



Children. Our everything.

Clinical Decision Support & Alert Fatigue - Striking the Right Balance

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CHOC Children's

Introduction

- Clinical Decision Support

- Alert users when acting outside the norm or performing unsafe maneuvers
- Applications: CPOE, pharmacy computer system, smart pumps
 - Dose
 - Administration rate
 - Allergy
 - Drug-drug interactions
 - Therapeutic duplications

- Alert Fatigue

- Frequent non-clinically significant alerts leads to automatic overrides of all alerts by users
- Consequence: overlook clinically significant alerts

CPOE Clinical Decision Support

- Existing clinical decision support for pharmacy application
 - Dose
 - Allergy
 - Drug-drug interactions
 - Therapeutic duplications
- Flaws with existing clinical decision support
 - Dose
 - Utilized recommended dosing range from tertiary references
 - Alert when doses were slightly above limit due to rounding of doses
 - Drug-drug interactions
 - Alert for all levels of significance
 - Therapeutic duplications
 - Alert when therapeutic duplications were clinically indicated
 - Example: fentanyl ATC and PRN

CPOE Clinical Decision Support - Strategy

- Dose Range Checking (DRC)
 - Created 4 quartiles based on frequency of use & safety profile
 - Developed dose range checking database for 1st & 2nd quartiles
 - Built in buffer based on drug safety profile
- Drug-drug Interactions
 - Alert only for severe interactions
- Therapeutic duplications
 - Alert turned off for CPOE

CPOE Clinical Decision Support - CQI



- All overridden DRC alerts reviewed daily by a 2nd pharmacist
- DRC alerts retrospectively reviewed and analyzed
 - DRC evaluated if frequency >10%
 - DRC adjusted or alternative DRC strategy developed if clinically appropriate
- DRC of 10 targeted drugs adjusted resulted in 62% reduction of alerts

DRC CQI Results

Drugs	Alerts Before	Alerts After
Albumin	15/39 (38%)	13/79 (16%)
Ampicillin	13/119 (11%)	13/119 (11%)
Antithrombin III	10/10 (100%)	5/17 (29%)
Atropine	9/26 (35%)	1/20 (5%)
Cefazolin	14/82 (17%)	6/77 (8%)
Ciprofloxacin	12/21 (57%)	1/28 (4%)
Enoxaparin	9/17 (53%)	0/5 (0%)
Erythromycin	10/20 (50%)	7/22 (32%)
Lorazepam	21/129 (16%)	8/158 (5%)
Phenobarbital	17/43 (40%)	5/63 (8%)
Overall	130/506 (26%)	59/588 (10%)

Smart Pumps Clinical Decision Support



- CQI data downloaded and Guardrails data analyzed
- Six drugs constituted majority of alerts
- Guardrails rebuilt with new dosing strategies
- Guardrails change resulted in 81% reduction of non-clinically significant alerts for the 6 drugs

Smart Pumps CQI Results

Drugs	Alerts Before	Alerts After
Fentanyl	958	74
Fat Emulsion	192	69
Midazolam	633	182
Potassium chloride	793	222
TPN	394	174
Vancomycin	447	25

Smart Pumps Clinical Decision Support

- Guardrails rebuilt during software upgrade
 - Eliminate unnecessary alerts
 - Built in dosing buffer
 - Pediatric strategies for absolute rate/dosing limits
 - IV fluids
 - PCA
- Biannual review of Guardrails CQI data
 - Created “high dose” profile for select sedation medications
 - Continue to refine Guardrails

Striking the Right Balance ...

- Appropriate strategies when creating dataset
- Periodic review and analysis of alert-override data and adjust dataset accordingly
- Avoid using alerts as “knee-jerk” answers to all safety solutions
- Always balancing the need for alerts with the risk of alert fatigue

Thank you.