Background: Respiratory depression is a life-threatening complication of opioids that impacts clinical and economic outcomes [1]. This is the subject of a recent Sentinel Event Alert by the Joint Commission on the safe use of opioids [2]. Respiratory depression related to N/PCA and epidural opioids is a challenge to the provision of safe postoperative analgesia. Although a recent survey of pediatric pain practices noted eight deaths occurring over 5 years related to opioids [3], there is a brevity of literature addressing methods to reduce respiratory depression for pediatric pain services. We present our experience in reducing opioid-related oversedation in our 450 bed pediatric center.

Methods: A multidisciplinary improvement team consisting of a nurse, quality improvement consultant, pain physician and data analyst was constituted to collect and analyze data regarding opioid-related respiratory depression and implement changes to reduce events. An event is defined as a patient with a N/PCA or epidural rescued with naloxone due to oxygen desaturation, apnea, or unresponsive to tactile stimulation. An automated report is generated from any dispensing of naloxone from pharmacy. Reported events are investigated by staff interviews and review of the electronic medical record to determine if the event was actual oversedation, if it was preventable, and to identify risk factors. The systems-based approach involved root cause analysis and implementation of prevention strategies.

Results: The baseline rate of respiratory depression of inpatients receiving epidural or N/PCA opioids was 47 days between two consecutive events. Risk factors were identified and the following monitoring and therapeutic preventive practice changes were implemented: electronic order entry of PCA and epidural order sets, PCA smart pump technology, modified Ramsay sedation scores, admission of patients with significant risk factors postoperatively to the ICU, aggressive employment of ketorolac and acetaminophen, use of ketamine for patients with refractory pain or side effects, use of peripheral nerve blocks, and addition of evening pain nurse, and identification of patients at risk.

Conclusion: The systems approach reduced opioid-related respiratory depression from a baseline of 47 days to a current 176 days between events. Future improvements include trial of continuous nasal capnography and genotype based risk prediction.

References:
2. The Joint Commission 49(8), 1-6 (2012).