

Leveraging Meditech for Improved Medication Safety

Pharmacy Clinical Monitoring Utilizing Meditech

Muse International Conference

May 2006



Components of Safety

- Demographics
- Renal Dosing
- A.D.E. Monitoring
- Non-Formulary
- Therapeutic Substitution
- IV to PO Conversion
- Drug Disease Interactions
- Drug Serum Level Monitoring
- Target Drug Monitoring



Introduction

- You can leverage your current Meditech system to protect patients against medication errors. By utilizing sophisticated clinical rules and reports you can identify potential drug problems, monitor laboratory values and alert the pharmacist to potential therapeutic risks.
- Rules can be evaluated at the time the refill list is run (REFILL rules) or at the time a med is ordered (MED rules)
- Refill rules can run independent of your current refill processes.

Adding Sophistication

- Utilizing Global Rules linked to fields on a Customer Defined Screen (CDS).
- Activating rules by selecting appropriate fields on the CDS.



Global Rules are attached in the Customer Defined Parameters

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAO LUU

Enter/Edit PHA Customer-Defined Parameters

1 - Gen 2 - Gen 3 - Site 4 - Site 5 - Site 6 - Site 7 - Site 8 - Site

Order Rules PCS/POM

Eval

FILE	Rule *	MAR Sort
MED	1 IN.IVPO TIG IV TO PO CONVERSION RULE	1
REFILL	2 IN.HYPOK TIG HYPOKALEMIA RULE	2
	3 IN.HYPERK TIG HYPERKALEMIA RULE	3

Auto Stop Days

Location	Inp
.DFT	DEFAULT

Drug Barcode Formats

1	
2	
3	

BSA Calculation Method

(Ht

Update Drug Index Web Page from this Database?

Warn On-line MAR User Based on Time Period of

MAR Variance Limit

Retro MAR Time Period

MAR Disp Stock Rx's?

MAR Disp DM Override Rx's?

Edit Label Comments?

Override Comment

TPN Clin Indication

IV/INJ Site Query

IV Therapy CDS

IV Therapy Query

ALT IV Tx CDS

Bottle 1 Query

Bottle 2 Query

Bottle 3 Query

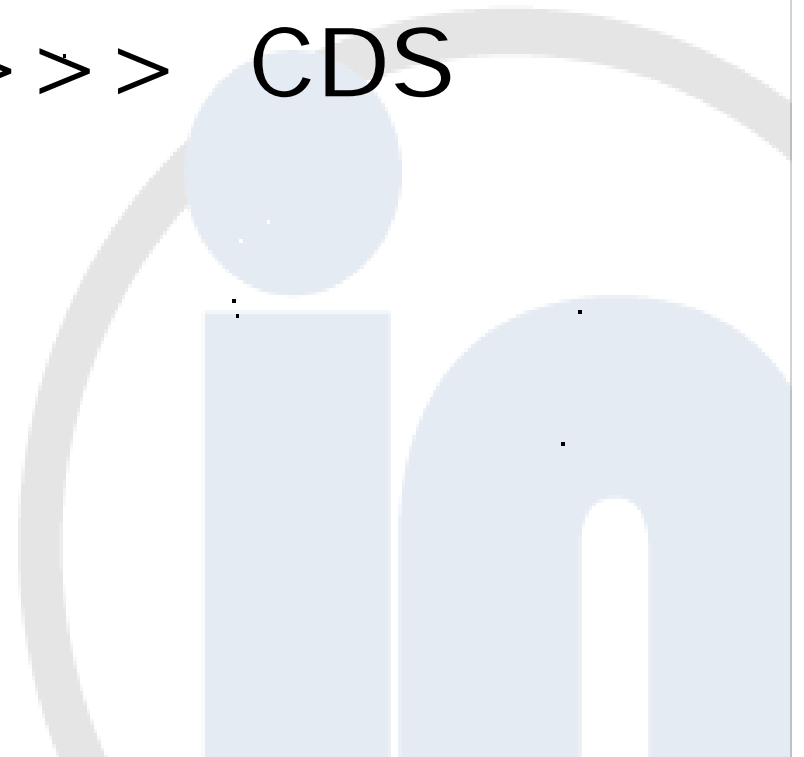
Bottle 4 Query

**Artificial Intelligence
vs.
Implied Intelligence**



Information "KNOWLEDGE" Capture and Storage

Queries >>>>>> CDS



Tools for capturing "KNOWLEDGE"

Customer Defined Screen Types

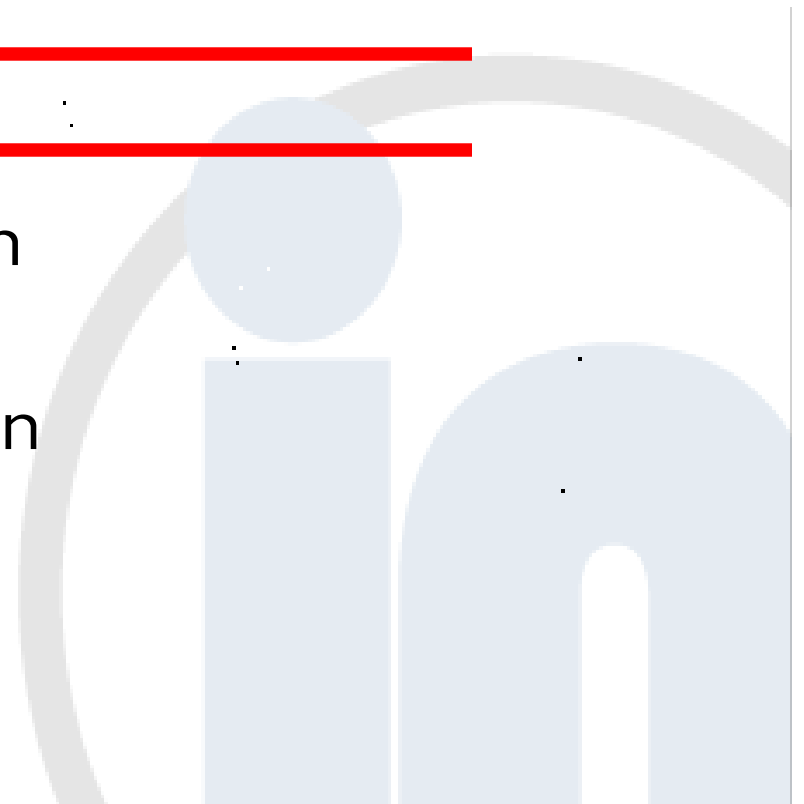
- Patient screen
- Medication screen
- Rx screen
- Intervention type screen
- ADR screen
- Clinical indication screen



Tools for capturing "KNOWLEDGE"

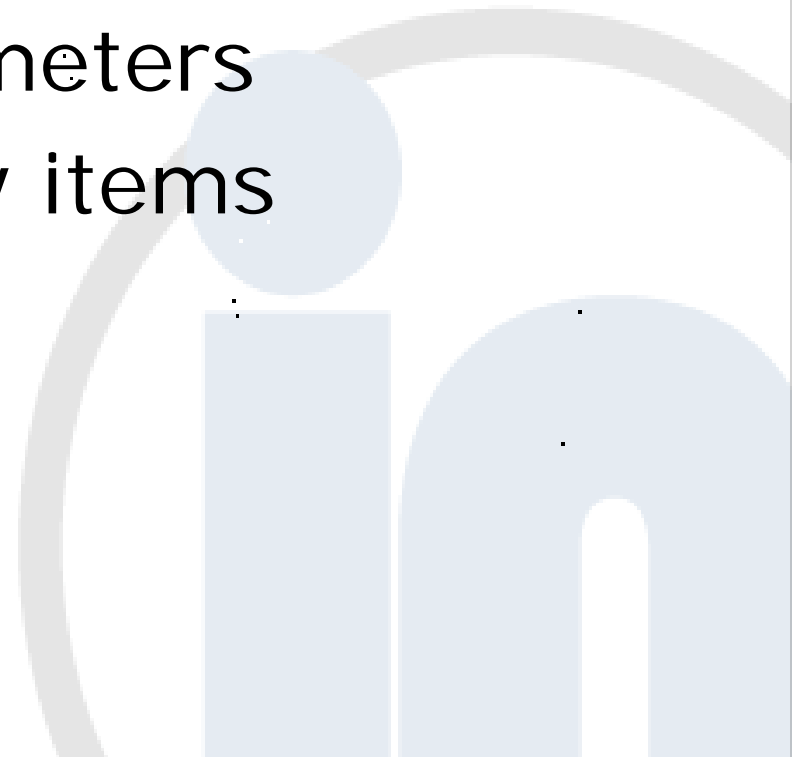
Customer Defined Screen Types

- patient screen
- medication screen ←
- Rx screen ←
- Intervention type screen
- ADR screen
- Clinical Indication Screen



Medication Screen

- PHA DRUG type screen
- Medication Specific Information
- Attached in PHA parameters
- Same for all formulary items



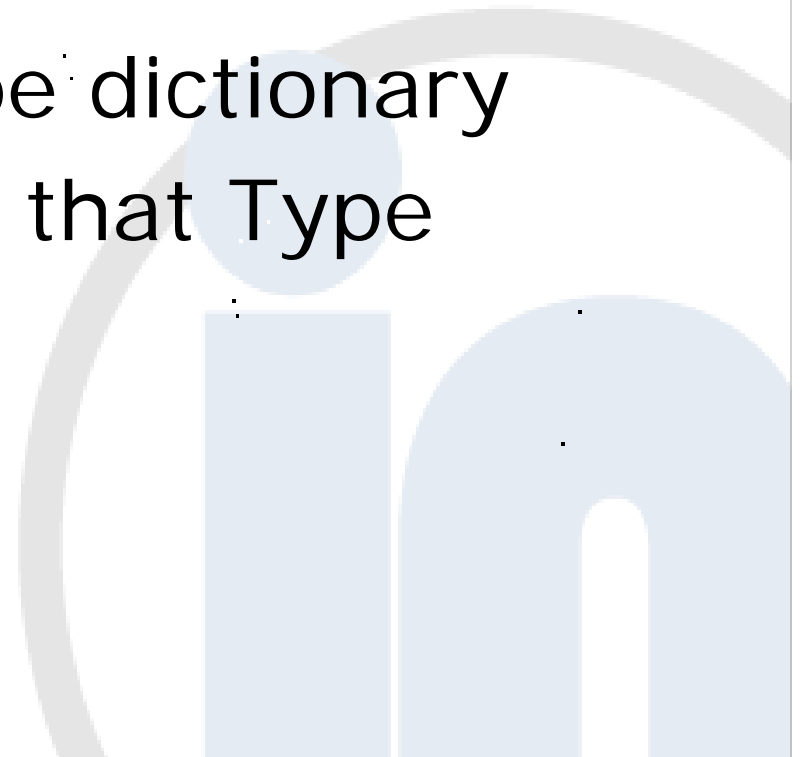
Possibilities

- Protocol - dosage calcs
- Do Not Crush - Do Not Shake
- Drug classification - chemo, contrast, blood
- Rx label information - MCD
- MAR warnings
- Nursing documentation prompts
- Triggers for invoking global rules



Rx Screen

- PHA RX type screen
- Rx specific information
- Attached in Order Type dictionary
- Same for all orders of that Type
- Entered as Rx queries



Possibilities

- Lot numbers
- Expiration dates
- Used with transaction rules can send information to B/AR
- Unique information
- "Key" for rule line check or display



Missing Demographics

- Report to list patients that need to have their demographics completed.
- Rule to warn users or prevent users from proceeding if key data has not been entered for a given patient.



Sample of Incomplete Demographics Report

[PID=13684]Missing Demographics Report - MEDITECH Document Preview

File Help

DATE: 10/24/05 @ 1922 Good Samaritan Hospital ADM P
 USER: LUUHAO Missing Demographics Report

Patient Name	Room/Bed	Account#	Missing Data
FUSCALDO, TEST	002-A	V000002371	Height, Weight, Allergy
NOTES, UR	003-A	V000002372	Height, Weight, Allergy
TTSMITH, AL	004-A	V000000046	Height, Weight, Allergy
D, B	005-A	V000000751	Height, Weight, Allergy
TTBLOW, YES	008-A	V000000050	Height, Weight, Allergy
TTEVERETT, MICHELLE	009-A	V000002145	Height, Weight, Allergy
TTWILL, NOT	023-A	V000000085	Height, Weight, Allergy
Donald, John	024-B	V000001424	Height, Weight, Allergy
TTBONJOVI, MARY	025-A	V000002330	Height, Weight, Allergy
TTNOT, HERE	026-A	V000000086	Height, Weight, Allergy
TTBONJOVI, JON SR	026-B	V000002325	Height, Weight
TTBABY, AMITH	027-A	V000000060	Weight
Cauley, Teddy	027-B	V000001612	Height, Weight
TTNO, ONE	033-A	V000000089	Height, Weight, Allergy
Morgado, Derrick	034-A	V000000810	Height, Weight, Allergy
TTMANZ, KOBE	035-A	V000002389	Height, Weight, Allergy
TTSMALL, ONE	036-A	V000000088	Height, Weight, Allergy
LIN, LYDIA	037-B	V000000802	Allergy
TTALLEN, MARY R	038-A	V000001705	Height, Weight
TTPATTON, WILSON	039-A	V000000695	Height, Weight, Allergy

1/3 95%

Allergy Check Rules

- Rules can be incorporated into system to warn users or prevent users from proceeding if key data has not been entered for a given patient.
 - Pharmacy Rule – this rule is a global rule and can be linked or removed from the pharmacy CDP. It will be invoked when no allergy is entered and the user attempts to enter a pharmacy order.
 - OE Rule - this rule must be incorporated into any existing category in the category dictionary, and should be attached to a common category such as DIET. It will be invoked when no allergy is entered and the user attempts to place an order in that category.
- **(Allergy rules can be built as warnings or errors based on your preference)**

Sample Allergy Check Rule

View PHA Rule

Mnemonic

Active?

POM Enabled?

Description

Evaluate At

Data Flds From

Rule

```
IF([f pt algy any]="Y" [f rx ok];  
  [f pt algy any]="Y" [f rx ok];  
  [f rx err msg]("Enter allergies before ordering."),  
  [f rx reject]);
```

Renal Dosing

- Patients with impaired renal function must have their drug therapy carefully monitored to avoid adverse drug events.
- Medication Rule “IN.CRCL.WN” provides the end user with an estimated creatinine clearance for appropriate patients (site determined age and CRCL parameters) when entering drugs that may have an impact on renal compromised patients. The display includes not only the estimated creatinine clearance but also all the demographic information utilized in the calculation and a trend of the serum creatinine levels with specimen dates and times. Further utilization of the customer defined screens within the pharmacy module provides a suggested dose for the medication based on the calculated creatinine clearance.
- Refill Rule continues to monitor patients creatinine clearance and displays on refill list when the value changes significantly

Medication CDS sample – Page 2 (9 pages available)

Enter/Edit PHA Drug Dictionary

Dispensing Purchasing Inventory Misc Ordering
Site Defaults **CDS** Order Strings

ASA/325T ASA/CALCIUM CARB/MAGNESIUM/ALH 325 MG TABLET

CRCL 40-50:


CRCL 30-40:

CRCL 20-30:

CRCL 10-20:


CRCL <10:

Next Page <F6>, Previous Page <Shft F6>



Page 2 – with data

Enter/Edit PHA Drug Dictionary				
Dispensing	Purchasing	Inventory	Misc	Ordering
Site	Defaults	CDS	Order Strings	
FMCC500T	FAMCICLOVIR 500 MG TAB			
CRCL 40-50:	500mg every 12 hours			
CRCL 30-40:	500mg every 24 hours			
CRCL 20-30:	500mg every 24 hours			
CRCL 10-20:	500mg every 24 hours			
CRCL <10:	250mg every 48 hours			
Next Page <F6>, Previous Page <Shft F6>				



Attaching CrCl Med Type Rule

Enter/Edit PHA Drug Dictionary

Site
Defaults
CDS
Order Strings

Dispensing
Purchasing
Inventory
Misc
Ordering

FMCC500T | FAMCICLOVIR 500 MG TAB

Dose Range *

MG/KG/DAY	MG/KG/DAY Dose Range Check

Protect from FSV?

Display Dose Calc?

Display

Error	Calc	Com
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Order Rules

Eval	Rule *	
MED	→ IN.CRCL.WN	TIG CRCL WITH WINDOW

EMR Items

1	
2	
3	

Patient Care System

Auto-Display?

Assessment

Variance limit

Multidose Container?

Cosignature Req'd for Doc MED?

Cosignature Req'd for Doc IV?

Sample CrCl Order Rule Display

Inpatient Medication: TTINSIGHT,TIM A#V000002151 ADM IN

Rx #
 Order Type
 Age/Sex
 Room

Order Dr*
 Location
 Bed

Med *

 (Med,Dose,Route,Sig,Schedule,Par,Total Doses)

Clinical Indication

Dose * () Bulk?

Route

Sig

Schedule Par PRN Reason

Start Date Start Time Total Doses

Stop Date Stop Time Soft Stop Refill Freq

Dispense () Cart Amount

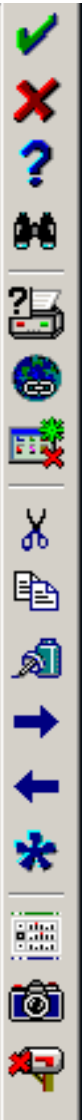
Inventory

Charge Type PER DOSE

Label
 Comments

Est. CrCl = 11 ml/min Based on Cr: 5.0 on 07/11/05 @ 1813
 Previous Cr: 1.3 on 06/28/05 @ 1600
 1.5 on 06/28/05 @ 1145

Pat. Data: Age: 53 Sex:M Weight = 44 kgs (98 lbs)
 Suggested: 500mg every 24 hours



Audit Trails

Enter/Edit RULE Dictionary

Entry Screen	Description	Shortcut	Editor
Mnemonic	IN.CRCL.WN		
Active?	<input checked="" type="checkbox"/>	POM Enabled?	<input type="checkbox"/>
Description	TIG CRCL WITH WINDOW	Evaluate At	MED
Data Flds From	RX		

Rule

```
(30>CRCL)&(20<CRCL) 1,  
"Suggested: "_[q PHA.CRCL30]→DOSE;  
(20>CRCL)&(10<CRCL) 1,  
"Suggested: "_[q PHA.CRCL20]→DOSE;  
(10'>CRCL) 1,  
"Suggested: "_[q PHA.CRCL10]→DOSE),  
[f rx win init],  
[f rx win add](EST),  
[f rx win add](M2),  
[f rx win add](M3),  
[f rx win add](BLANK),  
[f rx win add](DOSE),  
[f rx win disp],  
[f rx set rx comment]("Initial: CrCl = "_CRCL_" ml/min"),  
[f rx set rx comment](DOSE),1));
```

Utilizing dose comments provides an excellent audit trail of rule messages

Audit Trail Display

PATIENT: TTINSIGHT, TIM	ACCT #: V000002151	LOC: 4NO	U #: M001052
REG DR: AARO, KENITH M.D.	AGE/SX: 53/M	ROOM: 444	REG: 06/28/05
	STATUS: ADM IN	BED: B	DIS:

Rx # 000001754	STATUS: ACTIVE	ORD TYPE: INF MEDICATIONS
-----------------------	-----------------------	----------------------------------

FMOC500T - FAMCICLOVIR 500 MG TAB

DOSE: 500 MG (1 TABLET)
ROUTE: PO
SIG: Q24H (SCH)
START: 08/27/05-1800 **STOP:** None **SOFT:** **REFILL FREQ:**

INVENTORY: MAIN
DISPENSED TOT DOSES : 1 **TOT FORMS:** 1 **TOT COSTS:** \$0.00
CHARGE TYPE: BARMED **CHG/DOSE:** \$8.35 **TOT CHGS:** \$0.00
PHA SITE: MAIN

DUPLICATES AT ORDER ENTRY: 1

<u>TYPE</u>	<u>Rx #</u>	<u>Rx TYPE</u>	<u>GENERIC/CLASS/INGREDIENT</u>	<u>START</u>	<u>STOP</u>
C	000001602	MED	ANTIVIRALS (SYSTEMIC)	07/05-1845	None

DUPLICATE COMMENT: BENEFICIAL SYNERGISTIC REACTION

Rx COMMENTS: Initial: CrCl = 11 ml/min
Suggested: 500mg every 24 hours

ORD DR: AARO, KENITH M.D. **ADDRESS:**
DEA #:
LIC #:
PHONE: **FAX:**

IVPO Reviewed by Pharmacist (Y/N):

HISTORY:
08/27/05 1810 - ENTER by MATTRRP

ADE Monitoring

- Medications can be classified on the Drug CDS as those causing specific ADE's. Multiple ADE's can be associated with a single formulary item.
- Global refill rules will indicate a potential ADE and the order that may be causing the adverse effect.
- A Rule is created for each potential ADE.
- By answering "Y" to the ADE query "Potential ADE (Y/N)" and associating the appropriate ADE's at the "ADE:" prompt, these refill rules will be invoked and display on the refill list.

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAD L

Enter/Edit PHA Drug Dictionary

Dispensing Purchasing Inventory
Site Defaults CDS

20V800 | ACYCLOVIR 800 MG TAB

Non-formulary (Y/N): Antibiotic (Y/N):
 Therapeutic Substitution (Y/N): Sub. with:

IV to PO (Y/N): Oral Equivalent:
 Target Drug (Y/N):
 Potential ADE (Y/N): ADE: CR2

Lookup

ADE RESPONSES

Mnemonic	Responses
CR2	Creatinine > 2
CRINC	Increasing Creatinine
CRMF	Metformin Creatinine
CYCLOSPRNE	Toxic Cyclosporine Level
DIGOXIN	Toxic Digoxin Level
GENTAMICIN	Toxic Gentamicin Level
HEMOANEM	Hemolytic Anemia
HYPERK	Hyperkalemia
HYPONATLEM	Hypонатемия

By answering "Y" to the ADE query "Potential ADE (Y/N)" and associating the appropriate ADE's at the "ADE:" prompt, these refill rules can be invoked and display on the refill list

Multiple ADE responses can be entered for a specific formulary item

Sample Refill Rule for a Potential ADE

View PHA Rule			
Mnemonic	IN.ALT150		
Active?	<input checked="" type="checkbox"/>	POM Enabled?	<input type="checkbox"/>
Description	TIG ALT RULE	Evaluate At	REFILL
Data Flds From	RX		
Rule			
<pre>; This rule will display patient with ALT > 150 ; "PHA.ADEGRP"→GRP, [f rx med]→M, ""→FND→SEQ, DO{+&(T1)TF[M]Q[GRP]M[SEQ]→SEQ&'FND &(T1)TF[M]Q[GRP]M[SEQ]!0→RESP, IF(RES="ALT150" 1→FND)}, IF(FND ""→RES, [f rx nth ver Res-RES)("SGPT",1)→RES→MSGRES, RES#"0,"→RES, IF(RES>150 "Potential ADE, please note increase ALT level = "→MSG, MSG_MSGRES→MSG, [f refill rule msg](MSG);1); [f rx ok]);</pre>			

Potential ADE Refill List Display

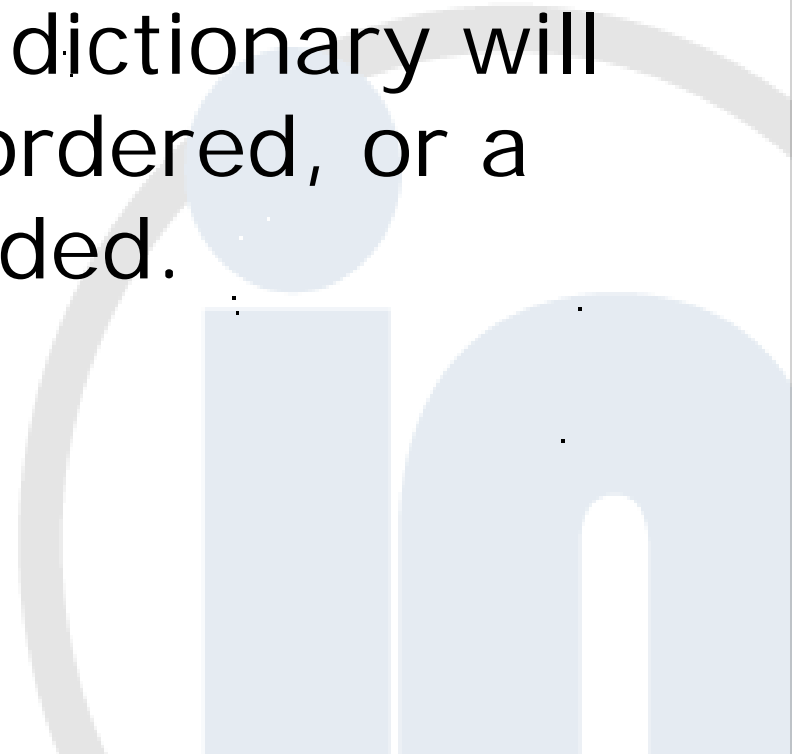
[FRIENDS WITH MEDS]

TTINSIGHT, PAT1 HT: 177.8 AGE/SEX: 54/M LOC: 4NO
V000002106 WT: 95.254 BSA: 2.19 m2 R/B: 470-A

<u>Rx #</u>	<u>MEDICATIONS</u>	<u>AMOUNT TO DISPENSE</u>
000001298	CIPROFLOXACIN/D5W 400 MG/200 ML BAG (CIPRO PREMIXED IN D5W)	226 BAGS (200 ML EACH) (224 LATE)
	**** CLINICAL REVIEW 10/18/05-0853 by REFILL LST Review for IV to PO conversion. Oral Equivalent: CIPROFLOXACIN 250 MG	
000001712	METFORMIN 500 MG TAB (GLUCOPHAGE)	168 TABS (500 MG EACH) (166 LATE)
	* HOLD PRE AND POST SURGERY AND POST X-RAY DYE STUDY **** CLINICAL REVIEW 10/18/05-0853 by REFILL LST Potential ADE, please note consecutive increases in creatinine level	

Non-Formulary

- A global rule can be utilized to address non-formulary medications.
- Medications flagged as non-formulary in the drug dictionary will not be allowed to be ordered, or a warning may be provided.



Non-Formulary Set-Up

The non-formulary rule is a global rule and can be turned on or off for a given formulary item by answering “Y” to the Non Formulary.

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAO LUU

Enter/Edit PHA Drug Dictionary

Dispensing Purchasing Inventory Misc Ordering
Site Defaults CDS Order Strings

20V800 ACYCLOVIR 800 MG TAB

Non-formulary (Y/N): Antibiotic (Y/N):
Therapeutic Substitution (Y/N): Sub. with:
IV to PO (Y/N): Oral Equivalent:
Target Drug (Y/N):
Potential ADE (Y/N): ADE: CR2

Sample Non-Formulary Rule Display

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAO LUU

Inpatient Medication: TTINSIGHT,TIM A#V000002151 ADM IN

Med Dosing Ix Cond Cmts Queries Ints Cjin Ints Gen Info* Pat Data

Rx # NEW Order Type MED Age/Sex 54/M Room 443
Order Dr* AAROKEN Location 4N0 Bed A

Med * INOPMS00
(Med,Dose,Route,Sig,Schedule,Par,Total Doses)

Clinical Indication

Dose* () Bulk?
Route
Sig
Schedule Par PRN Reason

Start Date Start Time Total Doses
Stop Date Stop Time Soft Stop Refill Freq
Dispense () Cart Amount
Inventory Charge Type (PER DOSE)

Label Comments

Warning

**** CANNOT ORDER **** Non Formulary per P&T

OK

Therapeutic Substitution

- A global rule can display information about a therapeutic substitution that has been determined to be made.
- The information entered in the formulary CDS will display when the med is ordered and direct the user to select the substituted medication

Therapeutic Substitution Set-Up

The Therapeutic Substitution rule is a global rule and can be turned on or off by answering "Y" to the Therapeutic Substitution prompt

PHA.GSR (GSR/GSR.TEST154/GSR.TEST154/G

Enter/Edit PHA Drug Dictionary

Dispensing Purchasing
Site Defaults CDS Order Strings

VANINH BECLOMETHASONE DIP 16.8 GM INH

Non-formulary (Y/N): Antibiotic (Y/N):
Therapeutic Substitution (Y/N): Sub. with: Beclovent 4 puffs bid = Fluticasone (Flovent) 110 mcg 2 puffs bid

IV to PO (Y/N): Oral Equivalent:
Target Drug (Y/N):
Potential ADE (Y/N): ADE:

Multiple lines of substitution information can be entered here

Sample Therapeutic Substitution Rule Display

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAO LUU

Inpatient Medication: TTINSIGHT,TIM A#V000002151 ADM IN

Med Dosing Ix Cond Cmts Queries Ints Cjin Ints Gen Info* Pat Data

Rx # NEW Order Type MED Age/Sex 54/M Room 443
Order Dr* AAROKEN Location 4ND Bed A

Med * VANINH
(Med,Dose,Route,Sig,Schedule,Par,Total Doses)

Clinical Indication

Dose* () Bulk?
Route
Sig
Schedule Par PRN Reason

Start Date Start Time Total Doses
Stop Date Stop Time Soft Stop Refill Freq
Dispense () Cart Amount
Inventory
Charge Type

Label
Comments

TIG THERAPEUTIC SUB RULE
This medication requires therapeutic substitution per P&T.
Becloment 4 puffs bid = Fluticasone
(Flovent) 110 mcg 2 puffs bid
Becloment 2 puffs bid = Fluticasone
(Flovent) 44 mcg 2 puffs bid

(PER DOSE)

IV to PO Conversion

- Fields can be added to the Drug CDS.
- The first field identifies if the medication can be converted to a PO medication.
- The second field will define the dose of the oral form that is equivalent to the IV form.
- The global refill rule provides the following information. For patients with active orders for the medications identified that can be converted to PO. It searches through the active orders of the patient for any other active orders for oral dosage forms that have a schedule of SCH. If that is the case the rule will display a message that the patient is receiving an IV medication that may be suitable for a specific PO substitution.

IV to PO Conversion Set-Up

Answering “Y” to this field identifies if the medication can be converted to PO.

Dispensing Purchasing Inventory Misc Ordering
Site Defaults CDS Order Strings

CIP400PM CIPROFLOXACIN 400MG/200 ML D5W

Non-formulary (Y/N): Antibiotic (Y/N):
Therapeutic Substitution (Y/N): Sub. with:

IV to PO (Y/N): Oral Equivalent: CIPROFLOXACIN 250 MG
Target Drug (Y/N):
Potential ADE (Y/N): ADE:

Oral Equivalent information to display can be entered here

IV to PO Conversion Refill Rule Display

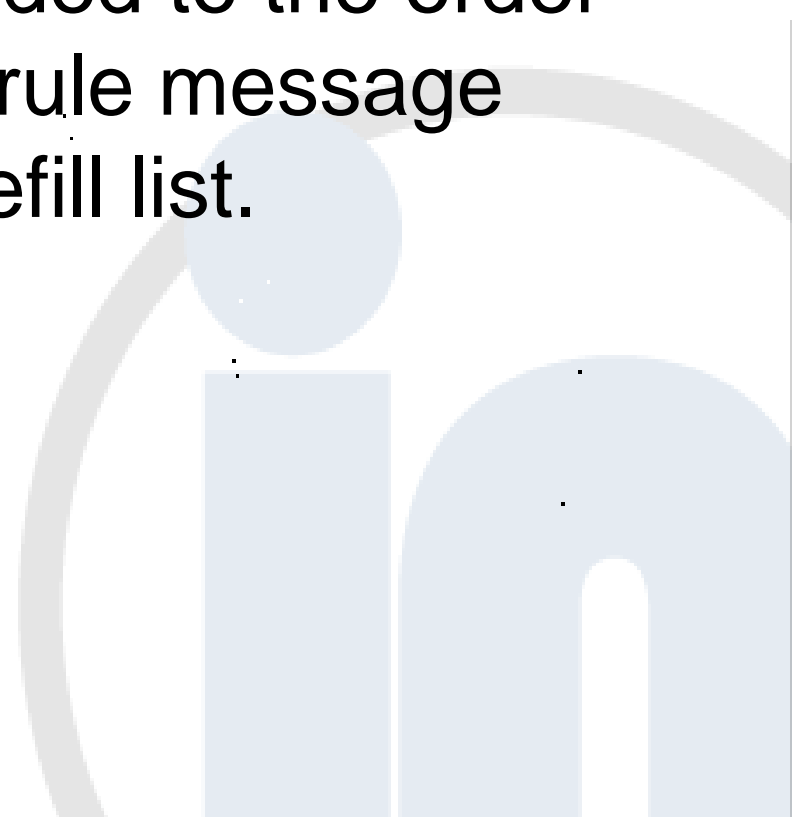
[FRIENDS WITH MEDS]

TTINSIGHT, PAT1 HT: 177.8 AGE/SEX: 54/M LOC: 4NO
V000002106 WT: 95.254 BSA: 2.19 m2 R/B: 470-A

<u>Rx #</u>	<u>MEDICATIONS</u>	<u>AMOUNT TO DISPENSE</u>
000001298	CIPROFLOXACIN/D5W 400 MG/200 ML BAG (CIPRO PREMIXED IN D5W)	226 BAGS (200 ML EACH) (224 LATE)
	**** CLINICAL REVIEW 10/18/05-0853 by REFILL LST Review for IV to PO conversion. Oral Equivalent: CIPROFLOXACIN 250 MG	
000001712	METFORMIN 500 MG TAB (GLUCOPHAGE)	168 TABS (500 MG EACH) (166 LATE)
	* HOLD PRE AND POST SURGERY AND POST X-RAY DYE STUDY **** CLINICAL REVIEW 10/18/05-0853 by REFILL LST Potential ADE, please note consecutive increases in creatinine level	

Added Sophistication

- If after reviewing an IV order, if it is determined that the IV should continue, an additional field can be added to the order type CDS to remove the rule message from displaying on the Refill list.



Order Type CDS

An Additional field can be added to the order type CDS. The CDS is attached in the Order Type dictionary

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAO LUU

Enter/Edit PHA Order Type Dictionary

Mnemonic Active? Name

Type Manual Dispense? Billing Revenue Group

Default Schedule Chemo? Customer Defined Screen PCS MAR Assessment

IVs

TPN? Return Fee Restrict IV Fluid to Dispense Unit Restrict IV Fluid to Ordering Unit

Special? Rate Unit

Max IV Fluids Order by

Dispense by Calculate by

Dft From 1st Additional Vol (mls)

IV Site Req? Use Drip Unit?

Ask Weight? Route of Admin

Return To Inv? Max Duration

Worksheet

Report Fragments

Sites

.DFT	DEFAULT

→ Type Fragment

Sample Order Type CDS

By utilizing the limited edit function and answering “Y” to the query “IVPO Reviewed by Pharmacist (Y/N):” the message will no longer display for this order on the refill list.

PHA.GSR (GSR/GSR.TEST154/GSR.TEST154/GSR/MAIN) - RAD

Limited Edit

Rx # 000001298 Acct # 000002106
Patient TTINSIGHT.PAT1 Age/Sx 54/M
Ord Typ INP MEDICATIONS Status ADM IN

Bottle Type

Medication
CIPROFLOXACIN 400MG/200 ML DSU

Instructions Start Stop
400 MG IV BID 06/27/05-2145 None

CIPROFLOXACIN 400MG/200 ML DSU

TIG PHA RX CDS

IVPO Reviewed by Pharmacist (Y/N): N

Drug Disease Interactions

- Identify drugs that are used to treat specific diseases on a patient's profile.
- Then utilize a rule to check for that drug when ordering a drug contraindicated with that disease.
- A warning message will display if the possible contraindication is identified. An example might be Digoxin, used to treat CHF. The rule would be attached to drugs contraindicated in CHF.
- These would be drug specific rules attached to individual drugs on the ordering page of the formulary

Sample Disease Contraindication Rule

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAO LUU

Inpatient Medication: TTINSIGHT,TIM A#V000002151 ADM IN

Med Dosing Tx Cond Cmts Queries Ints Clin Ints Gen Info* Pat Data

Rx # NEW Order Type MED Age/Sex 54/M Room 443
Order Dr* AAROKEN Location 4NO Bed A

Med * ZYV0600
(Med,Dose,Route,Sig,Schedule,Par,Total Doses)

Clinical Indication


Dose* () Bulk?
Route
Sig
Schedule Par PRN Reason

Start Date Start Time Total Doses
Stop Date Stop Time Soft Stop Refill Freq

Dispense
Inventory
Charge T: DOSE)

Label
Comment:

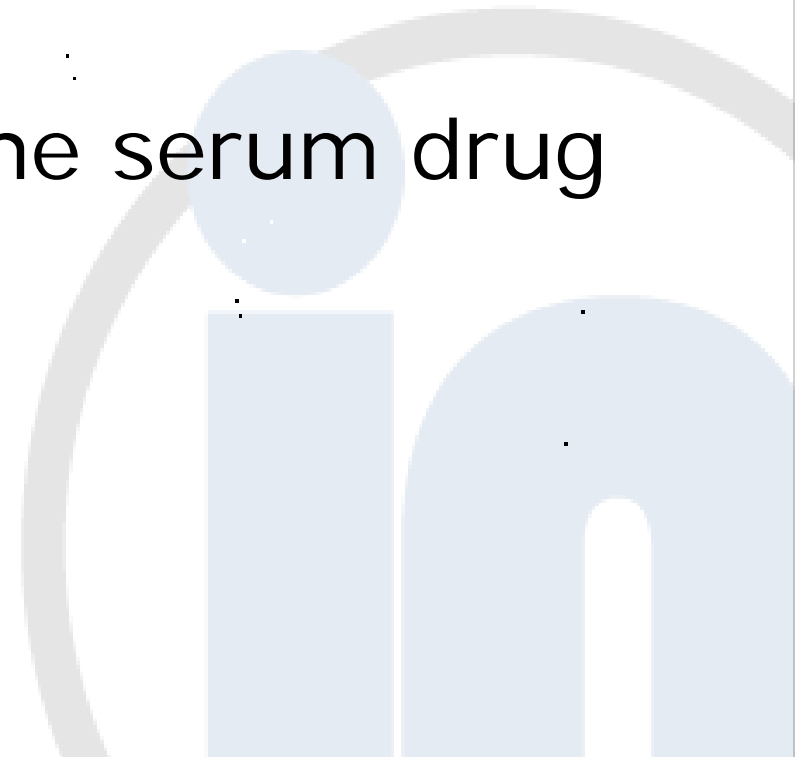
Warning

 PATIENT RECEIVING DIGOXIN MAY HAVE CHF, POSSIBLE CONTRAINDACATION

OK

Serum Drug Level Monitoring

- Report to list all serum drug levels reported by lab each day with trending information, identifying out of range results.
- Refill rule to display the serum drug levels on refill list.



Target Drug Monitoring

- Add field to the Drug Dictionary CDS to identify a drug as a target drug. (*easily turned on or off*)
- Report for Target Drugs with user specified data for all drugs identified on CDS.



Target Drug CDS Set-Up

Enter/Edit PHA Drug Dictionary

Dispensing Purchasing Inventory Misc Ordering
Site Defaults **CDS** Order Strings

ASA/325T ASA/CALCIUM CARB/MAGNESTUM/ALH 325 MG TABLET

Non-formulary (Y/N):

Therapeutic Substitution (Y/N): Sub. with:

IV to PO (Y/N): Oral Equivalent:

Target Drug (Y/N):

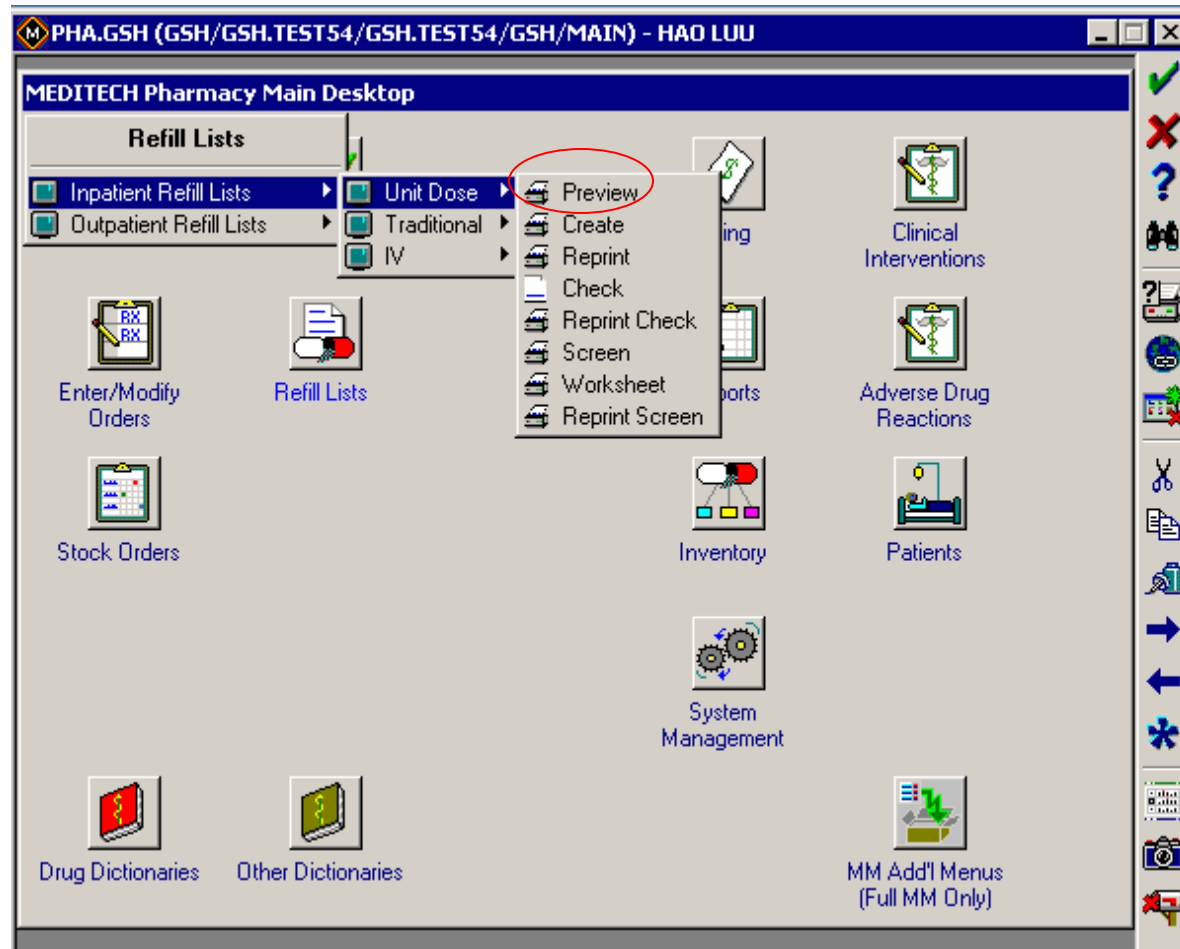
Potential ADE (Y/N): ADE:

Target Drugs can be easily turned On or Off on the CDS

Refill Lists

- Refill rules are applied to both Unit Dose Refill Lists and IV Refill Lists.
- The **PREVIEW** refill list can be used when monitoring patients for rule messages.
- Two additional refill list custom formats may need to be created named “RULE” and “NORULE”.
- These custom refill list formats could be selected for the appropriate refill list to be run. After filling in all the appropriate information, at the Alternate List Format, the user can hit <F9> lookup and select one the refill list custom formats.

Preview Refill List may be Utilized



Custom Refill List Formats

Additional refill list formats should be created

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAO LUU

Dose Refill List

Order Group
MED MEDICAT

Cart Run *
4N 4 NORTH

Lookup

Refill List Format

Mnemonic	Name
.IV	STD IV FORMAT
.OUT	STD OUTPATIENT FORMAT
.OUT.IV	STD OUTPATIENT IV FORMAT
.TRAD	STD TRADITIONAL FORMAT
.UNIT	STD UNIT DOSE FORMAT
IV	IV FORMAT
NORULE	STD UNIT DOSE FORMAT W/O RULE
RULE	STD UNIT DOSE FORMAT W/ RULE
UNIT	STD UNIT DOSE FORMAT

es _____
Wksht _____

Alternate List Format _____

Print in Bkg?

These can be used in the "Alternate List Format"

Using Alternate Refill List Format

PHA.GSH (GSH/GSH.TEST54/GSH.TEST54/GSH/MAIN) - HAO LUU

PHA Preview Unit Dose Refill List

Order Group		Restrict To PHA Site	
MED	MEDICATIONS	MAIN	MAIN PHARMACY

Cart Run *		Devices	
4N	4 NORTH	List VIEW	Wksht

Order Type	Label Device	Alternate List Format
		RULE

Print in Bkg?

All the "Order Type" and "Label Device" prompts should be cleared to prevent labels from printing.

Sample – Refill List with Rules Only

[PID=12108]Unit Dose Refill List with Rules Only - MEDITECH Document Preview

File Help

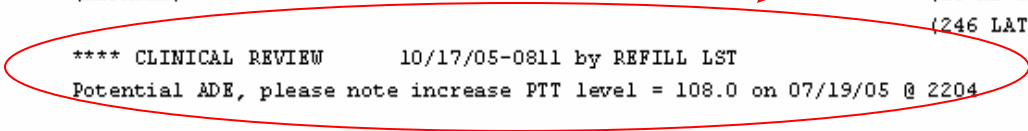
RUN TIME: 0812 Unit Dose Refill List with Rules Only
 CART: 4NO ORDER GROUP: MEDICATIONS 10/17/05-1501 BATCH: PREVIEW

PATIENTS WITH MEDS

TTINSIGHT HMO HT: AGE/SEX: 34/M LOC: 4NO
 V000002150 WT: BSR: m2 R/B: 446-A

Rx #	MEDICATIONS	AMOUNT TO DISPENSE	DIRECTIONS
000001708	HEPARIN SODIUM 10 U/ML ML (HEPARIN)	249 MLS (10 ML EACH) (246 LATE)	10 U Q8H
	**** CLINICAL REVIEW 10/17/05-0811 by REFILL LST Potential ADE, please note increase PTT level = 108.0 on 07/19/05 @ 2204		
000001728	LEVOFLOXACIN/DEXTROSE 5%-WATER 250 MG/50 ML ML (LEVAQUIN 250MG/50ML DSW)	164 MLS (50 ML EACH) (162 LATE)	250 MG Q12H
	**** CLINICAL REVIEW 10/17/05-0811 by REFILL LST Review for IV to PO conversion. Oral Equivalent: Levoquin Oral		
000001733	RANITIDINE HCL 150 MG TAB (ZANTAC)	300 TABS (150 MG EACH) (296 LATE)	150 MG ACHS
	**** CLINICAL REVIEW 10/17/05-0811 by REFILL LST Potential ADE, please note decrease platelet count = 47 on 07/19/05 @ 2205		
000001711	UNLADOLIC ACID 250 MG CAP	200 CAPS	500 MG

Only orders with refill rule messages would display



Sample Refill List with No Rule Display

[PID=12108] Unit Dose Refill List without Rules - MEDITECH Document Preview

File Help

Unit Dose Refill List without Rules

CART: 4N0 ORDER GROUP: MEDICATIONS 10/17/05-1501 BATCH: PREVIEW

PATIENTS WITH MEDS:

TTINSIGHT, MNO HT: AGE/SEX: 34/M LOC: 4N0
V000002150 WT: BSA: m2 R/B: 446-A

Rx #	MEDICATIONS	AMOUNT TO DISPENSE	DIRECTIONS
000001708	HEPARIN SODIUM 10 U/ML ML (HEPARIN)	249 MLS (10 ML EACH) (246 LATE)	10 U Q8H
000001728	LEVOFLOXACIN/DEXTROSE 5%-WATER 250 MG/50 ML ML (LEVAQUIN 250MG/50ML D5W)	164 MLS (50 ML EACH) (162 LATE)	250 MG Q12H
000001710	QUINIDINE INJ 80 MG/ML VIAL (QUINIDINE GLUCONATE)	328 UNITS	160 MG 6H
000001733	RANITIDINE HCL 150 MG TAB (ZANTAC)	306 TABS (150 MG EACH) (296 LATE)	150 MG ACHS
000001711	VALPROIC ACID 250 MG CAP (DEPAKENE)	996 CAPS (250 MG EACH) (984 LATE)	500 MG Q4H

4/10 82%

All orders display without refill rule messages

Refill List Timing

- The time the preview REFILL LIST is compiled in relation to your standard cart run times may require the edit cart run routine to be utilized.
- Your preview should include a full 24 hour period.
- This is accessed by highlighting the first cart run and then selecting the *. The user can select Edit All Cart Runs and put the Date and Time of your next cart run in the fields (i.e. if your normal cart runs are each day at 0700, and the refill list has already been generated for today and it is still before 0700, you would put T+1 in the date field and 0700 in the time and 1 in the number of Refill periods.)

Sample Preview Cart Run Edit

PHA Preview Unit Dose Refill List

Order Group	MED	UNIT DOSE MEDICATION	Restrict To PHA Site	MAIN	MAIN PHARMACY
-------------	-----	----------------------	----------------------	------	---------------

Cart Run *	2M	Special Function	List	Devices	Wksht
	2N	Edit THIS Cart Run			
	2W	Edit ALL Cart Runs			
	3M	3M CART RUN	Order Type	Label Device	Alternate List Format
	3N	3N CART RUN			
	3W	3W CART RUN			
	4N	4N CART RUN			
	4W	4W CART RUN			

Print in Bkg?

Highlight the First Cart Run and Select the * (special function icon)



Preview Cart Run – Date and Time Edit

PHA Preview Unit Dose Refill List

Order Group		Restrict To PHA Site	
MED	UNIT DOSE MEDICATION	MAIN	MAIN PHARMACY

Cart Run *		Devices	
2M	2M CART RUN	List	
2N	2N CART RUN		
2W	2W CART RUN		
3M	3M CART RUN		
3N	3N CART RUN		
3W	3W CART RUN		
4N	4N CART RUN		
4W	4W CART RUN		

Order Type Label De

Edit All Cart Runs

From Date T+1

From Time 0700

Refill Periods 1

Thru Date

Thru Time

The From Date and Time should be the time of your next cart run, the number of Refill Periods (usually 1), should equal 24 hours or more

Summary – What it takes

- Missing Demographics – Custom NPR Report, Global Med Rule, OE Category Rule
- Renal Dosing – Med CDS Queries, Dosage Information per Drug, Single Med Rule Attached to Multiple Drugs, Calculation Rule, Integrated Lab System
- A.D.E. Monitoring – MIS Group Responses, Med CDS Queries, Refill Rules per ADE, Pharmacy Custom Key Word, ADE vs. Drug Information, Integrated Lab System
- Non-Formulary – Med CDS Query, Global Med Rule
- Therapeutic Substitution – Med CDS Queries, Global Med Rule
- IV to PO Conversion – Med CDS Queries, Global Refill Rule, Order Type CDS Query, IV to PO Medication Equivalent Policies/Data
- Drug Disease Interactions – Med Rule per Drug, Drug Disease Contraindication Information
- Drug Serum Level Monitoring – Refill Rule per Drug Monitored
- Target Drug Monitoring – Custom NPR Report, Med CDS Query

Sample ADE Rule

; This rule will display patient with cyclosporine receiving cyclosporine drug

;

[f rx med]^M,

"PHA.ADEGRP"^GRP,

"CYCLOSPRNE"^CDS,

IF{[f z.get.cds.resp](M,GRP,CDS) ""^RES,

[f rx nth ver Res-RES]("CYCL1",1)^RES,

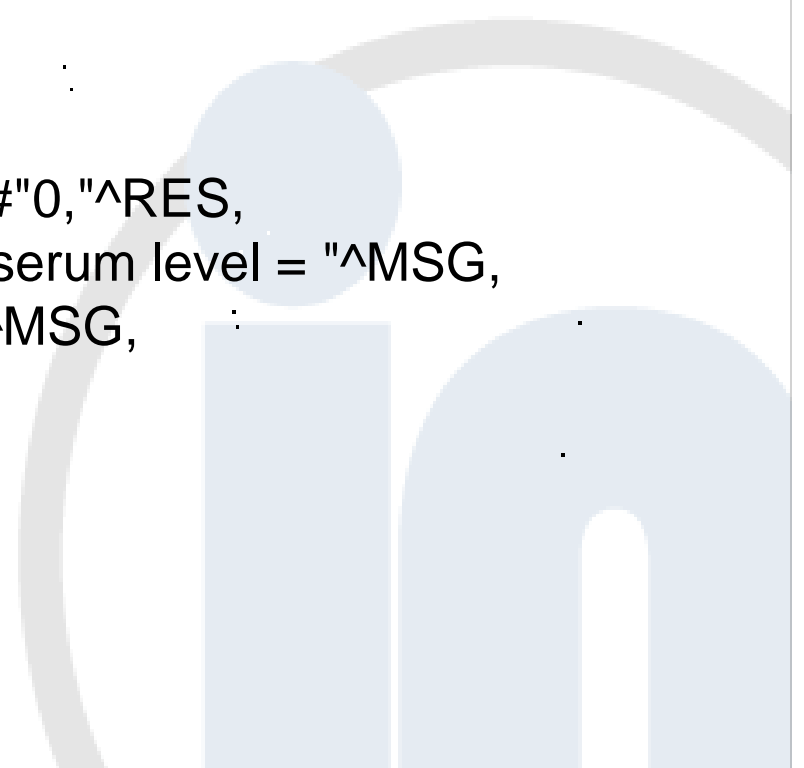
RES#"1,"^RESDT,RES#"2,"^RESTM,RES#"0,"^RES,

IF{RES>500 "Potential ADE, cyclosporine serum level = "^MSG,

MSG_RES_" on "_RESDT_" @ "_RESTM^MSG,

Q(MSG,RESDT,RESTM);[f rx reject];

[f rx reject];



Sample Custom Keyword

z.get.cds.resp

%PHA.RX.zcus.tig.npr.rx.rules.M.get.resp(

; This program will get the ADE group Response from the formulary Dictionary

; A - Med

; B - Query

; C - Response to check for

;

A^PHA.DRUG.mnemonic,

B^PHA.DRUG.query,

""^PHA.DRUG.query.mult.q^FND,

DO{@Next(PHA.DRUG.query.mult.q)&'FND

IF{@PHA.DRUG.query.mult.resp=C 1^FND}},

FND;



Questions / Discussion



Contact Information

<http://www.theingroup.com>

Bruce.Matthias@theingroup.com

