

# Improving Adoption of EHR-based Electronic Death Reporting

## Background

As part of a NCHS-funded initiative, the California Department of Public Health (CDPH) worked with UC Davis Health to implement functionality in the California Electronic Death Registration System (CA-EDRS) to enable data capture of death certificate medical section data from within a certified electronic health system (EHR). This functionality was implemented by employing the Vital Record for Death Reporting (VRDR) standards, which uses Integrating the Healthcare Enterprise (IHE) Retrieve Form for Data Capture (RFD). This functionality was added to CA-EDRS as a web-application module that was compatible with both the current version of CA-EDRS (v3.2) as well as an upcoming upgrade (v4.0).

Rollout of the EHR-EDRS function at UC Davis Health System was accomplished by May 2017. The team worked closely with the UC Davis Decedent Affairs office on the initial rollout strategy.

## Initial Rollout Strategy (UC Davis Health)

Like most hospitals, UC Davis has an established workflow to manage the administrative issues related to an in-hospital death. This workflow involved the physician who pronounced the death of the decedent completing a paper “death worksheet”, which was forwarded to the hospital decedent affairs office as the decedent’s body was transported to the morgue from where it would be transferred to a family selected funeral home, typically within 24 hours or less.

The UC Davis Health System Decedent Affairs office wanted to initially rollout the new electronic ‘death worksheet’ in limited fashion to ensure a smooth transition from the paper process. It was recognized that in an academic medical center, the death worksheet and much of the data entered into the death certificate are completed by residents. The Intensive Care Unit (ICU) setting was chosen for the initial rollout because it was a specific area of the hospital where nurses, residents, and supervising physician work closely and can be trained on the new workflow more easily. Furthermore, the ICU setting tends to have a higher mortality so a rollout in that environment provides more user experience of the new workflow to decedent affairs in a shorter timeframe.

The EDRS integration with the UC Davis Health EHR was transitioned to a production status by end of May 2017 and ICU staff were given basic information on how to invoke the electronic workflow. The access to the workflow required prior knowledge of the availability of the integrated electronic death worksheet in the EHR. The paper workflow was still available to minimize any disruptions. Within a month, fourteen deaths occurred within the hospital, with four (4) of them invoking the new workflow and death certificate data entry through the EHR-EDRS integrated module. The Decedent Affairs office personnel were interviewed at the end of June 2017 to characterize the experience up to that point.

## Summary of Findings from Initial Rollout

The interview with the UC Davis Decedent Affairs office provided several important early observations. These are listed below along with added explanatory information as well as suggested solutions.

**(a) Confusion with the use of the term “attending physician” on death certificates:** The term “attending physician” is used in US death certificates to mean the physician who last ‘attended’ the patient. The term “attending” in academic medical environments means the supervising physician. At UC Davis, like many academic training environments, many of the 2<sup>nd</sup> year residents have earned a valid state license to practice medicine, which allows them to complete and sign death certificates as ‘certifiers’. However, the presence of the signature block with “attending physician” caused some residents to seek the supervising physicians signature when their normal course of action would have been to attest to the causes themselves.

**(b) The integration of EHR and EDRS exposed a fundamental lack of physician knowledge and understanding in entering causes of death:** The electronic workflow through the integration of EHR-EDRS has the physician entering directly into the system first, allowing one to see how physicians are formulating causes before being assisted by Decedent Affairs personnel. This showed that those entering the causes had a poor understanding of how to optimally articulate the causes of death. Although poor physician understanding of how to properly articulate causes of death on a US death certificate is not a new problem, the early interaction with the EDRS system allowed project personnel to more directly observe the initial data entry of causes of death by physicians. The standard paper workflow typically has hospital personnel in a Decedent Affairs office transcribing the causes from a paper death packet into an EDRS. That key step allows an opportunity for Decedent Affairs personnel, who are experienced with causes of death, to intercede on poorly articulated causes prior to entry into the EDRS. The rollout exposed a significant lack of knowledge and understanding by physicians entering causes of death. These were most often residents with limited experience/exposure to completing death certificates. However, this also highlights a potential significant opportunity in using EHR-EDRS integration in terms of directly educating physicians through the electronic workflow. The notion of a “step-by-step” data entry mode for the integration module was suggested. Since the physician is using the EDRS system directly, one has the opportunity of personalizing the data entry process into an “assisted mode” versus an “expert mode”. This requires that the EHR supply the EDRS with the “role” of the individual accessing the EDRS record through the EHR. Presently, the commercial certified EHR used in the pilot does not furnish this information as part of the VRDR based integration. The team strongly suggested that the user’s role, and ideally their actual system based identity, be provided to the EDRS system by the EHR for auditing purposes within the EDRS, but also to enable personalizing of the data entry mode. Furthermore, if the EDRS incorporated the use of the VIEWS system, it could provide further assistance on properly articulated causes **at the point of data entry, improving the quality of the cause of death information.**

**(c) Physician confusion on which workflow to follow:** One of the physicians believed they had to complete both the paper and the electronic workflow for the death. This was due to the

presence of both electronic and paper workflow in the “death packet” typically provided to the physician pronouncing the death of the patient. The suggestion for future deployments was to not provide a paper workflow option, meaning the rollout of an EHR-EDRS integration should completely encompass the electronic workflow only in the units selected for the rollout.

**(d) Notification for next steps in the workflow:** One of the biggest challenges was not having a mechanism to alert the next relevant person in the workflow that an action was needed. This was not part of the EDRS-EHR project and module for two reasons. First, it requires that the EHR system communicate the role, and ideally identity, of the user accessing the EDRS integrated module from within the EHR. This was not currently part of the IHE RFD implementation in the commercial EHR used by UC Davis Health (Epic 2015). Second, the EDRS system itself would need to implement a notification process for physician users. The CA-EDRS system does not currently have that functionality. Notification infrastructure is not commonly found in EDRS systems. Two possible approaches were articulated by leadership from our project.

One suggestion was to consider leveraging use of the DIRECT standard for EHR messaging to physician users. DIRECT is a standard designed to enable EHR-to-EHR “Inbox” messaging for EHR users. User Inbox, or “in basket” messages are standard functionality in EHRs. The DIRECT standard was created to support sending/receiving of such messages across EHRs, and is part of the ONC requirement for EHR certification today. The use of the DIRECT standard would require that State organizations running an EDRS work with a Health Information Services Provider (HISP), an organization that manage security and transport for health information exchange among health care entities or individuals using the DIRECT standard. Although EHRs implement the ability to send/receive DIRECT messages, organizations must work with a HISP to manage the secure transport of these messages between EHRs.

Another suggested approach was to leverage smartphone use and the recently developed eCOD application as a means for facilitating the notification. For users of an EHR, it was felt that ideally one would use the EHR-EDRS integrated module (instead of the eCOD) because the physician is working with the medical record directly in the EHR, however, the eCOD application highlighted the possibility of using a smartphone application to facilitate notification. Smartphone applications include notifications as part of the platform. Another potential route would be to leverage the SMS messaging capability in a smartphone. The EHR vendor of the UC Davis EHR has recently added secure text messaging through a smartphone application to the EHR offering. This provides the means for a secure notification to the relevant EHR user about the next step in the workflow and tasks that await their action. This, however, would require working with the EHR vendor to allow an external application to trigger a secure text within the EHR, something that is not currently enabled by the EHR vendor system.

**(e) Use of EHR-EDRS integrated module outside of rollout units:** Knowledge of new system functionality is disseminated in many ways throughout a hospital setting. In an academic medical center, the resident physicians often discover new functionality through colleagues. The project personnel found that non-ICU ambulatory physicians discovered the electronic

death packet in the EHR, but were not trained in its use. The conclusion was that future deployments should not restrict use of the electronic workflow to in-patient deaths only but encompass any deaths documented in the EHR used by the organization, even if the death certificates being prepared by Decedent Affairs were for outpatient clinics where the decedent passed away outside the organization's hospital.

**(f) Physician lack of knowledge about causes of death and an opportunity to leverage “situational learning”:**

Even early rollout feedback is confirming the lack of knowledge and understanding by physicians about the death certificate, and particularly the causes of death section. This is a longstanding challenge with death certificates. It has become equally clear that the EHR-EDRS integration provides a unique opportunity to directly engage with those entering the causes of death and fundamentally improve their understanding and the data quality of causes of death by leveraging the direct interaction with the certifying physician at the point of data entry. The importance of this cannot be understated. Extensive research over the past three decades on the use of EHRs has underscored the importance of direct access to the physician during the activity of interest, and how that interaction can be leveraged to change physician behavior and enhance their decision making and knowledge. The success of computerized physician order entry (CPOE) in improving outcomes and reducing errors rests primarily on the ability of the physician-computer interaction and computer assisted ‘decision support’ at the point in time the physician is deciding on a diagnostic or therapeutic maneuver by ordering it. This “just in time” nature of the interaction enables the opportunity for a computer assisted workflow at the very point when the activity of interest is occurring.

Furthermore, research into the cognitive aspects of physician learning has also demonstrated that physician retention of new knowledge is optimized when it is coupled with an activity. This “situational learning” optimizes retention of the information. This can also be leveraged by the EHR-EDRS integration by providing physicians with a “standard” (assisted) versus “expert” mode for the entry of causes of death. The use of the term “assisted” purposefully avoided to improve uptake of the step-by-step data entry that provides an opportunity for system assistance. Instead, the use of “standard mode” is preferred. We envision a ‘standard mode’ data entry to consist of multiple application steps in a ‘easy mode’ fashion that incorporates links to “how to” educational materials that physician can optionally access. One would also offer an “advanced” mode, which is the single page, non-interactive version, which is essentially the mode implemented today by our project. The standard (assisted) mode will lead to improved knowledge retention about how best articulate causes of death, and lead to both improved learning by physician on entry of causes in death certificates, as well as lead to improved data quality of the causes – which will reduce the nosology time/effort and resources required downstream to appropriately classify deaths.