



How to Make PO the Way To Go: Using CPOE To Enforce Drug Use Guidelines

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Objectives

- Understand how Drug Use Guidelines can be enforced through Computerized Physician Order Entry (CPOE) systems



Background



- Yale-New Haven Hospital (YNHH) is a 944-bed tertiary care academic medical center
- Computerized Physician Order Entry (CPOE) implemented in 1992
 - June 2008 upgrade to Eclipsys Sunrise Pharmacy™ and Acute Care™

Background

- Chlorothiazide (Diuril®) IV was identified a top expenditure
 - Since August of 2005, the price of chlorothiazide (Diuril®) IV has increased by approximately 800%
- Currently no generic formulation of chlorothiazide (Diuril®) IV



Medication Use Evaluation (MUE)

- Retrospective
- All adult patients in a 2 month period
- Orders reviewed for:
 - Reason for use
 - Dose and duration
 - Diet orders and administration of significant oral medications



Results of MUE

- Total of 14 patients evaluated
- 11/14 (79%) had a regular diet order or were NPO & taking significant oral medications
- 48% of orders were for subtherapeutic doses
- Only 4/14 patients (28%) received oral thiazide prior to loop diuretic dose



Literature Evaluation

- No well controlled studies directly comparing IV to PO chlorothiazide
- Oral therapy preferred in several case studies due to:
 - Exceptional oral absorption
 - Fast onset
 - Long-lasting diuretic effects

Literature Evaluation

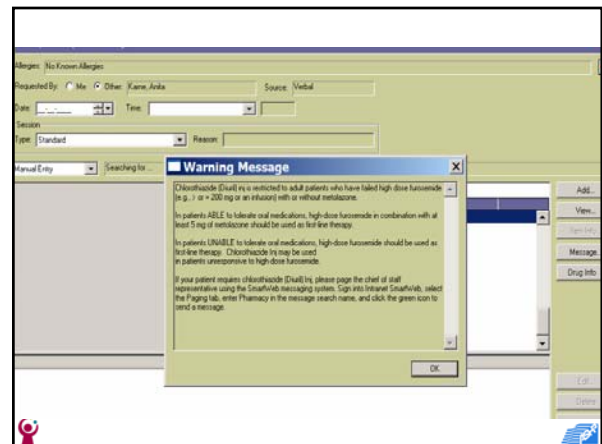
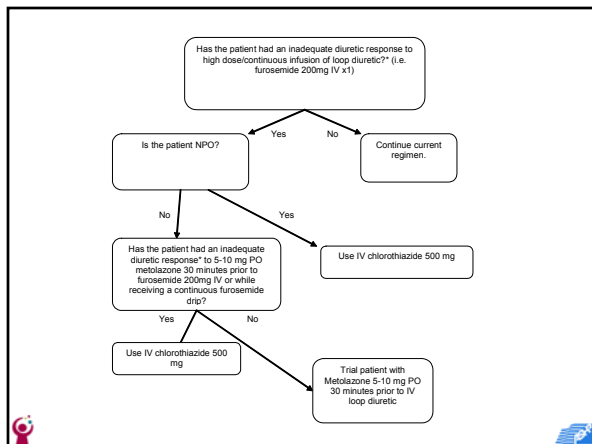
- The 2005 American College of Cardiology (ACC) and American Heart Association (AHA) recommend the use of combination diuretic therapy for the treatment of patients with diuretic resistance

Guidelines

- November 2009, the Pharmacy and Therapeutics (P&T) Committee approved Diuretic Resistance Treatment Guidelines
- Chlorothiazide IV restricted to:
 - Patients who are truly NPO
 - Patients with inadequate diuretic response to 5 mg PO metolazone 30 minutes prior to high dose IV loop diuretic

Incorporation into CPOE

- Created decision tree to account for all scenarios
- Created Medication Logic Module (MLM) to guide appropriate prescribing
 - Active on all patients ≥ 18
 - Prohibits use of chlorothiazide IV if all parameters are not met



Effectiveness of MLM

- MLM was implemented into CPOE system on April 12, 2009
- Fired 28 times from April 12th -August 14th
 - 16 times the prescriber chose alternative therapy
 - 12 times chlorothiazide IV was approved through our Non-Formulary Process



Reasons chlorothiazide IV approved

- Patient was NPO but diet order not updated
- Actually met criteria but MLM still fired
 - Currently MLM can not calculate cumulative doses
- Refractory to other diuretic attempts



Results

- YNH Chlorothiazide IV purchases
- AWP=\$349/vial
 - 10/1/07-8/30/08
 - 819 vials=\$285,831
 - 10/1/08-8/30/09
 - 493 vials=\$172,057
- Cost Savings: **\$113,774**



Next Steps

- Implement Diuretic Guidelines in Pediatrics
- Modify MLM to calculate cumulative furosemide doses
- Identify other drugs that an MLM can enforce drug use guidelines
 - Anti-emetics
 - Formulary conversions
 - Erythropoiesis-Stimulating Agents (ESAs)

