



Improving the Safety of Pediatric Continuous Infusions*



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BACKGROUND

- Continuous drug infusions are used in Pediatric/Neonatal ICU's nationwide
- "Rule of Six" method is the most common method of ordering and compounding
- JCAHO requires institutions to utilize standardized drips and limit use of "rule of six".
- Often, "rule of six" orders are:
 - Illegible
 - Incomplete
 - Incorrect (due to improper selections or math errors)
 - Too concentrated to make
- Pharmacists spend extra time clarifying and correcting "rule of six" orders

OBJECTIVES

- To develop a simplified, yet comprehensive computerized solution to facilitate easy transition to the standard concentration method
- To improve the **efficiency** of ordering by:
 - limiting calls for order clarification
 - improving the speed of creating and checking an order
- To improve the **safety** of ordering by:
 - Prescribing Advice (min/max dose)
 - Encouraging use of manufactured infusions
 - Eliminating illegible or incomplete orders via computerization
 - Requiring prescriber double signature for higher than normal doses
 - Standardizing diluents

METHODS

- 2-4 standard concentrations were determined that would meet the needs of patients 0.5kg to 70kg
- Program was designed to select an "optimal" concentration based on patient's weight, dose entered, and fluid restrictions (5-10% maintenance)
- Program was implemented in the pediatric and neonatal intensive care unit
- Data was collected for the new ordering system to evaluate it's ability to limit order errors and improve efficiency



RESULTS

| Indicator | Handwritten Order N=200 | CPMOE Order PICU only N=200 | CPMOE Order NICU only N=200 | Statistical Significance |
|-------------------------------------------------------------------------------|----------------------------|-----------------------------------|-----------------------------------|--------------------------|
| Incomplete (missing weights, diluents, infusion dose, infusion concentration) | 81/200 (40.5%) | 0 | 0 | P<0.00005 |
| Calculation Error | 13/200 (6.5%) | 0 | 0 | P=0.0002 |
| Illegible | 2/200 (1%) | 0 | 0 | |
| Exceeds Maximum Drug Concentration | 2/200 (1%) | 0 | 0 | |
| Average time to generate a computerized order | N/A | 71 seconds | 52 seconds | |

KEY LESSONS LEARNED

- The program allows the generation of an order in a rapid and efficient manner
- There is improved medication safety through computerization
- New ordering system has provided a comprehensive yet simplified computerized solution for implementing standard concentrations

REPLICATION POTENTIAL

- The program was successful in diverse locations (NICU & PICU)
- Program has been in place for over 1 year with sustained benefits
- Program has been patented and licensed to allow other institutions to utilize our solution

FUTURE DIRECTIONS

- Program has the potential to be easily exported and rapidly implemented at other institutions
- Standardizing the process across institutions would provide an additional layer of safety in the use of continuous infusions

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