

Wireless Refrigerator Temperature Monitoring Systems

Peggy Bickham, PharmD

No conflicts of interest.

How Many Have Had Any of the Following Experiences?

- Discovered the next morning that a med refrigerator door was left open all night.
- Discovered on Monday morning that a med refrigerator door was left open all weekend.
- Thrown away meds (and money) following an extended period of out-of-range storage (see above).
- Scrambled to “fill in the blanks” on those refrigerator monitoring documentation logs when the Joint Commission walks in the door for an unannounced survey.

More “Have You Ever’s”

- Recreated an entire month’s documentation sheet that went missing prior to a JC survey (a truly prodigious feat of memory).
- Received an RFI for a refrigerator temperature monitoring issue during a JC survey.
- Found refrigerator log forms on which out-of-range temperatures were faithfully documented but no action taken (“Is that what that grey zone meant?”)
- Investigational Drug Service needed to provide an adequate level of temperature monitoring to meet requirements of study monitor.

Wireless Temperature Monitoring Systems

- Consist of hardware, monitoring software, and PC or server
- Refrigerator probe wired to RF transmitter
- Repeater to boost signal to receiver
- Receiver connected to hospital computer system
- Computer system stores data, triggers alerts, provides reports

Hardware

- Air probes versus glycol probes (simulates product)
- Transmitter attached to each probe
- Signal repeaters (RF range extenders) required in multi-floor, extended range, or other areas of interference
- Receivers (base stations)
- Server / PC

Software

- Remote support capability
- Adequate data storage
- Memory buffering
- Alert or notification of hardware malfunction such as lost transmission, low battery charge
- Adequate report capability
- Accessible from one PC or through hospital network

Temperature Excursion Alerts

- Alert capability with customizable escalation options
- Alert notification options: alpha-pages, email, cell phone text, computer pop-ups
- Intervention documentation capability
- Report capability for quality assurance purposes

Shopping For a System

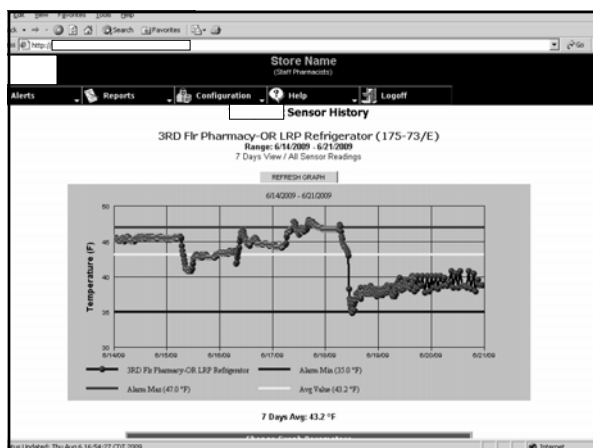
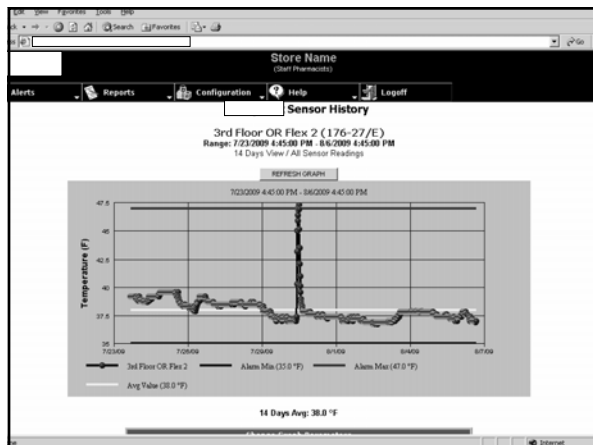
- Multiple vendors
 - Broad price range
 - Variability in features
 - Technical support and training
 - Service contracts
- Include your IT department, facilities, and biomedical engineering in evaluating systems

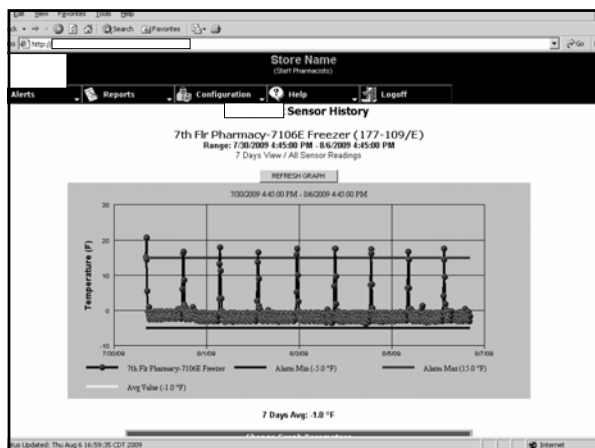
Policy and Procedure Issues

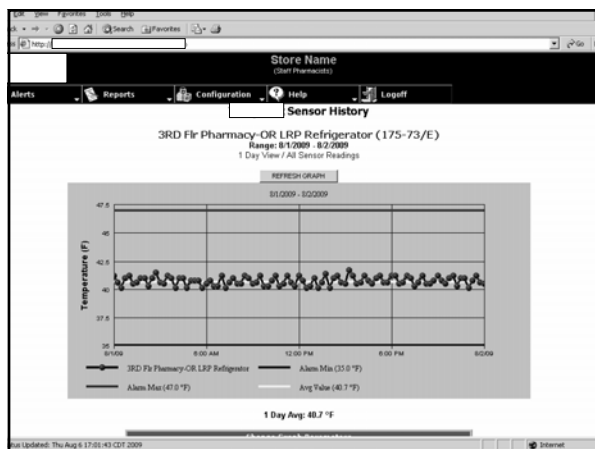
- Description of process – screen shots help!
- Assign responsibility for response to alerts
 - Normal business hours
 - After hours
- Stepwise directions for responding to alerts and troubleshooting causes
- Escalation of alerts if response does not occur
- Clearing of alerts and documentation of action taken

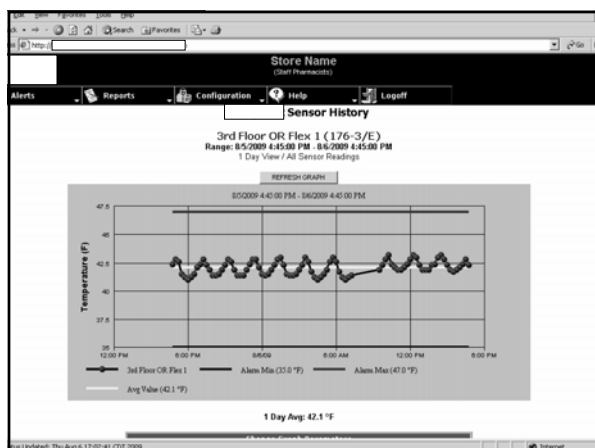
Other Considerations

- Variable refrigerator quality
- Remote access to system versus in-house access only
- Modes of alert notification
- Training and education process
- Monitor alert responses and trouble-shoot the troubleshooting process









Store Name (Staff Pharmacists)									
Alerts									
<div>Reports</div> <div>Configuration</div> <div>Help</div> <div>Logout</div>									
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 12:30:00 AM	29.0 °F	25.0 to 47.0 °F	Adjusted temperature settings valerie polon	6/23/2009 12:30:56 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 12:45:00 AM	29.6 °F	25.0 to 47.0 °F	Adjusted temperature settings valerie polon...temp was ok when i went upstairs...don't know why it keeps telling me this	6/23/2009 12:53:34 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 1:00:00 AM	29.8 °F	25.0 to 47.0 °F	Adjusted temperature settings valerie polon...it is not out of range when i go up there	6/23/2009 1:06:08 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 1:15:00 AM	31.6 °F	25.0 to 47.0 °F	Adjusted temperature settings valerie polon	6/23/2009 1:36:13 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 1:45:00 AM	34.3 °F	25.0 to 47.0 °F	Adjusted temperature settings valerie polon	6/23/2009 1:45:46 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 6:45:00 AM	30.0 °F	25.0 to 47.0 °F	Adjusted temperature settings valerie polon	6/23/2009 8:47:30 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 7:00:00 AM	31.3 °F	25.0 to 47.0 °F	veronica to adjust temp setting AGAIN! below	6/23/2009 7:25:25 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 7:30:00 AM	34.0 °F	25.0 to 47.0 °F	have adjusted slowly getting better. thalove	6/23/2009 7:47:40 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 2 (176-2/E)	6/23/2009 10:30:00 AM	50.0 °F	50.0 to 57.0 °F	Room temp antiseptic bags had been restocked (removed from fridge. J. Bockman)	6/23/2009 11:36:00 AM	Admin User		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 9:45:00 AM	29.1 °F	25.0 to 47.0 °F	Adjusted temperature settings Michael Gerdzok	6/23/2009 10:02:07 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 10:00:00 AM	27.9 °F	25.0 to 47.0 °F	Adjusted temperature settings Michael Gerdzok	6/23/2009 10:07:33 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 10:15:00 AM	26.8 °F	25.0 to 47.0 °F	Adjusted temperature settings Michael Gerdzok	6/23/2009 10:29:05 AM	Staff Pharmacist		
Sensor	3rd Floor OR Flex 1 (176-3/E)	6/23/2009 10:30:00 AM	24.4 °F	25.0 to 47.0 °F	Adjusted temperature settings Michael Gerdzok	6/23/2009 11:01:47 AM	Staff Pharmacist		

Troubleshooting Tips

- Actually read the alert message and tweak the correct refrigerator
- Be careful when restocking room temp items to a small refrigerator
- Do not overstock refrigerator and block airflow to probe
- Probe must be positioned properly so that it is immersed in glycol
- Do not over-correct temperature settings

References

1. McGregory ME. Wireless refrigerator temperature monitoring systems: because you have other things to worry about. Pharmacy Purchasing and Products. March 2006. <http://www.pppmag.com/pp-p-march-2006-articles/wireless-refrigerator-temperature-monitoring-sys.html> Accessed 8/4/09.
2. McGregory ME. Wireless temperature monitoring systems; selection, implementation, and quality assurance. Pharmacy Purchasing and Products. June 2007. http://www.pppmag.com/documents/V4N6/p20_22_24_25.pdf Accessed 8/6/09.
3. Foster J, Stutzman M, Lutz P, et al. Adoption of wireless temperature monitoring systems on the rise. Pharmacy Purchasing and Products. Sept 2008. http://www.pppmag.com/documents/V5N9/p12_14_15_17.pdf Accessed 8/4/09.

IT Pearls - Refrigerator Alarms – Roundtable questions
121-000-09-039-L04-P
Peggy Bickham

1. What policy issues did you find most difficult to address when implementing wireless temperature monitoring?
2. What features were most important to you when selecting a wireless monitoring system?
3. What difficulties did you encounter when implementing the wireless temperature monitoring system?

Refrigerator Alarms – Post test questions

09-039

Peggy Bickham

1. Which of the following are advantages of implementing wireless temperature monitoring of medication refrigerators?
 - a. Wireless monitoring ensures that refrigerators will consistently remain within the desired temperature range.
 - b. Wireless monitoring combined with a defined process for timely response to alerts can eliminate wastage of medications and bring your hospital into compliance with TJC standards on monitoring of medication refrigerators.
 - c. Wireless monitoring provides the capability to detect substandard refrigerators that are inadequate for medication storage.
 - d. b and c
 - e. All of the above

2. Some important features to consider when purchasing a wireless monitoring system are:
 - a. Alert options and reporting capability
 - b. Probe type
 - c. The system's ability to quickly cool down an out-of-range refrigerator
 - d. a and b
 - e. All of the above.

Vendor Tracking Services

Dave Hicks, RPh, MBA
Vice-President and Chief Pharmacy Officer
University of Chicago Medical Center

Neither I or my spouse have any actual or potential conflict of interest in relation to this presentation.

Pharmaceutical Rep Check-in Audience Poll

- Who has pharmaceutical reps check-in at pharmacy?
- Who has pharmaceutical reps check-in elsewhere?
- Which institutions use a vendor tracking service?

Why Vendor Tracking is Needed

Compliance Reasons	
Health & Human Services (HHS) Office of Inspector General (OIG)	Check against "List of Excluded Individuals & Entities" with Medicare/Medicaid Fraud sanctions
U.S. Treasury - Office of Foreign Assets Control (OFAC)	Mandate to continuously monitor that no vendors representatives are on the Terrorist watch list
Deficit Reduction Act	Federal regulation of policy and training presentation
Stark Law / Anti-kickback Federal Statute	Must have an auditable record of all disclosures of conflicts of interest
Health Insurance Portability and Accountability Act (HIPAA)	Ensure patient information is protected and have complete records of all who are granted access
Homeland Security	Disaster readiness: <ul style="list-style-type: none">• Know which vendor representatives are onsite, current company and individual contact information
Joint Commission (JCAHO) Audits	Demonstrate ability to: <ul style="list-style-type: none">• control facility access• attain immunizations and product/service competency
CDC/Association of Preoperative Registered Nurses/American College of Surgeons Guidelines	Validate immunizations and multiple training certificates for any healthcare vendor representative with access to procedural areas

Why Vendor Tracking is Needed

Supply Chain Reasons	
Security	Identify vendor representatives in the facilities; who are they, where are they going and who are they meeting
Central Contact Information	Access to valid self reported contact information by all the vendor representatives
Contractual Product	Avoid purchases of products or services already under contract
Capturing Vendor Policy Obedience	Document a vendor representatives exceptional or unwanted behavior
Merger and Acquisitions	Attain additional information on vendors for merger and acquisitions
Cost Control Reasons	
Scheduling	Manage "end-run" sales calls directly to physicians
Productivity	Limit drop-in interruptions
Efficiency	Reduce cost of administering vendor management programs

Vendor Information Turnstile

- 20% of all addresses change every year
- 18% of all phone numbers change or are disconnected annually
- Every hour, 33 new businesses open
- Every hour, 36 C-Level changes occur
- Every hour 251 business will have a suit, lien, or judgment filed against them.
- 42,000+ individuals and entities are on the HHS/OIG Exclusion List
 - 50 reinstatements/month
 - 400 new exclusions/month
- State level Medicaid/Medicare exclusion lists are not consistently reported to the Feds
- 14,000 bankruptcy filings Q1 2009

Source: Experian

Vendor Tracking Benefits for Pharmacy

- Lower vendor management administrative costs
- Expanded vendor and rep information
- Better vendor compliance and activity monitoring
- Integrated compliance, scheduling, and photo badges
- Ease of mass communication: moves, H1N1 alerts
- Activity reports:
 - Staff and vendor compliance with policies
 - Volumes, frequencies, and time on site for reps
 - Vendor scorecard, complaint, and discipline logs
- Little IT support required – web hosted
- No cost to your organization

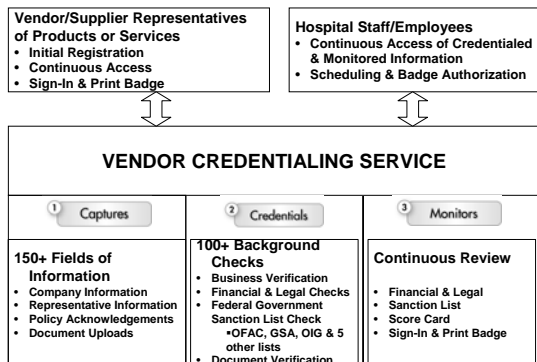
Vendor Tracking Systems Audience Poll

- Who has Reptrax at their hospital?
- Who has Vendormate?
- Who has VendorClear?
- Who has Status Blue?
- Who has Vendor Credentialing Service?
- Any others?

Hospital Vendor Risk Profiles

HIGH \$250	MEDIUM \$100	LOW \$25
<ul style="list-style-type: none"> • Representatives access procedural areas & require a badge • Representatives have access to patients or patient data • Greater than \$10,000 in annual spend • Annual Business Verification, Financial Health Assessment & Legal Review • Weekly Financial & Legal Monitoring • Monthly Sanction Checks – Entity, Principals, Reps • Historical Sanction Checks • Verified Document Storage & Management – Immunizations & etc. 	<ul style="list-style-type: none"> • Representatives do not access procedural areas but visit your facilities requiring a badge • Representatives do not have access to patients or patient data • Between \$10,000 and \$1,000 in annual spend • Annual Business Verification • Monthly Sanction Checks – Entity, Representatives • Verified Document Storage & Management – Insurance certifications – Diversity documentation 	<ul style="list-style-type: none"> • Do not have a current business relationship – financial, contractual, or otherwise • Representatives do not visit your facility • Less than \$1,000 in annual spend • Annual Sanction Check – Entity • Unverified Document Storage

Vendor Program Information Flow



Integrated Daily Photo ID Badges

- All vendors on your premises are clearly identified
- Electronic sign-in and out report of all vendor representatives
- Badge displays name, date, appointment location, photo, vendor status, and individual status
- Appointment scheduling integrated to Outlook Calendars

Vendor Tracking Service Reports

- All vendors on your premises are clearly identified
- Electronic sign-in and out report of all vendor representatives
- Badge displays name, date, appointment location, photo, vendor status, and individual status
- Appointment scheduling integrated to Outlook Calendars

Vendor Pushback

Fear a change in business: "We've always had easy access. Everyone knows me. Why am I being questioned now?" It's not an issue of trust. It's an issue of consistency and efficiency.

Believe this is only about controlling access
Don't understand that business operations, compliance guidelines, and access control are converging to drive this change.

Believe this is unduly burdensome
This change shifts the responsibility (and cost) of proof from the buyer to the seller. Not surprisingly, the sellers resist.

See no benefit to them
Corollary benefits include: Leveling the playing field across all vendors. Some standardization as only a few vendor systems vs. unique paper forms at each hospital.

- All vendors on your premises are clearly identified
- Electronic sign-in and out report of all vendor representatives
- Badge displays name, date, appointment location, photo, vendor status, and individual status
- Appointment scheduling integrated to Outlook Calendars

Questions?



Roundtable Discussion

- Give a quick summary of how your current vendor management program monitors vendor visits, meets vendor compliance issues, and limits vendor access.
- Estimate how many vendors your department sees or schedules per month and how much administrative time that requires
- Describe challenges and successes your department or organization has had with your vendor management program.

IT Pearls - Vendor Tracking - Roundtable Questions

121-000-09-039-L04-P

Dave Hicks

1. Give a quick summary of how your current vendor management program monitors vendor visits, meets vendor compliance issues, and limits vendor access.
2. Estimate how many vendors your department sees or schedules per month and how much administrative time that requires
3. Describe challenges and successes your department or organization has had with your vendor management program.

Post-test Questions

1. Which of the following are valid reasons hospitals implement vendor credentialing systems?
 - a. To reduce administrative cost of vendor management.
 - b. To improve hospital compliance with TJC infection control and access control requirements.
 - c. To meet federal mandates against doing business with individuals on terrorist watch list or with Medicare/Medicaid sanctions.
 - d. To facilitate increased vendor charity donations to hospital foundations.
 - e. All of the above

2. Which of the following are common features of vendor credentialing systems?
 - a. Multiple financial, legal, and sanction list background checks of vendors and representatives.
 - b. Multiple reports of vendor representative activities, document compliance, credentialing status, and any staff complaints.
 - c. Integrated daily vendor ID badges.
 - d. All of the above

Repackaging for a Reason: Implementation of a Repackaging Process to Support BCMA



Dan Makowsky, CPhT
Pharmacy Barcode Coordinator
NorthShore University HealthSystem

Conflict of Interest Declaration

I have no actual or potential conflict of interest in relation to this activity.

Objectives

- List the various reasons for repackaging medications
- Explain the rules and regulations related to repackaged medications
- Discuss the features of a repackaging system

NorthShore University HealthSystem

Corporate Services

- NorthShore University HealthSystem (NorthShore) is located in the northern suburbs of Chicago
- Academically affiliated with the University of Chicago Pritzker School of Medicine.
- Four Hospitals: Evanston Hospital, Glenbrook Hospital, Highland Park Hospital, and Skokie Hospital.
- 885 licensed beds.

NorthShore University HealthSystem

Pharmacy Services

- 24 hour per day pharmacy services in all four hospitals.
- Decentralized pharmacist staffing model
- Sterile product preparation
- Operating room pharmacy satellite
- Repackaging operations
- Decentralized pharmacy technicians

NorthShore University HealthSystem

Technology

- Electronic medical record (EMR)
- Integrated Pharmacy Software
- Computer physician order entry (CPOE),
- Automated dispensing cabinets (ADC)
- Barcode medication administration (BCMA)
- TPN Compounder
- Repackaging machine

Roles of Barcode Coordinator

- Day to Day operations
 - Identify and resolve barcode issues
 - Assist pharmacy buyer
 - Analyze barcode reports
 - Maintain repackaging machine
- Corporate Responsibilities
 - Planning and implementation of BCMA
 - Pharmacy compliance with BCMA
 - Monitor end user compliance with BCMA
 - Assist and maintain quality improvement measures

Rules & Regulations

Labeling ⁽¹⁾

- | | |
|------------------------|-------------------------------|
| • Drug Name | • Lot Number |
| • Strength | • Expiration date |
| • Form | • Manufacturer |
| • Repackaging Facility | • Controlled Substance Symbol |

Beyond-Use Date ⁽²⁾

- One year from date packaged, or
- Original expiration date, whichever is earliest

Repackaging at NorthShore

Before BCMA

- Repackaging was done as needed
- Different between sites
 - Evanston used Medical Packaging, Inc. repackaging system
 - Glenbrook & Highland Park a manual process
- Lack of strict library maintenance procedures
- All users could save changes

Repackaging at NorthShore

BCMA required changes

- Standardization of each hospital's repackaging systems
- All formulary medications must be available in Unit-Dose with a barcode
- Creation of repackaging technician position

Repackaging at NorthShore

Cont.

- Tighten access on repackaging system
 - All users assigned unique login & password
 - Standard user unable to change library
 - "Super User" to maintain library
- Repackaging system training
 - All technicians trained
 - Overnight pharmacists
 - Operations managers

MPI Repackaging System⁽³⁾

- Auto-Print™ UD Packaging System
- Pharmacy Accessory Label Printer (PALP)
- Computer with WinPakUD™ & WinPak Labels™ software



Images used with permission from MPI

Repackaging System Maintenance

Medication library management

- User maintained library
- Barcode scan/check ensures correct product (UD)
- Security
 - User ID's with password
 - Customizable user access
 - Control over library

Repackaging System Maintenance

Cont.

- Label customization
 - Adjustable font size
 - On screen label preview
 - Tallman lettering available (UD)
- Barcoding
 - Supports all popular healthcare barcode symbologies

Available Repackaging Reports

- Reports
 - Daily Log
 - Custom report generator

The screenshot shows a 'REPORT GENERATOR' window with the following fields and options:

- ORDER BY:** A dropdown menu.
- FROM:** A date field with a calendar icon.
- TO:** A date field with a calendar icon.
- PACK DATE:** A date field with a calendar icon.
- BEYOND-USE DATE:** A date field with a calendar icon.
- MANUFACTURER:** A text input field.
- MFG LOT:** A text input field.
- MOIST LOT:** A text input field.
- DRUG CLASS:** A text input field.
- DRUG FORM:** A text input field.
- PACKAGER:** A text input field.
- VERIFIER:** A text input field.
- Buttons:** 'Help', 'Print', 'To Print', 'To Screen', 'To File', 'To Clear All', 'To Exit'.
- Checkboxes:** 'BRIEF REPORT', 'DETAILED REPORT', 'TOTALS', 'SUPPRESS ZEROS'.

Image used with permission from MPI

NorthShore System

Daily Operations

- Staffed repackager M-F
- Ensure all medications are barcoded
- Repackage medications as appropriate
- Pharmacist check of repackaged/re-labeled medications

Repackaging Process (Receiving)

- All medications sequestered upon delivery
- Technician scans all medications
 - Meds with working barcodes go to the shelves
 - Meds without working barcodes at Unit-of-Use quarantined
 - Bulk oral solids get repackaged
 - Meds without barcodes get relabeled
 - Meds with invalid barcodes are **Rejected**

Reasons to Repackage

- Unit-dose product not available
- Cost
- Inventory management
- Adding barcodes to medications
- Packaging partial doses (e.g. half tablets)

Repackaging Process (Packaging)

Repackaging tech

1. Selects product from library
2. Enters manufacturer's lot number and expiration date
3. Assigns hospital lot number and expiration date
4. Verifies all information is correct
5. Starts printing
 - UD bulk bottle fully repackaged
 - Flag labels printed & affixed to product

Repackaging Process (Pharmacist Check)

- Repackaging tech prints repackaging log and groups the medications
- Pharmacist verifies information is correct on packaging/labels
 - A. Correct
 - Signs off product on log sheet
 - Med placed in stock by technician
 - B. Incorrect
 - Indicates error on log sheet
 - Returned to repackaging queue

Lessons learned

- Buying Unit Dose vs. bulk bottle
 - Philosophy: get as much as possible in unit-dose
 - Reasons not to purchase unit dose: LASA, cost, manufacture backorders, or BCMA reasons
- Waste
 - 1yr expiration date, others that normally have short exp date (levothyroxine)
 - Inventory control is important

References

1. US Food and Drug Administration. CPG Sec 430.100 Unit Dose Labeling for Solid and Liquid Oral Dosage Forms (CPG 7132b.10). Available at: <http://www.fda.gov/ICECI/ComplianceManuals/CompliancePolicyGuidanceManual/ucm074377.htm>. Accessed: August 6, 2009
2. USP Pharmacist's Pharmacopeia. USP<1146> Packaging Practice—Repackaging a Single Solid Oral Drug Product into a Unit-Dose Container. Available at: <http://www.uspp2.com>. Accessed: August 6, 2009
3. Medical Packaging Inc. Unit Dose Packaging. Available at: <http://www.medpak.com/v1/Main>. Accessed: August 7, 2009

Post Presentation Questions


Daniel Makowsky - 09-039

Repackaging for a Reason

1. Which of the following is not required by the FDA to be on the label of a repackaged medication?
 - a. Name of the facility where the medication was repackaged.
 - b. NDC of the medication.
 - c. Unique control/lot number for the repackaged medication.
 - d. Manufacturer of the medication.
 - e. The medication name.

2. What are some of the reasons that institutions choose to repackage medications into Unit-of-Use packaging on site?
 - a. Adding a barcode to the medication at the Unit-of-Use packaging.
 - b. Medication may not be available in Unit-Dose packaging from the manufacturer.
 - c. Cost to repackage a medication on site is lower then purchasing a Unit-Dose option from the manufacturer
 - d. All of the above.


3. What should the beyond-use date of a repackaged medication be?
 - a. 12 months from the date repackaged.
 - b. The manufacturer's expiration date.
 - c. Six months less then manufacturer's expiration date.
 - d. A or B, whichever is shorter.



Clinical Decision Support


Michael Postelnick, RPh BCPS AQ Infectious Diseases
Senior Infectious Diseases Pharmacist
Clinical Coordinator
Northwestern Memorial Hospital
Chicago, IL

The speaker has no conflict to disclose.



Clinical Decision Support (CDSS)

- Interactive computer program to assist clinicians with decision making tasks
- Medication management
- Rules-based system
- Real time alerts
- Ongoing monitoring after initial order entry



Why The Need?

- Initial review in order entry process
- Pharmacists rushed, multiple duties
- Alert fatigue – pharmacist misses
- Incomplete patient info on admission
- Initial drug profile review inconsistent

Pharmacy CDSS Benefits


- Consistent identification of potential opportunities to improve patient care
- Reduce tasks that involve manual pharmacist review
- Improve clinical workflow
- Improve outcomes

CDSS benefits cont.

- Increased scope of surveillance
- FTE impact
- Improved staff pharmacist utilization
- Improved staff retention
- Reduced cost of drug therapy
- Improved medication safety

Pharmacy CDSS – what we want


- Real-time alerts
- Intelligent rules
- Competent responders to alerts
Pharmacist, Nurse, Physician
- No false positive alerts
- Track users, documentation



CDSS role in medication management

Medication Safety Program


- ADR detection
- ADR prevention
- Reduce pharmacist misses
- ADE documentation
- ADR cost savings analysis and reporting



CDSS – role cont.

Pharmacist Clinical Interventions

- Document, track and report data
- Pharmacist productivity
- Drilldown on intervention types
- Track pharmacist actions



CDSS – role cont.

Regulatory TJC, CMS, CDPH

- NPSG Anticoagulation management
- DVT prophylaxis
- Black Box Warnings
- ADR tracer drug tracking

CDSS – role cont.

Drug utilization

- Criteria for use
- Length of therapy
- Physician specific
- Location specific
- Track savings

CDSS –role cont.

- Antibiotic stewardship
- Antibiotic utilization
- Microbiology data tracking
- Cost savings tracking
- Antibigram

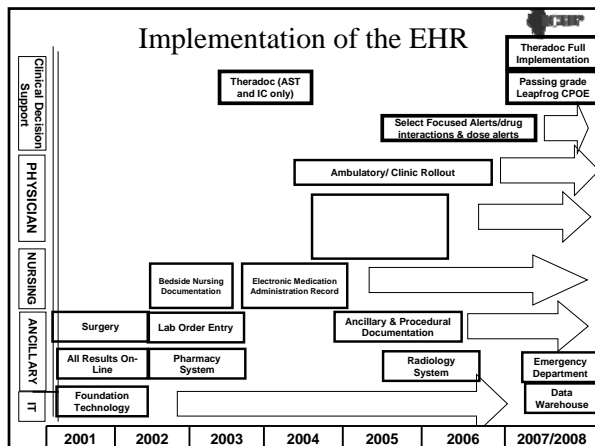
Northwestern Memorial Hospital



- **3 Million square feet** covering one city block
- High Tech – “**Most Wired**”
- **Level I** trauma networks and
Level III neonatal intensive care unit
 - 9000+ deliveries



Total Beds:	897
Total Admissions:	43,312
Total Outpatient Visits:	438,979
Total Outpatient Clinics:	13
ED Visits:	73,881
Average Daily Census:	596



Pharmacy Practice at NMH

- 6 satellite pharmacies over 3 buildings
- Integrated practice model
- Diverse specialty practice areas
 - Critical care
 - Medicine
 - Neonatal ICU
 - Hematology/oncology
 - Transplantation
 - Nutritional Support
 - Antimicrobial Stewardship
 - Anticoagulation Service

Continuity of Care

- Shift to Shift
- Day to Day
- Critical Issue Follow-up Identification

Rounding Documentation

ICU History and Physical ONLY [Select First (Significant Encounter): 03/03/2009 19:21] [New Entry] [Collapse All] [Settings] [X]

ICU History and Physical ONLY: 03/03/2009 14:44 MAROLYNSTON (copy)

27 yr M w/ ptosis w/ 48 hr of redness of the nasopharynx admitted for meningococcal fever being treated with Vanco, Zosyn and Flagyl, receiving transfusions regularly developed acute hypoxic respiratory failure with clinical findings concerning for ARDS vs. TRALI and possible sepsis.

PE ID: 03/03/2009 14:16 MAROLYNSTON (copy)

SpO₂ 94% with pulse oximetry, possible C. diff

pt had blood culture with gram stain sent on 3/3/09 and urine culture with gram neg bacilli on 3/3/09

Spinal coverage with Vanco, Zosyn, Flagyl, Vancomycin and Tetracycline x 2

will pan culture and send C. diff x 2

other blood sterility (blood culture 3/3/09) given 1/2 recent chemotherapy.

RE ID: 03/03/2009 11:44 MAROLYNSTON

3/3/09 name changed to benedict, ID at with change awaiting final co results, pt bronched today 1/2 co

Notes ID: 03/03/2009 14:46 MAROLYNSTON (copy)

updated and parceled on number

PLAN ID: 03/03/2009 14:16 MAROLYNSTON (copy)

Subtotal pulmonary infiltrates concerning for ARDS vs. TRALI, ARDS protocol initiated

Notes/One ID: 03/03/2009 14:16 MAROLYNSTON (copy)

Neurological Mx: Ceftriaxone

CT previous admission with new pulmonary nodules, new liver nodules and enlarged splenic lesion c/w progression of disease

cost shows regimen with high dose ceftriaxone 1200, heparin, vancomycin during last admission. (Please note, there is no specific trial reference to support this regimen, this is being used as an intermediate therapy to hopefully bridge pt to SCT)

General Documentation

ENTERED BY	INTERVENTION TYPE	INTERVENTION STATUS	FOLLOW-UP STATUS	ASSOC ALERT	CURRENT LOCAT
ENGELHART, KRISTA	Clinical Activity Pharmacokinetic Consult	Accepted	Complete		Neuro/Spine ICU
RAY, LESLIE	Clinical Activity ADG Prevention-Major	Accepted	Complete		Neuro/Spine ICU
RAY, LESLIE	General	Accepted	Pending		Neuro/Spine ICU
POSTELNICK, MIKE	Clinical Activity Medi Criteria	Accepted	Complete	15769502 (Details)	Neuro/Spine ICU
KLIMAVICUITE, MILETA	General	Accepted	Complete		Neuro/Spine ICU
MICHALEC, CLARE	Clinical Activity Medication Reconciliation Intervention	Accepted	Complete		Neuro/Spine ICU
LEVASSOUR, KIMBERLY	General	Accepted	Complete		Neuro/Spine ICU
LEVASSOUR, KIMBERLY	Clinical Activity Discontinues/Avoid Duplicate Therapy	Accepted	Complete		Neuro/Spine ICU
LEVASSOUR, KIMBERLY	Clinical Activity Medication Reconciliation Intervention	Accepted	Complete		Neuro/Spine ICU

Non-rounding Documentation

Sender: RAY, LESLIE

Receiving Clinician:

Description:

Reasons:

1. Antibiotic Monitoring
2. Culture Results

Outcomes:

Follow-up Status: Pending ☐ ☒

Intervention Status: Accepted ☐ ☒

Comments to Team:

Comments to Provider:

3/3/09: name 2g q22 per ID for GPC in EVD, slow infusion, premedicate with benadryl for possible allergic rxn. 1/2 co results. Also consider name to give 1/2 co next

3/3/09: Awaiting results of cultures. Per ID continue vanco for now. FU with ID next PM

3/3/09: name sent with van 1200 1/2. 1200 & 1200000 as dose given at 15:18:22. Consider what target trough is, but likely to be high since trying to get adequate levels in CNS fluid. Please re-order trough before 2300 dose, but appears 1200 dose was not given this am, so wouldn't be accurate. Pt now settles. Please FU ID notes for plan to order to level when appropriate. Van

Generate Note Cancel << Back Submit >>

Alert Time 03/15/2009 12:45	Alert ADP Prevention: Warfarin		Admit Diagnosis: DYSPEASIA/PRES/INOPE		
Document			*Demographics & renal function		
Diagnosis	Patients receiving WARFARIN and AZITHROMYCIN have an increased risk of bleeding.				
Suppress	*Management				
Reference Medication(s):					
Drug	Dose	Start	End	Status	Pat Class
WARFARIN	3 mg PO Every Tu Th Sa Su (HS)	03/15/2009 22:00:00		ACTIVE	1
Reference Medication(s):					
Drug	Dose	Start	End	Status	Pat Class
AZITHROMYCIN	500 mg PO Daily	03/15/2009 10:00:00		ACTIVE	1
Order/Culture	Result	Source	Result Status (Date/Time)	Specimen #	Ordering Provider
PLUTHEROMBIN TIME	DNB = 2.8 A (0.8-1.2)		03/15/2009 03:56	F 0323A/2009 04-042	HRLB233 MYRIE_KEVIN
Lab Review	Medications		Microbiology Review		

[illegible]

Assessment of Impact

Monthly Intervention Report

A	B3
1	Total Action
2	119
3	164
4	134
5	3
6	11
7	18
8	73
9	164
10	6
11	6
12	12
13	33
14	664
15	6
16	44
17	6
18	16
19	8
20	11
21	5
22	3
23	23
24	90
25	34
26	31
27	164
28	3
29	8
30	2
31	156
32	49
33	1
34	42
35	19
36	67
37	263
38	29
39	5
40	15

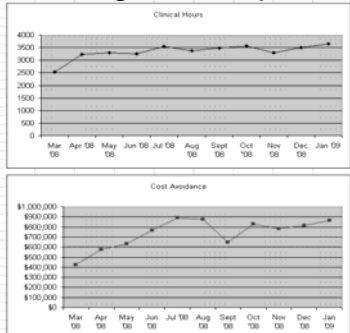
Thomson Healthcare Action OI

- Solucient clinical workload reporting
- Provides standard times and values for interventions
- Provides for cross-institutional comparison

Tracking and Reporting

THOMSON HEALTHCARE - ACTION OI			
Intervention, Clinical, Interventions, Intervention, Documentation, Worksheet			
Intervention	Units	Missing per Unit	Total Minutes
1) ADE Prevention-Major	119	30	2570
2) ADE Prevention-Minor	164	15	2760
3) Anticoagulation Therapy-Consult	3	15	0
4) Anticoagulation Therapy-Review	0	20	0
5) EPO	0	20	0
6) Lipid Depot	0	20	0
7) Metformin	0	20	0
8) Nifedipine	0	20	0
9) Nifedipine	0	20	0
10) Nifedipine	0	20	0
11) Nifedipine	0	20	0
12) Nifedipine	0	20	0
13) Nifedipine	0	20	0
14) Nifedipine	0	20	0
15) Nifedipine	0	20	0
16) Nifedipine	0	20	0
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36) Nifedipine	0	20	0
37) Nifedipine	0	20	0
38) Nifedipine	0	20	0
39) Nifedipine	0	20	0
40) Nifedipine	0	20	0

Tracking and Reporting



Summary and Conclusions

- CDS increases clinical pharmacist efficiency and impact
- CDS contributes to enhanced medication safety
- Documentation tool provides consistent method to document pharmacist impact

Acknowledgement

- John Russillo, RPh

Clinical Decision Support
09-039
Michael Postelnick

Post Test Questions

1. Clinical Decision Support Systems minimize the need for pharmacist clinical judgment.
2. Clinical Decision Support Systems cannot identify patients most in need of pharmacist intervention.
3. Clinical Decision Support Systems aid in preventing ADEs in hospitalized patients.