Appendix 2. BRIGHAM and WOMENS NSPF MEDMARX CPOE ERRORS PROJECT - CPOE ERRORS TAXONOMY

WHAT Happened

Patient

Meds ordered for wrong patient
Meds ordered on wrong patient account
Meds labeled for wrong patient
Meds administered to wrong patient
Same or similar patient names

Drug

Omitted drug
Drug not available in TPN template
Missing drug form
Ordered wrong drug
Look alike sound alike drug
Correct drug ordered/wrong drug processed
Ordered wrong formulation/dosage form
Ordered wrong PO formulation (ER, XR, etc.)
NDC Mismatch/wrong package size
Ordered wrong diluents (IV)
Allergy
Prescribed drug to white patient was allergic
No Allergy Assessment
Contraindicated
Duplicate Order
Same exact drug
Same drug different routes
Duplicate Therapy
Different drug same class
Ordered a drug that was non-formulary
Ordered a drug that was restricted
Ordered a drug that was out of stock/drug shortage
Ordered for a home medication
Non-existent medication

Dose

Ordered wrong dose or strength
Incorrect units used
Correct dose ordered/incorrect dose processed
Dose range order
Wrong concentration/volume
Unavailable dose ordered
Combinatory issues
Dose modification issue
Missing number/quantity or wrong number ordered
Missing dose on Rx
Under dose or potential under dose
Patient missed dose
Potential for missed dose(s)
Dose lower than ordered
Overdose or potential overdose
Patient given extra dose
Patient potential for extra dose
Dose higher than recommended
Prolonged infusion (e.g. extra dose for IV infusion)

Route
Missing route
Ordered wrong route for patient
Route-formulation mismatch
IV/PO issue

Time
Missing time/schedule information
No start date entered
No stop date entered
Wrong time selected
Wrong schedule entered
Correct schedule entered/incorrect schedule processed
Wrong order date
AM/PM Mix-up
Date/time mismatch
Frequency range order
Patient received delayed dose
Drug product expires before infusion finished
Drug product expires before prescribed amount finished
Confusion related to initial start time and continuation
ED order issues – scheduled vs. once or future
Wrong administration rate
No administration rate
Refill information missing or erroneous

Miscellaneous
Unable to enter desired order
Staff workload increase and/or order not processed or delayed
Order missed
Data loss
Order entered prior to admission
Order wasn’t renewed
Order not verified
Order was held
Hold order mismatched
Order was confusing: Order needed to be clarified
Order was confusion: Missing info/incomplete order
Order was confusing: Comments field has conflicting information
Routing issue
Missing or incorrect SIG/patient instructions
Nursing process/administration issues
Erroneous alert
Ordered wrong template /order set
Discontinuation issues
Verbal/Telephonic issues
Corollary order issues
IV flush issues
Controlled substance issues
No valid order
Administration/order label mismatch
Monitoring
   Order mismatch
   Failure to act on critical lab
   Inadequate monitoring
Order entered under incorrect MD
Ordered wrong non-drug product
Electronic order correct; hard copy ordered incorrectly
WHY it Happened

CPOE – Order Entry Issues

System interface/usability/visual display issues
  Pull-down menu issues
  SALA/LASA issues
  Instructions/meds in comment field were not seen
  Comments field or free text confusing/confusion
  Use of system or SIG abbreviations
  Computer dosing calculation issues
  Weight information not available/inaccurate
  Initial vs. continuing order issues
  Discontinuation order issues
  Hold orders
  Order/reorder modification issues
  Lack of transparency in duration/renewal status
  CDS failure/problem
  Order set/template/protocol issues
  Issues with favorites
  Patient information on screen after order was filed
  Visual display confusing or inadequate
  Transcription (copy/paste)

System limitations/inadequacy
  Drug formulary issues
  Build issues—route/drug not in CPOE
  Drug dictionary miscode/out-of-date drug information
  Inadequate field length
  Inability/problems in titrating/tapering
  Inability to enter alternate day dosing
  Error in default dose or schedule
  Default SIG or other default issues
  Scheduled drug routing issue
  Pharmacy routing issue
  Corollary orders: timing to properly linked
  Routing/mapping issue

Drug allergy issues
  Drug ordered as text, unable to check for allergy in text
  Failure to alert
  Drug allergy field limit
  Drug allergy incomplete/unclear/conflicting

Computer System Issues

Computer down/outage
  Hybrid system (electronic & paper)
  eMAR/MAR issues
  Multiple systems (2 or more electronic systems)
  Pharmacy order entry problems/issues
Profiling issues—failure to perform or do correctly
TPN issues

Transition Issues
Medication reconciliation issue
Home medication issue
Patient transferred (within hospital)
Patient discharged (out of hospital)
Transferred from outside hospital

User Issues
Communication issues
2 different clinicians entered
Misinterpretation of order(s)
Lack of computer training/system knowledge
Inexperienced end user
Failure to verify patient identification
Failure to follow established procedures or protocol
Lack of protocol knowledge
Calculation error
Lack of clinical knowledge
Alert ignored/overridden
Typing error
Nursing administration

Miscellaneous/Patient Issues

Insurance Issues

Patient Access Issues

Inaccurate/Inadequate Patient Drug Knowledge

Administrative Issue/Delay
Possible PREVENTION Strategies

Clinical Decision Support (CDS) Enhancements
Ordering facilitators/alerts

ALLERGY
- Drug allergy checking (including class)
- Standardized SIGs

DUPLICATE
- Duplicate order checking/support
- Duplicate therapy checking/support

DOSING SUPPORT
- Dose availability checking
- Default dosing selections
- Dose range checking
  - Individual dosing calculations
- Auto-calculations for combinatory and other complex dosing regimens
- Dose conversion support
- Titration/dose change – better system for entering/conveying
- Scheduling feedback

DURATION SUPPORT
- Drug duration support
  - Drug expiration support
  - Reminders about automatic stop dates/need for re-order drug
- Route/mix/diluent

DDI
- Drug-drug interaction checking

COMPATIBILITY
- Route formulation checking (eye drops, ear)
- Patient access route guidance
- IV mix support (IV compatibility, how to mix)
- Enhanced ability to modify orders and regimens (tapers)
- Auto calculation for prescription quantities
- System for reconciling new/now with continuing dosing

FORMULARY
- Formulary status and restrictions warnings
- Alerts for non-formulary medications
- Generic substitution

DRUG LAB
- Drug-laboratory linking checking
- Automatic corollary lab orders

DRUG DISEASE STATE
- Drug-disease alerting
Pregnancy alerting

MISCELLANEOUS WORK FLOW DESIGN FACILITATORS
Order set support
Protocol support
Automatic corollary products/supplies
Blank field checking

Alert Tiering Enhancements
Hard stops
Tiered alerts with hard stops when necessary

Management Support (Policies/Infrastructure/Standards)
Order set QA testing/updates
Standardize product formulation naming
Standardized constructs for dosing regimens
Standardized constructs for dose form-route
Comment field display
Communication related to hold orders
Systems integration
Electronic transmission of Rx
Remove option to e-scribe federally controlled substances
Staff authorization issues
Improved downtime procedures
Improved patient registration workflow/logistics
Operationalize TPN and IV queues
Tie into internal scheduling
Direct order entry: Verbal/Telephonic issues
Medication handoff/transfer standardization

Enhanced Education/Training
Standardized SIGs
Standardized weights (only in kilograms)
Enhanced allergy entry for drugs not included in allergy list

Improved Design/Functionality
Reminders for Staff
Facilitation of products selection by pharmacists instead of MD
Unlimited number of medication allergies
Include a picture of the patient on the ordering screen
Indication on prescription
Include time in pick list (actual time)
Patient location support
Patient route access availability: IV access NPO
Provide links to clinical references
Tallman lettering
Order set/sentences for complex tapers
Order set/sentences for range orders
Weight-based dosing
Medication reconciliation support

Other CPOE & System Enhancements
- Indication on prescription (standardized SIG)
- Mapping standards
- Direct order entry: Verbal/Telephonic issues
- Direct order entry and transmission of controlled substances
- DEA direct order entry

Drug Database Improvements/Enhancements

Other Pharmacist Interventions