The Road to Implementing Smart Narcotic Pumps: Keeping Safe Patient Care in the Headlights

J. Foley, RN, BSN, MHA; M. Grzybinski, BSN, RN; K. Carnevale, MS, RN;
E. Carvelli, RN; David Mangan, PharmD, RPh; Bill Pyne; Patrick Thomas; Paul Anderson
Beth Israel Deaconess Medical Center, Boston, MA

The Problem

At Beth Israel Deaconess Medical Center, PCA and epidural pumps were end of life and did not provide smart technology.

As the institution prepared to transition to new pumps we:

- Established an interdisciplinary pump work group
- Reviewed patient safety reports for trends regarding PCA and Epidural errors
- Queried existing PCA and epidural medication orders sets and uncovered ordering variability
- Evaluated the different vendor pumps for medication library capabilities and ability to set clinician safety limits
- Identified pump user groups to participate in pump selection
- Determined best practice for medication library development and for patient care protocols

Team Goals

- Improve safety of narcotic administration via PCA and epidural pumps through the use of standardized drug libraries
- Standardized practice of narcotic prescribing and administration throughout the medical center
- Reduce the risk of adverse events associated with PCA and epidural narcotic administration
- Improve the ability of data retrieval for QA review
- Develop a sustainable multidisciplinary education process

What we implemented

General Practice Support

- Identified a potential medication safety issue with one pump capable of delivering both treatment modalities
  - › Decisions to designate a fleet of epidurals and a fleet of PCA's, both with different medication delivery reservoirs
- Conducted a human trial of PCA and epidural pumps on a designated inpatient unit
- Evaluated and updated current practice and policy at BIDMC to support practice
- Made changes to the pain assessment flow sheet to clearly define safe patient monitoring according to policy

Electronic Tools

- Queried POE data base to ascertain current narcotic use and ranges to build pump programming
- Updated POE ordering capabilities with standardized concentrations and dose limits
- Utilized LEAN methodology to distribute pumps throughout the medical center based on current use and availability

Comprehensive Education Plan

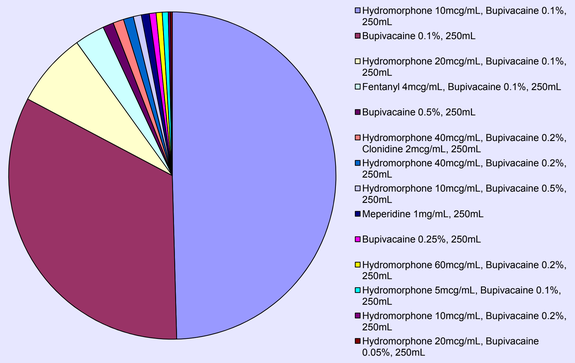
- Conducted multidisciplinary evaluation of the pump library for comprehensiveness and safety prior to house wide training
- Provided a comprehensive hospital-wide, hands on staff education program to all frontline users
- Provided on-line educational competency for ongoing support
- Incorporated content of new pump education into the yearly educational day mandatory for all staff

What we monitor

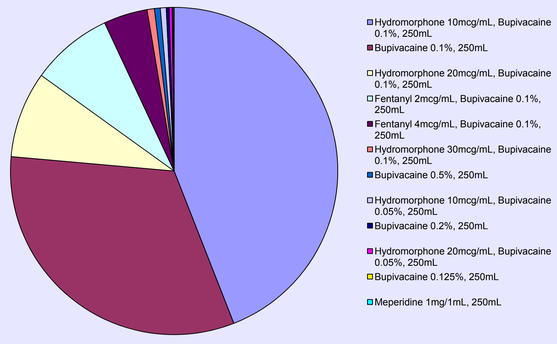
- Incident reports related to PCA and epidural pumps and narcotic administration
- Review of all Narcan removal and their relation to PCA and Epidural pumps
- Provider request for library additions

Narcotic Ordering Variability

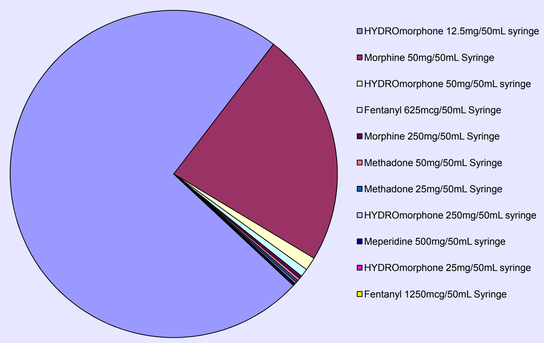
Epidural formulas ordered BEFORE Smart Pump Implementation



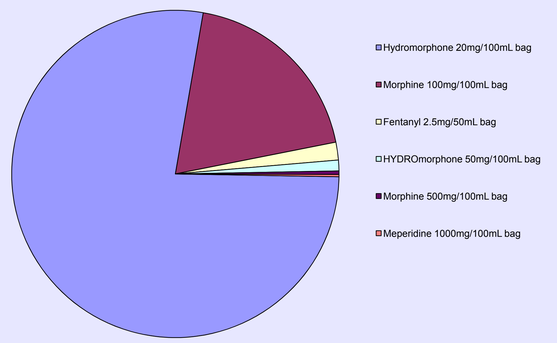
Epidural formulas ordered AFTER Smart Pump Implementation



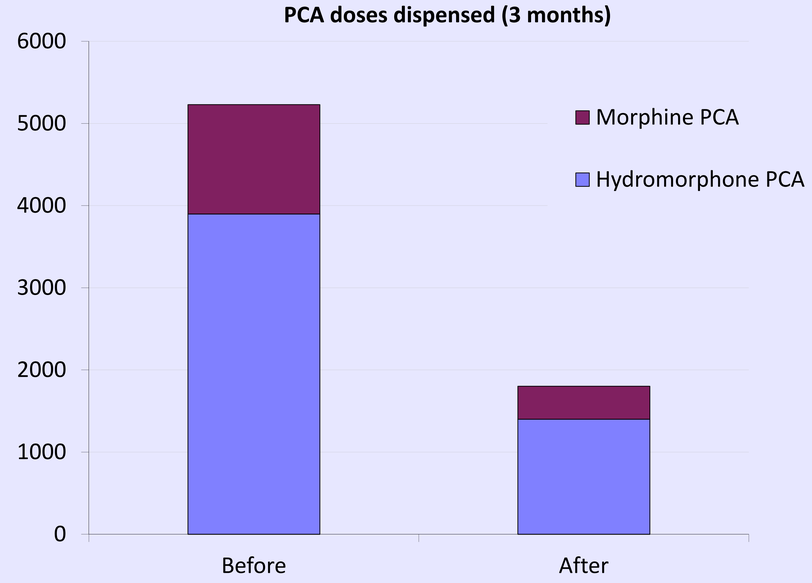
PCA orders placed BEFORE Smart Pump implementation



PCA formulas ordered AFTER Smart Pump implementation



PCA doses dispensed (3 months)



What we've learned

- A senior leadership champion is essential to mobilize resources, meet equipment needs, and guide the team with critical decisions
- Development of a standardized protocol requires collaboration of a number of disciplines
- Successful implementation depends on a comprehensive education plan
- Pump software allows for QA data collection making medication review process more robust
- Limitations in wireless technology for making changes and monitoring in correct programming
- This complex and well thought out process will provide a model for future purchasing for other medical devices in the medical center

For More Information, Contact:
Mary Grzybinski, BSN, RN, mary_grzybinski@bidmc.harvard.edu