Electronic Medical Records

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

- 2011
  - Epic Outpatient electronic record
  - Epic Inpatient electronic record, including ED, L&D, & ICU
  - Epic Hospital revenue and scheduling
  - GE Physician 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](http://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
<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Event</th>
<th>Location</th>
<th>Type</th>
<th>Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/23/2000</td>
<td>12:00 PM</td>
<td>Traffic Stop</td>
<td>Route 200</td>
<td>35 mph</td>
<td>OK</td>
<td></td>
</tr>
</tbody>
</table>

**Chief Complaint: Traffic Stop**

**Position:** Stop

**Duration:** 5 minutes

**Traffic Conditions:** Slow moving traffic

**Incident:** 

- **Event:** Traffic Stop
- **Type:** 35 mph
- **Status:** OK
- **Notes:**
  - Route 200
  - Stop
  - Duration: 5 minutes
  - Traffic Conditions: Slow moving traffic

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**Additional Information:**

- **Witness:** Present
- **Description:** Traffic was thinned out after the stop

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**Police Report:**

- **File #:** C200012001
- **Vehicle Info:**
  - Make: Generic
  - Model: Generic
  - Year: Generic
- **Location Info:**
  - Road: Route 200
  - City: Generic
  - State: Generic
- **Weather:**
  - Conditions: Fair
  - Temperature: 72°F
  - Wind: Calm

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**Contact Information:**

- **Name:** Officer John Doe
- **Phone:** 555-1234
- **Email:** police@city.gov

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**Follow-up:**

- **Action:** No issuance of citations
- **Reason:** All drivers were cooperative and understanding

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**Conclusion:**

- Traffic flow was restored within the specified time frame.
- No injuries reported.

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**Safety Tips:**

- Always maintain a safe following distance.
- Be aware of sudden stops.

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**Emergency Contact:**

- **Police:** 911
- **Fire:** 911
- **Medical:** 911

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**Notes:**

- Data collected by Dick Smith, Traffic Stop Monitor.
**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

- Use of Computer Physician Order Entry (CPOE)
- Drug-drug and drug-allergy interaction checking
- Generate and transmit permissible prescriptions electronically
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

<table>
<thead>
<tr>
<th>Meaningful Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Record clinical information as structured data</td>
</tr>
<tr>
<td>• Utilize drug-drug &amp; drug-allergy alerts</td>
</tr>
<tr>
<td>• Generate lists of patients by conditions to use for quality improvement</td>
</tr>
<tr>
<td>• Provide patients electronic copy of their health information</td>
</tr>
</tbody>
</table>

“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

<table>
<thead>
<tr>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Unstructured data</td>
</tr>
<tr>
<td>- Data that can assume any value</td>
</tr>
<tr>
<td>- Hand written notes, dictated notes, typed notes</td>
</tr>
<tr>
<td>- Static medium for recording information</td>
</tr>
</tbody>
</table>
## Data

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

## 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

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)
Medication List

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simvastatin 20 mg PO TADs</td>
<td>60 mg</td>
<td>take 1 Tab by mouth daily.</td>
</tr>
<tr>
<td>Piroxicam (ACTOS) 30 mg PO</td>
<td>30 mg</td>
<td>take 1 Tab by mouth daily.</td>
</tr>
<tr>
<td>Furosemide (Lasix) 40 mg PO</td>
<td>40 mg</td>
<td>take 1 Tab by mouth daily.</td>
</tr>
<tr>
<td>Atenolol (Inderal) 25 mg PO</td>
<td>25 mg</td>
<td>take 1 Tab by mouth daily.</td>
</tr>
<tr>
<td>Potassium chloride SA (K-OUR) 10 mEq</td>
<td>10 mEq</td>
<td>take 1 Tab by mouth Stines daily</td>
</tr>
</tbody>
</table>

Best Practice Alert

- This patient is 65 years of age or above. It is recommended that a Pneumococcal 23-Valent Vaccine be administered.
- Open SmartSet: Pneumococcal Vaccine 23-Valent BPA preview
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)

EMR Generates
Patient List

<table>
<thead>
<tr>
<th>Name</th>
<th>DOB</th>
<th>Gender</th>
<th>BP</th>
<th>HbA1c</th>
<th>LDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient # 1</td>
<td></td>
<td>Gender</td>
<td>130/80</td>
<td>6.2</td>
<td>105</td>
</tr>
<tr>
<td>Patient # 2</td>
<td></td>
<td>Gender</td>
<td>138/86</td>
<td>7.1</td>
<td>78</td>
</tr>
<tr>
<td>Patient # 3</td>
<td></td>
<td>Gender</td>
<td>160/92</td>
<td>9.2</td>
<td>142</td>
</tr>
</tbody>
</table>

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

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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 (2003), August 5th at www.harrisinteractive.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

## Summary

- EMRs enable improvements in healthcare 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

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