Successes and Challenges in Population-Based Electronic Pathology Reporting

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Overview

- Electronic pathology (E-Path) implementations in Kentucky
- Successes
- Challenges
- Future Directions
- Conclusions
E-Path Reporting in Kentucky

- Began in **November, 2004**
- Consists primarily of lab installations using software from Artificial Intelligence in Medicine, Inc. (AIM)
  - ~98% of all reports at KCR
  - Sponsored by the NCI/SEER program
- In 2009, implemented interface through the CDC Public Health Information Network Messaging System (PHIN-MS)
  - For national based reporting
    - Labcorp
Nearing Population Based E-Path Reporting

- Includes hospital based and freestanding pathology labs
- 35 of 48 pathology labs are reporting electronically (73%)
- 79 of 100 hospitals are covered (79%)
  - 90% of cases seen at large hospitals
  - 72% of cases seen at small hospitals
- Receiving approximately 2000 reports/week
- About 282,000 reports received to date
Increasing E-Path Volumes

E-Path Records Per Year

<table>
<thead>
<tr>
<th>Year</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Records</td>
<td>0</td>
<td>10000</td>
<td>30000</td>
<td>50000</td>
<td>60000</td>
<td>80000</td>
<td>40000</td>
</tr>
</tbody>
</table>
KCR E-Path Record Management

- E-Path repository designed according to NAACCR Standard HL7 2.3.x message structure
  - MySQL database server
  - One table for each HL7 message segment
- Applications developed to parse and store E-Path records
- Other utilities developed to search and view E-Path reports
E-Path Architecture
Successes: Hospital Case-finding Audits

- E-Path used for six annual audits since 2005
- Over 60 missed cases identified
- KCR plans to use E-Path for audit purposes more frequently as the repository database and applications mature and more labs are installed
Successes: Additional Missed Cases Identified

- E-Path reports routinely matched against central database to search for missed cases
- Currently auditing 2008 E-Path reports
- 93 possible missed cases from 10 labs identified so far
  - Cases not reportable by hospitals
Challenges: Establishing New Feeds

- Business agreements must be vetted
- Technical specifications
  - Feed format (Custom interface for each format)
  - Hardware requirements
  - Personnel
  - Network specifications, etc.
- Testing
- Production
- AIM handles most logistic details
- Motivated facilities may take up to a year to bring online
Challenges: Complexity

- The transmission route is complex involving multiple systems from the path lab to KCR
- Most steps are automated but human intervention is frequently required
- Tends to be “Error prone”
  - Single bad messages can cause a facility’s feed to shutdown
- A central monitoring tool would be beneficial
- KCR implemented automated daily e-mails showing report volumes by sending facility
Sample Daily E-Mail Report

Number of Pathology Reports on Mon June 21, 2010
Baptist East: 17
Central Baptist: 5
DIANONCT: 12
Ephraim McDowell RMC: 5
Jewish Hospital: 14
Jewish Hospital - Shelbyville: 1
Kings Daughters MC: 19
KOSAIR: 1
LABCORP - Park Duvall Comm. Health Ctr.: 1
MCBG: 3
MCBG - BOWLING GREEN DROP-OFF: 4
Murray Calloway: 8
NORTON: 6
OMHS: 15
Pikeville Medical Center - Pikeville Medical Center: 4
RMC Trover - MADISONVILLE WOMEN'S CENTER: 1
RMC Trover - RMC TROVER: 3
ST. CLAIRE RMC: 1
University Of Kentucky: 56
Challenges: Message Filtering

- Reports are filtered at the pathology lab
  - AIM: natural language processing
  - PHIN-MS: Lab filtering by ICD-9 codes
    - Non-reportable skins not filtered
  - Numerous unwanted reports still transmitted to central registry
  - Some cases still missed
- Requires systematic audits
Other Challenges

- Missing data elements
- Update and addendum reports
  - Not distinguished from new reports
- Non-standard HL7 formatting
Challenge: NAACCR HL7 Standards NOT Being Followed

- Well defined HL7 standards published in NAACCR Volume V since 2005
- Standards not being followed in E-Path installations
  - Missing required segments (such as common order segment)
  - Data elements appear in wrong HL7 field
  - Required data elements missing
  - Labcorp: non-escaped field delimiters embedded in field
- Failure to follow standards negates benefits of NAACCR standards
  - Custom applications must be written to deal with “exceptions”
Future Directions

- KCR integrating hospital E-Path reports as an electronic case-finding source for the hospital abstracting system provided to all non-federal hospitals in Kentucky.
- Integration will support automated abstraction of limited set of E-Path variables.
- Challenges previously mentioned are slowing KCR’s progress towards this goal.
Conclusions

- E-Path installations and record volumes have dramatically increased over past five years
- Utility of E-Path reports increasing but not fully realized
- Challenges remain that should be solvable
- Adherence to NAACCR HL7 standards by software vendors would be beneficial
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Questions?