National Institute of Diabetes and Digestive and Kidney Diseases

Population Health and Analytics at IHS: A Strategic Plan

Indian Health Service

Setting & Background

Lead Organization: Indian Health Service (IHS) provides care to members of 566 federally recognized Tribes, representing 2.2 million American Indians and Alaska Natives. Tribal, urban, and IHS facilities provide approximately 44,677 inpatient admissions and 13,180,745 outpatient visits each year. IHS has 12 area offices and 170 IHS and tribally managed service units. Thirty-three (33) urban programs provide services ranging from community health to comprehensive primary care.

Key Partners

- Tribal leaders/communities
- Tribal health care workers (including community health representatives)
- Providers
- Patients

Health Care System Structure: National network of facilities; over 50% of facilities are tribally operated.

Target Population: Members of 567 federally recognized Tribes representing 2.2 million American Indians/Alaska Natives in the United States.

EHR Platform: IHS uses a federally developed and supported EHR that is based on the VistA (Veterans Administration) system. The EHR is the graphical user interface (GUI) to the IHS Resource and Patient Management System (RPMS), a set of software applications that integrates patient-related information into one comprehensive, centralized database for user-friendly viewing.

Population Management Systems: IHS' population health management activities (**Table 1**) are facilitated by iCare, a population management software tool that interfaces with the IHS EHR/RPMS database to provide a comprehensive view of patient and population information. iCare was initially deployed in 2005 and subsequent releases have provided enhanced population health functionality. iCare allows providers to create multiple panels of patients with common characteristics (e.g., age, diagnosis, community) and to personalize how they view patient data within a graphical user interface. This provides staff, clinics, and sites access to information, enhancing clinical decision-making. Prior to the release of iCare, RPMS was able to provide population health functionality through a query tool, but this functionality was not intuitive for the end user. For additional detail, see RPMS iCare (BQI v2.1) from the IHS website.

iCare's interface consolidates patient information from various software applications and components of the RPMS database under a single interface.

Time Period

- IHS was an early adopter of EHRs with a health information technology (HIT) system in place since 1987 and an ongoing commitment to open source meaningful use (MU)-certified HIT systems. By July 2015, the RPMS EHR was in use at 459 of 470 facilities (98%).
- IHS has developed a population health management strategic plan (2015 – 2020).

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Introduction

IHS strives to provide comprehensive services to a very high-risk population. To this end, IHS implemented the patient-centered medical home (PCMH) model in the 1980s, and tracks outcomes at both the community/population and patient level. The following are key elements of the PCMH approach:

- Population health management (includes defined panel lists, reminders, use of disease/condition-specific registries/populations, diagnostic tags, use of demographic information, longitudinal tracking);
- End user (including tribal community member) involvement in development of requirements;
- Performance measurement; and
- Quality improvement.

Given limited resources, IHS has relied heavily on technology— the RPMS system and the EHR in particular. To guide HIT activities and ensure that key goals and objectives are met, IHS developed a 5-year strategic plan starting in 2004, with 5-year updates (**Box 1**). The most recent plan, Vision 2020, is for 2015-2020. HIT and the ability to acquire, consume, and report data are viewed as key quality improvement tools.

An important aspect of this work has been involving the community— tribal community leaders as well as tribal health boards. IHS is committed to having effective partnerships and collaborations at the community level, using activities such as local listening sessions to help facilitate a two-way flow of information. In response to requests from the community, IHS ensures data are made available to communities in accessible and easy-to-understand formats, allowing communities to use the data to make decisions about local health priorities. IHS also drives clinical quality measures based on tribally identified health priorities as well as external reporting requirements.

Table 1: IHS HIT and Population Management Systems

System	Support Tasks	User Segments with Appropriate Permission/Security
RPMS iCare	•Manage the care of patients and patient populations. •Access a comprehensive view of patient information when used in combination with the EHR. •Create multiple panels of patients with common characteristics (e.g., age, diagnosis, community). •Create custom patient panels. •Enable provider review. •Population, community, and patient views of data allow display of clinical quality measures from patient, population (registry), and/or provider perspective. •Relies on national taxonomy standards that are endorsed and integrated into RPMS and the Cache dB.	•Local providers and nursing staff/appropriate health care team members •Local population health specialists •Local schedulers •Local health care administrators •Local case managers tribal administrators
RPMS Clinical Reporting System (CRS)	•Enable the collection and reporting of clinical performance results provided annually to HHS and to Congress. •Access on demand clinical performance measures from the local RPMS database with nighttime updates for the health care team as well as other local users, including tribal leaders. •Generated printed or electronic report for any or all of over 300+ clinical performance measures, representing 74 clinical topics (Healthcare Effectiveness Data and Information Set [HEDIS]/National Committee for Quality Assurance [NCQA], The Joint Commission). •Update clinical performance measure logic and definitions annually. •Use of taxonomies to ensure comparable query results across facilities.	•Office of Public Health Support (OPHS)/Division of Planning, Evaluation and Research(DPER) •Local providers •Local health care administrators
National Patient Information Reporting System (NPIRS) National Data Warehouse (NDW)	•Access reports that are required by statute and regulation. •Generate Government Performance Results Act (GPRA) reports. •Access a broad range of clinical and administrative information to enable better management of individual patients, local facilities, and regional and national programs. •Access historical repository of patient registration and encounter information dating back to October 2000. •Access highly focused, often temporary, program data marts to support searches and reports on a subset of data.	•Managers at all levels of IHS •National and area headquarters program staff •Statisticians •Epidemiologists •Population health specialists •Senior leadership •OPHS/Division of Program Statistics (DPS) •National and area GPRA coordinators

Box 1: Strategic Plan Goals (2020)

- Increase consumer empowerment and person-centered care.
- Improve the sharing and use of patient-generated health data.
- Connect an expanded set of users and data sources through the use of telehealth, mobile health, and wearables.
- Improve systems to support chronic disease management and self-management support.
- Health care teams will have on demand access to the information they need in an easy to consume and useful manner; technology and data will not be a barrier during the patient encounter.
- Improve capability to support population health management through the application of data analytics.

Methods

The strategic plan is designed to meet the needs of key IHS stakeholders (**Table 2**).

Details of Population Health Management Intervention

Access to data provides clinicians opportunities to improve care at the patient and community level. The current system includes a query tool that allows clinicians to search their patient base at the point of care using Boolean logic in a graphic user interface, both facilitating ease of use and increasing use.

This allows clinicians (as well as the many medical students and other trainees that rotate through IHS facilities) to engage in quality improvement activities. For example, if clinicians notice a health-related trend in their patients, they can conduct longitudinal and community-based queries related to this condition in order to explore it in greater detail at the community- and patient-level.

Summary of Health Care System Changes and Modifications

The process has been incremental, built on the implementation of the HIT system since the 1980s. Implementing changes over time has reduced the burden on clinicians, and has supported the PCMH model through increased ease of use and the ability to quickly evaluate impact of interventions to improve care.

Table 2: Expected Vision 2020 Outcomes for Stakeholders

Stakeholder Group	Expected Outcomes
Consumers/Patients	• Will be the focus point of our processes, will experience an integrated, culturally sensitive, seamless health care encounter with limited wait times, no paper forms, and no redundant data entry. • Will have on-demand access to their HIT data within 24 hours of their encounter. • Will be able to easily share their health data, either manually entered or from consumer-owned sensors (including wearable devices), with any provider around the country from any device. • Will be able to seamlessly and quickly access care providers from any device, using a combination of video, audio, text, and sensitive file transfer. • Will have increased access to educational materials, support groups, and interactive applications to support them in achieving their health goals.
Health Care Providers	• Will have access to current and evidence-based contextual clinical decision support. • Will be able to identify at-risk populations and individual patients and make appropriate referrals for early intervention. • Ensure early sentinel awareness of specific disease situations.
Population Health Specialists	• Will be able to identify at-risk populations and provide early interventions and preventive medicine approaches.
Leaders and Decision Makers	• Will have near-real-time access to provider and team performance data to be able to support rapid cycles of improvement. • Will be able to predict resource need and allocate resources to address population health needs. • Will be engaged in a recurring planning process that incorporates timely stakeholder input and that is responsive to stakeholder needs. • Will be tech savvy, technophiles, conversant in technology innovation and innovation processes, and business savvy, conversant in health informatics and government administrative processes.
Technology Teams	• Will have seamlessly integrated customer service channels at all levels of the federal IHS system (web, email, phone, chat, etc.). • Will incorporate stakeholder feedback seamlessly into the software development lifecycle and will ensure transparency and stakeholder engagement throughout the process.

Outcome Measures

IHS uses GPRA indicators as well as the Joint Commission, HEDIS, and Uniform Data Set measures (from Bureau of Primary Health Care, Health Resources and Services Administration).

A unique aspect of the IHS EHR is that providers can document and track patient education (even though it cannot be billed). These codes were developed by clinicians and are in a nationally distributed data set. The patient education software application includes the ability to document level of understanding as well as individual patient goals and success with meeting them.

Itemized Summary of Tools, Resources, and Code

Population health and analytics tools include:

- Case management system (maintains patient registries/populations)
- Chronic disease management
- Community health representative system
- Diabetes management system
- HIV management system
- MU performance measure reporting
- Health information exchange (both internal and external facilities)
- Immunization interface management including bidirectional immunization exchange with state registries
- Immunization tracking system
- Patient Care Component management reports, including efficiency report
- Personal health record (CACHE.DAT database mounted to the local RPMS)
- Clinical reminders
- Well-child component
- Women's health, including a procedure tracking system
- Obstetrics module
- Generic interface system (allows transmission of demographic and care data to and from RPMS system)

Itemized Listing of Data Sources

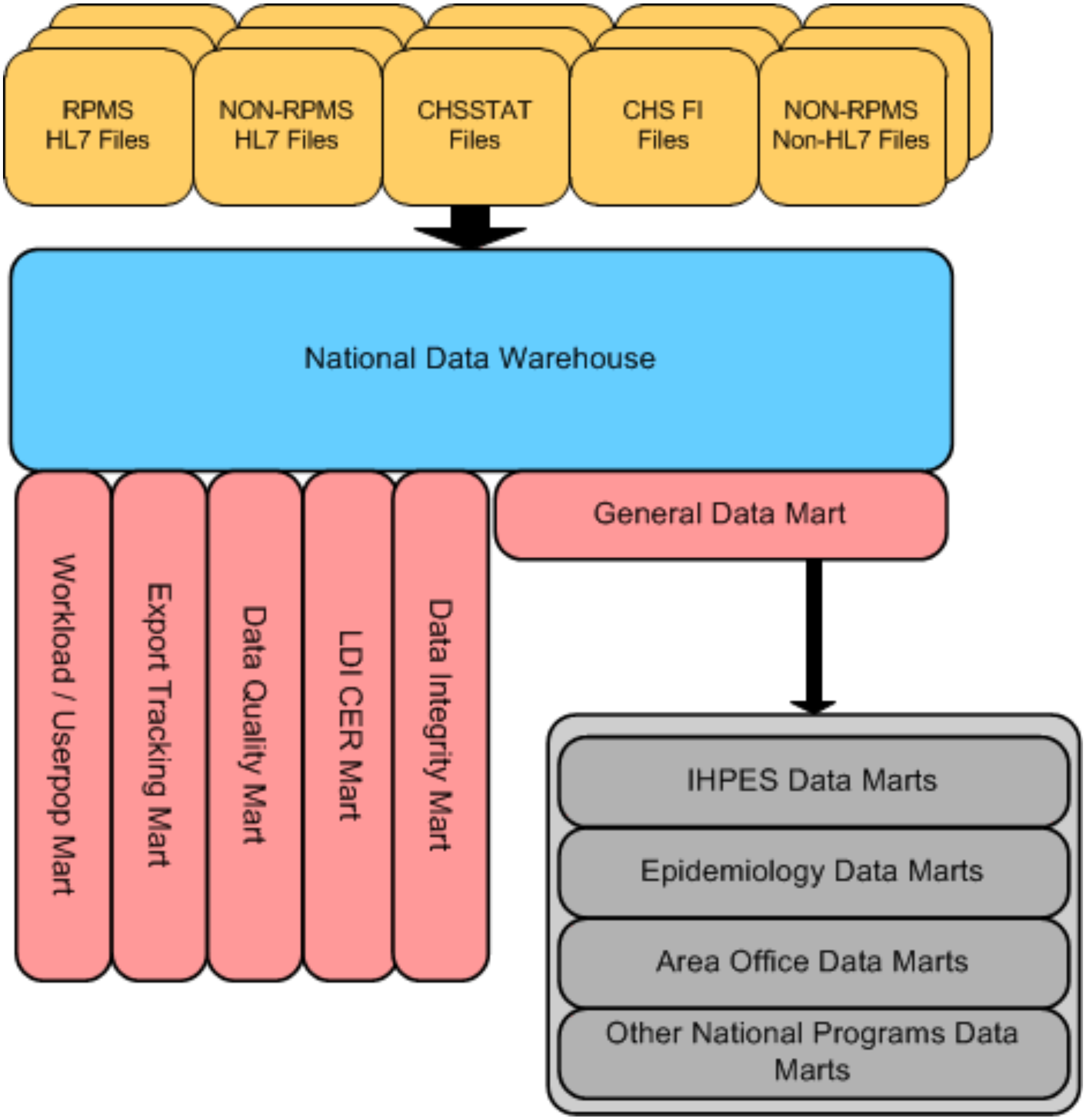
The National Patient Information Reporting System (NPIRS) compiles data from IHS facilities in the National Data Warehouse (https://www.ihs.gov/NDW/index.cfm), a state-of-the-art, enterprise-wide data warehouse environment for IHS's national data repository (**Figure 1**). The National Data Warehouse includes a national-level database with historical patient registration and encounter information dating back to October 2000, as well as individual, program-specific data marts that allow end users to quickly and efficiently access targeted information, often via a web interface. Data marts are created by importing only the data required to fulfill the custom requirements of specific end users. Data marts can be refreshed or purged and the data re-imported from the National Data Warehouse whenever necessary. The Indian Health Performance Evaluation System (IHPES) provides data marts for the IHS Office of Clinical and

Preventive Services. Access to data marts is overseen through an Indian Health National IRB, though many Indian Health Areas operate an area level IRB that is involved in data access. Currently, there are 22 data marts under the NPIRS umbrella.

Summary of Program Funding

Funding for IHS Office of Information Technology activities is part of overall IHS funding.

Figure 1: Organizational Structure of NPIRS



Results

Accomplishments to Date

- The 2014 certified RPMS EHR implemented at 459/470 facilities (98%) as of July 10, 2015.
- Over $158.8 million received as a result of adoption and/or meaningful use of the RPMS EHR by IHS, tribal, and urban eligible hospitals and providers.
- Release of MU2-related enhancements: personal health record; enterprise-wide health information exchange (HIE); eHealth Exchange; RPMS Direct; and Terminology Services solution to address clinical terminologies (SNOMED, ICD, CPT, LOINC, etc.).
- Federated Services Agreement (FSA) with DirectTrust.
- Developed new policy and trust framework to support the data sharing requirements for IHS, tribal, and urban participants in MU2. This framework has been formalized and adopted via the Multi-Purpose Agreement (MPA) (https://www.ihs.gov/meaningfuluse/includes/themes/newihstheme/pdf/MultipurposeAgreement.pdf).
- Prototyped new enterprise performance reporting solution and began development of production version in order to improve capabilities and alignment with Agency's many performance reporting requirements.
- Managing four major, national deployments simultaneously—2014 CERH, RPMS Network (MU2), BCMA, and ICD-10—while beginning preparations for MU3 and transitioning to planning for other national priorities.
- VA Bar Code Medication Administration (BCMA) solution deployed to 21 high-priority hospitals.
- ICD-10 solutions developed, tested, and deployed.

Challenges & Solutions

Challenges in Rural HIT

A large number of IHS facilities are in rural areas. This creates additional challenges for the Agency. Challenges for implementing HIT in these settings include:

- Technology and infrastructure disparities, including low band width and need for asynchronous data sharing;
- Lack of skilled workforce;
- Increasing certification, accreditation, and auditing requirements, the opportunity cost of which is decreasing ability to fulfill patient and provider generated requirements and decreasing support for innovation initiatives;
- Increasing infrastructure requirements due to health data sharing;
- HIT market consolidation and its impact to localized needs;
- Immaturity, variance, and ever changing interoperability standards;

- Variance in states' approaches to population health, privacy, reporting, interoperability, data sharing, and implementation of the Medicaid EHR Incentive Program; and
- A national interoperability framework that does not effectively support the rapid growth of a patchwork of national, state, regional, and local HIEs--whether public or private—often in overlapping jurisdictions.

In response to this challenge, IHS has:

- Worked with Tribes, states and federal partners to maximize use of rural health dollars for improved infrastructure;
- Developed training programs with local community colleges to ensure appropriate workforce;
- Leveraged other federal partners (VHA) for informatics training materials;
- Maximized use of American Recovery and Reinvestment Act of 2009 (ARRA) funding to build internal infrastructure capacity;
- Worked with Federal Communications Commission (FCC) to develop predictive model of bandwidth needed for interoperability;
- Worked with state public health departments to identify ways to share public health data;
- Begun the discussion with federal partner agencies to address the emergence of the patchwork of HIEs; and
- Distributed locked data sets and moved towards common practice standards within and between facilities.

Challenges Related to Maintenance

As HIT continues to grow, key factors such as having sufficient resources and funding to implement and maintain systems are imperative. One has to consider the hardware, software, and services to help clinicians' access data more efficiently and effectively so quality decisions can be made. IHS' utilization of HIT grew out of a system where resources were in demand. Use of technology has been driven by federal requirements related to implementation of the EHR (i.e., meaningful use) and tracking clinical outcomes (e.g., GPRA). IHS has focused on how HIT can be used to improve patient care. For example, resources were limited to do chart reviews to assess clinical quality. Using the HIT system to access and aggregate these types of data was essential to consistent clinical quality reporting. Creativity and innovative use of technology in the face of limited funding have helped in implementing solutions to provide quality and safe patient care. In addition, partnerships and piggybacking on other systems have helped to address the lack of resources and increase the overall cultural understanding for the need of HIT and appropriate resources at the local and regional level.

Facilitators

Lock Down Your Data Set

- Involve stakeholders (clinicians, patients, community)

- Ensure interoperability of data systems
- Clean (and published) data model and dictionary
- Use standard terminology
- Data can be aggregated and reviewed at point of care with no need to know SQL or other query builders
- Data are actionable

Empowering Primary Care Providers/Health Care Teams

- Involve health care teams in generation of requirements
- Data allow primary care providers to track patients, populations, and chronic disease over time
- Allows providers to view individual patient within a population context
- Provides flexibility

Getting Staff on Board (avoiding push back related to collection/entry of data)

- Implement EHR incrementally
- Ensure functionality is informed by staff needs
- Involve staff in the process
- Support from leadership

Conclusions

Developing robust HIT and population management resources ultimately helped IHS improve care in a resource-limited environment. Working with community stakeholders—especially tribal leaders—was central to developing an effective, patient-centered system that meets community needs. Development of 5-year strategic plans has guided IHS HIT efforts, driving continuous improvement.

Additional Resources

RPMS and iCARE code are published on Open Source Electronic Health Record Alliance (OSEHRA) at http://code.osehra.org/journal/journal/?q=text-journal.tags:RPMS.

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