

## Using Health Information Technology to Support Population-Based Clinical Practice

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<b>Organization:</b>	University of Utah
<b>Mechanism:</b>	PAR: HS09-085: Mentored Clinical Scientist Research Career Development Award (K08)
<b>Grant Number:</b>	K08 HS 018538
<b>Project Period:</b>	September 2009 – July 2014
<b>AHRQ Funding Amount:</b>	\$795,960
<b>Summary Status as of:</b>	December 2010

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**Target Population:** Acute Respiratory Infections, Pediatric\*

**Summary:** Acute respiratory infections (ARIs) are a major burden to the health care delivery system and the public's health. The overuse of antibiotics for viral infections has contributed to the rapid emergence of antimicrobial resistance and a substantial number of adverse drug events. As a result, research on preventing the overuse of antibiotics is a national priority. This project aims to improve providers' and patients' ability to distinguish viral infections from bacterial infections by providing timely, accessible information about the local incidence of common respiratory viruses via a population health repository and decision support tools.

Intermountain Healthcare, affiliated with the University of Utah School of Medicine, developed Germ Watch  (<https://intermountain.net/portal/site/mdvsi/>), a reporting system for pediatric respiratory infections that imports data from all Intermountain Healthcare system practices. The reports display pathogen-specific data presented in graphs on the Web site with a user interface to select for age ranges, pathogens, and regions. The overall goal of the project is to refine this dashboard and further integrate it into clinical workflow.

This study will address important gaps in patients' and providers' population-based health knowledge and the information technology tools required to fill these gaps. The lessons learned through developing, implementing, and evaluating the impact of population health and decision support tools for ARI treatment will lead to significant scientific contributions in this research area and will improve the integration of decision support tools at health care practices.

### Specific Aims:

- Assess primary care clinician use of current population-based ARI health information resources and decision support tools using focus groups and structured observation. **(Ongoing)**
- Refine population-based ARI health information resources and decision support tools to improve clinical information system workflow integration and patient communication. **(Ongoing)**
- Implement these population-based ARI health information resources and decision support tools in primary and urgent care settings. **(Upcoming)**
- Measure the effects of population-based ARI health information resources and decision support tools on population-based clinical practice and patient and parent compliance. The goal of these

interventions is to increase the effectiveness and appropriateness of antibiotic prescribing for ARI. **(Upcoming)**

In addition to the specific research project aims, Dr. Gesteland has, as part of this Mentored Clinical Scientist Research Career Development Award, the following career goals:

- Expand existing skills in the extraction, analysis, and graphical display of health care data using electronic data warehouses, business intelligence platforms, and the Web 2.0.
- Develop new expertise in the cognitive science of data and information visualization and display to support clinical decisionmaking and patient-centered care delivery.
- Develop additional expertise in the integration and implementation of knowledge management and decision support tools in clinical information systems.
- Develop additional skills in conducting health information technology intervention studies including workflow analysis, cluster-randomized control and quasi-randomized controlled trials, interrupted time series analysis, and controlled before-and-after studies suitable for testing proposed intervention.
- Expand and refine existing skills in measuring the effect of information or communications systems on the quality and productivity of health care.

**2010 Activities:** Initial 2010 work has focused on: determining how providers use population-based ARI health information resources and decision support tools, understanding the level of interest that patients and parents have in having access to viral epidemic data, and evolving the system infrastructure to support improved and enhanced data visualization. The original plan to conduct focus groups with providers was changed to an approach involving one-on-one contextual interviews in which the principal investigator sits with providers and reviews how they use current tools and information resources, and solicits ideas for how the system could be improved. The switch to contextual interviews was based upon advice from the research organization's Strategic Planning Group that has extensive expertise in conducting focus groups and soliciting input from physicians. During the interviews the project team showed providers dashboard prototypes, which they continue to refine in an iterative fashion. Dr. Gesteland has been incorporating methods of Cognitive Task Analysis that he initially learned about at the Health Information Technology Grantee and Contractor meeting in June 2010. By December 2010, Dr. Gesteland has completed three of the targeted 20 projected interviews. In addition to these formal interviews, Dr. Gesteland has had numerous impromptu discussions with physicians about their information needs and ideas for improving the current system. Overall, feedback has been very positive and numerous ideas have been provided on how to improve the functionality of the tool and better integrate it into clinical workflow as a dashboard.

Activities in 2010 also included two focus groups with parents of patients to help inform the development of patient-facing components of the decision support tools being developed. The intent of these focus groups was to assess parent information needs relevant to ARI, understand where parents receive ARI information, and determine parent preferences on ARI information and how it should be presented. Focus group participants included both first-time parents and parents with multiple children. An additional focus group for Spanish-speaking parents is planned.

The research team has made substantial progress with evolving the system infrastructure to support improved and enhanced data visualization. The team analyzed the content of current reports for common information communication objectives and interviewed system users (administrators, clinicians, infectious disease experts, and epidemiologists) to understand their goals and tasks when accessing current reports and tools. Using weekly counts of positive tests and percent positive, the team developed

pathogen-specific activity thresholds by analyzing historical outbreaks. These thresholds were used to develop a set of dashboard elements that present pathogen-specific indicators of activity (None, Minimal, Moderate, Heavy, Intense), trend (5 weeks, 1 year, 5 years), severity (percent inpatient, critical, respiratory failure), and regions affected.

**Preliminary Impact and Findings:** During the focus groups with parents, participating parents reported interest in having access to the type of information about common viral epidemics that the Germ Watch system provides. These findings were presented to Intermountain Healthcare's Pediatric Guidance Council, which subsequently has generated discussion and early planning such as discussions with the public relations office about the development of a public-facing version of Germ Watch. The vision of this spin-off project is to provide the equivalent of a weather report for respiratory viruses that could be published in the local news media.

The development of the dashboard will be presented in May 2011 as a platform presentation at the meeting of the Pediatric Academic Societies.

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**Strategic Goal:** Develop and disseminate health IT evidence and evidence-based tools to improve health care decisionmaking through the use of integrated data and knowledge management.

**Business Goal:** Knowledge Creation

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\* *AHRQ Priority Population*