Using Health Information Technology to Support Population-Based Clinical Practice

Emerging Research from Career Award Grantees

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Welcome to your shift doctor…

<table>
<thead>
<tr>
<th>TIME</th>
<th>DEMOG</th>
<th>COMPLAINT</th>
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<tbody>
<tr>
<td>17:00</td>
<td>2 yr F</td>
<td>FEVER, COUGH</td>
</tr>
<tr>
<td>17:10</td>
<td>21 mo M</td>
<td>COUGH, FEVER</td>
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<tr>
<td>17:15</td>
<td>2 wk F</td>
<td>CONGESTION</td>
</tr>
<tr>
<td>17:25</td>
<td>17 mo M</td>
<td>COUGHING, VOMITING</td>
</tr>
<tr>
<td>17:35</td>
<td>2 yr F</td>
<td>BARKING COUGH</td>
</tr>
<tr>
<td>17:50</td>
<td>3 mo F</td>
<td>FEVER, RESP DIST</td>
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<td>…</td>
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So what about 2 yr F with fever & cough?

“What does Bridget have?”
“Is anything going around?”
“What can we do about it?”
“Can I get some antibiotics?”
“What about some cough medicine, the strong stuff?”
“What is going to happen to Bridget, will it get worse?”
“Are my other kids going to get sick? Am I?”
“When can she go back to day care?”

NEW in 2009 → “Is it the Swine flu?”
Value: Acute Resp. Infection (ARI) Care

Improved awareness of community outbreaks
- Provision of timely information about regional respiratory viral activity to front line clinicians

Improved tools for provider-patient communication.
- Showing parents a graph of local viral activity and providing pathogen-specific patient education

Improved quality of care for ARI
- More judicious antibiotic use
- Safer and more effective symptom reliever use

Improved provider and patient satisfaction
Population-Based Clinical Practice & ARI

Community perspective
   Knowing what is going around and who is at risk
Clinical epidemiology perspective
   Understanding how different pathogens behave
Emphasis on outcomes
   Knowing likely, and how to optimize outcomes
Emphasis on evidence-based practice
   Knowing which tests and treatments work
Emphasis on prevention
   Vaccine advocacy and education about transmission
Why focus on ARI?

Most common reason for seeking acute care
Expensive $ \Rightarrow \$40 \text{ billion (2003)}$
Excessive antibiotic use
  Resistance and ADEs
Hazardous / ineffective use of symptom relievers
Highly dynamic information needs
  Endemics vs. epidemics vs. emerging infections
Evolving medical technologies- testing, drugs
Clinician Information Needs for ARI

- Presenting signs & symptoms
- Epidemiological clues (e.g. sick contacts, travel, etc)
- Physical exam findings
- Probability of disease X
- Results of diagnostic testing
- Knowledge of infectious diseases
Clinician Information Needs for ARI

- Probability of disease X
- Presenting signs & symptoms
- Epidemiological clues (e.g. sick contacts, travel, etc)
- Physical exam findings
- Results of diagnostic testing
- Knowledge of infectious diseases
- Knowledge of the local incidence of various infectious diseases
Molecular Diagnostics for Infectious Diseases

Needs driving advances in molecular diagnostics

- More pathogens detected → panels
- Lower cost
- Higher sensitivity
- Faster turn around
- Closer to point of care

<table>
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<tr>
<th>Rapid</th>
<th>DFA &amp; Culture</th>
<th>PCR</th>
<th>Future **</th>
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</thead>
</table>
Respiratory Viral Testing at Intermountain

Total Tests by Method for Respiratory Viruses

- Rapid
- DFA
- Culture
- PCR
Primary Children's Medical Center

Respiratory Virus (DFA) Surveillance Dec 21, 2000 thru Jan 24, 2010

Graphs showing the prevalence of various respiratory viruses from 2000-2010:
- RSV
- Influenza A
- Influenza B
- hMPV
- Adenovirus
- Parainfluenza
Germ Watch Architecture System

Daily Extract

Report Server Cognos®

Chart Server NetCharts®

EDW Oracle®

Map Server Google®

Laboratory Information System

21 Hospitals

>100 Health Centers
Welcome to Germ Watch

This site is intended to provide up-to-date information about communicable diseases that routinely affect our communities. Here you will find current surveillance information about the following infectious diseases:

**Respiratory Viruses** (Influenza A & B, RSV, Parainfluenza, Adenovirus, human Metapneumovirus)

**Enterovirus**

**Rotavirus**

**Bordetella pertussis**

Various gastrointestinal pathogens

**Disease Update - Monday, January 25th, 2010**

- Influenza activity remains much lower than earlier in the fall with only 8 isolates last week, all of which were 2009 H1N1.
- RSV activity continues to increase.
- HMPV is also increasing.
- The activity of adenovirus, rhinovirus and parainfluenza 1 is still ongoing and steady.

**Acknowledgements**
Germ Watch Updates

Dashboard Style Reports

Graphs showing the progression of various viruses and infections over time.

Respiratory Viruses
- Influenza A & B
- RSV
- Parainfluenza
- Adenovirus
- Human Metapneumovirus

Enterovirus

Rotavirus

Bordetella pertussis

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Acknowledgements
Weekly report
What have we learned so far?

We can disseminate timely and meaningful information
  >300 physicians getting weekly updates
  Web site being utilization
Clinicians attitudes and beliefs
  Generally understand applicability
  Believe it improves their performance
  Diagnostic accuracy and treatment decisions
  Peers and patients expect them to be knowledgeable
Clinicians want it quick, easy and at their finger tips
What we need to learn more about?

Role and optimization of data visualization
- Epidemic curves, activity gauges, GIS
- Patient facing visualizations
Integration with clinical work flow
- Clinical information system
  - Info buttons, e-resources, alerts
- Acute care episode work flow
Optimizing tools to support communication
- System → provider; provider → patient
K08 – Mentored Clinician Scientist Award

Aim 1 - Assess use of current tools & information needs
   Semi structured interviews with clinicians
   Focus groups with parents

Aim 2 – Tool refinement
   Clinical information system integration
   Clinical work flow integration

Aim 3 – Implementation of refined tool set

Aim 4 – Measure effects via nested randomized controlled trail
Clinical encounter in the future

Waiting room phenomenon – teach patients
Time limited with providers – well spent
Which virus is it and how long will they have symptoms
Intervention
  Pathogen-specific, more testing
Advice
  “Your child will have symptom X for Y duration…”
  “Complication A shows up X% in these risk groups”
Questions?
Suggestions?

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