Using EHRs to extract information, query clinicians, and insert reports

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NIH HCS Collaboratory
EHR working group webinar
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Electronic Support for Public Health Vaccine Adverse Event Reporting System

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Extracting information
ESP: Automated disease detection and reporting for public health

Practice EMR’s → ESP Server → Health Department

- diagnoses
- lab results
- meds
- vital signs
- demographics

HL7 electronic case reports

JAMIA 2009;16:18-24
Using the EHR to Query Clinicians
ESP: Automated detection and reporting with clinician input

- Practice EMR’s
- Data from EMR
  - Adverse event prompt
  - Clinician comment
- ESP Server
  - HL7 electronic VAERS report

- diagnoses
- lab results
- meds
- allergies
- vaccines
Example ESP-VAERS Logic

Day 0 – measles vaccine administered

Day 6 – patient diagnosed with meningitis

1. Assess patient’s past encounters → no ICD-9 for meningitis in the past year

2. Send message to patient’s clinician
   “could this be related to recent vaccine?”
Sending a message to the clinician’s InBasket

- Message to the clinician is HL7 text message
  - Identifies patient, provider
  - Records information about the condition of interest
  - Saved to file system directory and database record
- Epic picks up text message
- Files and loads them via Transcription Interface
  - EMR
  - Message appears in provider InBasket
Your patient received the following vaccination on Jan 21, 2010
influenza, H5N1-1203

We noted the following potentially concerning events after vaccination:

<table>
<thead>
<tr>
<th>Event Date</th>
<th>Days Since Vaccine(s) given</th>
<th>Encounter Type</th>
<th>Labs</th>
<th>Diagnosis</th>
<th>Prescription</th>
<th>Allergies</th>
</tr>
</thead>
<tbody>
<tr>
<td>05-Feb-2010</td>
<td>15</td>
<td>Ambulatory</td>
<td>Labs</td>
<td>Meningitis 321.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Possible Adverse Event?

- [ ] Yes, submit the adverse event report to CDC/FDA
- [x] No

Please provide details so that we can refine our adverse event detection algorithms:
Example ESP-VAERS Logic

Day 0 – measles vaccine administered

Day 6 – patient diagnosed with meningitis

1. Assess patient’s past encounters → no ICD-9 for meningitis in the past year
2. Send message to patient’s clinician
   “could this be related to recent vaccine?”
   a. No → stop
   b. Yes → clinician invited to add comments
3. Send HL7 report to VAERS
Possible adverse event detected by ESP algorithm

Clinician notified via InBasket

Category 1 & no clinician response 7 days
- Adverse event report generated

Category 1 & 2 agree with adverse event
- Add comments

Category 2 & no clinician response
- No report

Disagree with adverse event
- Add comments
- Comments go to ESP for revising algorithm
Messages to VAERS

- HL7 message to CDC specifications
- Report includes
  - Patient name, gender, date of birth, contact
  - Reporting clinician name and contact
  - Vaccine name, lot number, date of administration
  - Adverse event, date, value
    - last known lab value if appropriate
  - Did adverse event require ER Visit/Hospitalization*
  - Other vaccinations within 4 weeks prior to the date listed
  - Clinician comments

* In April, 2013
Inserting an updated report into the EHR

If HL7 message sent to CDC
• ESP generates VAERS report
• ESP generates new HL7 text message
  – Picked up by the Transcription Interface
  – New message updates patient’s Epic EHR
    • Initial Epic report updated with new information that a VAERS report has been submitted
Pros and cons of exporting/importing vs adding reporting functionality to the EHR

• **Pros**
  – Allows fully customized algorithms and reporting formats
  – Doesn’t slow the EHR’s response time
  – No engagement with host IT department needed for modifications
  – Doesn’t increase EHR’s code base and associated license fees
  – New capabilities are readily portable to a wide array of EHRs
  – Reports can be directed to appropriate person: primary care doctor, team manager, clinician who assigned a diagnosis, social worker, etc.

• **Cons**
  – Doesn’t operate in real time, e.g., during a patient encounter (sometimes this is desirable)

• **Neutral**
  – Host organization retains complete control over its data
For more information:
https://www.nihcollaboratory.org/Pages/ehr-data-faqs.aspx

Recommendations, feedback, and questions:
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