



health_eme



Health & Wellness Management System

Open Source.
Completely Customizable.
Integrates with EHR Systems.

A solution that works with how you work.

Overview

HealtheMe started in 2007 as a Personal Health Record (PHR) pilot project funded through Center for Medicare and Medicaid Services (CMS). Today, it has been expanded and implemented across care settings, and supports record extractions from several Electronic Health Records (EHRs).

KRM Associates Inc., the original developer, has released this solution as open-source software to allow the healthcare community as a whole to modify, enhance, and implement the solution in any care scenario. As the community around the solution grows, enhancements may be freely shared among the user base to communally grow a mature and effective solution to the benefit of all.



Quick Facts

System:

- ▶ Web Accessible
- ▶ Self-Entered & Clinical Data
- ▶ Highly Customizable
- ▶ Data Access Delegation
- ▶ Can interact with EHRs, HIEs

License:

- ▶ AGPL v3

Technologies:

- ▶ Java
- ▶ Glassfish
- ▶ MySQL

Project History

In 2007, KRM participated in a Medicaid Transformation Grant for transformative Health Information Technology in the state of West Virginia. A component of this grant was the pilot implementation of a PHR. Originally evaluating the Department of Veterans Affairs (VA) PHR, MyHealtheVet, as a possible solution, it was determined that the architecture used relied too heavily on proprietary components, and was not easily able to stand independently of VistA, the VA's EHR.

To overcome this problem through working collaboratively with MyHealtheVet staff, KRM developed a PHR very similar in functionality to MyHealtheVet, though relying upon freely available and open-source technologies and standards. This solution used a MySQL database and Java front-end, and was designed to support the Continuity of Care Record (CCR) standard as its data format.

This version was deployed in 2009 at a pilot location, and is currently used in production at that facility. Originally titled "HealtheMountaineer," it is now known simply as "HealtheMe."

Features

Having been based on the MyHealtheVet Personal Health Record, and leveraging the Continuity of Care Record, the project supports industry standard data points. These features are listed to the right. Logically, the data items have been divided into self-entered and clinical tabs; wherein users may contribute to their self-entered elements, but clinical data remains static. Designed to be down-stream from EHRs, this decision was made to prevent variance between systems and ensure users would raise discrepancies or errors with their provider. Implementation specific considerations, such as mandatory delays for lab data, have been configured as well to allow providers time to review data prior to patient access.

Modularity

Those with the highest need for a tool to coordinate care are special populations with specific use cases and care needs such as the pregnant, chronically ill, or those which require rehabilitation. One of the primary advantages of the open-source approach to software implementation is the ease with which customizations may be implemented and refined to such scenarios.

The features of the care notebook component were initially developed for children's health specific requirements, however they are certainly applicable to a variety of other use cases. By expanding the types of data this tool supports in support of specific needs and care plans, overlapping data points can help drive best practices across implementations.

Current Features

Health Record:

- ▶ Medical Events
- ▶ Allergies and Reactions
- ▶ Medications
- ▶ Lab and Test Results
- ▶ Immunizations
- ▶ Vitals
 - Blood Pressure
 - Pulse
 - Body Temperature
 - Pain Level
 - Peak Flow
 - Body Height
 - Body Weight
 - Body Mass Index (BMI)
 - Fingerstick Blood Glucose

- ▶ Appointments and Visits

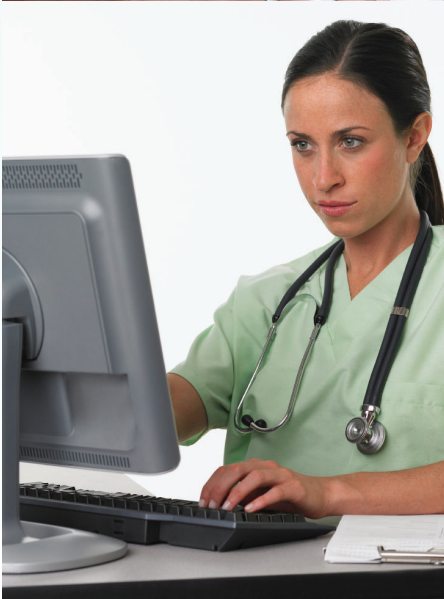
Care Notebook:

- ▶ Medical Information
- ▶ Care Providers
- ▶ Family History
- ▶ Nutrition
- ▶ Daily Care Logs
- ▶ Transitions and Goals
- ▶ Education
- ▶ Employment

Health Tracking:

- ▶ Exercise
- ▶ Health Calendar

Extensions



NHIN CONNECT Integration

Collaborating with Northrop Grumman™, HealtheMe has been successfully integrated with a prototype Health Information Exchange (HIE) using NHIN CONNECT. This project demonstrated HealtheMe requesting XML-based patient records using CONNECT standards, the HIE retrieving records from installations of the VistA and RPMS EHRs and delivering them to HealtheMe, at which time HealtheMe would parse the clinical records into the solution for patient access.

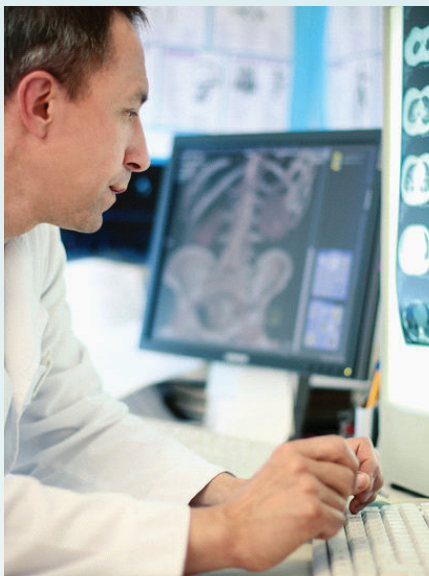
CHIP Case Management Extension

HealtheMe has been modified and implemented as part of a multi-state collaborative initiative in support of the Children's Health Insurance Program (CHIP). This project required the development and implementation of a case manager role, which could access and review patient records in order to manage care in non-traditional settings. As a result, patients are now able to grant and revoke requested record access for case managers. Additionally, the solution was modified to reflect elements traditionally captured in a care notebook. By using HealtheMe as the manner of capture for these data items, paper based methods of capture have been eliminated, and the data can easily be reviewed and analyzed.

Educational Integration

Working with Shepherd University, HealtheMe has been implemented as a component of the nursing school's curriculum. Incoming students leverage the solution to track personal health information, such as immunizations and medications. HealtheMe has been expanded to include exercise information as well, allowing students to track and estimate calories burned for a variety of workouts. This community provides critical feedback pertaining to usability and suggested enhancements.

Roadmap



Additional Data Integration

HealtheMe has been interfaced to installations of VistA and RPMS through using XML-based data extracts. Currently, these have been generated out of installations by leveraging the Continuity of Care Record (CCR) standard. In an aligned initiative, KRM has participated in a project to extensively map C32 data extractions generated from an RPMS installation into a relational schema for Comparative Effectiveness Research (CER). This project has been conducted for the Agency for Healthcare Research and Quality (AHRQ), and Indian Health Service (IHS). This schema is currently being integrated into the database architecture of the solution, and once implemented will support an extensive amount of data points, as well as the importation of C32 records. It is anticipated that this will then be expanded to support the emerging CCDA standard, which is likely to be released as a component of Meaningful Use Phase II.

Blue Button Support

HealtheMe has been designed to support the importation of clinical data in standardized, XML-based format. However, EHRs remain poorly interconnected, with data exchange between systems sparse and incomplete. To combat this, the Department of Veteran's Affairs has created the 'Blue Button,' a feature which allows users to print their complete medical record and manually bring it with them to encounters. Once the architectural enhancements in support of C32 are implemented, this feature will be released. By supporting multiple clinical feeds, a consolidated blue button record could be generated, granting a more complete set of clinical records.

Custom Dashboarding and Reporting

The database component of this solution constitutes a clinical data repository rich with patient information. By making custom dashboards available for specific roles, users will be able to easily and quickly review important information. Case manager and patient specific dashboards could enhance coordination and visibility across care plans. Clinicians could expeditiously review reports they require, such as Meaningful Use related metrics.

Why Open-Source?

Open-Source in healthcare has the potential to be a transformative force. By its nature, healthcare is a dynamic industry, constantly redefining best practices and care models, with a great variety of service environments. Providers range from emergency responders and small clinics to military and large hospital systems, each with distinct needs. Given the variety of use cases, knowledge and solutions often become “silo’ed” into specific implementations, which are typically proprietary in nature; this inherently acts as a barrier to rapid innovation and information sharing. If open, standardized code can be customized and shared across implementations, dynamic and well tailored solutions can best serve the users while continually providing the benefits of improvements made across care settings. The result would be rapid innovation in solutions and best practices throughout the user community, resulting in cost savings and improved outcomes.

The AGPL v3 license has been selected for this project. This license ensures contributions and enhancements made to the core functionality of the solution must be contributed back to the community, and remain open-source. However, modules and extensions interfaced to the solution are not subject to this requirement. Thus, the main functionality is shared amongst participants, while closed-source solutions may be easily interfaced for specific extensions as needed.

About OSEHRA

OSEHRA's mission is to facilitate, through the use of the best practices in open source software development, the improvement and maintenance of EHR information systems. These systems will be freely available for all medical beneficiaries and – like other successful open source communities – will welcome the contributions of all kinds of developers.

OSEHRA simply and powerfully establishes an organized framework for all kinds of companies and creative individuals – users, developers, service providers, researchers, universities and for-profit companies – to communicate, collaborate, and share. The open source ecosystem is a transparent, rapid and safe way to accelerate progress in creating an ever improving, and highly functional EHR for the beneficiaries of VA healthcare, and more broadly, the nation as a whole.

While OSEHRA has initially focused on building an open-source ecosystem central to the VA's VistA EHR, and facilitating the development of iEHR, its focus has broadened to supporting the healthcare community as a whole. In supporting projects such as genomics and imaging, OSEHRA is becoming a central point of open-source software discussion and development particular to Health Information Technology. Key federal partners and community members may communally develop and grow solutions. As a solution based on federal funding, and already integrated to both the VA's and IHS's EHRs, facilitating the future of this project through the OSEHRA infrastructure is a natural extension and complimentary to its purpose.

How to get it.

For the latest on developments and enhancements, visit OSEHRA's website at **www.osehra.org**.

At this site, you may visit the JIRA issue tracker to see the latest development activity, discuss potential enhancements, and download the source code available through the git repository.



Implementation and Enhancement Services

While the community may download, install, and extend the solution as they wish, KRM offers implementation, training, enhancement, and support services for HealtheMe. For further information, please contact KRM Associates Inc. by using the information listed below:

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