BACKGROUND
Adequate analgesia of the newborn undergoing surgery, or the lack thereof, has been a recent topic in the lay press. Despite clear data on the medical benefit of pain control in neonates having surgery, including improved survival, decreased stress responses, and decreased protein catabolism, many are receiving inadequate doses of opioids during bedside surgery. Our large tertiary care center conducted an extensive literature search and concluded that a minimum of 10 mcg/kg of fentanyl should be administered during neonatal intensive care unit bedside surgeries conducted under total intravenous anesthesia. A quality improvement project was initiated to evaluate compliance with departmental guidelines and assess improvement with various interventions.

METHODS
Data from all neonatal intensive care unit bedside cases from January 2012 – November 2016 was retrospectively collected from intraoperative records from our EPIC electronic medical record (Epic Systems, Verona, WI, USA). Primary variables collected included patient birth date, date of surgery, patient weight at time of surgery, type of procedure, and total bolus doses of narcotics (fentanyl, morphine, midazolam). Secondary variables included doses of narcotic infusions (fentanyl, morphine, midazolam) and presence of vasoactive infusions. Total bolus doses of morphine were converted to fentanyl equivalents according to published conversion tables. Data was plotted on a run chart (Figure 1), with annotations of interventions made, including lecture based educational session, electronic educational module, departmental sharing of the data via publicly displayed poster, and rapid peer feedback from the departmental Quality Improvement Committee when the standard of care was not met, and there was no clear justification.

RESULTS
From January 2012 to November 2016, an average of 65% of patients received the department stated standard of care of a minimum of 10 mcg/kg of fentanyl during neonatal intensive care unit bedside surgery. In March 2016 a 45 minute departmental educational session was conducted regarding the benefits of adequate surgical analgesia during bedside surgery. After the educational session, 87% of patients who were cared for by attending anesthesiologists that attended the educational session, received the predefined departmental standard of care of a minimum of 10 mcg/kg of fentanyl. On the other hand only 66% of patients who were cared for by an attending anesthesiologists that DID NOT attend the educational session, received the predefined departmental standard of care of a minimum of 10 mcg/kg of fentanyl. The relative risk of inadequate analgesia was 1.33 for the patients cared for by attending anesthesiologists that did not attend the educational session with an odds ratio of 3.7.

CONCLUSIONS
Attending an educational session on the benefits and departmental standard of care for surgical analgesia during NICU bedside surgery was strongly associated with improved compliance. Other interventions that will be evaluated include the effect of an online educational module, sharing the compliance with departmental standard by way of a dashboard, and peer feedback by means of the quality improvement committee.

REFERENCES