Interoperating Death Registration and Electronic Health Record Systems for More Timely Mortality Surveillance

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Utah’s EDRS: EDEN Overview

- Electronic Death Entry Network introduced in 2006
- Vital Event Volume: 50,000 Births, 15,000 Deaths
- 100% FD users
- 60% of dc’s “all-electronic”
- Local participation in registration process
- Legal record is born-electronic
EDRS Performance Requirements

- Legal Requirement
  - In Utah, 72 hours to certify
  - 5 days to register

- Public Health Requirement
  - 60% literal cause-of-death availability in 5 days currently useful for H1N1 surveillance in Utah
  - Goal: real time mortality surveillance
Death Records Registered < 5 Days

Death registration timeliness in Utah before and after EDEN:

- Pre-EDEN (1/2004-7/2006):
  - On-time: 62.6%
  - Late: 37.4%

  - On-time: 63.4%
  - Late: 36.6%
What Determines EDRS Timeliness?

- Since the EDEN Rollout in 2006:
  - 87% of deaths certified on time (<72 hrs) were registered on time
  - 67% of deaths certified late were registered late.

- Reduced certification time a key to improved EDRS surveillance capacity
Partners in CDC-funded Demonstration of EMR/EDR Interoperability

- Office of Vital Records and Statistics
  - Modified EDEN to Accept HL7 message

- Intermountain Healthcare
  - Cause-of-Death module in Help2 EMR

- Utah State University
  - Developed matching algorithm
Intermountain Market Share

- Provides healthcare to approximately one-half the Utah population.
- During 2007-2009, Intermountain physicians certified 39% of Utah deaths.
- 52% of Electronic certifications (within EDEN) come from Intermountain physicians.
### Use of EDRS by Intermountain Physicians Grouped by Number of Deaths Certified per Month

<table>
<thead>
<tr>
<th>Death Carts./Month</th>
<th>% of All Death Certifiers</th>
<th>% of All Death Carts.</th>
<th>% Certified Electronically</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>96.5%</td>
<td>35.4%</td>
<td>28.0%</td>
</tr>
<tr>
<td>1-2</td>
<td>1.8%</td>
<td>11.7%</td>
<td>89.8%</td>
</tr>
<tr>
<td>2-3</td>
<td>0.4%</td>
<td>4.7%</td>
<td>98.6%</td>
</tr>
<tr>
<td>3-4</td>
<td>0.4%</td>
<td>6.6%</td>
<td>99.6%</td>
</tr>
<tr>
<td>4-5</td>
<td>0.1%</td>
<td>1.1%</td>
<td>99.3%</td>
</tr>
<tr>
<td>&gt;5</td>
<td>0.7%</td>
<td>40.5%</td>
<td>99.9%</td>
</tr>
</tbody>
</table>
Current Death Registration Workflow

FD = Funeral Director
MD = Physician
LHD = Local Health Department

1. **Death**
   - FD initiates EDEN record (demographics)

2. **Is MD EDEN user?**
   - Yes: MD certifies death certificate in EDEN
   - No: FD prints paper death certificate

3. **FD prints paper death certificate**
   - FD delivers to MD Office
     - MD signs Paper Certificate (cause of death)
     - FD delivers to LHD
8. **Drop-to-paper process**

4. **FD delivers to LHD**
   - LHD keys Paper certificate into EDEN

5. **LHD registers death**
   - Death is reported to NCHS
Transmit Cause of Death Certification From EMR to EDEN

Intermountain EMR

EDEN Master Database

Matcher & Merger

EDEN Cause of Death Table

UDOH HL7 Message Server (Rhapsody)

Intermountain HL7 Message Server

Cause of Death Interface

HL7 Over VPN Tunnel
Complete the following fields  (*=Required field)

**Deceased Patient Information**

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPI</td>
<td>548029408</td>
</tr>
<tr>
<td>*Patient Name</td>
<td>XTESTDQ, GLUCOSE NINE</td>
</tr>
<tr>
<td>Social Security Number</td>
<td></td>
</tr>
<tr>
<td>*Gender</td>
<td>Male</td>
</tr>
<tr>
<td>*Date of Birth</td>
<td>7/21/1978</td>
</tr>
<tr>
<td>*Death Date</td>
<td></td>
</tr>
<tr>
<td>*Last Seen by Certifier</td>
<td></td>
</tr>
</tbody>
</table>

**Cause of Death Information**

**Part I:**
Enter the **Chain of Events** - diseases, injuries or complications - that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest or ventricular fibrillation without showing the etiology. DO NOT abbreviate. Enter only one cause on a line.

1. **Immediate Cause (Final disease or condition resulting in death)**

   Time Interval (Number, Unit Type)

2. Sequentially list conditions, if any, leading to the cause listed above

   Time Interval (Number, Unit Type)

3. Enter the **UNDERLYING CAUSE** (disease or injury that initiated the events resulting in death)

   Time Interval (Number, Unit Type)

**Part II:** Enter other **significant conditions contributing to death** but not resulting in the underlying cause given in **PART I**

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**Suggestions**
Additional Information

*Autopsy Performed?  ○ Yes  ○ No

Were autopsy findings available prior to completion of the Cause of Death?  ○ Yes  ○ No

*In your opinion, Tobacco Use by the decedent:

○ Probably contributed to the cause of death  ○ Was the underlying cause of death  ○ Did not contribute to the cause of death

○ Is unknown in relation to the cause of death  ○ Non User  ○ Unknown If User

*Manner of Death:

○ Natural  ○ Accident  ○ Suicide

○ Homicide  ○ Could not be Determined  ○ Pending Investigation

If female, decedent was:

○ Not pregnant within past year  ○ Pregnant at time of death  ○ Not pregnant, but pregnant within 42 days of death

○ Not pregnant, but pregnant 43 days to 1 year before death  ○ Unknown if pregnant within the past year

Injury Information

*Injury Information Available?  ○ Yes  ○ No

Date/Time of Injury

Injury at Work?  ○ Yes  ○ No  ○ Unknown

Place of Injury

At home, farm, street, factory, office, building, etc. (Specify)

If motor vehicle accident:

○ Driver  ○ Passenger  ○ Pedestrian  ○ Unknown

○ Other  Specify:

Address of Injury

Street or rural route number  City  State
Place of Injury
At home, farm, street, factory, office, building, etc. (Specify)

If motor vehicle accident:
- Driver
- Passenger
- Pedestrian
- Unknown

Other Specify:

Address of Injury
Street or rural route number
City
State
County (if in Utah)
Country (Type out if not U.S.A. or Canada)

Describe how injury occurred (enter sequence of events which resulted in injury):

Certifier Information

Certifying Physician Name: TRIPP, JACOB S

License Number: TEST1234

Certifier Address 1

Certifier Address 2

Certifier City/State/Zip

Medical Examiner Contacted? Yes, No, Unknown

Notes on Contact

M.E. Case Number

Medical Examiner Type
New Death Certificate Workflow With Electronic Interface to Intermountain EMR

1. FD initiates EDEN record (fact-of-death)
2. Is MD an EDEN user?
   - Yes: MD certifies death certificate in EDEN
   - No: FD notifies MD that cause of death data is needed
3. MD enters cause of death data in EMR
4. OVRS matches MD-provided data against FD-provided data to complete record
5. Data transmitted electronically to state
6. LHD registers death
7. Death reported to NCHS

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### HL7 Message Segments Used to Report Cause of Death

- Message Type is ADT^08 with following segments:
  - MSH
  - PID
  - PD1
  - NK1
  - PV1
  - PV2
  - OBX
  - AL1
  - DG1
  - DRG
  - ACC
  - PDA
  - OBX
Workflow Among Matcher, Merger, and Deferred Match Resolver

- Cause of Death Table
- EDEN Master Database
- Deferred Match Table

- Cause of Death Data Loader
- Deferred Match Resolver

- Matcher
- Merger
Pilot Program: Oct-Nov 2010

- Beta testing at Merrell Gappmeyer clinic, Provo UT
- Clinic does 2 deaths per month
- 60% EDEN certifications last year
Thank You

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