Why is HIT so frustrating, and how can we make it less so?

SINI, Baltimore, MD

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- UPENN PI, FDA-Harvard study of CPOE and medication error
- Evaluator, Harvard Medical School's SHARP 3 project to develop a new HIT computer architecture
- Senior Investigator, NSF-Penn study of smart alarms and of safe cyber communication within hospitals
- Co-PI, NSA study of workarounds to computer access rules
- Research Director, Study of scheduled medication registries and safe prescribing
- Editorial Board, International Journal of Medical Informatics


PUBLIC SCHOOL
70
1952 - 53
CLASS 1-3
CHESTER PHOTOS

Ross has such extraordinary potential.

It's such a pity that he…

Assumptions and Facts

- More HIT = More Patient Safety?
- More HIT = Less Patient Safety?
- More HIT = No Change to Patient Safety?
- More HIT = Different Patient Safety Issues?
- More HIT = Unknown Patient Safety Changes?
- More HIT = More HIT?
- More HIT = More HIT Sales?

Assumptions and Facts

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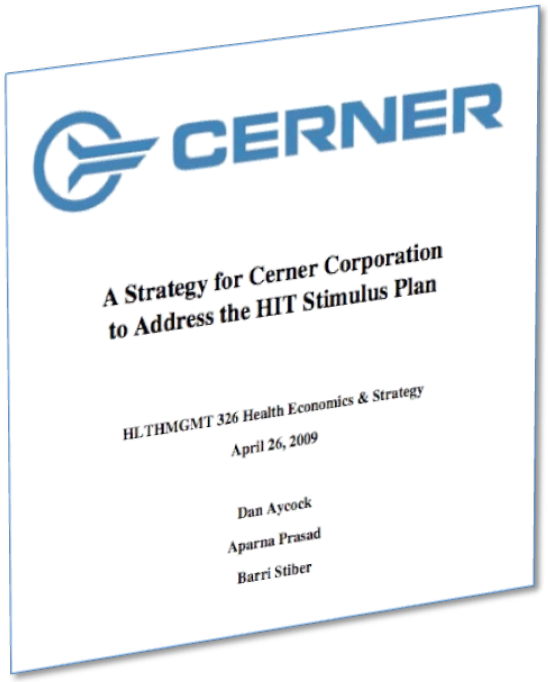
The Use and Meaning of Patient Safety

"Because patient safety is viewed so favorably, our task is to ensure HIT *appears to enable* patient safety"

Dr. Douglas Peddicord
(American Medical Informatics Association's Chief Lobbyist)
Washington Health Strategies Group
Oldaker, Belair & Wittie LLP
Phoenix, Arizona, May 2010



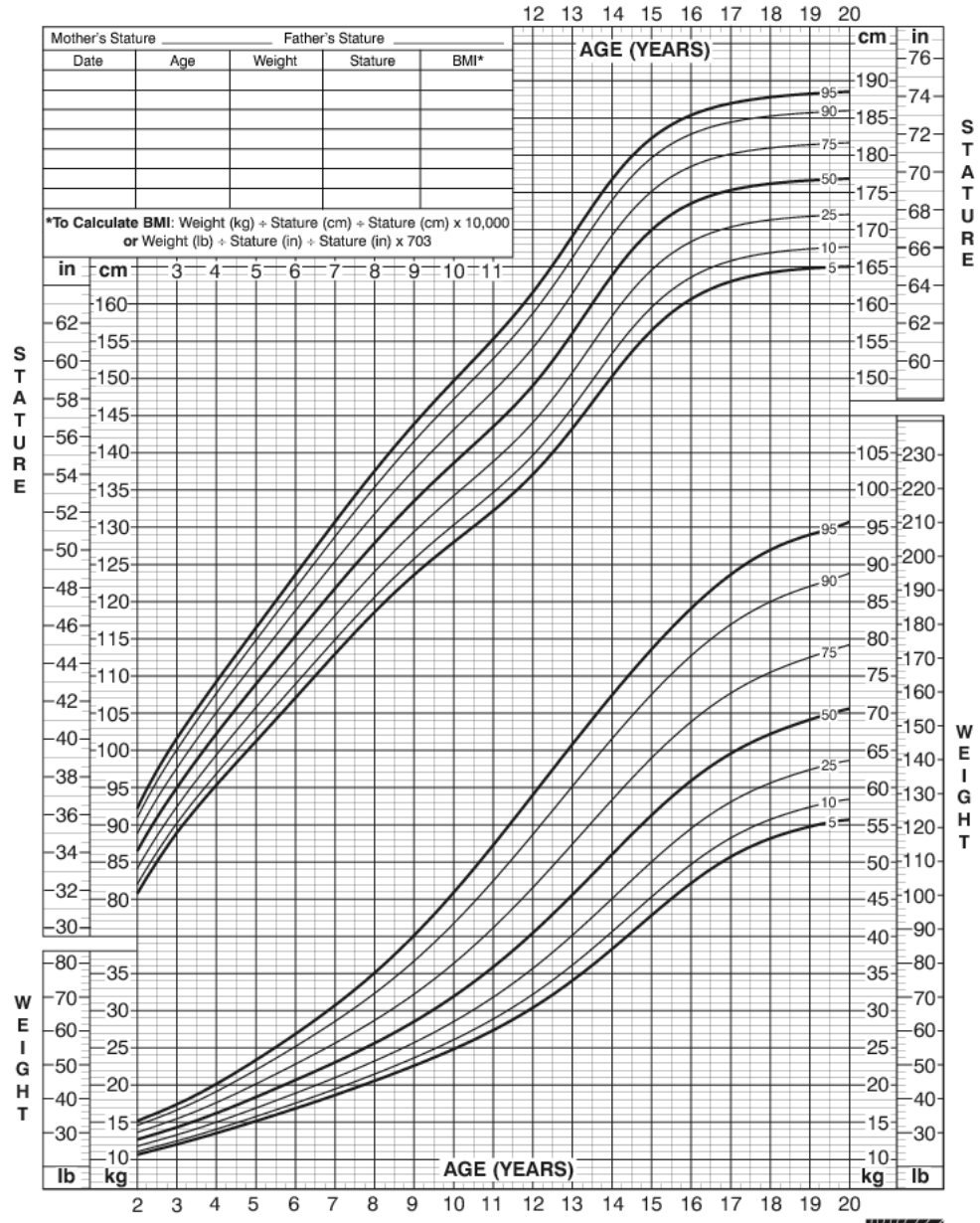
"The message to government officials must not appear to be for the purposes of establishing barriers to entry, rather, it must suggest that *meaningful* cost savings & *quality improvements* cannot be achieved without a high standard of "meaningful use."

Growth Chart

2 to 20 years: Boys
Stature-for-age and Weight-for-age percentiles

NAME _____

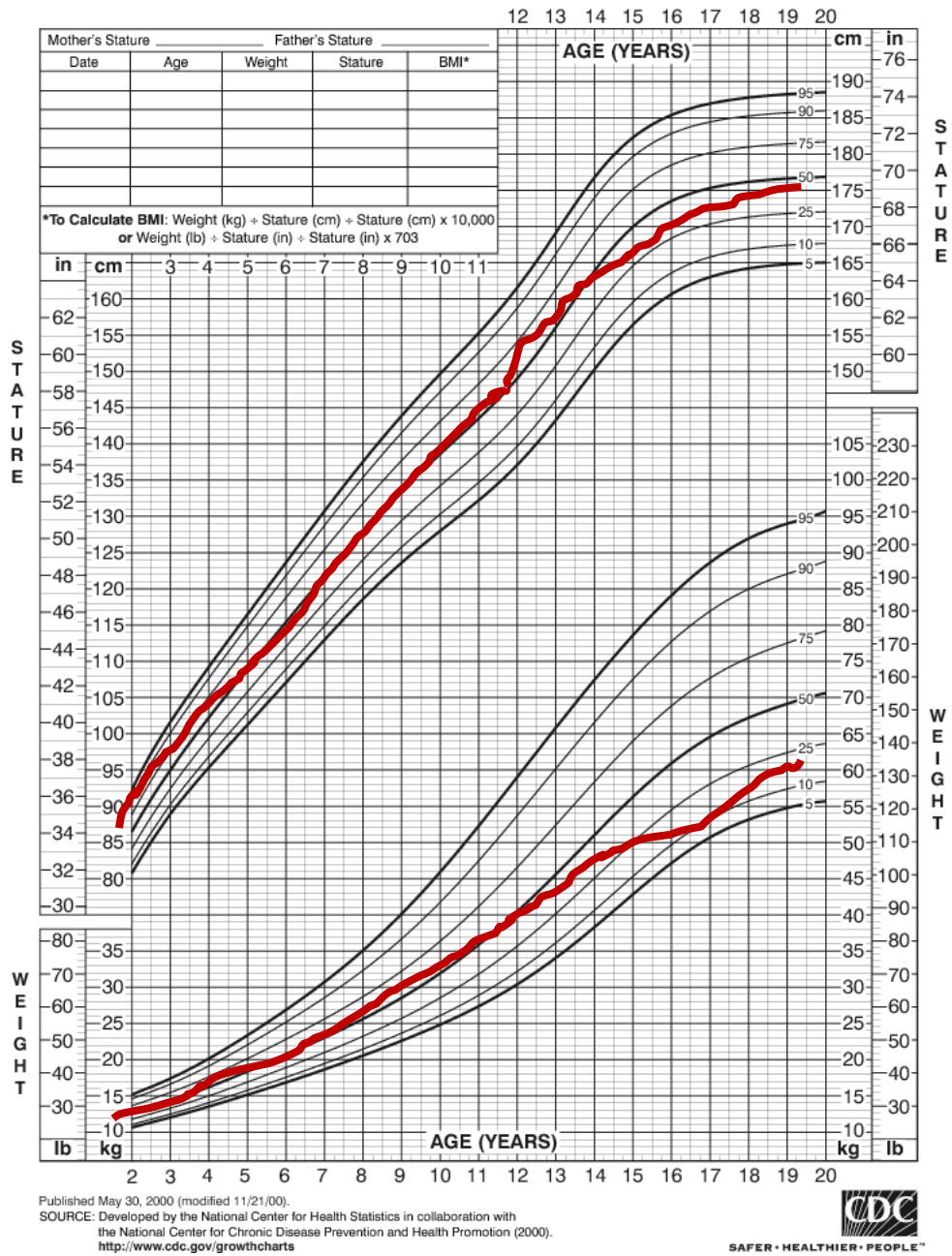
RECORD # _____



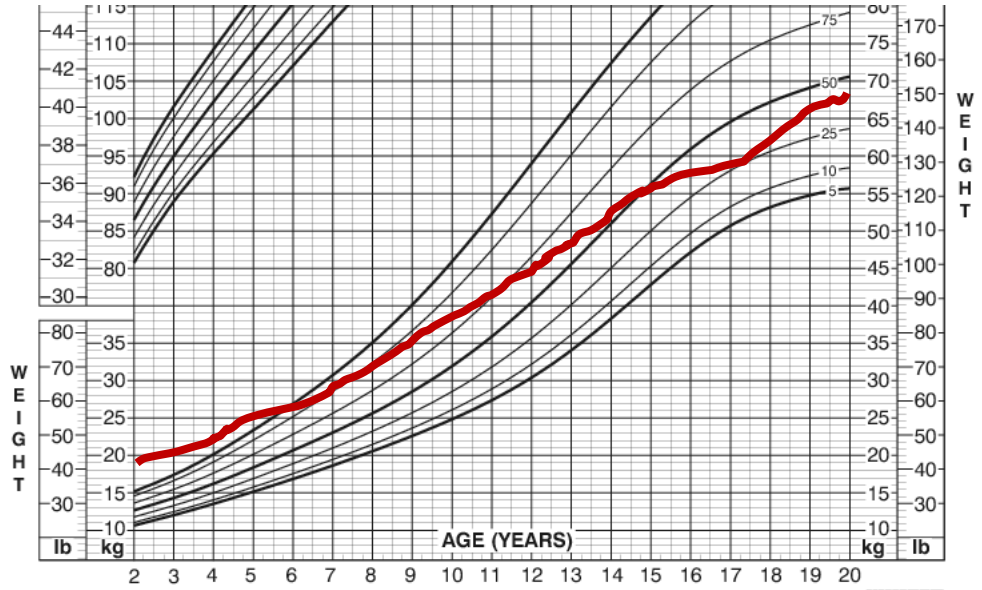
Published May 30, 2000 (modified 11/21/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

SAFER • HEALTHIER • PEOPLE™

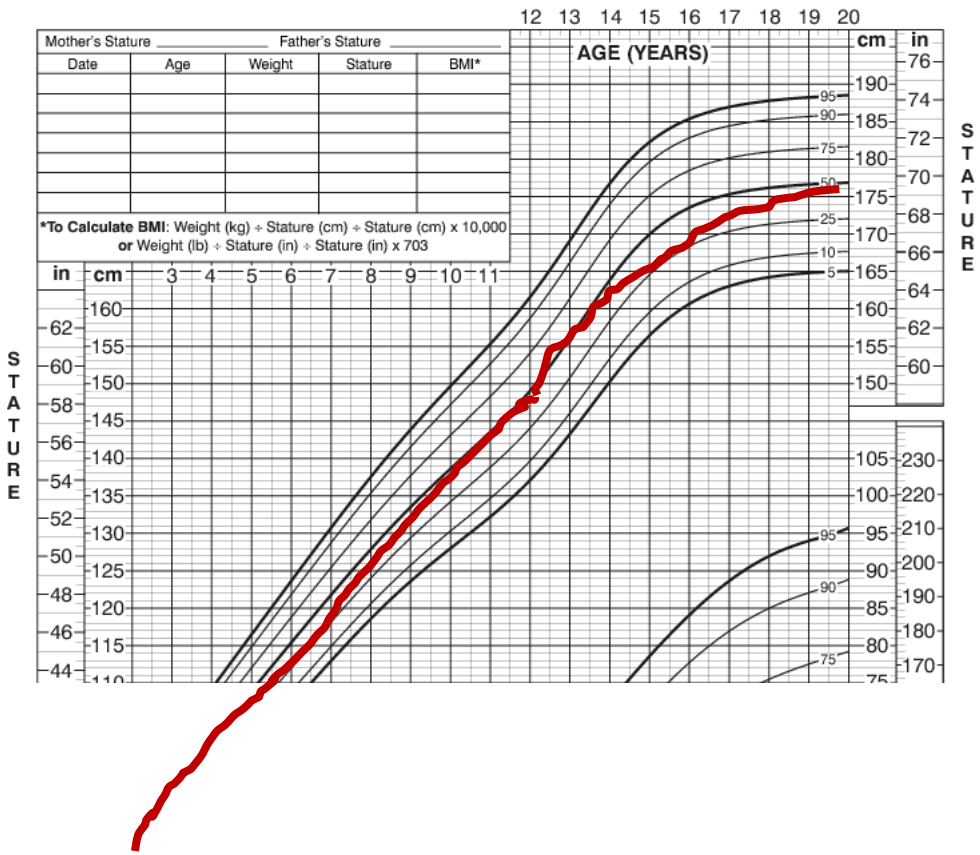
Growth Chart



Growth Chart



Growth Chart



Example 1: A seemingly straightforward measure in an EHR

Legit Blood Pressure Reporting Entries

125 | 75

125
75

125/75

75

2 pages later

125

Low

OK

Under control

Treated

Too High

Labile

Left Foot

There are 40 legitimate ways of recording bp in standard EHRs

More Legit Blood Pressure Reporting Entries

Seated, Systolic pre-Injection

Standing… etc, etc

75

4 pages later

125

High

Improved

Non-compliant

Meds too low

After exercise

w/o meds

Right Foot

18 more

Example 2.

5

4

1

7

2

Another Example

- ☑ No allergy
- ☑ No known allergy
- ➔ **Multiple Allergies**

- ☑ Penicillin allergy
- ☑ Latex allergy
- ➔ **Multiple Allergies**

Do "Multiple Allergies" = "No Allergy" ?

This is obviously wrong, too

No Allergies

Penicillin

Latex

➔

No Allergies

Why does “No Allergies” show?

Yet another example:
Pediatrician A enters data …

Patient weight: 2.7 kg

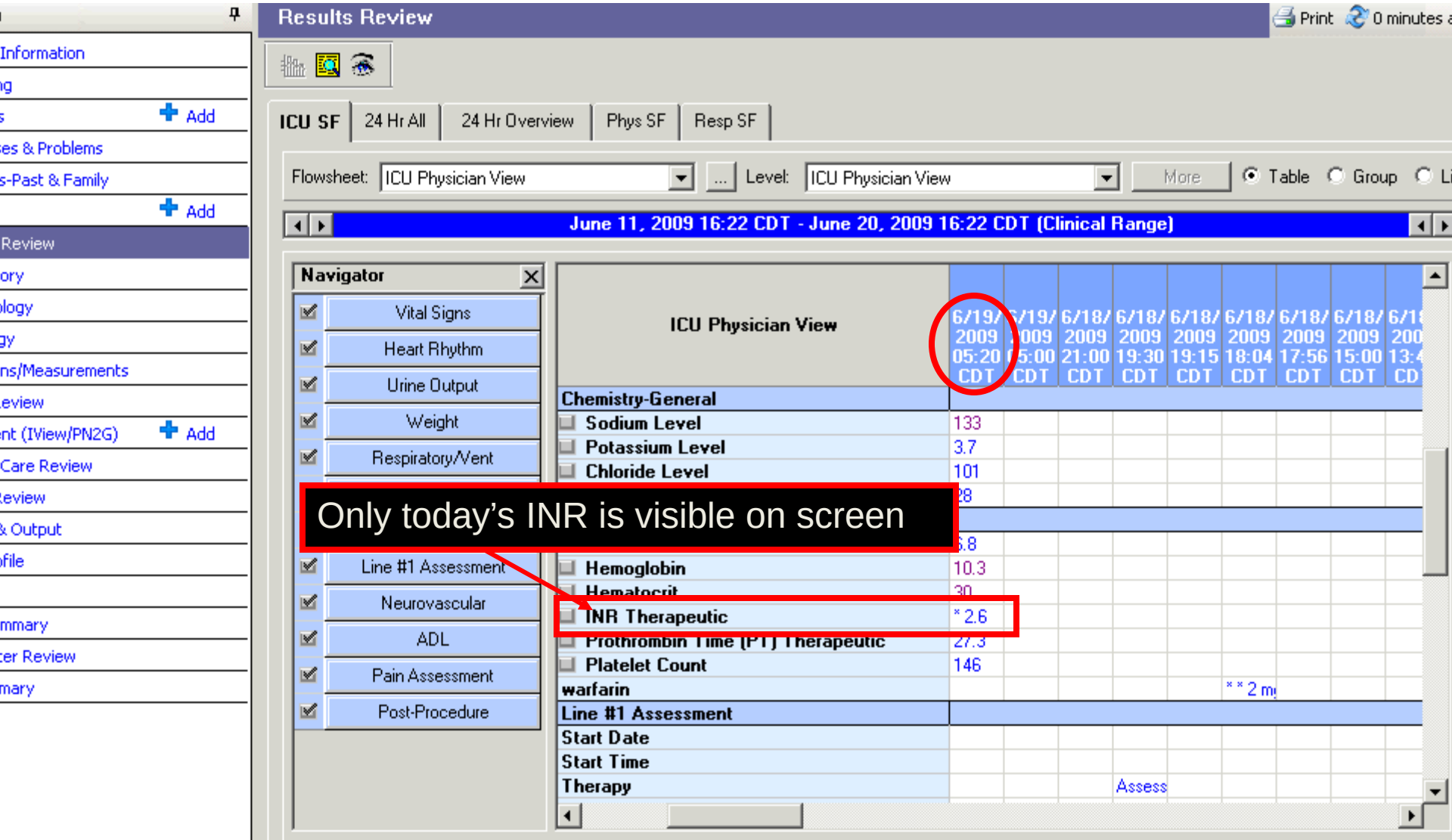
5.9 lbs

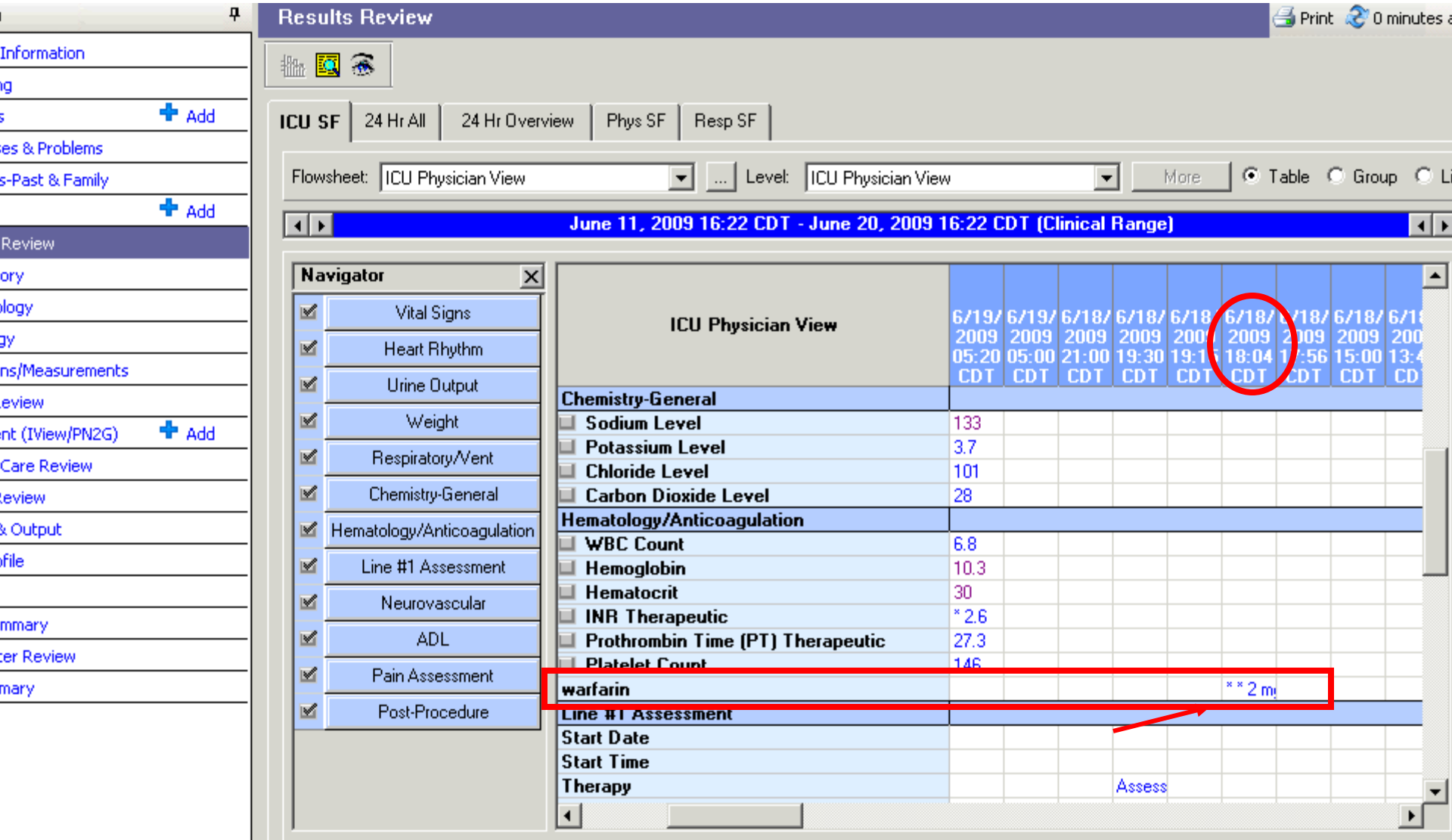
Pediatrician B takes decision…

Patient weight: 5.9

Dilantin at 2.2X dose?

Another example:
Ordering Warfarin: Lag, Prediction, Trends




Results Review
Print
0 minutes
Information
Add
es & Problems
s-Past & Family
Add
Review
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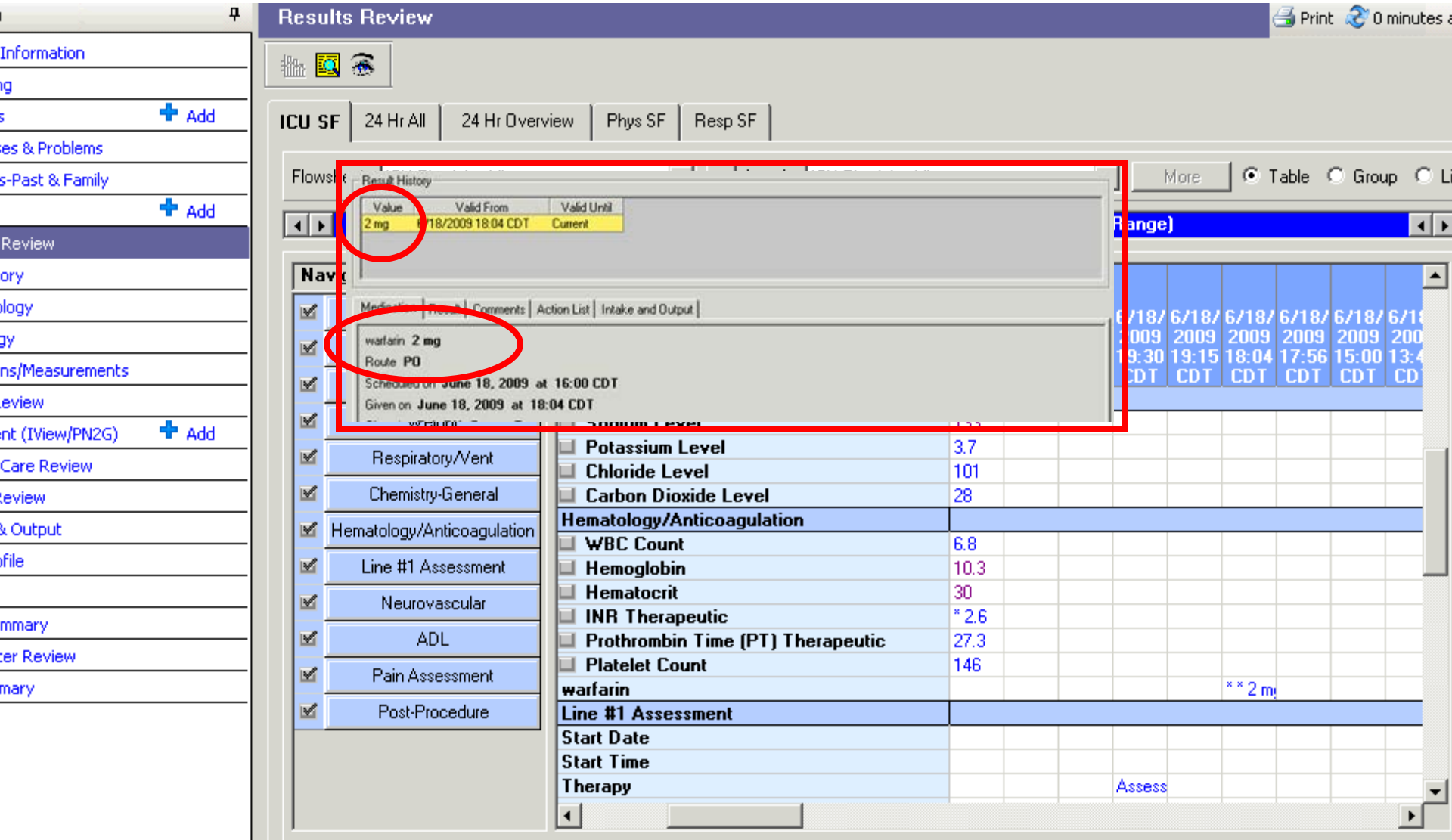
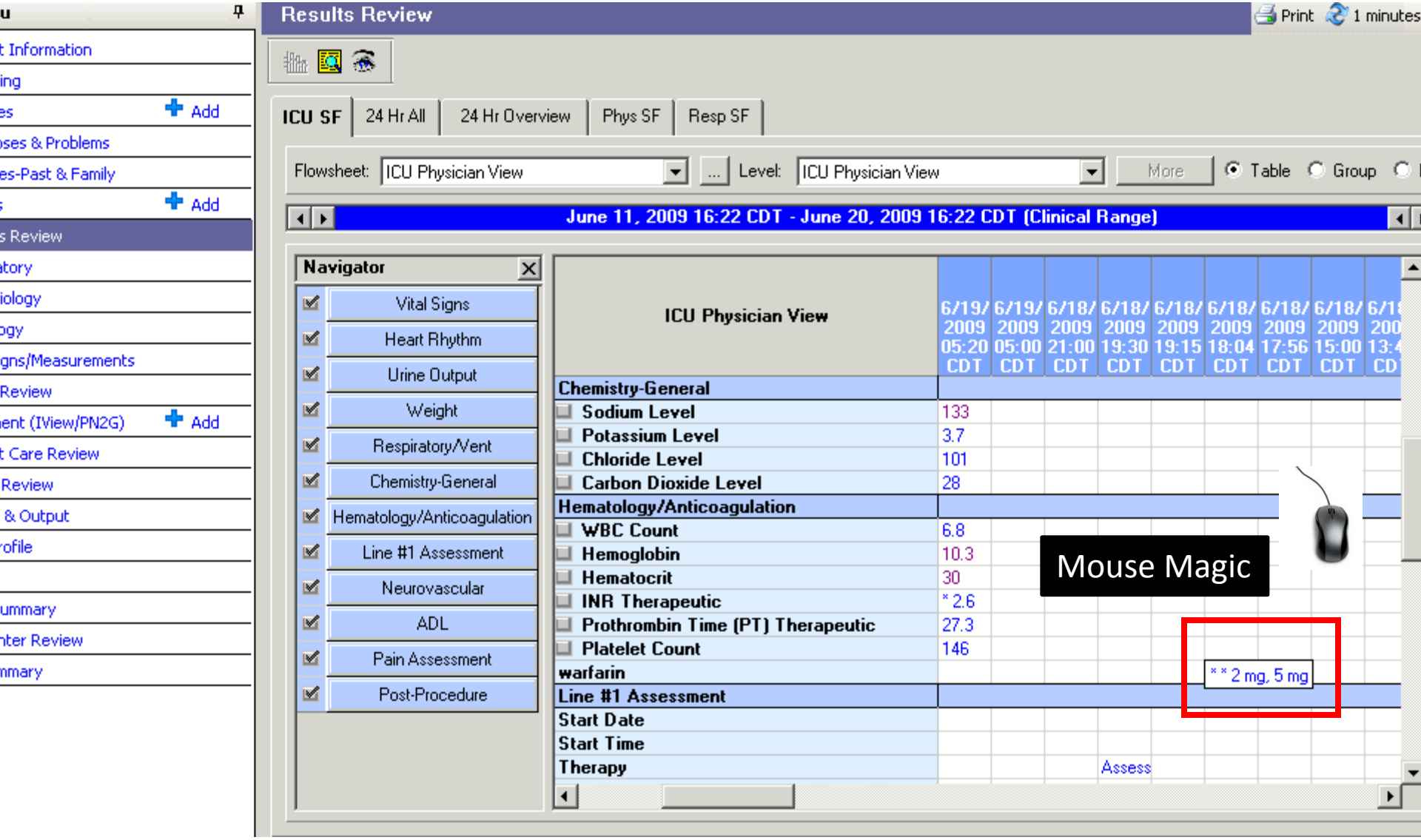
logy
gy
ns/Measurements
eview
nt (IView/PN2G)
Add
Care Review
eview
& Output
file
mmary
er Review
mary
ICU SF
24 Hr All
24 Hr Overview
Phys SF
Resp SF
Flowsheet:
ICU Physician View
Level:
ICU Physician View
More
Table
Group
June 11, 2009 16:22 CDT - June 20, 2009 16:22 CDT (Clinical Range)
Navigator
Vital Signs
Heart Rhythm
Urine Output
Weight
Respiratory/Vent
Chemistry-General
Hematology/Anticoagulation
Line #1 Assessment
Neurovascular
ADL
Pain Assessment
Post-Procedure
ICU Physician View
6/19/ 2009 05:20 CDT
6/19/ 2009 05:00 CDT
6/18/ 2009 21:00 CDT
6/18/ 2009 19:30 CDT
6/18/ 2009 18:04 CDT
6/18/ 2009 15:00 CDT
Chemistry-General
Sodium Level
133
Potassium Level
3.7
Chloride Level
101
Carbon Dioxide Level
28
Hematology/Anticoagulation
WBC Count
6.8
Hemoglobin
10.3
Hematocrit
30
INR Therapeutic
* 2.6
Prothrombin Time (PT) Therapeutic
27.3
warfarin
Line #1 Assessment
Start Date
Start Time
Therapy
Assess

This pop up would seem to indicate that the patient received 2 mg of warfarin.




Results Review
Print
1 minutes
ICU SF
24 Hr All
24 Hr Overview
Phys SF
Resp SF
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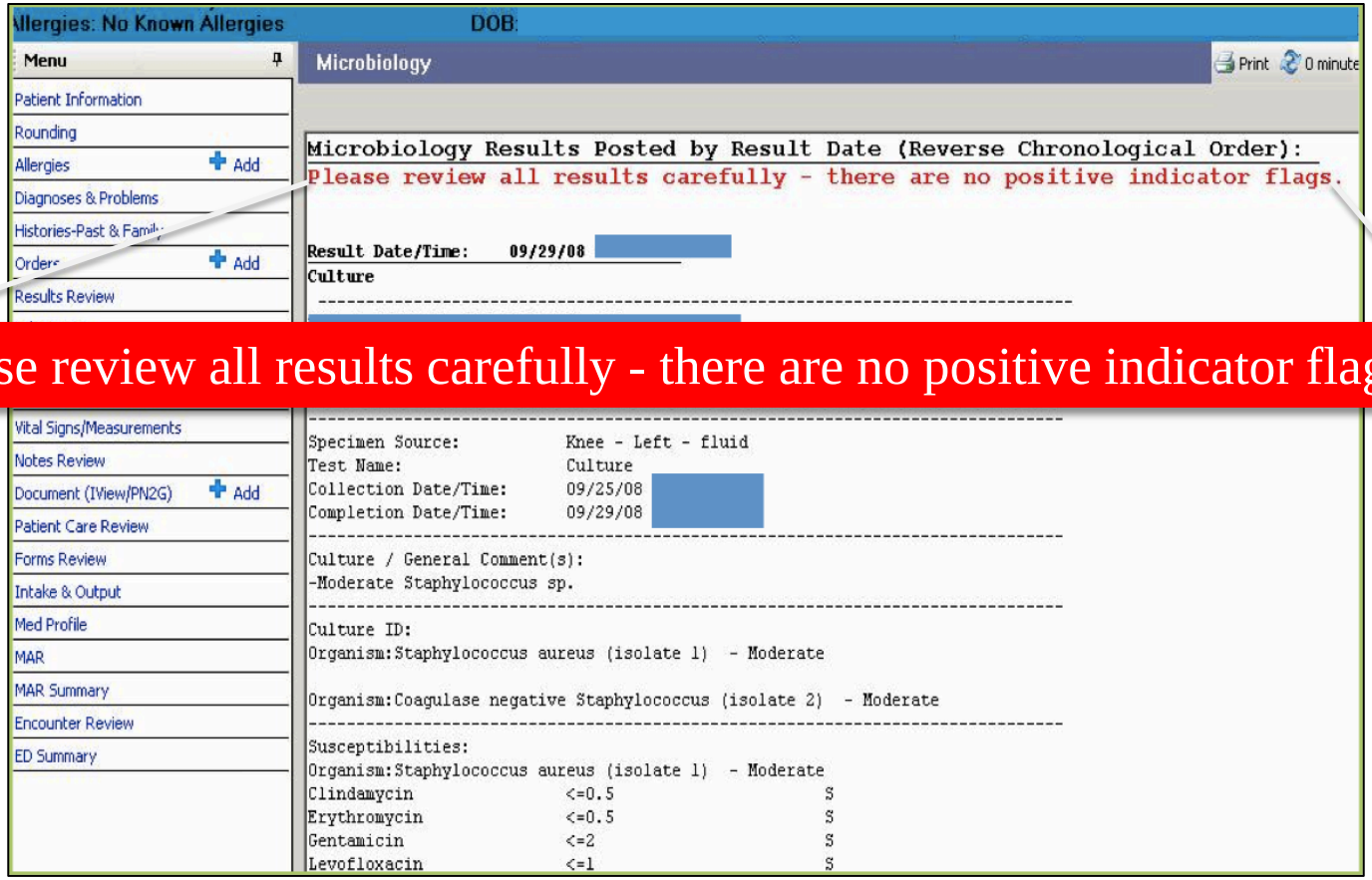
6/18/2009 19:30 CDT
6/18/2009 19:15 CDT
6/18/2009 18:04 CDT
6/18/2009 17:56 CDT
6/18/2009 15:00 CDT
Chemistry-General
Sodium Level 133
Potassium Level 3.7
Chloride Level 101
Carbon Dioxide Level 28
Hematology/Anticoagulation
WBC Count 6.8
Hemoglobin 10.3
Hematocrit 30
INR Therapeutic * 2.6
Prothrombin Time (PT) Therapeutic 27.3
Platelet Count 146
warfarin
* * 2 mg, 5 mg
Line #1 Assessment
Start Date
Start Time
Therapy
Assess
Mouse Magic

Workarounds suggested by the EMR itself?



Enough

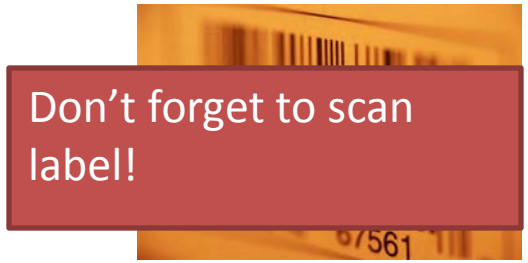
To…. Errors Due To Barcode Technologies

WORKAROUNDS TO BARCODE MEDICATION ADMINISTRATION SYSTEMS: THEIR OCCURRENCES, CAUSES, AND THREATS TO PATIENT SAFETY

Koppel, Wetterneck, Telles, Karsh (JAMIA)

31 Causes of workarounds e.g.,

Unreadable medication-barcodes (crinkled, smudged, torn, missing, covered by another label)



Studied actual BCMA use at 5 hospitals:

1. 

2-Analyses of almost ½ million medication- and patient-ID BCMA uses… and ~50,000 alert-override reasons (in 4 hospitals)

Nurses overrode BCMA-alerts for 4.2% of patients charted; & for 10.3% of medications charted. CONTRAST W/ VENDOR DATA = 0.1% ERROR.

What we did….

3-Interviews with physicians, nurses, pharmacists, IT-directors, vendors

X…. and 34 hospital leaders CMOs, CNOs, CMIOs, CQOs (not in paper)

What we did

Participation in:

4. BCMA-use reviews
5. Failure-mode-and-effects analyses
6. Morbidity and & Mortality Reviews

Causes:

- Unreadable or missing patient-ID-wristbands (chewed, soaked, wrong, missing)
  - Elderly
  - Children; Neonates
  - Moving (unit or floor or nursing home)
- And: *Covered and *Contact isolation
- Different ward/unit/facilitiy
- New: *Intentional (not in paper)

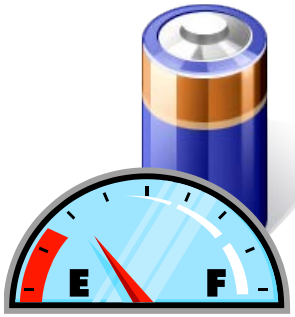
Causes

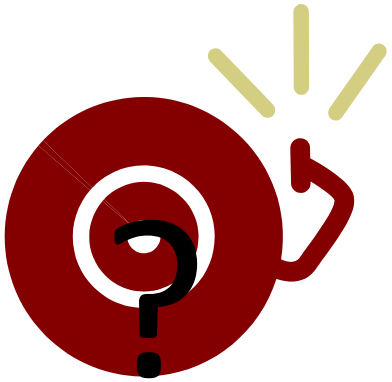
- Uncertain wireless connectivity, broken scanners

- Dumb programming

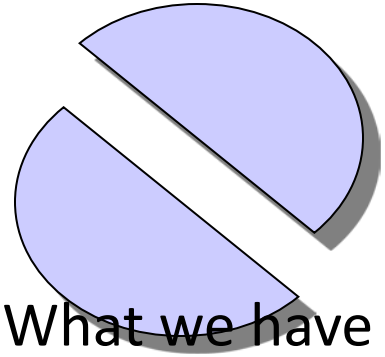
  (2 X 10 = 20?)

Many other causes…



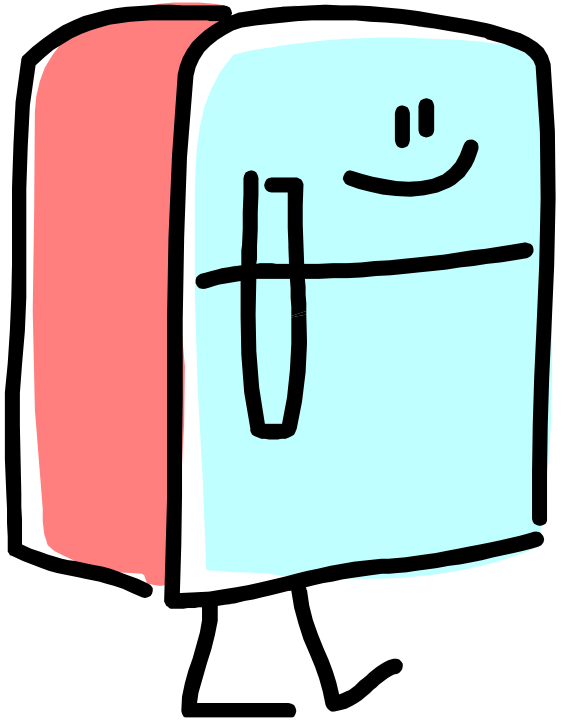


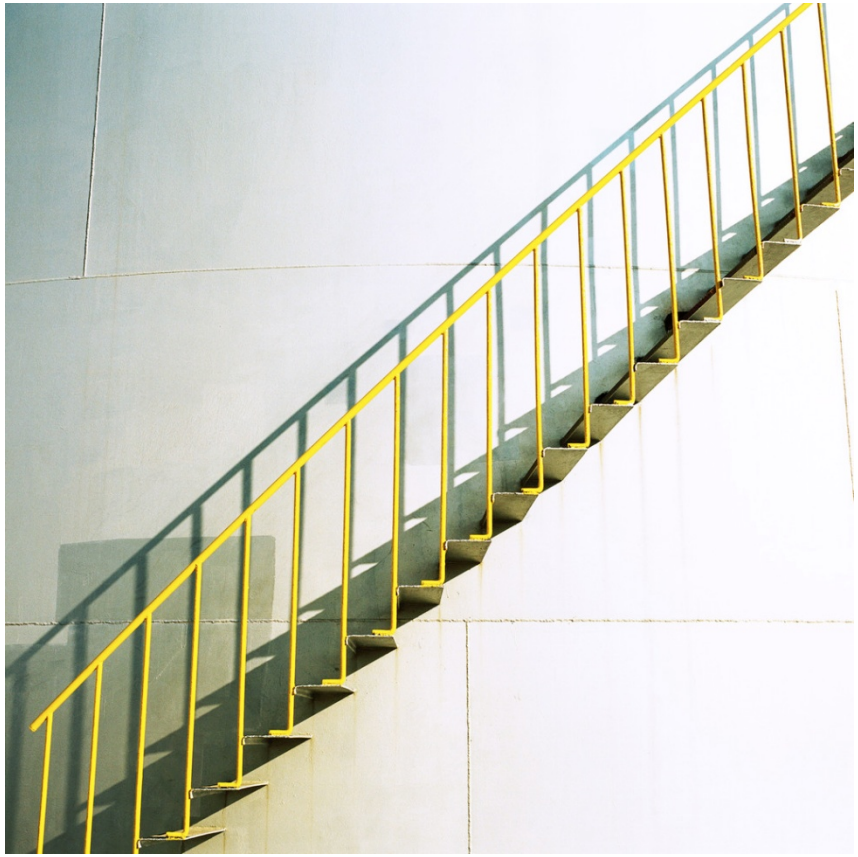
E.D.



What we have

Refrigerated Medicines





Now, The fun stuff:

15 identified Workarounds

Barcodes affixed to:

RN clipboard

Scanner itself

In nurses' pockets,

Belt-rings,

Worn as bangles

More places we found extra copies of pt. barcodes (1st workaround, continued)

- Nurses' desk
- Medication cart
- Supply room
- Med dispensing machine
- Doorjamb
- Baby crib
- Other places…









More workarounds and related issues

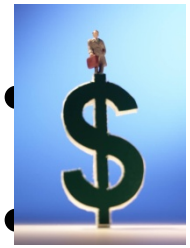




And about 9 other workarounds and 26 other “causes”

So….
why so hard to fix these problems?

Economic capture: HIT: purchase and repairs



- ~$200,000,000 for full, big system (EPIC)
- ~ 4 fold that for training, cross cover, implementation, customization, set up (~$8,000,000)
- Total cost = $1 Billion

HIT: purchase and repairs (2)

- Upgrades and yearly maintenance = $20,000,000 to $30,000,000
- Builds and extra training:

Training = $20,000/day; Builds = $30 to $300 K

You want this fixed?

- Please fix this: drop down menus from hell (forgive mixed direction metaphor)
- Non-valid choices
- Need for modifications

Questions:

- Is it my fault?
- Is it the system?
- Is it the implementation?
- Is it an upgrade?

Questions (2):

- Call help desk?
- Look like idiot?
- Help desk: What did you do?
- Help Desk Problem solved…. Or not?
- Elevate: Help Desk to CMIO
- Elevate: CMIO to Vendor

Elevation to Vendor

Local problem (due to user error or to institutional modification).

May well be true

May be due to links

Training issue (and we have help)

If accepted: Get a ticket, and a category

Vendor priorities (1):

- Who's problem: User fault or "ours"
- Hurt patient(s). How many?
- Additional fee for customization?
- Number of *customers* affected
- Useful for sales soon?

Vendor priorities (2):

- Cost of repairs:
- Send overseas?
- Timing of repairs (in-house; resources)
- Links within other parts of “our” system
- Links with other usual systems (not ours)
- Useful for sales soon? = Delay …why?

Vendor priorities (3):

- How to release:
- Patches and repairs: episodically, weekly or monthly.
- Special releases
- Save for upgrade or version (delay!)

Production schedules

- Usual cycle = 18 mos for development

  And 12 months for testing

  – *You get it 30 months later*

  – *If you hit the cycle perfectly*

How to Mend the Broken Chain?

- Answer: Instant and Frictionless Reporting
- Save identified hazards and problems by independent party
- Reporting system uses full information about system. [The Gordy Story]
- Expose problems; Fix problems
- Contractual Changes

Demand Responsive HIT

Recognize market distortions from MU:

obliging purchase;

limits acting on buyer's remorse

CHANGE: ONC must work for patient safety and clinical usability; not only cheerleading and encouraging HIT sales and use.

Thank you.

Questions?

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