HealthInfoNet (HIN) is the Regional Health Information Organization (RHIO)/Health Information Exchange (HIE) for the state of Maine. Current efforts to build a statewide clinical information sharing system for Maine began in 2004 with a feasibility study. After concluding that such a system was feasible, stakeholders from throughout the state progressed to the planning and development of the system. In 2005 a request for information (RFI) was released and responding vendors’ proposals to build the HIN system were evaluated. In 2006, as the field of vendors was narrowed, HIN was incorporated as a nonprofit organization, and governance was finalized. The governing body includes an executive director and a board of directors comprising representatives of various stakeholders from throughout Maine, including providers, employers, consumers, payers, and state government. In 2007 HIN has announced that a team led by 3M Health Information Systems (HIS) is the vendor of choice to build the HIN system. 3M HIS has proposed a centralized architecture for the Maine RHIO that consists of the 3M Clinical Data Repository (CDR), Enterprise Master Person Index (EMPI), and Healthcare Data Dictionary (HDD). Partnering with 3M HIS on the project are Orion Health and Connectria. The system is Web-based and remotely hosted.

Presentation
I. History
A. MHIC
The Maine Health Information Center (MHIC) was established in 1976 as a nonprofit health data research and data management organization. It manages the country’s first all-payer, all-setting health and dental insurance claims database, the Maine Health Care Claims Data Bank. The database is run on a system that annually processes over 50 million claims transmitted via the Web from 150 insurers nationwide.

B. 2004
In August, 2004, with financial support from the Maine Health Access Foundation (MeHAF), the Maine Quality Forum, and the Maine Bureau of Health, the MHIC conducted a study to determine the feasibility of building a statewide clinical information sharing system. The study was completed in December, 2004, and concluded the following:
1. There was sufficient penetration of health information technology (HIT) in Maine’s hospitals and physician practices for initial population of a patient-specific database with clinical information.
2. The Maine health care community supported progress of the project to planning and development of the system.
3. Though incomplete, national efforts to create data sharing standards were sufficiently developed to support the system.
4. The technology was available and industry interest was sufficient to support the system.
5. A cost-benefit analysis showed large cost savings that could potentially be realized by implementing a statewide system. The study, commissioned by the MHIC, estimated that between $42.3 million and $58.4 million could be saved annually through:
   a. Availability of patient-specific clinical data at the point of care.
   b. Clinical decision support.
   c. Avoiding unnecessary hospitalizations due to unavailable patient information.
   d. Decreasing preventable adverse drug events (ADEs) in the hospital.
   e. Decreasing outpatient visits due to preventable outpatient ADEs and unavailable information.
   f. Decreasing duplicate testing.
   g. Decreasing redundant use and overuse of medications.
   h. Decreasing emergency department workflow expenses.

C. 2005
In July, 2005, the MHIC released a request for information (RFI) describing the project and inviting vendors’ responses. From a group of 33 industry respondents, six were chosen to formally present their solutions in November, 2005.

D. 2006
In 2006 the field of vendors was further narrowed to two, and significant developments in the governance and status of Maine’s statewide Regional Health Information Organization (RHIO)/Health Information Exchange (HIE) occurred.
1. HealthInfoNet (HIN) was established as the RHIO to address delivery of the statewide HIE system.
2. Devore S. Culver was chosen to be HIN’s first Executive Director.
3. HIN was incorporated as a nonprofit organization.
4. Maine is one of nine states with state-level RHIOs chosen by the Office of the National Coordinator for Health Information Technology (ONC) to gather information for determining best practices for RHIOs.

E. 2007
In 2007 HIN has announced that a team led by 3M Health Information Systems (HIS) is the vendor of choice to build the HIN system. HIN has received funding from a variety of public and private sources, including the State of Maine, the Maine Health Access Foundation, the Centers for Disease Control and Prevention (CDC), and KeyBank. A 24-month demonstration phase of the project is to be followed by a statewide implementation phase.

II. HIN System
A. 3M HIS
3M Health Information Systems (HIS), based in Murray, Utah, has proposed a centralized architecture for the Maine RHIO that consists of the 3M Clinical Data Repository (CDR), Enterprise Master Person Index (EMPI), and Healthcare Data Dictionary (HDD).

B. Partners
Partnering with 3M HIS on the project are Orion Health and Connectria.
1. Orion Health, based in Auckland, New Zealand, is supplying its Concerto Medical Applications Portal, Rhapsody Integration Engine, and Soprano Forms product.
2. Connectria, based in St. Louis, Missouri, is providing remote hosting services.

C. System Components
1. 3M CDR
   a. Used in the Department of Defense (DoD) electronic health record (EHR).
   b. Centralized, relational database.
   c. Lifetime, longitudinal, patient-centric record.
   d. Open system architecture, thereby preserving the investment in and useful life of legacy systems.
   e. Standards-compliant.
   f. Authorized user access for security and privacy. Access is controlled at the database, transaction, and application levels.
   g. Robust and scalable. That is, it can store an extensive range of complex data from various institutions and supports addition of new data fields as needed.
   h. Highly structured, normalized data. It captures data from diverse sources, in different formats, and stores it in a common, context-sensitive form that is meaningful to the people who use it.
2. 3M EMPI
   a. Minimizes duplicate patient records.
   b. A single, central index for identification of people. Cross-references all identification systems from various institutions and integrates person registration data from those systems.
   c. Creates a unique HIN “Enterprise Number” for individual patients.
   d. Maintains identifiers used by source systems, which then become searchable identifiers (e.g., MRN, ENC, etc.).
   e. Uniquely identifies patients through features such as trusted source logic and 3M’s Advanced Matching Logic (AML).
   g. Contains demographic and encounter data across the continuum of care, linking all acute and ambulatory data and maintaining demographic data consistency.
3. 3M HDD
   a. Levels of interoperability, as defined by the National Committee on Vital and Health Statistics (NCVHS)
      i. basic interoperability
      ii. functional interoperability
      iii. semantic interoperability
   b. Critical data requirements for HIN
      i. interoperability requirement
      ii. meaningful structure requirement
      iii. collecting and storing data in a manner that make it useful for
         - decision support
         - reporting
         - improving patient care
         - reducing costs
   c. Exchanging standard codes
   d. Why HDD?
      i. shift in the meaning of standard codes
      ii. removal of standard codes
      iii. lack of comprehensive standard codes
   e. HDD structure
      i. controlled medical vocabulary
      ii. knowledge base
      iii. medical information model
4. Orion Concerto
   a. Clinical portal (provider and patient access)
   b. Browser-based access to patient records
c. Displays clinical information in a clear and concise way

d. Patient privacy protection
   i. controls access to the patient record
   ii. record level privacy
   iii. information level privacy
   iv. five levels of security
      - full
      - break the glass
      - more . . .
      - locked
      - no access
   v. rule-based access using policies defined to satisfy HIN requirements
   vi. flexible—can change as legislation, test cases, and understanding changes
   vii. management of patient consent

e. Authentication, access control, and security

f. User messaging and notifications

g. On-demand audit logging

h. System administration tools
   i. Clinical standards support, such as Clinical Context Object Workgroup (CCOW) and Health Level Seven (HL7)

5. Orion Rhapsody
   a. Delivers patient demographics and information from feeder systems into the HIN system
   b. Performs message mapping between various formats
   c. Provides interfaces to systems from existing vendors in Maine
   d. Provides a simple, easy-to-use mapping and routing toolkit through an intuitive graphical user interface. Most interface development occurs in this non-programming environment.

6. Connectria Remote Hosting
Connectria is providing the remote hosting and hardware management for the project. The system is configured such that two instances of HIN will exist, each housed in its own data center in separate buildings in St. Louis, Missouri. If one instance should fail, the system fails over to the other instance. Additional disaster recovery is provided via tape backups of the data. Each data center is secured physically and contains multiple, high bandwidth Internet connections.

III. HIN/3M Partnership In Innovation
A. 24-Month Demonstration Project

An initial portfolio of product and service offerings has been highlighted for development during the first 24 months of HIN operation.

1. Person-centric clinical summary
2. Clinical messaging
3. Maine CDC surveillance reporting
4. Medication reconciliation
5. e-prescribing

B. Sustainability Principles

1. Products and services designed to achieve certain goals.
   a. Improve quality
   b. Enhance patient safety
   c. Increase patient confidentiality and system security
   d. Moderate rate of increase of healthcare costs
   e. Ensure simple, convenient provider access
   f. Provide consumers with convenient, affordable access to personal medical information
   g. Produce sufficient revenue

2. Clear and concise, results-based metrics.
3. HIN’s business and investment strategies.
5. Deliberate, research-based development and delivery of HIN’s products and services.

C. Primary Customer Segments

1. Consumers
2. Providers
3. Maine CDC

D. Future HIN Products and Services

1. Statewide standardized disease registry
2. Personal health record (PHR)
3. Electronic health information utility

Learning Objectives

I. To learn about the challenges (e.g., political, organizational, financial, etc.) faced in forming a statewide RHIO.
II. To learn about the technical problems and proposed solutions for a statewide, centralized HIE.
III. To learn about the ongoing challenges and proposed solutions for operating and sustaining a statewide RHIO and HIE system.

Who Should Attend?
Providers, Students, Educators, Chief Information Officers (CIOs), Chief Technology Officers (CTOs), Information Systems Managers, Quality Improvement Managers, Care Management Directors, Chief Medical Officers (CMOs), Chief Medical Informatics Officers (CMIOs), Administrators, Business Managers