained, care plans were reviewed, and contingencies were developed for each patient. Critically, this function served as an opportunity for interdisciplinary collaboration in the development of optimal care plans.<sup>11</sup>

Our institution has long had error prevention behaviors similar to those found in TeamSTEPS.<sup>12</sup> These have traditionally focused on optimizing team function by creating standardized language and expectations through the use of tools such as SBAR (Situation-Background-Assessment-Recommendation) and CUS (I am Concerned! I am Uncomfortable! This is a Safety Issue!). As part of our evolution and in response to the Institute of Medicine's report on diagnostic error, we developed and deployed new behaviors called "Talk Out Loud" and "What Else Can It Be."<sup>13</sup> These strategies were based on recent literature of cognitive bias.<sup>13</sup> Use of these tools was encouraged during the 9:30 p.m. huddle, during proactive rounding at the bedside, and during emergent responses to evolving situations.

Between 11 p.m. and 1 a.m. interns proactively went to their assigned nursing units accompanied by nursing supervisors and had another briefing with unit-based staff to identify any new issues of concern. After this brief huddle, the watcher patients were seen in their rooms to ensure another medical assessment for further refinement of their care plan. To ensure collaboration, nurses were encouraged to be at the bedside

during these proactive rounds as well as for emergent calls.<sup>14</sup>

Nighttime unit-based nursing leaders submitted nightly electronic reports of intern participation in the unit-based huddles and the proactive rounding. Reports of attendance and participation were automatically forwarded to medical and nursing leadership on a daily basis to enable rapid course correction and resetting of expectations as necessary.

In the morning, at the end of their shift, the night float interns were asked to reflect on the sign-out they received as well as the course of the events of the evening. They were asked to enter an end-of-shift electronic report form. The process of form completion and reflection allowed for the development of a feedback loop to the day teams with the intent of improving the sign-out process. As an example: If the night floats encountered situations that had been evolving during the day but the patient was not identified as a watcher, they would note that in the form and discuss it with the daytime primary service/team.

It was recognized that despite the above efforts, there were patients that had clinical declines in the overnight period that were not

identified as watchers at end-of-day sign-out. In order to provide additional cycles of learning and reflection any non-watcher patient that had a critical event or an unplanned transfer to a higher level of care was identified and a "reflection form" was sent to the primary team to guide them through the process of learning and refining their approach to future watcher patient identification. The intent was to allow the day teams to ponder if there could have been different decisions made during the previous day that could have prevented the patient's decline. The form used open-ended questions but also contained prompted options such as a proactive upgrade in level of care, the ordering of additional labs, obtaining specialty consultation, etc.

In order to better understand the impact of the CSNP, an electronic survey was developed and distributed via email on May 5, 2017, and remained open for completion until June 1, 2017. Observed/expected mortality ratios were obtained from the Advisory Board's Crimson Continuum of Care national cohort and are based on All Patient Refined Diagnostic Related Groups (APR-DRG) methodology which uses age, severity of illness, and risk of mortality-based case matching.

## Results

Baseline inpatient mortality rate from April 2013–March 2015 was 2.08% (compared to the Crimson national cohort average of 1.79% and top quartile of 1.65%) (Figure 2). Baseline observed/expected mortality ratio was 1.04. The CSNP was initiated in April 2015 and mortality rates from April 2015–March 2017 fell to 1.56% (compared to Crimson average of 1.72% and top quartile of 1.69%). The observed/expected mortality ratio fell to 0.76 during this same period.

AHRQ SOPS data improved in the teamwork domain from a pre-baseline (2012) level of 78% to baseline (2015) of 81% to 83% after the intervention period (2017). This improvement represented movement from the lowest decile against the AHRQ benchmark in the 2012 survey to the 25<sup>th</sup> percentile at baseline in 2015 to the 50<sup>th</sup> percentile in the 2017 survey.

Process measures were used to ensure accountability and to develop ongoing learning and feedback systems. For example, unit-based nursing night leadership completed "end of evening" electronic data capture to verify the presence and participation of the rounding intern/resident in the evening. Since the launch of the program a total of 2,640 opportunities were present for intern/nursing staff proactive rounding on WATCHER patients. A total of 1,920 interactions occurred for a rate of 72.7%.

A total of 41 critical events that occurred at night (codes, RRT activation) in patients that were not proactively identified as watchers were analyzed by the primary teams using the structured reflection form (this process commenced in October 2016). Twelve of the 16 teams that cover the general medicine patients completed at least one reflection form for these patients, thus demonstrating feasibility of this approach. Of the 41 patients, 1

patient had a cardiac arrest, 28 had unplanned transfers to a higher level of care, and 12 had RRTs but remained in the room. Many insights were had on the part of the day teams. A few examples of learnings and reflections included the need for earlier consultation of specialists, more attention to changes in daytime vital signs, need for more aggressive medical management, different triage decisions regarding level of care from emergency trauma center, and more aggressive use of blood products.

A convenience sample of 105 staff members was surveyed using an electronic survey capture tool. The majority of the survey respondents were nurses and intern/resident physicians (82.8%) (Figure 3). As indicated by the survey results (Table 1) the overall program was extremely well received. The 9:30 p.m. interdisciplinary huddle was shown to be positive in improving situational awareness (67% somewhat or completely agreed) and in allowing the development

of appropriate action planning for risk mitigation. (66.9% somewhat or completely agreed.)

Through its use of structured process and standard language the CSNP has dramatically improved the organization's ability to be proactive in identifying risk; 67.6% somewhat or completely agreed that it helped reduce risks for unanticipated clinical decline and 84.7% somewhat or completely agreed the watcher created clarity and focus for priority setting (Table 1). The CSNP has led to improved interactions (72.4% somewhat or completely agreed) and collaboration and communication between disciplines at night (71.4% somewhat or completely agreed), while simultaneously impacting efficiencies (52.3% somewhat or completely agreed) and "joy at work" (37.2% somewhat or completely agreed) (Table 1).

Figure 2. Mortality data for Abington Hospital before (April 2013–March 2015) and after (April 2015–March 2017) the initiation of the Create a Safe Night Program

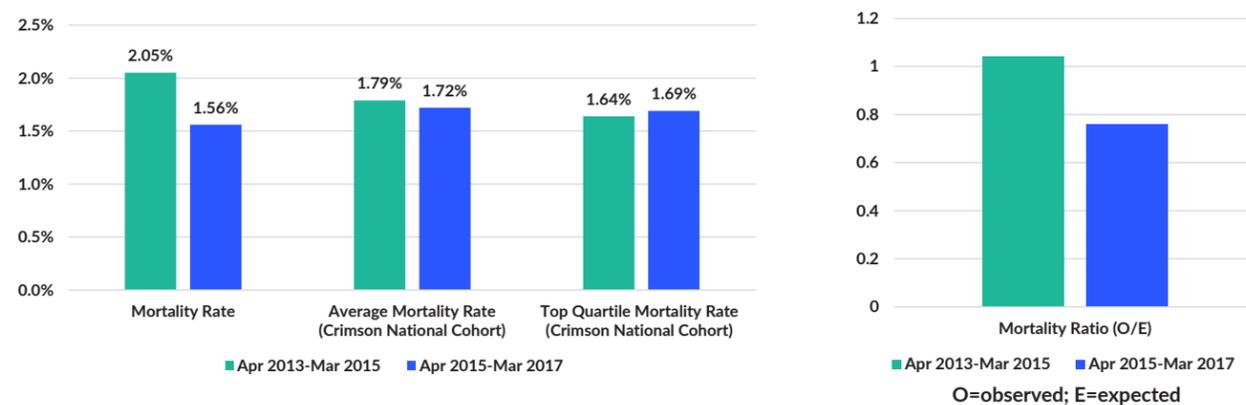


Figure 3. Clinical Role of Survey Respondents (N=105)

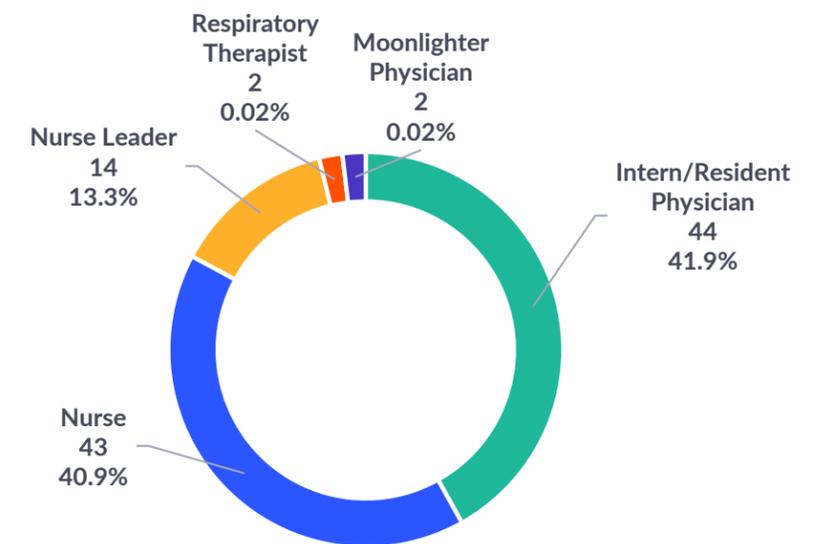


Table 1. Create a Safe Night Program (CSNP) Post-Intervention Survey Results

Survey Question	Completely Disagree (N/%)	Somewhat Disagree (N/%)	Neutral (N/%)	Somewhat Agree (N/%)	Completely Agree (N/%)	Not Applicable (N/%)
The 9:30 p.m. huddle in the flow center was useful in creating situational awareness of risk at the unit and organizational level	6/88 (6.8)	3/88 (3.4)	20/88 (22.7)	24/88 (27.3)	35/88 (39.8)	17 (Did not participate)
The 9:30 p.m. huddle helped the organization prioritize the application of resources in the evening to mitigate the risk of patient decline	4/88 (4.5)	5/88 (5.6)	19/88 (21.5)	35/88 (39.7)	25/88 (28.42)	17 (Did not participate)
The CSNP has been helpful in reducing risks for unanticipated clinical decline (codes, upgrades to critical care, etc.) for our patients	6 (5.7)	7 (6.7)	21 (20.0)	39 (37.1)	32 (30.5)	
The use of the word “watcher” created clarity and focus for priority setting that was easily recognizable across disciplines	1 (1.0)	4 (3.8)	11 (10.5)	31 (29.5)	58 (55.2)	
The CSNP has been helpful to foster positive interdisciplinary team-based interactions	5 (4.8)	7 (6.7)	17 (16.2)	38 (36.2)	38 (36.2)	
The CSNP has improved communication between the disciplines at night	8 (7.6)	7 (6.7)	15 (14.3)	41 (39.0)	34 (32.4)	
The CSNP has been helpful to create order and structure thereby reducing overall work burden. (i.e., it improved our ability to get the job done efficiently)	11 (10.5)	13 (12.4)	26 (24.8)	37 (35.2)	18 (17.1)	
The CSNP has allowed me to feel better about my role at night and has improved my “joy at work”	15 (14.3)	11 (10.5)	40 (38.1)	28 (26.7)	11 (10.5)	

## Discussion

We believe that the CSNP has contributed to patient safety, enhanced our culture, and possibly improved joy of work for involved staff. Acknowledged, however, is the fact that the intervention took place in a non-static environment with concurrent staff turnover and other improvement activities. Hence a direct causal link between the CSNP and the outcomes presented and studied cannot be scientifically proven without a randomized control trial of hospitals.

Given the face validity of the results and the fact that interventions naturally are born from and are aligned to safety and high-reliability science, the program has merit to be replicated at other facilities. The initiative can be replicated in other facilities given its ability to be modified to any hospital's structures. The program simply needs to have a coordinated approach between physicians who cover patients during the evening and their nursing counterparts. While physician staff in our initiative took

the form of interns in training and moonlighters, other facilities can vary the program dependent on their coverage model (e.g., fellows, nocturnists, hospitalists, intensivists, etc.). Nursing departments are all organized slightly differently but all have unit-based staff and leadership as well as a senior nurse who is operationally “in charge” in the evening. Other types of providers (e.g., respiratory technicians, pharmacists, laboratory professionals, etc.) can be brought in as necessary and able.

Sustainability of any new initiative or tactic is key for long-term improvement. The CSNP is likely to be sustainable given its positive impact on teamwork, culture, and efficiency. Considering the staff's support of the structural and process changes that have occurred, the fabric and culture of the institution at night has been altered—these processes are the new normal and the new “habit” of the evening. Should drift occur, frontline staff will likely demand its return. Additionally, this initiative is highly likely to be sustained, given the integration of the process into other core daily activities where a high degree of accountability exists. These include structured and supervised physician sign-outs, hospitalwide safety calls during the day where patients are now also being discussed, as well as the aforementioned ability to collect real-time performance data that can be fed back to leadership should drift emerge.

Our study demonstrated that 37.2% of providers experienced more joy at work through this initiative. With burnout rates of healthcare providers climbing year over year, any intervention that may increase joy at work should be critically evaluated and supported.

Many lessons have been learned through this project. Through the lens of the reliability framework we needed to carefully follow the formula of: 1) set expectations, 2) educate, and only then, 3) hold accountable. We found that we needed to be very clear regarding the expectations. Expectations of standard work needed to be distributed repeatedly and regularly in writing to staff that rotated at night. For staff that may be present for only a few shifts a month, just-in-time teaching was developed. Moonlighters who may work only a few sessions a month and interns who rotated on weekly schedules benefited from this just-in-time

approach. This degree of coordinated expectation setting required tremendous support from leadership from each discipline. The establishment of electronic feedback loops back to leadership was developed early on to ensure all parties were aware of drift.

Technology will continue to evolve and predictive tools (e.g., MEWS) will improve over time. The CSNP creates the cultural and structural foundation to manage and mitigate risk before events occur. At the end of the day, technology is important, but people working collaboratively in teams are necessary to achieve the outcomes our patients deserve.

## Conclusion

An interprofessional approach to high-quality transitions in care, risk identification, and mitigation, along with structured huddles and proactive rounding, can improve patient safety at night while simultaneously improving staff satisfaction, joy, and safety culture. This approach is possible without the application of additional resources and may be replicable at most hospitals.

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