

Patient-Centered Outcomes Research Trust Fund for Data Infrastructure

Contract Number 200-20012-50804, Task Order #8 Final Report

Project Title: Exchange of Relevant Death Information between Electronic Medical Records and State Electronic Death Registration (EDR) System

This is a final report of the completion of Task 2 deliverables to demonstrate the exchange of relevant death information between electronic medical records and a state's electronic death registration system using the HL7 V2.6 Vital Records Death Reporting (VRDR) draft standard. The goal was to improve both the timeliness and quality of death information.

The deliverables for this task included modifying NCHS DVS systems to receive, accept and parse HL7 messages and CDA with death information received from states, and for the state's Electronic Death registration System (EDRS) to be able to receive from participating hospitals HL7 messages or CDA death information to be used in the registration of a death event. The EDRS was also expected to send HL7 messages to NCHS for processing of the registered record and receive from NCHS mortality codes for insertion into the state's database. After testing, the implementation of real-time exchanges between the participating hospital and the State, between the State and NCHS, and vice versa was expected. During this process, participants were to evaluate the draft standards to support improving the standard for future use.

NCHS has worked closely with representatives from University of California Davis Health System (UCDHS) to complete the modification of systems and to pilot the implementation at California Department Public Health (CDPH). Representatives from UCDHS collaborated with NCHS Divisions of Vital Statistics (DVS) and the CDC Public Health Information Network Messaging System (PHIN MS) team to install PHIN-MS nodes and successfully transmit test HL7 messages to NCHS.

UCDHS collaborated with the Epic EHR integration team to test the interface with the Epic EHR system and the Electronic Death Registration System (EDRS) Integrating Medical Information in EDRS also known as the IMAGINE module. EPIC was able to successfully launch IMAGINE and submitted Cause of Death information from the EHR system to populate information in the EDRS.

The UCDHS EDRS team created an HL7 message template for generating HL7 messages and set up an automatic trigger to generate an HL7 message when a new record is state registered. The UCD EDRS team also set up a Vital Records Death Reporting (VRDR) message exporter to automatically send and receive messages to NCHS via PHIN MS. Causes of Death HL7 message (A04) were tested and are able to be sent successfully to NCHS while also receiving Acknowledgement (ACK) HL7 message from NCHS. UCD EDRS team successfully received sample HL7 messages with more than one coded cause from NCHS. NCHS also configured the Mortality processing system to receive and load received HL7 IG formatted Death Report data into the NVSS processing system. Immediately after coded Medical data is available, HL7 IG formatted data is returned to the original source jurisdiction.

The UCD EDRS team also reviewed the HL7 V2.6 Vital Records Death Reporting Implementation Guide (VRDR IG) that was published in Aug. 2016 to determine requirements and modifications needed

Patient-Centered Outcomes Research Trust Fund for Data Infrastructure

Contract Number 200-20012-50804, Task Order #8 Final Report

to support using this updated version of the messaging standard for the pilot implementation. The HL7 V2.6 VRDR IG is posted at http://www.hl7.org/implement/standards/product_brief.cfm?product_id=209. Initial work activities referenced the previously published HL7 V2.5.1 VRDR IG while also keeping abreast on the developing HL7 V2.6 VRDR IG that was awaiting final publishing. The team provided a list of detailed findings from their HL7 transmission that served to revise and enhance the standard and to make improvements/corrections to the NCHS HL7 Parser. The UCD team also tested the National Institute for Standards and Technology's Conformance Testing tool to provide feedback on needed modifications.

In 2016-2017, the EPIC EHR system was upgraded to the 2016 module. Following the full implementation of the EPIC EHR 2016, and final enhancement of the IMAGINE module, the UCD team began pilot testing. Deployment to production occurred in May 2017. Testing occurred on May 2, 2017. Fewer than expected physicians utilized the IMAGINE module to report hospital deaths. This is despite UCD working with the UCDHS Decedent Affairs staff and Physician staff in planning efforts for rollout.

Widespread adoption of the system needs to be addressed. It is noted that physicians may find the familiar paper document easier/quicker to complete than the on-line version. Also, UCDHS used the on-line reporting system for inpatient only; however, the possibility of expanding to outpatient is feasible. There is need to work with the EHR system vendors to socialize the availability of the death system, while expanding it to include outpatient deaths as well. Direct text messaging to physicians may be useful to alert them of a death certificate that needs their completion or signature. Strategies for adoption could also include greater user training and outreach to promote user buy-in.

The UCD EDRS team lead reviewed observations with the decedent affairs office and noted some barriers. The term "Attending" used in an academic setting such as UCD refers to the person in charge of the residents and interns. Residents and interns who complete electronic death certificates will not sign them but will wait for the attending or person who is their superior to sign since this is the indication on the death certificate. In a usual setting, the attending refers to the person who last saw the patient. This physician, no matter his role, will sign the death certificate. If this confusion is clarified, residents and interns may more likely utilize the system for completing and signing the death certificate. Also, the role of the individual accessing the system is not currently visible. Therefore, no indication is provided to prompt appropriate providers to complete and sign the death certificate. If this was remedied, there may be greater uptake of death system utilization.

The decedent affairs office also provided feedback that duplicates of paper and electronic submissions are not currently easily identified. For instance, two physicians completed both the paper and electronic certificates that were both processed as separate until a manual process identified them as duplicates. A final observation is that there has not been much improvement in data quality of the causes of death using the IMAGINE system. A proposed solution is to integrate with the Validations and Interactive Edits

Patient-Centered Outcomes Research Trust Fund for Data Infrastructure

Contract Number 200-20012-50804, Task Order #8 Final Report

Web Service (VIEWS) system. The VIEWS is an online service provided by NCHS enabling improved mortality data validations during data entry which can be used by state EDRS. An additional solution identified is to provide a wizard driven approach in standard and expert modes to assist in more accurate data for causes of death.

The UCDHS team collaborated with NCHS to participate in trial implementation activities and several demonstrations using the HL7 and Integrating the Healthcare Enterprise (IHE) standards for death reporting including:

- Jan. 25-29, 2016 - IHE 2016 Connectathon/Projectathon in Cleveland to begin testing use of HL7 V2.5.1 VRDR IG and the IHE VRDR profile for death reporting to NCHS
- Feb. 2, 2016 - Dr. Hogarth (UCDHS) presented the PCOR: Exchange of Relevant Death Information between EHR and EDRS project at NAPHSIS eHealth Committee meeting
- Feb. 28 – Mar. 3, 2016 – Demonstration at the Healthcare Information Management and Systems Society (HIMSS) Annual Conference in Las Vegas, NV at the Interoperability Showcase within the Federal Health Architecture (FHA) Section
- Apr. 1, 2016 – Demonstration of the death reporting project on an FHA Learning Series webinar
- June 12 – 15, 2016 – Presentation on the Death Reporting Demo at the NAPHSIS Annual Meeting 2016 in Kansas City
- Aug. 3, 2016 – Presented on Federal and State Collaboration to Improve Vital Events Reporting during the CDC EHR Forum webinar
- Aug. 22 – 23, 2016 – Demonstration of the death reporting project in the CDC Public Health Informatics Conference – Interoperability Showcase
 - Nov. 12 – 16, 2016 – UCDHS provided a poster presentation on the death reporting project during the American Medical Informatics Association 2016 Annual Symposium
 - February 19-23, 2017 – UCD EDRS team participated with NCHS representative in the FHA Interoperability Showcase death reporting demonstration in collaboration with CDC Cancer program at HIMSS 2017 in Orlando FL
- March 10, 2017 - UCD team presented overview of death reporting project in webinar demonstration on March 10, 2017 to FHA staff