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HL7 Version 3 Domain Analysis Model: Vital Records, Release 1

Section 2 – Vital Records Storyboards

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Storyboards

A Storyboard is a "plain language" description of a series of steps involving some exchange of information between different participants to achieve the objectives of a healthcare business process. [1] The steps can be in generalized, abstract terms, or in the form of a real-world example.[2] The Storyboard provides a narrative representation to describe for what purpose the information is being shared.

The storyboards provided in this section have been included to provide narrative descriptions to illustrate typical scenarios in which vital records information is collected and recorded on the U.S. Standard Certificate of Live Birth, U.S. Standard Certificate of Death and U.S. Standard Report of Fetal Death. These storyboards are not intended to represent all vital records processes or circumstances. These scenarios are supported by the birth, death and fetal death activity models and core data models that have been included in the Vital Records Domain Analysis Model.

Actors

Patients
- Baby Girl Grace
- Margaret Mother

Nursing Staff
- Michelle Midwife
- Nicole Nurse

Physicians
- Amy Anesthesia
- Eric ER Doc
- Floyd Family Physician
- Ollie Obstetrician
- Patty Pediatrician

Other Staff
- Andy Admissions
- Betty BIS (Birth Information Specialist)
- Steve Social Worker

Others
- Dan Decedent
- Debra Decedent
- Frank Funeral Director
- Fred Father
- Howard Husband
- Matt Medical Examiner
- Paul Policeman
- Ricky Registrar

Place
- Labor & Delivery (L&D)
- Memorial Medical Center

[1] Health Level Seven Development Framework. Version 2.0.0. Chapter 2: Requirements Documentation – Modeling, Analysis and Harmonization. 2004 Sep 24.

[2] Ibid.

Birth Storyboards

Birth at Hospital

Margaret Mother is expecting her first baby. She receives her prenatal care from the family practice physician, Floyd Family Physician. All information on Margaret Mother's prenatal care and pregnancy history, such as her last menstrual period (LMP) is documented in Floyd Family Physician's prenatal care records. All of her prenatal care information will be electronically sent to Memorial Medical Center just prior to her delivery.

Several weeks later, Margaret Mother arrives at Memorial Medical Center in labor. She is admitted to the facility by Andy Admissions, the Admissions clerk. Margaret Mother is taken to a birthing suite in the Labor & Delivery (L&D) unit. Andy Admissions reviews with Margaret Mother some of the demographic and financial information on Margaret Mother available in the electronic health record (EHR) system that was provided during her pre-admission processing. He verifies the current information and provides updates as needed. (Note that this demographic/financial information is not used for the birth certificate/Electronic Birth Registration System (EBRS)).
Shortly thereafter, Margaret Mother delivers a baby girl. Attending the delivery is Dr. Ollie Obstetrician and Nicole Nurse, the Labor and Delivery nurse. Information about the labor and delivery and the infant (e.g., a spontaneous vaginal delivery of a girl weighing 3,242 grams) is documented by Nicole Nurse in the hospital's labor and delivery log. Selected information about the labor and delivery and the newborn is also documented by Nicole Nurse in the Facility Worksheet for the Child's Birth Certificate. Dr. Patty Pediatrician performs a physical exam of Baby Girl Grace. The physical assessment is noted in the newborn's medical record and in the appropriate sections of the Facility Worksheet by Nicole Nurse.

The next morning, Betty Birth Information Specialist (BIS), the hospital staff person responsible for gathering and entering information for the birth certificate, checks the hospital's information system for a list of all new births. She prints a copy of the list and takes it to the L&D unit where she picks up the Facility Worksheet that was completed by Nicole Nurse.

Betty BIS then goes to Margaret Mother's room and presents her with a packet of information and several forms to complete. One of the forms, called the Mother's Worksheet for the Child's Birth Certificate, collects important demographic information on the mother and father. Betty BIS helps Margaret Mother complete the Mother's Worksheet.

Betty BIS then returns to her workstation with both the Mother's and Facility Worksheets for Margaret Mother. Betty BIS quickly notices, however, that the "Characteristics of Labor and Delivery" section of the Facility Worksheet has not been completed. Betty BIS knows that Nurse Nicole had left the hospital for the day so Betty BIS asks the L&D unit for a copy of the L&D log for Margaret Mother. In reviewing the L&D log, Betty BIS observes that one of the specific characteristics of labor and delivery in the Facility Worksheet was present for Margaret (she had received an epidural for pain relief). Betty BIS notes this on the Facility Worksheet. Betty BIS then reviews Margaret Mother's prenatal care and other medical records. She

determines that the prenatal care information had been sent to the hospital more than eight weeks ago and phones Margaret Mother's prenatal care provider for more up-to-date information.

Betty BIS then begins to enter the information from Margaret Mother's worksheets into the State's web-based Electronic Birth Registration System (EBRS). She also notes that the MWS indicates that Margaret Mother would like to request a U.S. Social Security card for her new baby and checks the appropriate box on the EBRS screen to send this request to the U.S. Social Security Administration.

Betty BIS is interrupted several times to perform other tasks, but is able to save the record each time a 'pending' status and return to enter more information without losing her work. At the time of data entry, the EBRS performs field edits and cross-field edits that are pre-programmed into the system. These edits are mostly invisible to Betty BIS until she accidently mistypes "14" as the Margaret Mother's month of birth, which the system does not allow. Once the record "passes" all validations, Betty BIS submits the record to the state for registration. The birth record for Baby Girl Grace is then automatically transmitted over a secure Internet connection to the State Office of Vital Records.

Ricky Registrar works at the Office of Vital Records. When he returns from lunch that day, he reviews a list of newly transmitted birth records received from birthing facilities around his state. He reviews the new birth record for Margaret Mother's baby and notes that it has not passed all edits. He contacts the hospital and requests that they correct and retransmit the birth record. The hospital corrects the birth record and retransmits later that day. Seeing that the birth record now has passed all edits, he registers the birth of Baby Girl Grace.

As is the practice in her state, Margaret Mother is given an informational copy of the birth certificate information prior to leaving the hospital. Now that the birth record has been registered, Margaret Mother can also receive a certified copy of the birth certificate.

Planned Home Birth

Margaret Mother is expecting a baby. Margaret Mother decides to deliver the baby at home with the help of Michelle Midwife who is affiliated with her obstetrician, Dr. Ollie Obstetrician. While she is examined by and being prepared for delivery at home by the midwife, Margaret Mother also is periodically examined by Dr. Ollie Obstetrician to assure there are no complications. Michelle Midwife takes notes on these prenatal home visits by hand, and later, upon returning to her office, enters the information into Dr. Ollie Obstetrician's electronic record for Margaret Mother.

Following 9 months of uncomplicated pregnancy, Margaret Mother goes into labor at home. Her husband, Howard Husband calls Michelle Midwife who arrives at the home, examines Margaret Mother and finds things are proceeding normally. Michelle Midwife delivers a healthy baby girl named Grace. Baby Girl Grace is examined, weighed, measured, foot printed and cleaned by the midwife.

After attending to the mother and newborn, Michelle Midwife documents information about the labor and delivery in her notes and in the Facility Worksheet for the Child's Birth Certificate. She also checks the Mother's Worksheet for the Child Birth Certificate, which Margaret Mother had filled out the earlier that week, to make sure it is complete, and adds the baby's name.

Later that day, back in her office, Michelle Midwife accesses Margaret Mother's electronic records and updates the records to include Margaret Mother's home birth. She also checks the obstetrician's records to make sure she has all of the prenatal care information she needs to complete the birth certificate. Michelle Midwife then logs into the State's Electronic Birth Registration System (EBRS). She accesses the function for creating a Record of Live Birth and enters Margaret Mother prenatal care information and all other information from Margaret Mother's worksheets. As data are entered, the EBRS performs field-level validations according to federal and state edit specifications built into the EBRS. The system notifies Michelle Midwife at the time of data entry of out-of-range values, missing data, or incorrect data. The system allows her to save the record in an incomplete (pending) status and return to it as often as needed, with or without errors, until she finally submits the record to the state. All mandatory edits must pass validation before final submission.

Mindful that the record must be completed, validated and submitted to the state vital records office in a timely manner, Michelle Midwife carefully reviews the record for accuracy and completeness. Once all data has been entered, she transmits the record over a secure Internet connection to the state vital records office. Richard Registration Clerk receives the record in his 'pending registration' queue on his desktop. He quality assures the record and notes several incomplete fields. He contacts Michelle Midwife to get the necessary data and makes the corrections to the record. The record is now complete. It is assigned a state file number, a filing date and is officially registered.

Fetal Death Storyboard

Fetal Death Using the State's Electronic Fetal Death Registration System

Margaret Mother and Fred Father are expecting their first child. Margaret Mother receives her prenatal care from the family practice physician, Floyd Family Physician. Her ultrasound, taken at her first prenatal visit, indicates that she is in her 11th week of pregnancy; this estimate corresponds well with her date of last normal menses (LMP). The ultrasound does not suggest any problems and her pregnancy appears to be progressing normally. All information on Margaret Mother's prenatal care and pregnancy history, such as the last menstrual period (LMP) is documented in Floyd Family Physician prenatal care records.

Late one evening in about her 7th month of pregnancy, Margaret Mother notices that the baby is not kicking. When Margaret Mother wakes the morning she does not feel well and phones her doctor. Floyd Family Physician examines Margaret Mother and cannot pick up any heart tones. He orders an ultrasound which confirms that there are no signs of life. The doctor discussed the options of waiting for Margaret Mother to go into labor spontaneously or of being induced. Margaret Mother decides to be induced as soon as possible, is immediately to the hospital, registered by the admitting clerk, Andy Admission and taken to the OB Unit.

Nicole Nurse gives Margaret Mother medication to induce labor, and to ease labor pains. Later she checks Margaret Mother and finds that she is 6 cm dilated. She notifies the nurse anesthetist, Amy Anesthesia and requests an epidural for Margaret Mother. Amy Anesthesia arrives about 15 minutes later and gives Margaret Mother an epidural while Dr. Ollie Obstetrician examines Margaret Mother. Shortly thereafter, Margaret Mother delivers. Amy Anesthesia then gives Margaret Mother medication to help her sleep. Nurse Nicole enters information about the labor and delivery in the L&D log and selected information in the Facility Worksheet for the Fetal Death Report.

The next morning the Social Worker, Steve Social Worker comes to offer the family help in making funeral arrangements. He contacts the funeral home and helps the family to make plans. Betty BIS (Birth Information Specialist), the hospital staff person responsible for gathering and entering information for the fetal death report, checks the hospital's information system and learns about Margaret Mother's loss. She obtains the Facility Worksheet that was completed by Nicole Nurse and goes to Margaret Mother's room to help her complete the Patient's Worksheet for the Fetal Death Report (MWs).

Betty BIS enters information from the worksheets in the State's Electronic Fetal Death Registration system. She also contacts Dr. Ollie Obstetrician to remind him to fax Margaret Mother's prenatal care information to the hospital and to enter the cause of death in the system. The doctor finds a blood clot in the umbilical cord when examining the placenta. He also orders blood tests. Margaret Mother's blood tests reveal that she has a genetic blood disorder called Factor V Lieden. The blood clot is identified as the cause of death. Dr. Ollie Obstetrician discussed the findings with Margaret Mother and Fred Father and recommended they see a hematologist for more information.

Betty BIS completes the electronic fetal death report and transmits the record over a secure Internet connection to the state vital records office. Richard Registration Clerk receives the record in his 'pending report' queue on his desktop. He quality assures the record and notes several incomplete fields. He sends electronic notification to Betty BIS to provide the necessary data and to make the corrections to the record. Once the record "passes" all validations in the EBRS, Betty BIS submits the record to the state vital statistics office. The fetal death report is then automatically transmitted to the State Office of Vital Records. Betty BIS also prints a copy of the report for Margaret Mother and Fred Father.

Death Storyboards

Death at a Hospital

Dan Decedent was experiencing chest pains. His wife, Debra Decedent, called his doctor, Floyd Family Physician and 911 (Emergency Response Services). Dan Decedent was rushed to Memorial Medical Center. After some frantic work in the emergency room by a medical team lead by Eric ER Doc, Dan Decedent succumbed.

The characteristics of Dan Decedent's death did not fit within state requirements for medical examiner or coroner involvement, so Dan's physician is responsible for certifying Dan's death and completing the medical section in the state electronic death registration system (EDRS).

Dan Decedent's family made arrangements for his funeral and the funeral home was informed of the location of his body. Staff went to the hospital to retrieve the body. Dan Decedent's body was released to Frank Funeral Director along with a burial-removal-transit permit by the facility. By law, this permit is required by this jurisdiction and must be issued for the body to be transported from the facility.

Frank Funeral Director is responsible for completing the demographic items and logs into the EDRS. He first searches for Dan Decedent's record in the EDRS to ensure a duplicate record is not entered. The medical certifier, Floyd Family Physician, has not started the record. Therefore, Frank Funeral Director starts the death record in the EDRS. While discussing the funeral with family members, Frank Funeral Director asks them to provide all demographic information needed for the death certificate. The EDRS prompts Frank Funeral Director for a response if any edits are triggered as he enters information on the record.

When Frank Funeral Director enters the few relevant fields and saves that information, the EDRS automatically sends the information to the Social Security Administration (SSA) to verify Dan Decedent's social security number. A response is received back from SSA that the social security number was verified.

As the funeral director electronically completes the demographic information, he verifies the facts and searches for Floyd Family Physician to "designate" him as the medical certifier. In this process, the EDRS sends an email to Floyd Family Physician, notifying him that he has a death record to complete.

Upon logging into the EDRS, Floyd Family Physician selects and views the appropriate record from his queue of pending death records. He opens the electronic record and begins the process of completing it through the EDRS. Floyd Family Physician consults with Eric ER Doc, the ER staff, and medical and health records before making a decision about not needing an autopsy. He also uses this knowledge of Dan Decedent's medical history and consultation with the ER staff and review of medical records to derive the sequence of causes and any other significant contributing causes that resulted in Dan's death. Floyd Family Physician reports Dan

Decedent's immediate cause as cardiac tamponade, due to myocardial infarction, due to atherosclerotic coronary heart disease which Dan Decedent had had for 10 years.

After Floyd Family Physician completes the cause-of-death section, he then completes all other medical items on the record and electronically signs the record in the EDRS. Since the demographic information was already verified by the funeral director, the record is saved and filed electronically with the state vital statistics office.

The state vital statistics office reviews the record for consistencies during quality checks, including review of the medical section after the record is accepted for filing. The medical section needs to be completed correctly, with a reported sequence of conditions arising from the underlying cause of death. This medical information reported on Dan Decedent's certificate is complete and provides accurate information about Dan's condition. If the medical information is incomplete, for example, the sequence of events are not logical, the state vital statistics office may query the EDRS back to the certifier to obtain additional information for the correct completion of the medical section of the EDRS.

Once the record is filed with the state, it is stored in a cumulative database of all deaths occurring in the state. This database is used for issuance of certified death records. An order for certified death certificates that was placed by the Funeral Home and/or the relative and paid for can now be processed. The certificates are mailed to the family. Moreover, at an established time basis, records from this database are downloaded with relevant data items to be submitted to other agencies; in addition, the state periodically creates a statistical file that is used for internal statistical analysis and reporting.

A fact-of-death data file is sent to the SSA and applicable statistical files for death records received are then transmitted to any agencies with standing agreements such as the National Center for Health Statistics (NCHS) or other state vital statistics offices. NCHS accumulates information for all deaths occurring in the United States and maintains the National Death Index data file, a national statistical data set of all deaths for each calendar year. Depending upon the state, cause-of-death processing via Mortality Medical Data System (MMDS) may have been done and completed in the state or may be done at NCHS. The EDRS in this state could generate a file for input into MMDS to facilitate cause-of-death processing. Through this process, both the state vital statistics office and NCHS would check each record errors and inaccuracies (edits) in cause of death information to ensure high quality data. If problems are found by the state, the state would send a query about the death back to the hospital or physician for additional information. If problems are found by NCHS, NCHS would query the state who would query the hospital or the physician. If changes are made to the record, the state can transmit an amended record of the death with the updated information to NCHS. The record is reprocessed and replaces the original record for that death.

Death with Cause of Death under Investigation

While on routine patrol, Paul Policeman found a middle-aged man's body with several stab wounds in an alley off Smith Street at 4 a.m. The deceased had identification for a Dan Decedent, but no money and no weapon were discovered. The characteristics of Dan Decedent's death fit within state requirements for medical examiner or coroner involvement, so Matt Medical Examiner was called to the scene, pronounced the death, and began the investigation of the death.

Matt Medical Examiner conducts an autopsy that reveals that Dan had died from an intrathoracic hemorrhage caused by a stab wound of the lung, so the stabbing was fatal. In the investigation, Matt also determines that the stabbing occurred in the alley and estimates that Dan Decedent had died at 0300. Matt Medical Examiner is responsible for certifying Dan Decedent's death and completing the medical section in the state electronic death registration system (EDRS). If no family is found, Matt may complete all sections of the EDRS, but in this case, family has been located. Matt Medical Examiner started the process of completing the EDRS by logging into and starting the case in the EDRS. Matt reviewed the results from his investigation to derive the sequence of causes. Matt Medical Examiner reports Dan Decedent's immediate cause as intrathoracic hemorrhage, due to stab wound of lung with a duration of minutes; reports the details of the injury; and reports that an autopsy had been performed and that the finding was available to complete the cause of death. Once the medical section is completed by Matt Medical Examiner, the EDRS may prompt him for a response if any edits were triggered. After Matt Medical Examiner enters his electronic signature in the EDRS, the record is ready to be finalized by Frank Funeral Director.

When Dan Decedent's family made arrangements for his funeral, the funeral home was informed of the location of the body and sent staff to the County Medical Examiner's office to retrieve it upon release by Matt Medical Examiner. Frank Funeral Director, who is responsible for completing the demographic items, logs into and search for Dan Decedent's case in the EDRS which was already started at the Medical Examiner's office. While discussing the funeral with family members, Frank Funeral Director asks them to provide all demographic information needed for the death certificate. When Frank Funeral Director enters the few necessary fields and saves the information, he initiates the step of sending this information to the Social Security Administration (SSA) to verify Dan Decedent's social security number. A response is received back that the social security number was not verified and information is provided as to what information was inconsistent with SSA records. Frank reviews this information and makes corrections needed to repeat the SSA verification. The EDRS may prompt Frank Funeral Director for a response if any edits are triggered as he enters information on the record.

Once all demographic information is completed and the funeral director electronically records and verifies the facts, the record is saved and the EDRS notifies the funeral home that the record is ready for submission to the state since the medical information was already completed. Frank Funeral Director submits the record for electronic filing with the state. At the same time the

funeral director completes the EDRS, he places an order with the state vital statistics office on behalf of the family for 10 copies of the death certificate.

Before the record is accepted for filing, the state vital statistics office reviews the record for consistencies during quality checks, including review of the medical section. The medical section needs to be completed correctly, with a reported sequence of conditions arising from the underlying cause of death. This medical information reported on Dan Decedent's certificate is complete and provides accurate information about Dan's condition. If the medical information is incomplete (for example, the sequence of events are not logical), the state vital statistics office may through the EDRS query the certifier to obtain additional information for the correct completion of the medical section of the EDRS. If additional information is available, corrections to this information can be done by the coroner/medical examiner and submitted to the state office by completing a Supplemental Report of Medical Certification of Death form.

Once the record is electronically filed with the state, it is stored in the cumulative database of deaths for that state. This database houses all death records occurring in the state and is used for issuance of certified death records. In fact, Frank Funeral Director's request for 10 certified copies of his death certificate are issued and mailed to the family of Dan Decedent within three days of his death. Using the cumulative database, death records are downloaded on an established time basis to create a statistical file for analysis and reporting.

The fact-of-death data file is sent to the SSA and applicable statistical data files for all processed deaths are then transmitted to any agencies with standing agreements such as the National Center for Health Statistics (NCHS) or other state vital statistics offices. NCHS accumulates information for all deaths occurring in the United States and maintains the National Death Index file, a national statistical data set of all deaths for each calendar year. Depending upon the state, cause-of-death processing via the MMDS may have been done and completed in the state or may be done at NCHS. The EDRS in this state could generate a file for input into MMDS to facilitate cause-of-death processing. Both the state vital statistics office and NCHS check the data for each death for errors and inaccuracies (edits) to ensure high quality data. If problems are found at this time, NCHS can send a query about the death back to the state for additional information. If changes are needed the state can transmit an amended record of the death with the updated information. This information is reprocessed and replaces the original information for that death.