

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

---

<b>Principal Investigator:</b>	Gesteland, Per, M.D., M.S.
<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

---

**Summary:** Acute respiratory infections (ARIs) are a burden to the health care delivery system and the public's health. The overuse of antibiotics for viral infections has contributed to the 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 related decision support tools.

Intermountain Healthcare's Primary Children's Medical Center, which is affiliated with the University of Utah Department of Pediatrics, developed GermWatch  (<http://www.intermountainphysician.net/gw>), a reporting system for pediatric and adult respiratory infections that captures routine microbiological testing data from all Intermountain Healthcare system practices. The system generates reports that display pathogen-specific data in graphs and maps that are distributed with a bulleted summary to more than 400 clinicians in the Intermountain west every week. The reports are also available on the GermWatch Web site, which provides a user interface that supports custom queries based on time-periods, 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 them.

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

In addition to the research project goals, Dr. Gesteland aims to further his long-term career goal of utilizing information technology and clinical information systems to optimize the management of common diseases that affect the health of adults and children. Funding from this Mentored Clinical Scientist Research Career Development Award will allow Dr. Gesteland to advance his skills through mentorship by experts in

advanced epidemiologic and statistical methods, health services research, cognitive psychology of medical decisionmaking, integrated medical systems, health care quality improvement, and biomedical informatics.

**2011 Activities:** Dr. Gesteland made significant progress on the first two aims during 2011. He sought to determine how providers use population-based ARI health information resources and decision support tools and understand the level of interest parents of patients have in accessing viral epidemic data. The research team conducted interviews with providers to inform the development of the dashboard style reports and to elucidate design objectives for the Web site redesign. Specifically, the team sought to understand how current data visualizations could be improved and what additional content and tools (e.g., patient education, ARI guidelines, information about viral testing) providers need and where in the clinical information system and clinic workflow would providers prefer to access these resources. The interviews also identified new issues, including providers' comfort level with office staff access to GermWatch and with tailoring information appropriately for parent access. These refinements are ongoing.

Based on input from parent focus groups, the research team began developing a public-facing version of the GermWatch system, which will have content designed specifically to meet the information needs of patients and parents relevant to common respiratory pathogens and the related ARI they cause. General design, layout, and storyboard development are complete and individual page content has been drafted. The public-facing Web site will be beta tested with Intermountain employees in summer 2012. This site will serve as the companion tool that clinics can give patients who want to learn more about conditions and specific pathogens. The pediatric infectious disease (ID) team will conduct a critical review of the content to ensure that messages are well articulated for specific pathogens. Dr. Gesteland is also working on the process of message authoring with public relations, in collaboration with ID colleagues and media relations personnel from State and local health departments.

On the provider interface, new dashboard style reports have been developed and refinements to the GermWatch provider-facing site that incorporate the dashboard components are underway. Some mock-ups have been developed, and navigation improvements have been discussed. Refinements to the GermWatch infrastructure include improvements to the GermWatch database with new schemas that support analysis at the level of a viral 'episode of care,' new data types (ICD-9 coded visits), and a quality assurance check before data becomes public. Newly developed functionality includes the ability to monitor influenza-like illness, measles, and pertussis outbreaks automatically. In addition, the system now has the ability to look at antibiotic resistance information in many different ways, for example, by region, by condition (e.g., skin and soft tissue infections, febrile infant), or hospital versus ambulatory information.

A primary focus during the year was on project dissemination and manuscript development. The development of the dashboard was presented in May at the meeting of the Pediatric Academic Societies. Dr. Gesteland presented a paper, [The EpiCanvas Infectious Disease Weather Map: An Interactive Visual Exploration of Temporal and Spatial Correlations](#), at the 2011 American Medical Informatics Association Symposium. This paper won the Homer R. Warner Award and is now available as an e-publication in the *Journal of the American Medical Informatics Association*. Dr. Gesteland is working on integrating this "infectious disease weather map," which depicts regional infectious disease activity at-a-glance into the GermWatch system.

**Preliminary Impact and Findings:** Parents participating in focus groups reported interest in having access to the type of information about common viral epidemics that the GermWatch system provides.

---

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

**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

---

*\* This target population is one of AHRQ's priority populations.*