Improving Population Health through Targeted Decision Support

Brian E. Dixon, MPA, PhD, FHIMSS
Keeneland PHSSR Conference
April 21, 2015
Agenda

• Population Health Decision Support

• Case Reporting Then and Now

• A Pop Health Decision Support Intervention

• Preliminary Findings
Clinical Decision Support

• Computer-based clinical decision support (CDS) can be defined as the use of the computer to bring relevant knowledge to bear on the health care and well being of a patient. – Greenes, 2007

\[
(\text{Brain} + \text{Computer}) > \text{Brain}
\]

Friedman, JAMIA, 2008
How Does CDS ‘Fit’ into Public Health?

Office of the National Coordinator for Health IT, 2014
PH Decision Support

• Public health decision support (PHDS) can be defined as the use of the computer to bring relevant knowledge to bear on the health and well-being of a population.
  
  — Dixon, Gamache, Grannis, 2013

• Examples:
  
  — Vaccine forecasting report
  — Suggestion for ordering stool culture
### Patient Information
- **Name**
- **Address**
- **Phone#**
- **DOB**
- **Gender**
- **Race/ethnicity**

### Lab Information
- **Etiologic agent**
- **Test name**
- **Test date**
- **Treatment initiation date**
- **Treatment (drugs)**

### Provider Information
- **Physician name**
- **Physician address**
- **Phone#**
- **Reported by**
- **Report date**
Enhanced Case Reporting Workflow
Enhancement Builds Upon Core Infrastructure

• Automated case detection
  – Identification of cases that must be reported

• Clinical messaging
  – Getting information to its recipient in a way that is integrated into workflow

• Public health communication pathways
  – Electronic laboratory reporting
  – Fax communications
The Notifiable Condition Detector

Inbound Messages

Realtime

Compare to Dwyer I

Reportable Conditions

Record Count as denominator

Abnormal flag, Organism name in Dwyer II, Value above threshold

Reportable Results

Reportable Results Database

E-mail Summary

Daily Batch

To Public Health

To Infection Control

Print Reports

To Public Health

To Infection Control

RICHARD M. FAIRBANKS
SCHOOL OF PUBLIC HEALTH
INDIANA UNIVERSITY
Indianapolis

Regenstrief Center for Biomedical Informatics
Triggers for Case Detection

• ICD-9 / ICD-10 / SNOMED CT
  – Clear signal of clinical or lab confirmed diagnosis

• LOINC
  – Clear signal of test that examines PH condition
  – Yet the “result” can be hard to confirm

• Natural Language Processing
  – Hard but necessary as labs “dump” results into standard messages
Clinical Messaging/Public Health Communication

Docs 4 Docs® Service
Login Screen

Welcome

Please enter your username and password, then press "Log in".

Username: 

Password: 

Log in

Forgot your password?

Contact IHIE • FAQs • Log In

helpdesk@ihie.org
317.644.1752
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St. Clare Medical Center
1710 Lafayette Road
Crawfordsville, IN 47933
(765) 362-2800

Pt: ""
MRF: 23258
DOB: 1/19/19
Sex: M

Pt Class: E
Admit Date:
Primary Care:

***Final Report***

EXAM: CR WRIST MIN 3 VU RT 73110
EXAM DATE: Sep 10 2007 11:17AM
ACCESSION#: 3291227

ADMITTING DIAGNOSIS: EXTREMITY FW

CLINICAL HISTORY: Recent trauma. The patient presents with pain in wrist.

IMPRESSSION: No evidence of an acute or healing fracture.

RESULT: Three views of the right wrist show no evidence of an acute or healing fracture. The distal radius and ulna are intact. The carpal bones are normal in appearance, position, and alignment. Incidental note is made of metallic plates and screws in the fourth and fifth metacarpals, consistent with open reduction of prior fractures.

Read by: JAMES PEARCE MD

Reviewed and Electronically signed by:
JAMES PEARCE MD
D: Sep 10 2007 12:07A
Inbox

Grannis, Shaun J.
SERVICE - Reportable Conditions

Document INBOX

Holds all new documents. VT is 'visit type': OP (Outpatient), IP (Inpatient), ER (Emergency), MC (Misc) or blank if not known.

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CONFIDENTIAL REPORT OF COMMUNICABLE DISEASES
State Form 43823 (R2 / 11-96)
THIS FORM CONTAINS CONFIDENTIAL INFORMATION PER 410 (AC 3.1-2.18).

Name (last, first, m.i.)
If child, name of parent (last, first, m.i.)
Address (number and street)
City, ZIP code
County
Date of birth (month, day, year)
Age
SEX
RACE
ETHNICITY

☐ Male ☐ Female
☐ White ☐ Black ☐ Hispanic ☐ Non-Hispanic
☐ Unknown
Pregnant?

DISEASE
HEPATITIS C

Copy for: UNKNOWN (NPI_ALL_PP_MASTER: 000000001)
Pt: unknown_1999999_1

Notifiable Report
So What Happens Next?

• Today clinics must print these forms, complete them manually, and submit them to local health departments using Fax
  – Some use electronic fax

• In the future, we hope to work with SHA to deliver completed forms electronically directly into the state NEDSS system
ARF Project Status

• Baseline data collection completed
  – Existing counts of disease cases, data quality, and processes within public health department
  – Continuing to analyze baseline numbers

• Intervention went live in Sept 2013
  – Turned on intervention in clinics using a rolling approach through end of 2013
  – Collecting post-intervention data
  – Beginning analysis of post-intervention data
Baseline Completeness

• 12,309 reports for 8,353 unique patients
  – Chlamydia, gonorrhea, syphilis, Hepatitis C, Acute Hepatitis B, Salmonella, and Histoplasmosis

• Data Completeness (Not NULL)
  – Provider: 65% mean (Range 33.6% - 100%)
  – Fax-based Lab: 75% mean (Range 14.2% - 100%)
    • ELR: 73% mean (Range 0.01% - 100%)
  – ELR completeness higher for 11 of 15 fields
    • Lab higher compared to provider except race and ethnicity
  – Similar patterns across all conditions
Completeness Discussion

• What can lab reports not provide?
  – Ethnicity; sometimes race
  – Treatment: was order written; med dispensed?
  – Clinical symptoms

• Strategies for getting these data electronically
  – CPOE, eRx and Pharmacy systems
  – Direct EHR access for PH workers
Timeliness Results*

• Most cases are reported within 1 day
  – >80% reported within 3 days

• For nearly all cases, lab is the *first* signal
  – Only 11% cases have provider report at all

• Lab report types
  – ELR, Fax, PH clinic, NEDSS
Next Steps

• Enhanced form generation
  – Currently developing enhanced forms across the various condition groups
  – Turn on enhanced form in mid-2015

• Analysis and dissemination
  – Continue to analyze baseline, post-intervention
  – Synthesize qualitative data
  – Publish findings
Acknowledgements

• Key folks supporting my work
  – Shaun Grannis (IUSM and Regenstrief)
  – Zuoyi Zhang (Regenstrief)
  – Jennifer Williams (Regenstrief)
  – P. Joe Gibson (Marion Co. Public Health Dept.)
  – Debra Revere and Becky Hills (U. Washington)
  – Patrick Lai, MPH (SOIC) and Uzay Kirbiyik (FSPH)

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Questions?

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Research Scientist, Regenstrief Institute;
Health Research Scientist, Department of Veterans Affairs

http://tinyurl.com/fsphbed
Twitter: @dpugrad01
References
