Electronic Medical Records

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Clinical Director, Integrated Healthcare Information System

Associate Professor, Clinical Family Medicine

The Ohio State University Medical Center

- **2011**
  - **Epic Outpatient electronic record**
  - **Epic Inpatient electronic record, including ED, L&D, & ICU**
  - **Epic Hospital revenue and scheduling**
  - **GE Physician Revenue cycle**

The Ohio State University Medical Center

- **2005**
  - **Outpatient paper medical record**
  - **Inpatient paper medical record**
  - **Computer Physician Order Entry**
  - **GE Physician Revenue Cycle**
  - **Siemens Hospital Revenue Cycle**

Goals in Implementation

- **Help create a foundation for personalized medicine.**
- **To increase patient safety.**
- **Promote continuity of care.**
- **Improved patient satisfaction.**
- **Establish a foundation of information for research, education and patient care.**

Health Information Technology for Economic and Clinical Health Act (HITECH)

- This act makes available to doctors and hospitals federal incentive payments when they adopt electronic health records and demonstrate use in ways that can improve quality, safety, and effectiveness of care.

Payments for Meaningful Use

- Participation can begin as early as 2011
- For maximum incentive payment, must begin by 2012
- For 2015 and later, those who do not demonstrate meaningful use will have a payment adjustment in their Medicare reimbursement.

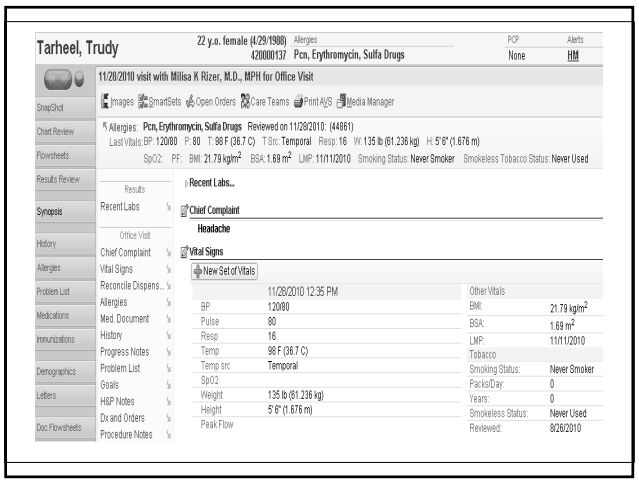
Meaningful Use

- An Incentive Program
  - "The Medicare and Medicaid EHR Incentive Programs will provide incentive payments to eligible professionals, eligible hospitals, and critical access hospitals as they adopt, implement, upgrade, or demonstrate meaningful use of certified EHR technology."

    www.cms.gov/EHRIncentivePrograms

Stage 1 Objectives

- Improving quality, safety, efficiency, and reducing health disparities.
  - Record and chart vital signs: bp, ht, wt, bmi, etc
  - Record smoking status for patients 13 and older


Tarheel, Trudy
22 y.o. female (4/29/1988)
420000137
Allergies
Pcn, Erythromycin, Sulfa Drugs
PCP
None
Alerts
HM
11/28/2010 visit with Millisa K Rizer, M.D., MPH for Office Visit
Images
SmartSets
Open Orders
Care Teams
Print AVS
Media Manager
Allergies: Pcn, Erythromycin, Sulfa Drugs Reviewed on 11/28/2010: (44861)
Last Vitals: BP: 120/80 P: 80 T: 98 F (36.7 C) T Src: Temporal Resp: 16 W: 135 lb (61.236 kg) H: 5'6" (1.676 m)
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Chief Complaint
Headache
Vital Signs
New Set of Vitals
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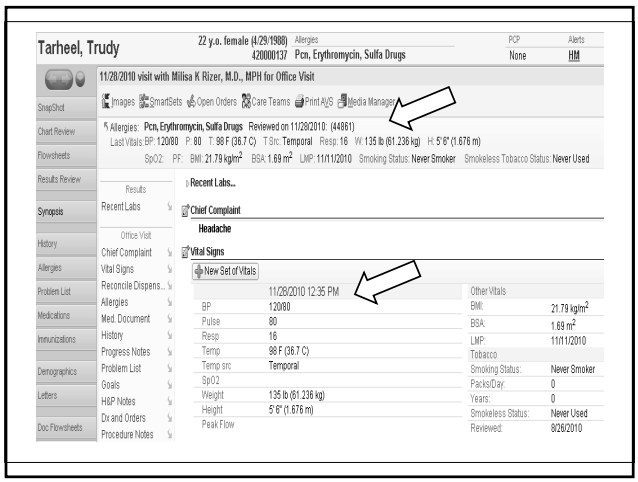
Reviewed: 8/26/2010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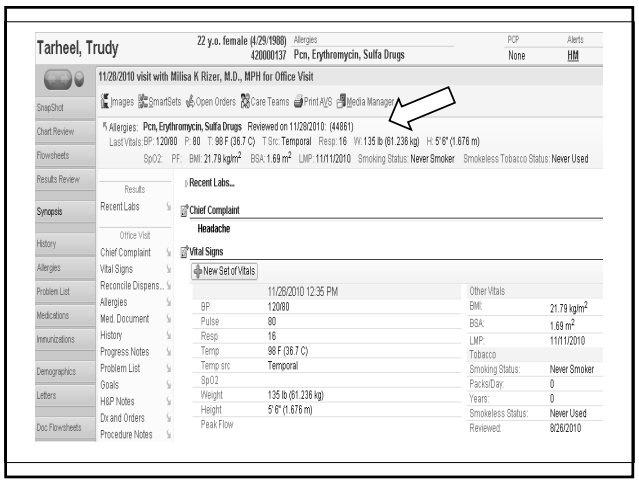
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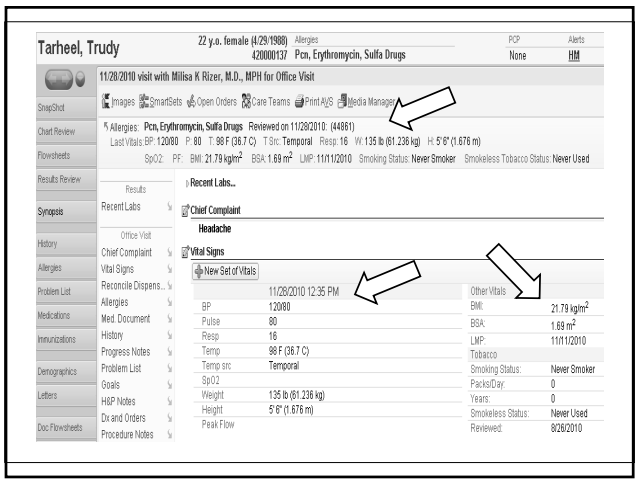
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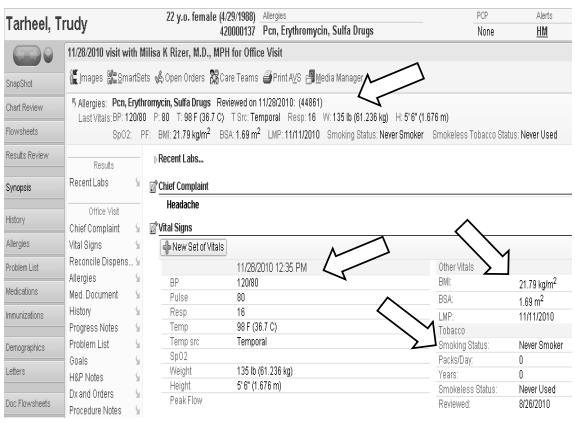
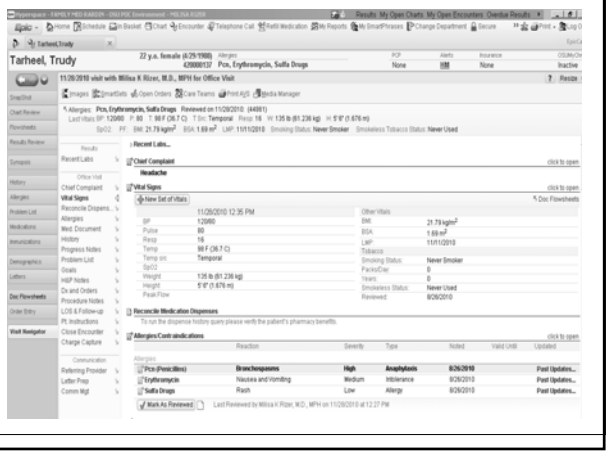


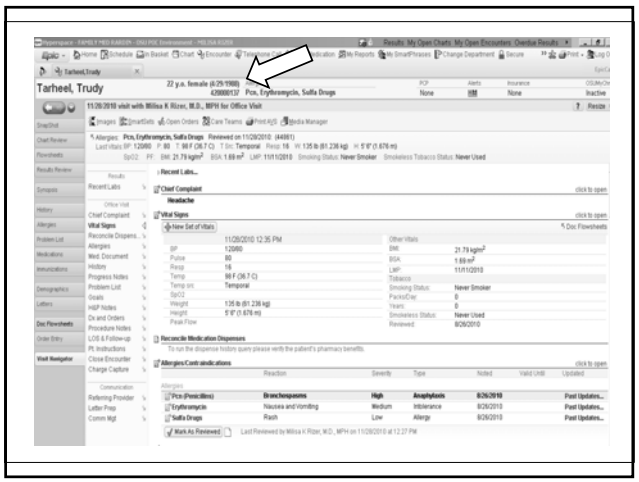
Stage 1 Objectives

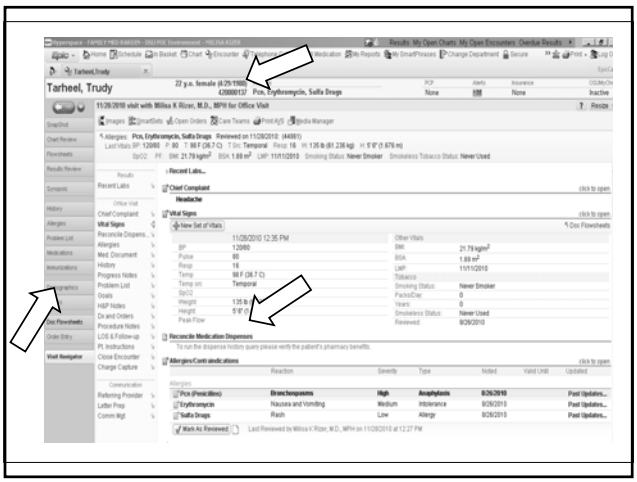
- **Improving quality, safety, efficiency, and reducing health disparities.**
  - **Use of Computer Physician Order Entry (CPOE)**
  - **Drug-drug and drug-allergy interaction checking**
  - **Generate and transmit permissible prescriptions electronically**

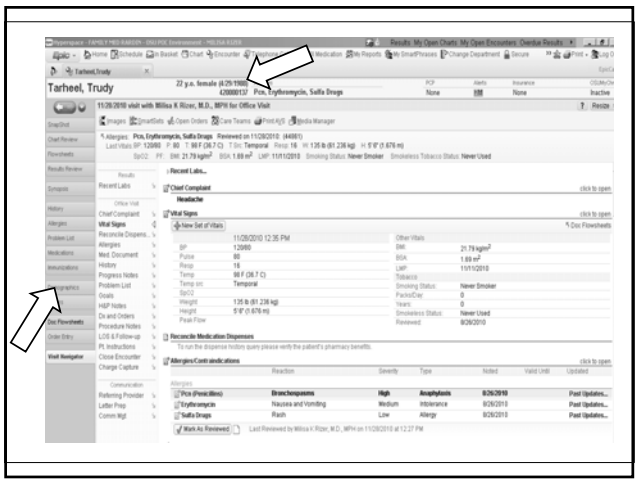
Stage 1 Objectives

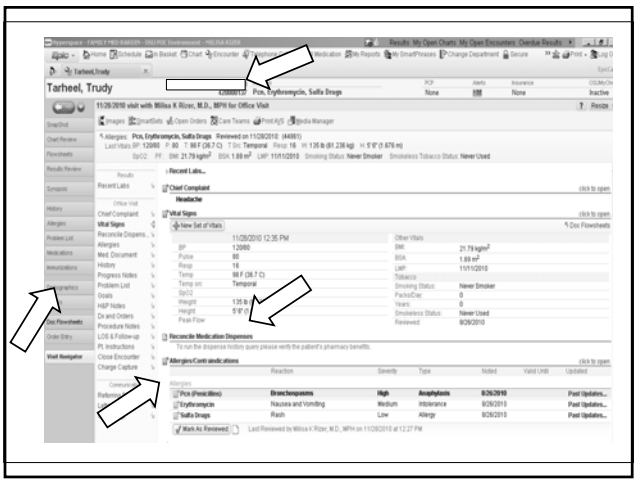
- **Improving quality, safety, efficiency, and reducing health disparities.**
  - **Record demographics: gender, race, ethnicity, etc**
  - **Active medication list**
  - **Active medication allergy list**
  - **Up-to-date problem list**

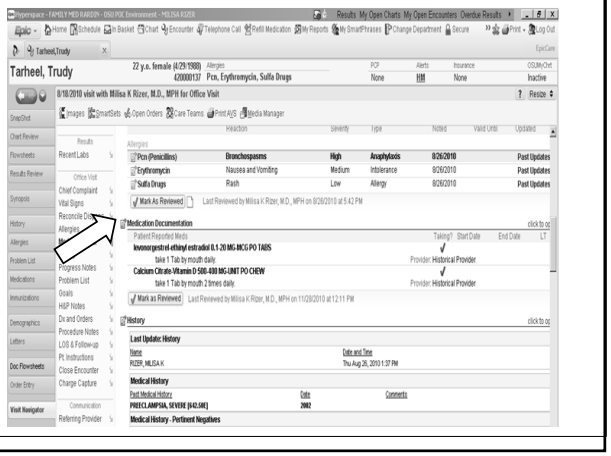








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420000137 Pcn, Erythromycin, Sulfa Drugs
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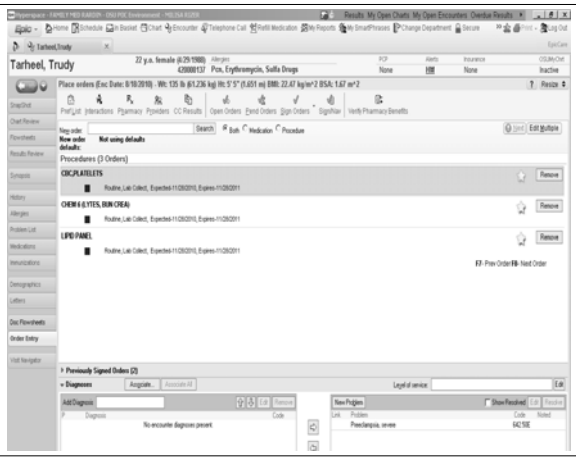
Medication Documentation
History
Medical History

Preference List Browser - Tarheel,Trudy
Labs
Orders (Labs)
Procedures
Accept
Cancel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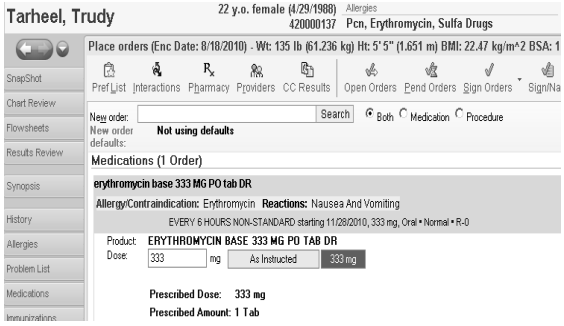
Place orders (Enc Date: 8/18/2010)
Procedures (3 Orders)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Medications (1 Order)
erythromycin base 333 MG PO tab DR
Allergy/Contraindication: Erythromycin Reactions: Nausea And Vomiting
EVERY 6 HOURS NON-STANDARD starting 11/28/2010, 333 mg, Oral • Normal • R-0
Product: ERYTHROMYCIN BASE 333 MG PO TAB DR
Dose: 333 mg As Instructed 333 mg
Prescribed Dose: 333 mg
Prescribed Amount: 1 Tab

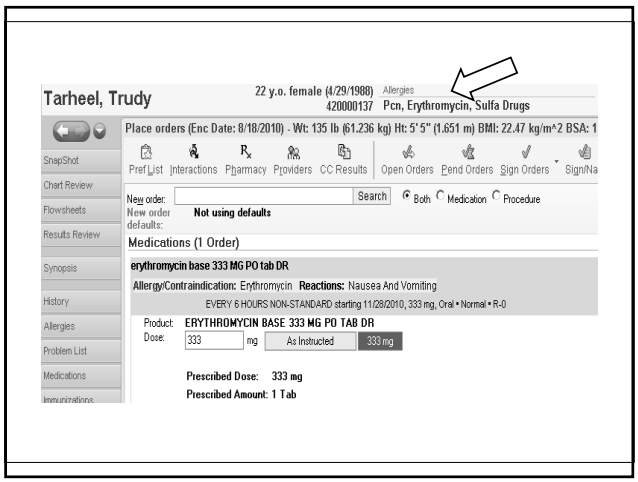
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Chart Review
Flowsheets
Results Review
Synopsis
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Allergies
Problem List
Medications
Immunizations
Pref List
Interactions
Pharmacy
Providers
CC Results
Open Orders
Pend Orders
Sign Orders
Sign/Na
New order:
Search
Both
Medication
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New order defaults:
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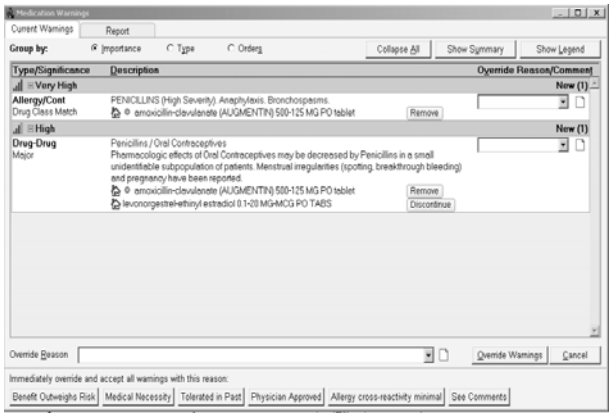
Medication Warnings
Current Warnings
Report
Group by:
Importance
Type
Orders
Collapse All
Show Summary
Show Legend
Type/Significance
Description
Override Reason/Comment
Very High
New (1)
Allergy/Cont
Drug Class Match
PENICILLINS (High Severity). Anaphylaxis. Bronchospasms.
amoxicillin-clavulanate (AUGMENTIN) 500-125 MG PO tablet
Remove
High
New (1)
Drug-Drug
Major
Penicillins / Oral Contraceptives
Pharmacologic effects of Oral Contraceptives may be decreased by Penicillins in a small unidentifiable subpopulation of patients. Menstrual irregularities (spotting, breakthrough bleeding) and pregnancy have been reported.
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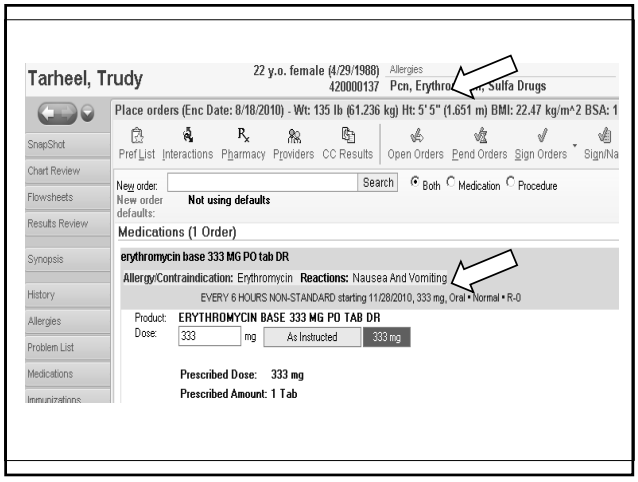
Remove
levonorgestrel-ethinyl estradiol 0.1-20 MG-MCG PO TABS
Discontinue
Override Reason
Override Warnings
Cancel
Immediately override and accept all warnings with this reason:
Benefit Outweighs Risk
Medical Necessity
Tolerated in Past
Physician Approved
Allergy cross-reactivity minimal
See Comments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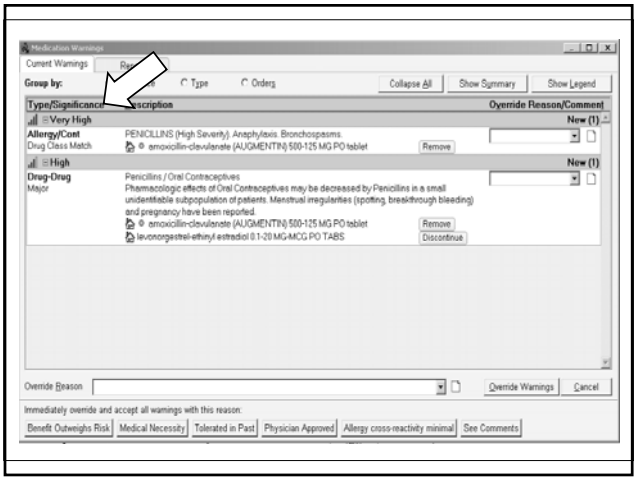
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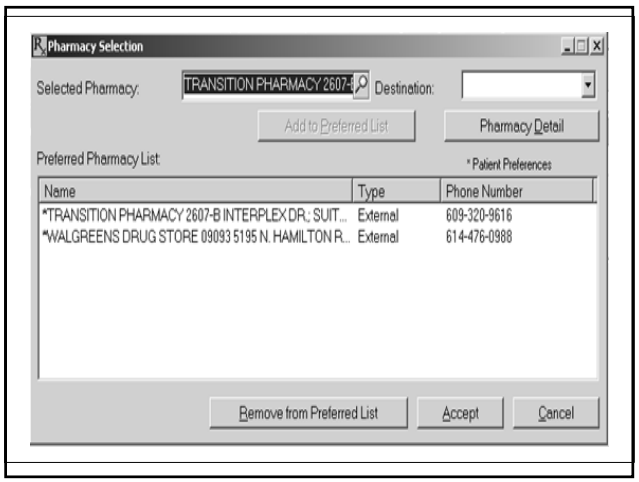


Stage 1 Objectives

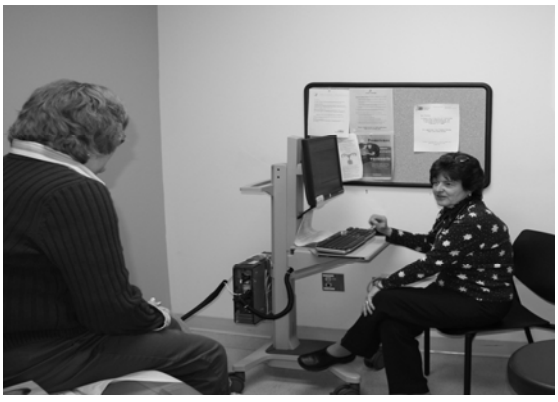
- **Engage patients and families in their healthcare.**
  - **Provide patients with an electronic copy of their health information**
  - **Provide patients with an electronic copy of their discharge instructions**
  - **Provide a clinical summary of each office visit**
  - **Provide patients with timely electronic access to their health information, within 4 business days**

Stage 1 Objectives

- **Improve care coordination**
  - **Exchange key clinical information among providers of care and patient authorized entities electronically.**
- **Ensure adequate privacy and security protections for personal health information**

Lessons Learned

- **A well planned implementation can result in less productivity lost and better satisfied users.**
- **Role based practice helps ease the anxiety of the go live by all users.**
- **Patients expect this level of communication and connectivity from their healthcare providers.**



Electronic Medical Records

Neeraj H. Tayal MD

Assistant Professor

Division of General Internal Medicine

"I do not fear computers. I fear the lack of them."

Isaac Asimov

Meaningful Use

- **Record clinical information as structured data**
- **Utilize drug-drug & drug-allergy alerts**
- **Generate lists of patients by conditions to use for quality improvement**
- **Provide patients electronic copy of their health information**

- ***"All sorts of computer errors are now turning up. You'd be surprised to know the number of doctors who claim they are treating pregnant men."***

Isaac Asimov

Data

- **Unstructured data**
  - Data that can assume any value
  - Hand written notes, dictated notes, typed notes
  - Static medium for recording information

Data

- **Structured data**
  - Data that can assume only specified values
  - Selected from a category list
  - Facilitates computational processes

Scanning Paper Records

Scanning Paper Records

Scanning Paper Records

- **Scanning is labor and cost intensive**
- **Scanned documents can be difficult to find**
- **Solutions include:**
  - **Selective scanning of paper record**
    - **Patient signed forms (consent, advanced directives, etc)**
    - **Imaging, procedure, pathology reports**
  - **Maintain read only access to legacy systems**
  - **Maintain access to paper records for 6-12 months**

Abstraction

- **Transfer of data in paper chart to structured data elements in the electronic chart**

High	
DM w/o Complication Type II, Uncontrolled	250.02
HTN (hypertension)	401.9AF
Hyperlipidemia	272.4S
Medium	
Osteoarthritis	715.90AN

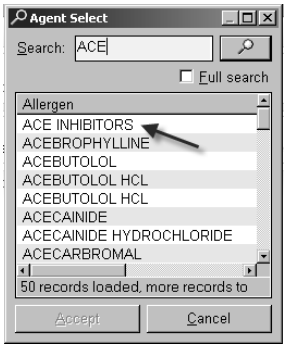
Abstraction (keys to success)

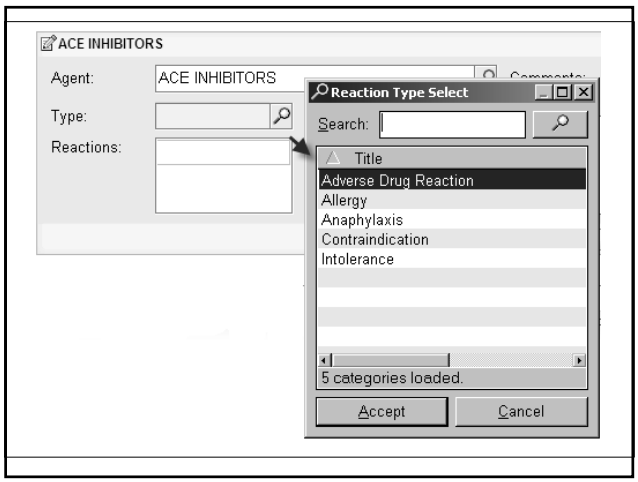
- **Coordinate the necessary resources**
  - **Physicians**
  - **Staff**
  - **Outside resources**
- **Plan for which patient charts will be abstracted and when.**

Abstraction (keys to success)

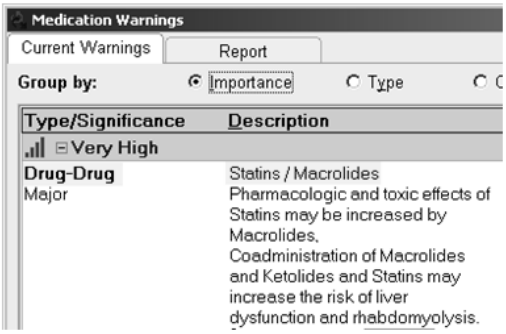
- **Focus on high value data to make chart effective**
  - **Current medications and allergies**
  - **Problem list, medical ,and surgical history**
  - **Immunizations**

Allergy (Structured Data)





Drug-Drug Alert

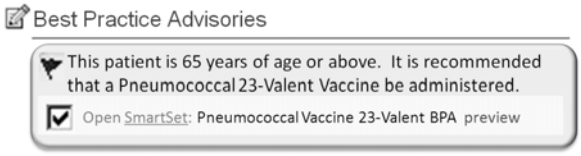


Medication List

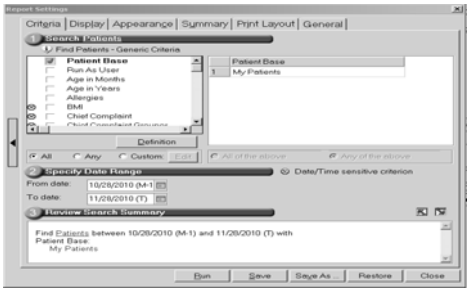
Prescription Summary for This Visit (11/18/2010)

Medication	Dose	Sig
simvastatin 20 MG PO TABS	60 mg	take 3 Tabs by mouth daily.
pioglitazone (ACTOS) 30 MG PO	30 mg	take 1 Tab by mouth daily.
furosemide (LASIX) 40 MG PO	40 mg	take 1 Tab by mouth daily.
acarbose (PRECOSE) 25 MG PO	25 mg	take 1 Tab by mouth daily.
potassium chloride SA (K-DUR) 10 MEQ PO tab ER	10 mEq	take 1 Tab by mouth 3 times daily.

Best Practice Alert



Generate lists of patients by condition to use for quality improvement



EMR Generates Patient List

Name	DOB	Gender	BP	HbA1c	LDL
Patient # 1	DOB	Gender	130/80	6.2	105
Patient # 2	DOB	Gender	138/86	7.1	78
Patient # 3	DOB	Gender	160/92	9.2	142

Generate lists of patients by condition to use for quality improvement

- Find Patients
- Between 8/28/10 (M-3) and 11/28/10 (T)
- Patient Base – My Patients
- Problem List
  - Diabetes type II, controlled (250.00)
  - Diabetes type II, uncontrolled (250.02)

Electronic Patient Portal (E-Health, Web 2.0)

Features of Electronic Patient Portals

- View key components of the record
- Interact with Medical Staff
- Test results
- Proxy access to family member records
- Access patient educational materials

Interact with Medical Staff Online

- Medical advice
- Prescription refills
- Appointment requests

View Key Components of the Chart

- Active problem list
- Medical and surgical history
- Medications
- Allergies
- Immunizations
- Test results
- NO ACCESS TO PHYSICIAN NOTES

Electronic Patient Portal (E-Health, Web 2.0)

- Harris Interactive Poll (2002)
- Over 66% of US adults are online
- 90% of these adults would like to communicate with their physicians online
- >70% would like to
  - Ask medical questions
  - Fix appointments
  - Receive test results

Patient/physician online communication: many patients want it, would pay for it, and it would influence their choice of doctors and health plans. Health Care News 2002 Apr 10 [cited 2010, August 5th] at www.harris interactive.com

Electronic Patient Portal (E-Health, Web 2.0)

- Harris Interactive 2010
- 8% have the ability to:
  - Email to communicate with your doctor
  - Schedule an appointment via the internet
  - Receive test results online

Harris Interactive, Health Day - from June 8-10 among 2,035 U.S. adults.

Summary

- EMRs enable improvements in health care by storing data in a structured fashion
- Physician, staff, and patient remain key to the successful deployment and usage of this powerful tool

Stats on Message Volume and Content

- Physicians received 2 – 12 messages per day
- Average response time was 3.5 minutes
- 63% required clinical assessment & decision

Improved Quality at Kaiser Permanente through E-Mail Between Physicians and Patients, Health Affairs July 2010