

# **POKE-R: Using Analytics to Reduce Patient Harm**

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## **What will the attendee be able to do after being in your session?**

The attendee will be able to understand the value of reducing patient “pokes” and how to use analytics to achieve this improved outcome.

## **Description of the Problem or Gap**

Every time a patient’s skin is broken, the opportunity increases for hospital-acquired infections. Every time blood is drawn the potential for anemia is increased. Each time a radiology imaging study is performed, the patient is exposed to radiation. There is significant literature demonstrating the harmful effects of all of these events on the patient’s health.<sup>4 5 6</sup> Many of these events are not clinically necessary and increase costs while reducing patient outcomes. This is especially true for pediatric patients.

This problem and proposal is first described by Dixie Regional Medical Center<sup>1</sup>. We have used analytics in conjunction with structured rounding to implement the proposed process, and have added radiology to the types of events considered.

## **Methods**

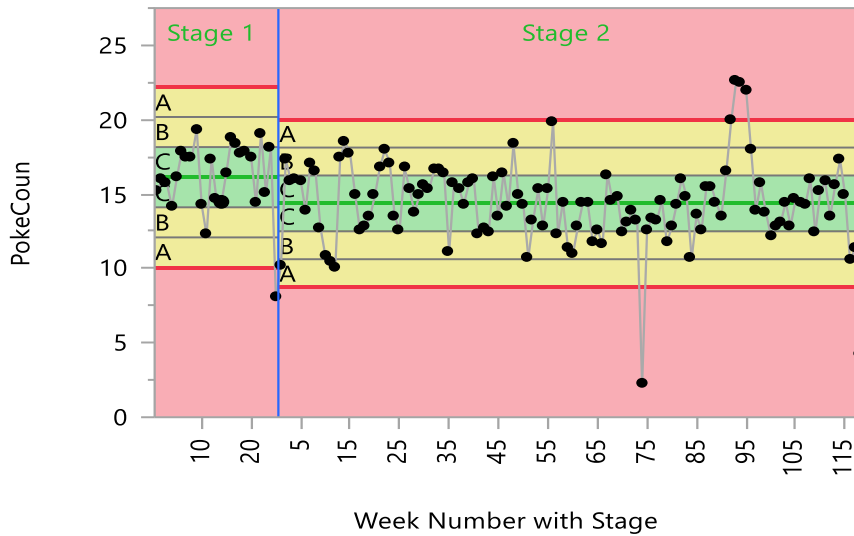
We have defined “pokes” as specimen collections, medication administrations, lines, drains, airways, surgeries, radiology images and invasive procedures. We have created a configuration tool to allow the clinician to specify which MAR routes, specimen types and procedure order types are pokes. For example, a medication given orally is not a poke, but one given by syringe is. We also classify pokes as painful vs non-painful as one of our goals is to reduce patient pain. We then use our enterprise data warehouse to build a fact table based on this configuration, and we build reports on this fact table which links to our order fact table and to our provider, patient and encounter dimensions to provide additional information and filtering options.

We first collected this data and created a report used specifically in the pediatric intensive care unit (PICU) for daily structured rounding. The report shows the number of POKE-R events for this patient for the past 1, 3 and 7 days and the number scheduled for today. Each patient has an individual report. The goal is to allow the clinicians to examine the various orders and cancel redundant or unnecessary orders during the morning structured rounds implemented in our PICU. We use a separate trend report to analyze how providers are performing and if the project is working.

As an extension of this project, we have now inserted the POKE-R information for yesterday and the scheduled POKE-R events for today into the patient’s chart in the EMR. We also link the chart to an interactive dashboard. We are rolling the process out to other units one-at-a-time, starting with critical care units.

## **Results**

For just our PICU implementation, we compared patients prior to the project with patients after the project went live (3,544 PICU patients) and we demonstrated a reduction in POKE-R events of 14.2% with  $p < 0.001$ . We also specifically targeted specific types of orders and achieved reduction of 26.3% in metabolic panels, 47.9% in blood gases, and 49.8% in kidney ureter and bladder x-rays, 12% in medications, and 30% in point-of-care labs. Analysis of secondary outcomes revealed a decrease in basic metabolic panels (BMP) for patients with status asthmaticus (1.7 to 1.2 per patient per day, ( $p < 0.0001$ ), while serum potassium checks increased, and in patients with hypo/hypernatremia, a decrease from 2.1 to 1.7 per patient per day, ( $p < 0.0001$ ), with an increase in serum sodium checks. There was also a decrease in complete blood counts (CBC) from 16.5 per week to 12.7 ( $p < 0.004$ ), complete metabolic panels (CMP) from 6.7 to 5.2 ( $p < 0.05$ ), chest x-rays (CXR) from 39.5 to 32.3 ( $p < 0.002$ ), and abdominal X-rays from 8.2 to 5.5 ( $p < 0.004$ ). For intubated patients, the blood gases decreased from 71.6 to 44.8 ( $p < 0.0001$ ) and the CXRs from 19.4 to 14.4 ( $p < 0.003$ ). We worked with our decision support department to analyze reduction by order type and the associated costs and were able to demonstrate \$11.05 million in direct savings by reduced utilization over a 5 year period for just our PICU. This does not even count potential savings from reduction in length of stay, readmissions and hospital-acquired infections. Figure 1 shows the control chart for overall pokes.<sup>3</sup> Table 1 shows the projected cost savings for specific categories.



**Figure 1.** Control Chart for Overall POKE-R events

**Table 1.** Cost savings by category

POKE-R type	Cost Savings (5 year)
BMP	\$3,082,600
CBC	\$534,720
CMP	\$452,160
Blood Gas	\$1,362,630
Chest X-Ray	\$5,625,975

## Conclusion

Our project has been a strong success in the PICU with statistically significant reduction in pokes and dramatic cost savings. We have now made the data more readily accessible by importing it into the patient's chart and we are rolling it out throughout the hospital. We expect that we will see similar improvements in each unit as we expand.

## References

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