Innovations in Chemotherapy Preparation Safety: Telepharmacy and Barcode Technology

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TOGETHER WE MAKE A GREAT TEAM

Objectives

- Understand the potential benefits of telepharmacy and barcode verification when added to the chemotherapy preparation process
- Understand barriers to successful implementation of telepharmacy and bar-coding systems
- Demonstrate capabilities of telepharmacy systems that can be applied to improve medication preparation in other healthcare settings

The University of Kansas Hospital

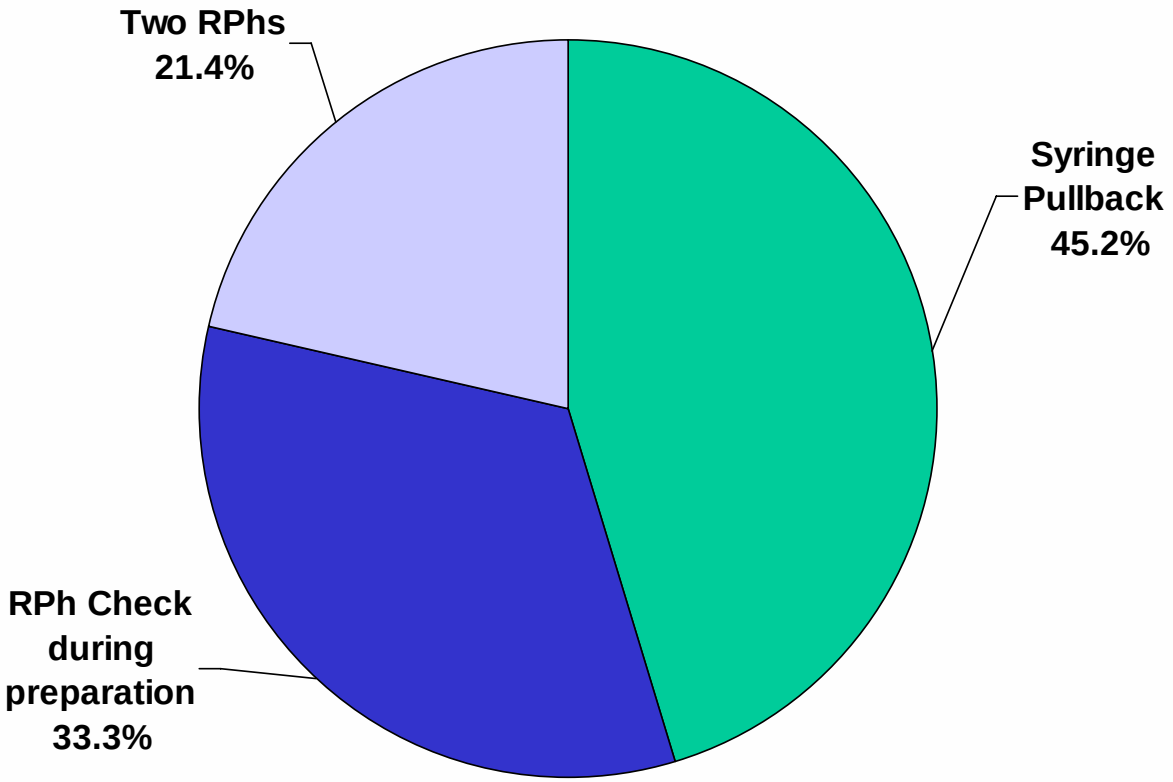
- Kansas City, Kansas
- Level I Trauma Center
- Magnet designation
- 22,430 admissions in FY08
- Average daily census of 354
- 25-30 parenteral chemotherapy doses per day for inpatients

Common Practices for Chemotherapy Preparation and Pharmacist Checking

- **Syringe pull-back method**
  - **Technician prepares chemo, then pulls back syringe to indicate volume of drug injected into secondary container**
- **Pharmacist check during preparation**
  - **Technician prepares chemo, then summons a pharmacist to inspect syringes prior to injection into secondary container**
- **Pharmacist preparation**
  - **One pharmacist prepares chemo, then a second pharmacist checks the final product**

Checking Practice Prevalence

- **2007 survey of academic medical centers (n=42)**



O'Neal BC. Preparation of chemotherapy for inpatients. Email survey of University Health System Consortium membership. 2007.

Telepharmacy

- **Use of digital images or video to inspect medications from a remote location**

Goals of Project

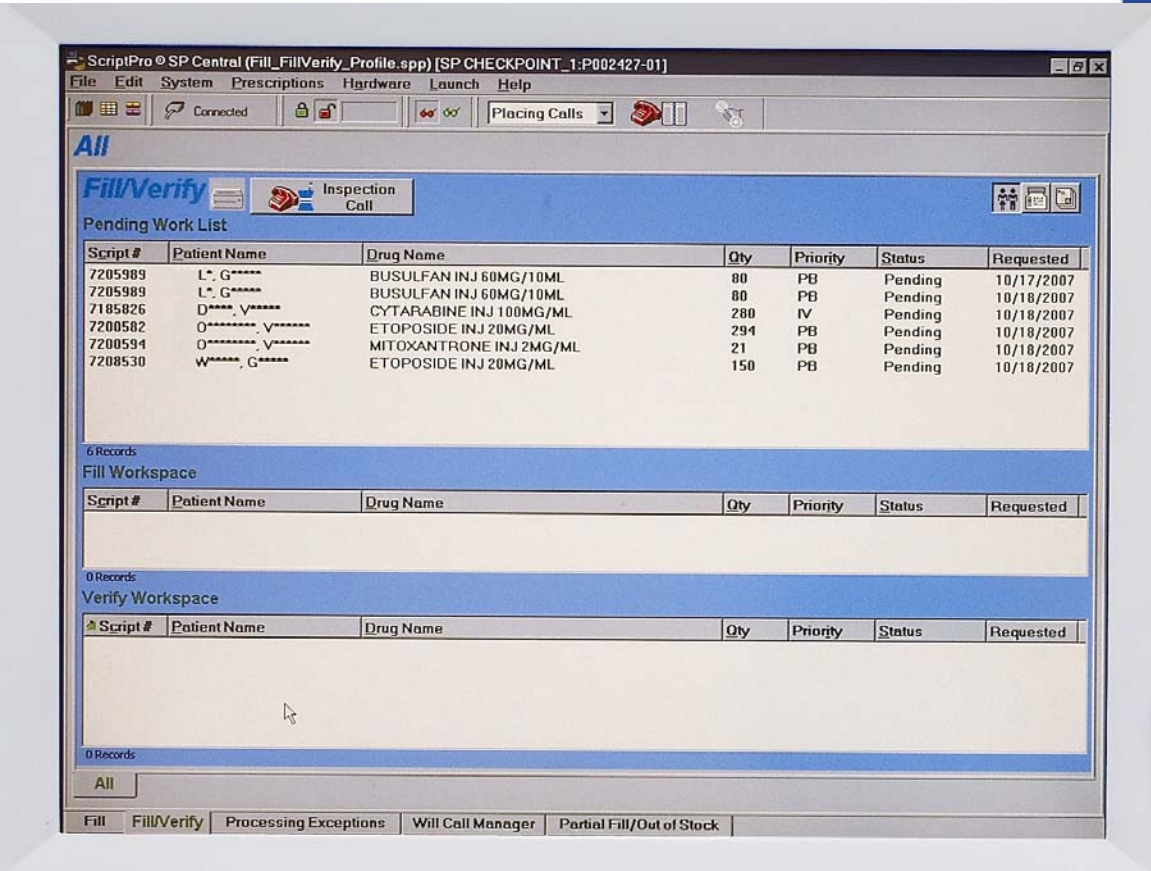
- Use telepharmacy to increase the presence of the pharmacist at a critical risk point during the preparation process
- Incorporate barcode technology to reduce risk of selecting the incorrect drug
- Improve readability of small pitch font chemo vials
- Reduce potential for surface contamination and employee exposure to chemotherapy

Proposed Workflow

- **Step 1**
  - Pharmacist checks chemotherapy medication vials against the work label as the first check to ensure that the correct medication was selected

Proposed Workflow

- **Step 2**
  - Technician takes the product into the chemo prep area and selects the appropriate patient from the Pending Work List on the check station



Proposed Workflow

- **Step 3**
  - Technician scans the barcode on the vial to match the selected product to the NDC of the ordered medication

Proposed Workflow

- **Step 4**
  - Technician takes a picture of the work label, vials, diluent, fluids to be used, and the syringe (prior to injection in the bag) along with the final product

Proposed Workflow

- **Step 5**
  - Pharmacist views these pictures from a check station in the ante room while checking the finished product

Implementation Timeline

- **Present concept to telepharmacy vendor (ScriptPro) – *March 2007***
- **Interface and workflow planning – *April 2007***
- **Addition of chemo drugs to database – *May 2007***
- **Installation of hardware and user training– *June 2007***
- **System go-live – *July 2007***

Interface Development

- Use of printer intercept interface
  - Needed for capture of chemotherapeutic orders as they passed from pharmacy information system to IV room printer
  - Allowed technician to tie digital images to a specific patient and medication order
  - Device was configured so that it would identify and capture orders containing the word CYTOTOXIC on the top line
  - Once captured by the interface device, the drug name and concentration would match up with list of NDCs in the vendor database, allowing for barcode verification

Other System Features

- Archiving of digital images
  - Allows for retrieval of lot number data and verification of past dispensing practices
- Live audio and video communication via webcam
- Reporting capabilities
  - Date and time stamping of system activities can be used for turnaround time assessment and performance improvement

Implementation Obstacles

- Multi-ingredient preparations
- Barcode scanner limited to linear barcodes
- Acceptance of telepharmacy by State Board of Pharmacy
- USP 797 compliance assessment
  - Biological safety cabinet passed certification for ISO Class 5 with inspection camera in place
  - Camera is removable and cleanable
  - Airflow visualization and particle test

Post-Implementation Experience

- **Data collection period – *Jul 2007***
  - **Use of telepharmacy system for chemo preparation resulted in intervention in 1.1% of doses (4 of 363)**
- **Easy to use**
  - **Less than 50 seconds of technician time per dose**
- **Ongoing maintenance**
  - **Requires addition of new drugs and NDCs to database**
- **Expansion to ambulatory cancer center – *Nov 2008***

Future Uses of Telepharmacy

- Remote checking of admixtures in rural and underserved areas
- Pharmacist checking of neonatal syringes
- Hardware and software can be modified to track doses throughout the medication distribution process, from admixture through delivery

Summary

- System benefits
  - Barcode verification to ensure that the correct drug is selected
  - Pharmacist is able to visually inspect the syringe, containing chemotherapy and/or diluent, before injection into secondary container
  - Small pitch font can be digitally enlarged for easier readability
  - Contaminated syringes and vials can be disposed of in the chemo preparation area