Vital Reporting
Domain Analysis Model

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Context for this Presentation

We are asking you to provide your feedback on a set of models that represent the data that matters when vital record data is transmitted between systems.

Outline

- **What is a Domain Analysis Model?**
- **Why do we work on it?**
- **How do you read it?**
- **What do the Vital Records models have in them?**
- **Walk through the Birth Model**

Expert Friendly Expression

- **A domain analysis model (DAM) is a product created by Health Level 7 – a standards development organization.**
- **Our standards are based on a single high-level data model, a single point of reference. We call it the Reference Information Model.**
- **We need a product to express functional requirements in a form that subject matter experts – people like you - will use to provide direction and feedback. This is the DAM.**

Using the Model

- **Discovers & Exposes Requirements**
- **Engages Stakeholders**
- **Sets the scope for developing:**
  - Messages
  - Structured documents
  - Services

Model Components

- **Our DAM has been developed using a specific modeling language: UML (Unified Modeling Language)**
- **It contains:**
  - Storyboards
  - Activity Models
  - Class Models
    (Note, the class models include data elements, vocabulary, and specialized data types – more on this later.)

Reading Storyboards

- **A narrative that describes how things are done in terms of example characters.**
- **E.g.: "Margaret Mother delivered a 6 lb. 8 oz. baby boy. The baby boy was given to the pediatrician, Dr. Patty Pediatrician, and taken to the newborn nursery for measurement and an initial examination. Dr. Patty Pediatrician's physical assessment was noted and an impression of the baby's footprints and thumbprint were obtained by the L&D nurse, Nurse Nicole. …."**
- **Provides an informal portrait of a single case**
- **Is used as a starting point for further analysis and discussion.**

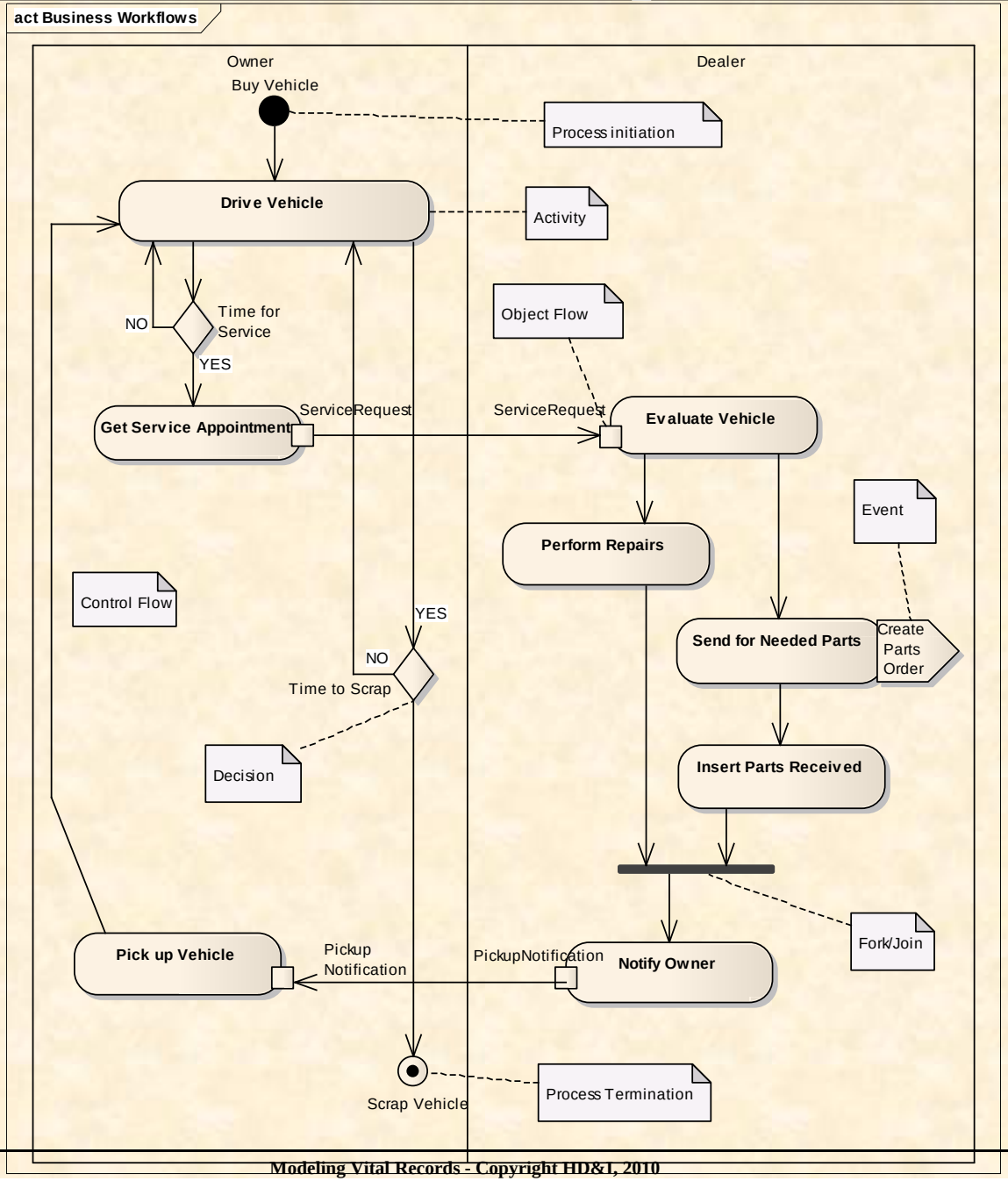
Tracing Workflow

- **Show the flow from activity to activity – the dynamic view of a system.**
- **Understand how different organizations are involved.**
- **Activity diagrams are used to:**
  - Identify work processes and how they are related.
  - Indicate the different parties, e.g., health care provider involved in the process
  - Show how activities managed by different parties require that data move.

Diagramming Activities

- **Activity**
  - An oval with a name inside
  - Indicates a process, something that has to be done
- **Swim Lane**
  - Indicated by lines on the diagram
  - Used to show that different parties are responsible for activities
- **Control Flow**
  - An arrow
  - Shows the flow from one activity to another
- **Object Flow**
  - An arrow with rectangles on either end
  - Shows that data is passed as well as control
- **Decision Point**
  - A diamond
  - Used to how choices

An Example


act Business Workflows
Owner
Dealer
Buy Vehicle
Process initiation
Drive Vehicle
Activity
NO
Time for Service
YES
Object Flow
Get Service Appointment
ServiceRequest
ServiceRequest
Evaluate Vehicle
Event
Perform Repairs
Control Flow
YES
NO
Time to Scrap
Send for Needed Parts
Create Parts Order
Decision
Insert Parts Received
Fork/Join
Pick up Vehicle
Pickup Notification
PickupNotification
Notify Owner
Scrap Vehicle
Process Termination

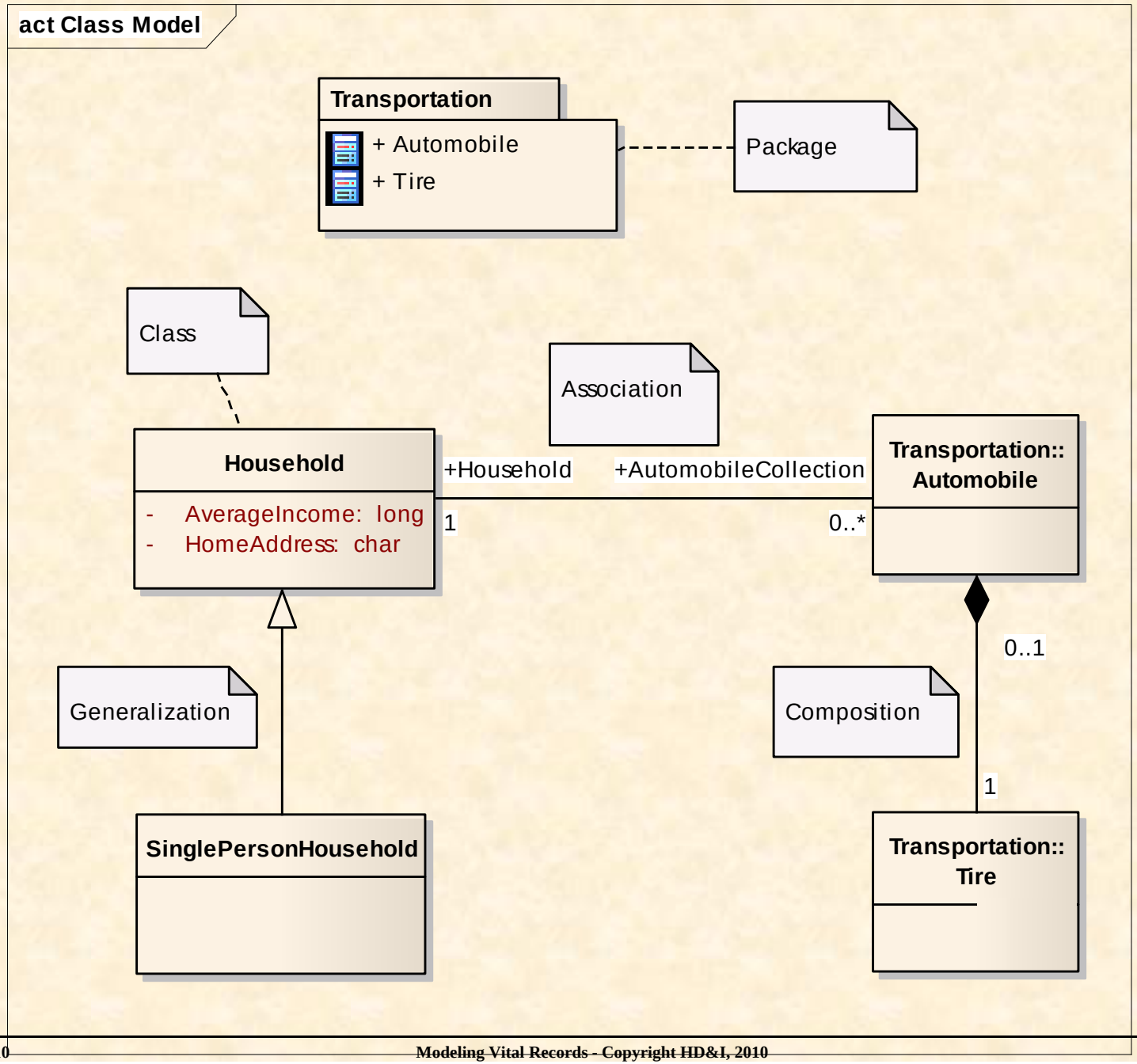
Defining Data

- **Enable computerized data processing.**
- **Lay the basis for data exchange without direct human intervention.**
- **We need to:**
  - Record and manage the data elements that are important for a group of activities.
  - Provide name, description, data type, and (for coded elements) the list of possible values.
  - Show how data elements are grouped, and clarify how these groups are associated.

What's in a Class Model

- **Package**
  - A rectangle with a notch cut out. Just like a paper folder.
  - A collection of related classes
- **Class**
  - A box showing a name, and a list of included elements
  - Reveals how data is grouped, displays the "things" that attributes tell about.
- **Attributes**
  - A text item with a class
  - An individual piece of information.
- **Association**
  - A line between two classes.
  - Allows us to show the relationships – semantic and numeric between two classes.
  - Two special types: generalization/specialization, and composition.

An Example


act Class Model
Transportation
+ Automobile
+ Tire
Package
Class
Association
Household
- AverageIncome: long
- HomeAddress: char
+Household
+AutomobileCollection
1
0..*
Transportation::
Automobile
0..1
Generalization
Composition
1
SinglePersonHousehold
Transportation::
Tire

The Model is More than its Diagram

- **The diagrams summarize the model, but they are only part of it.**
- **You should also be aware of:**
  - Descriptions for activities, classes, and attributes.
  - The multiplicity (cardinality) of associations
  - How coded attributes are linked to a “concept domain”, and how that concept domain (aka code set) shows the possible values for coded elements.

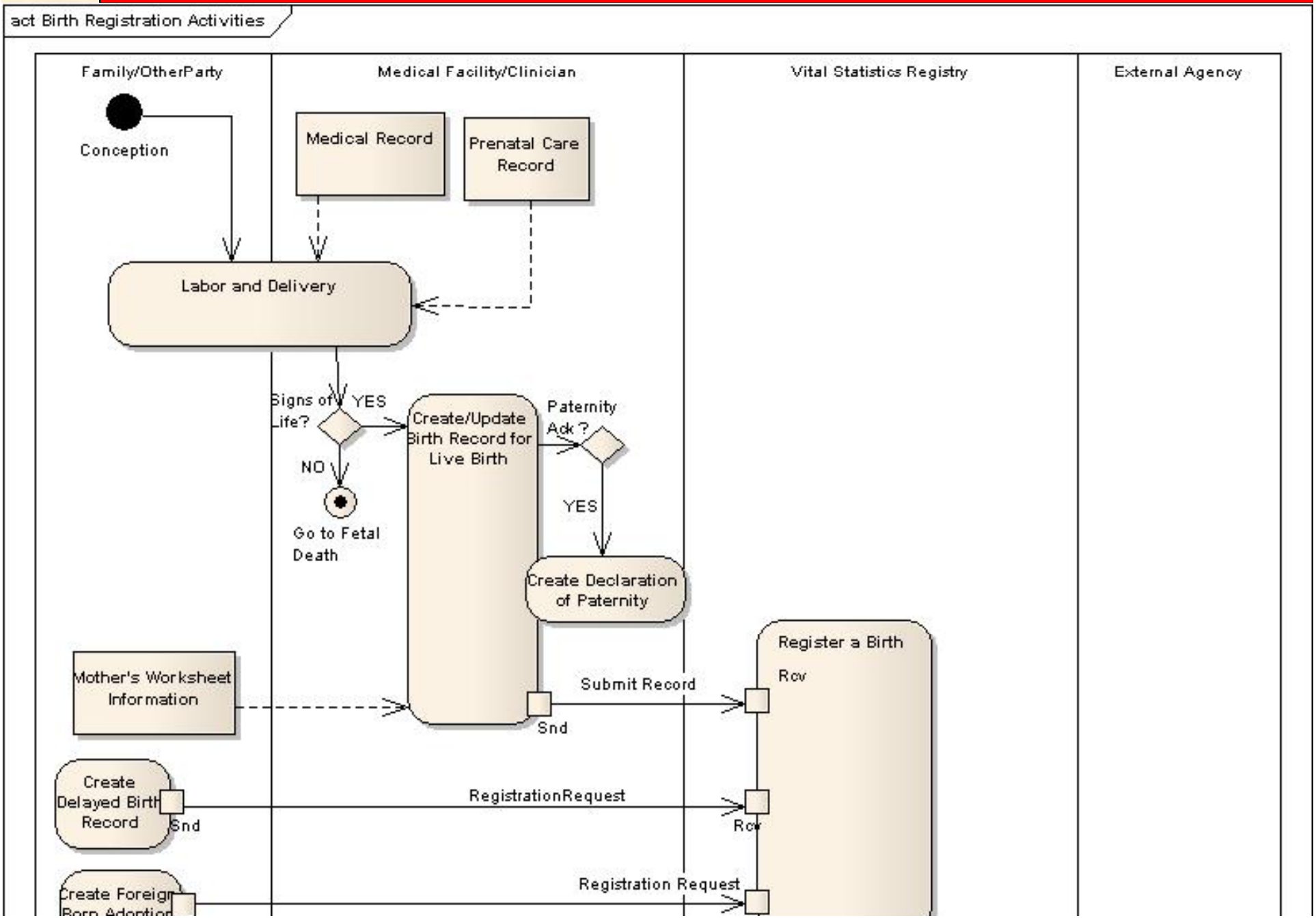
Our Three Models

- **Registration of live birth**
- **Registration of a death**
- **Recording the death of a fetus**

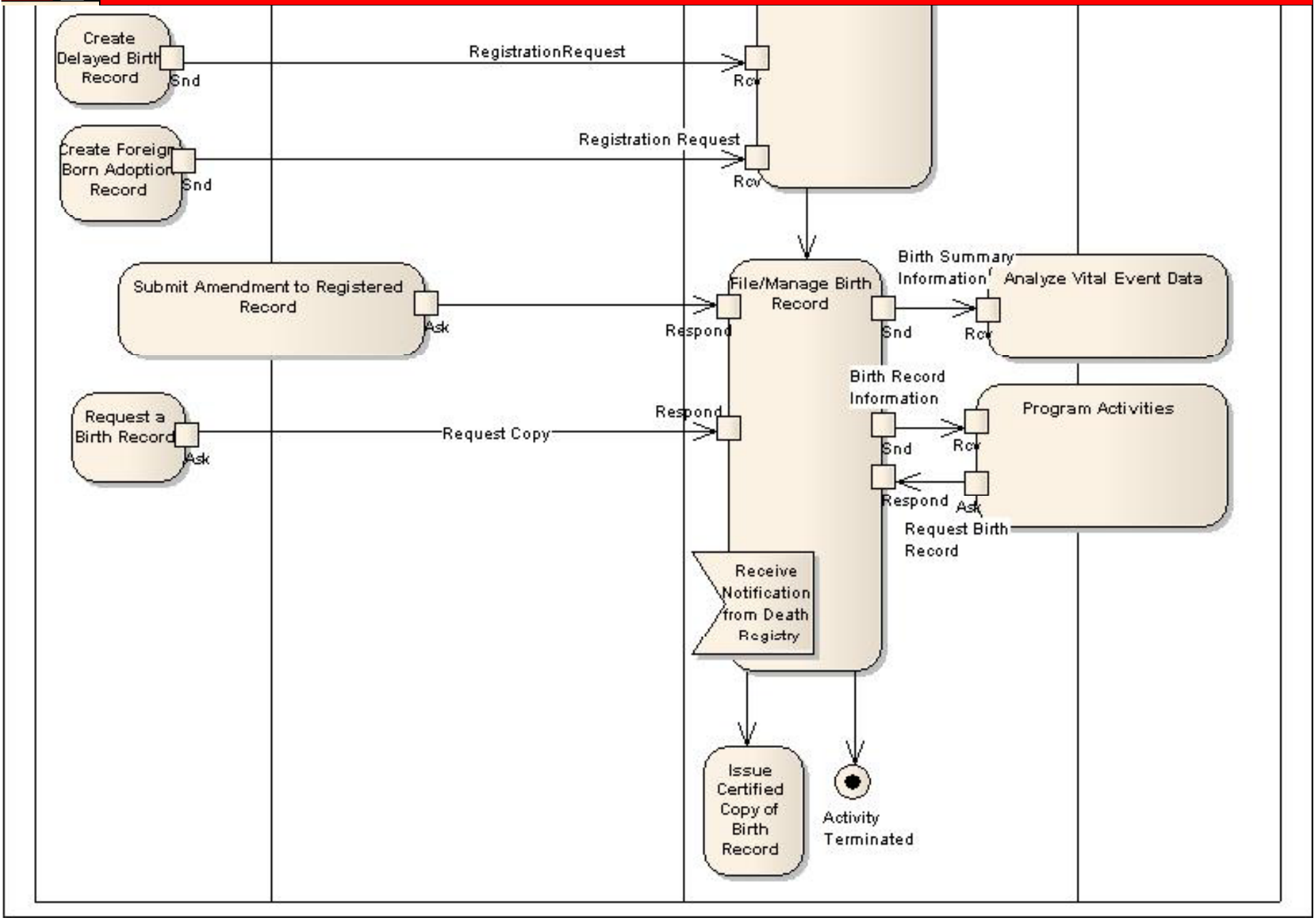
An Activity Model for Birth Registration

- **Coverage:** Labor and delivery, capture of information related to the birth, birth registration, managing the birth record, using birth related information.
- **Parties involved:** Family member, medical facility/clinician, Vital Statistics Registry, external agency
- **Information exchanges:** Submit vital record, Registration Request (delayed birth record, foreign born adoption record), Request amendment, Request record copy, Birth summary information, Birth record information

A look at Birth Related Activities I



A look at Birth Related Activities II



Looking at the Text: An example

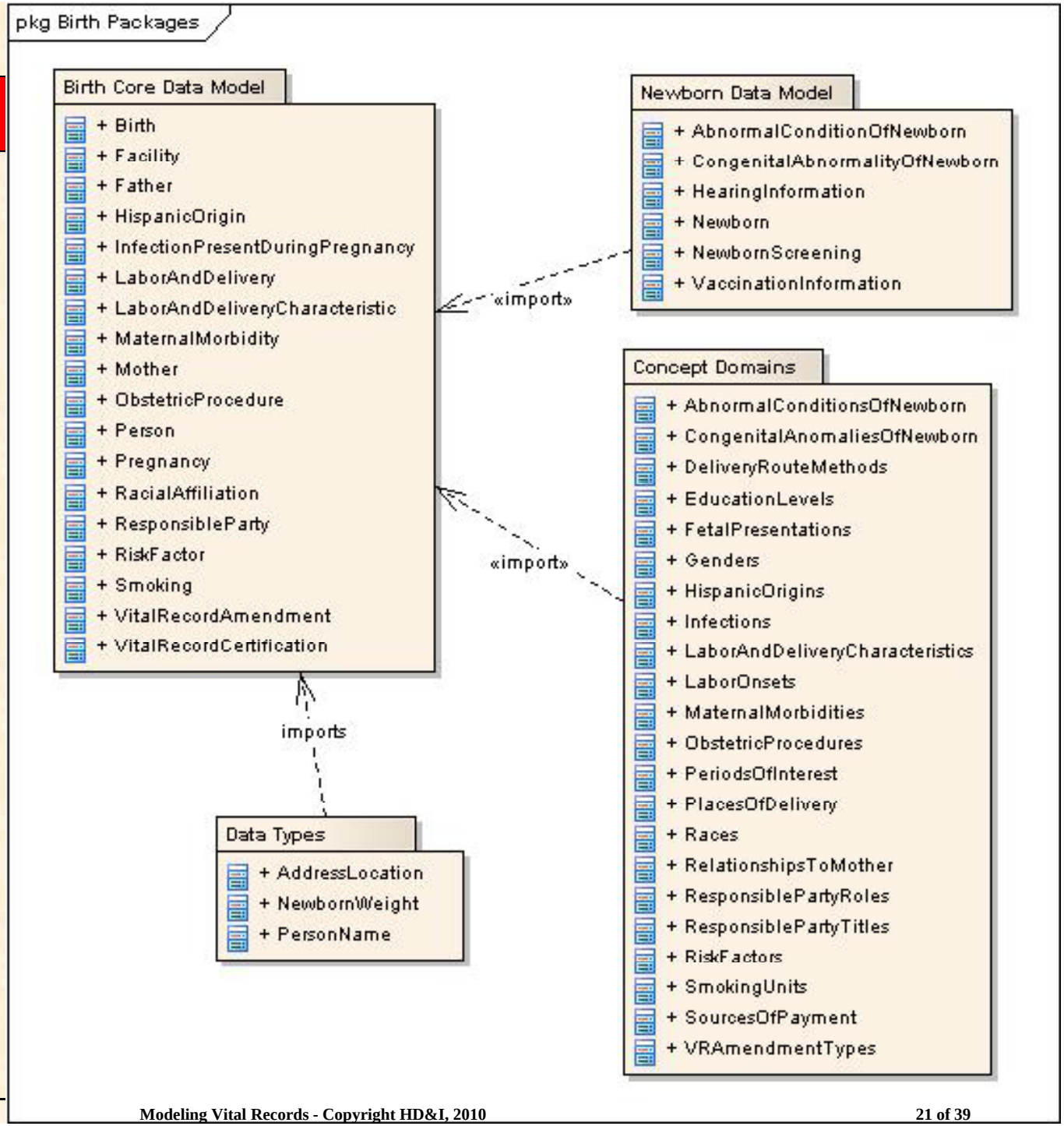
- **Create Delayed Birth Record**
- *Activity:* Each jurisdiction sets a time frame for the registration of a live birth, generally within one year of the event. If the registration of a live birth is delayed beyond the period defined by the jurisdiction's law, a request to register a delayed birth must be submitted. In addition to the required live birth information, additional documentary evidence must be submitted showing proof of residence, pregnancy and delivery. The delayed registration application is subject to acceptance and approval of the jurisdiction, and may be ordered by court. Delayed birth registrations are usually associated with unattended births, but may also be filed for hospital births that were not recorded in a timely matter due to omissions.

  Note: This activity also supports EBRS Use Case 013: Create Delayed Birth Record.

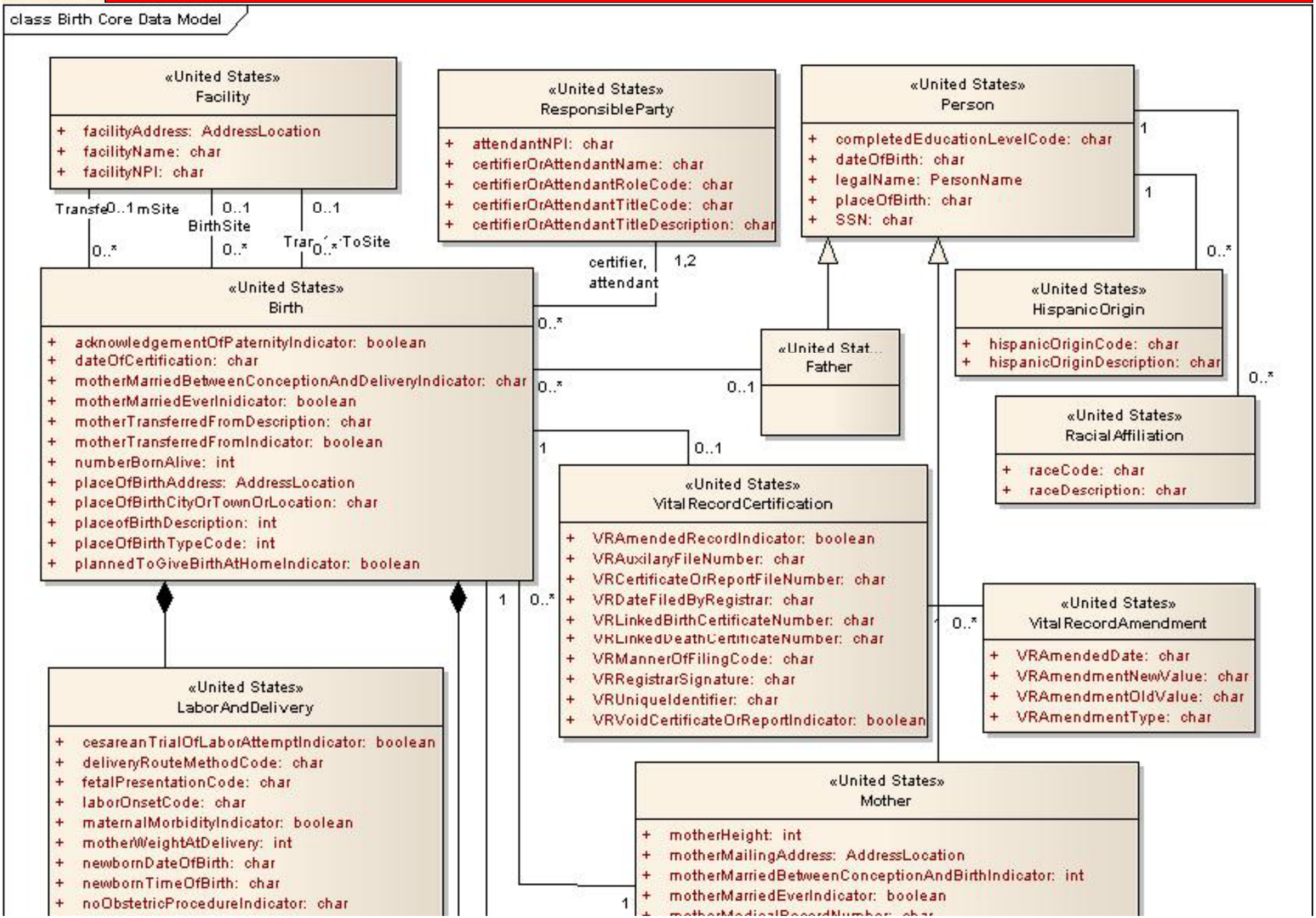
Features of the Information Model

- **Individual attributes are drawn directly from the US Standard Certificate.**
- **Code sets too.**
- **Classes are developed to show:**
  A. Relationships between groups of data, and the "multiplicity" (whether it repeats) of the relationship.
  B. Functional grouping of the data.
- **Note, the class model has been split across two diagrams: birth & newborn. This is strictly to improve legibility – to keep the diagram on one page.**

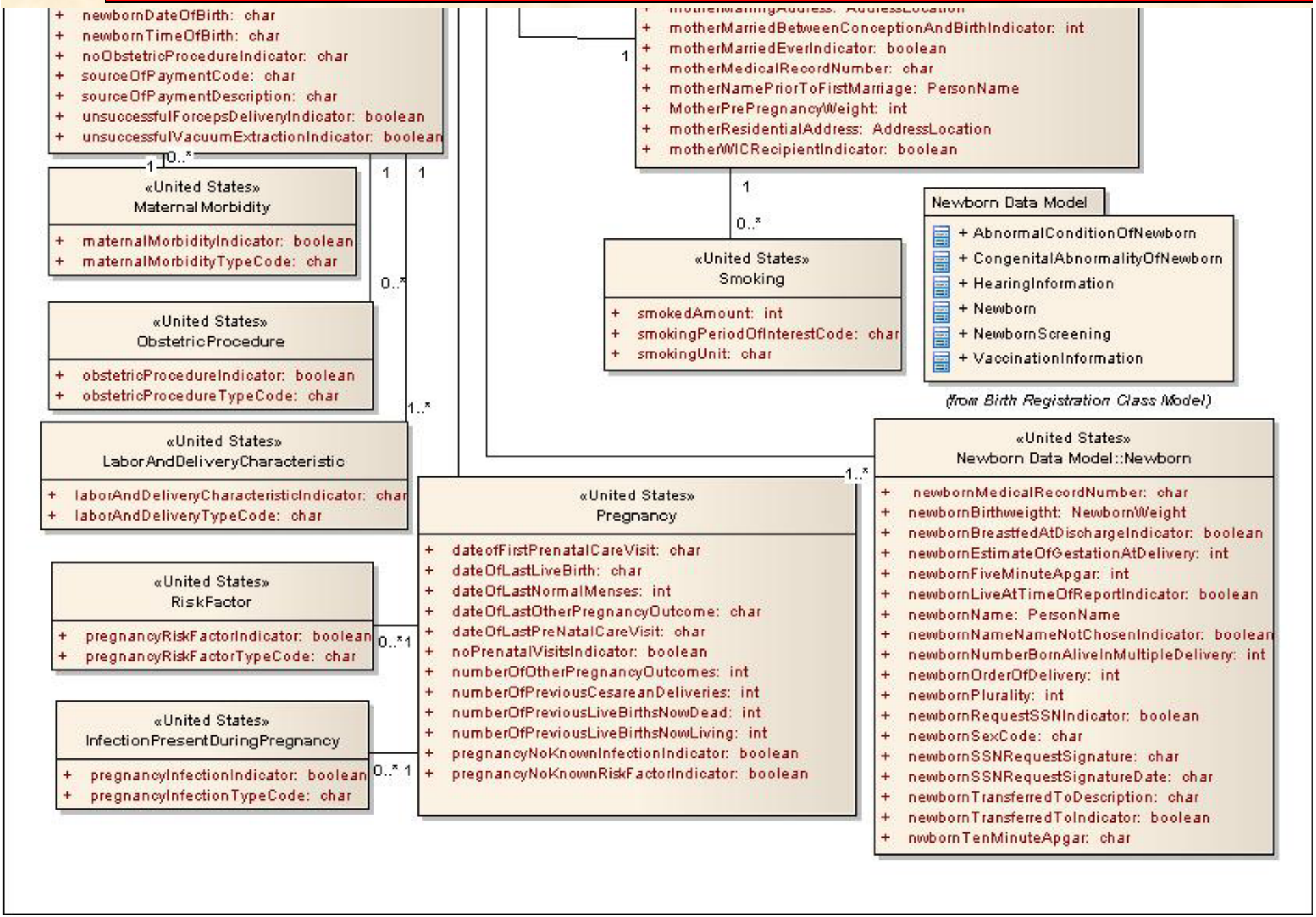
Packages


pkg Birth Packages
Birth Core Data Model
+ Birth
+ Facility
+ Father
+ HispanicOrigin
+ InfectionPresentDuringPregnancy
+ LaborAndDelivery
+ LaborAndDeliveryCharacteristic
+ MaternalMorbidity
+ Mother
+ ObstetricProcedure
+ Person
+ Pregnancy
+ RacialAffiliation
+ ResponsibleParty
+ RiskFactor
+ Smoking
+ VitalRecordAmendment
+ VitalRecordCertification
Newborn Data Model
+ AbnormalConditionOfNewborn
+ CongenitalAbnormalityOfNewborn
+ HearingInformation
+ Newborn
+ NewbornScreening
+ VaccinationInformation
«import»
Concept Domains
+ AbnormalConditionsOfNewborn
+ CongenitalAnomaliesOfNewborn
+ DeliveryRouteMethods
+ EducationLevels
+ FetalPresentations
+ Genders
+ HispanicOrigins
+ Infections
+ LaborAndDeliveryCharacteristics
+ LaborOnsets
+ MaternalMorbidities
+ ObstetricProcedures
+ PeriodsOfInterest
+ PlacesOfDelivery
+ Races
+ RelationshipsToMother
+ ResponsiblePartyRoles
+ ResponsiblePartyTitles
+ RiskFactors
+ SmokingUnits
+ SourcesOfPayment
+ VRAmendmentTypes
«import»
imports
Data Types
+ AddressLocation
+ NewbornWeight
+ PersonName

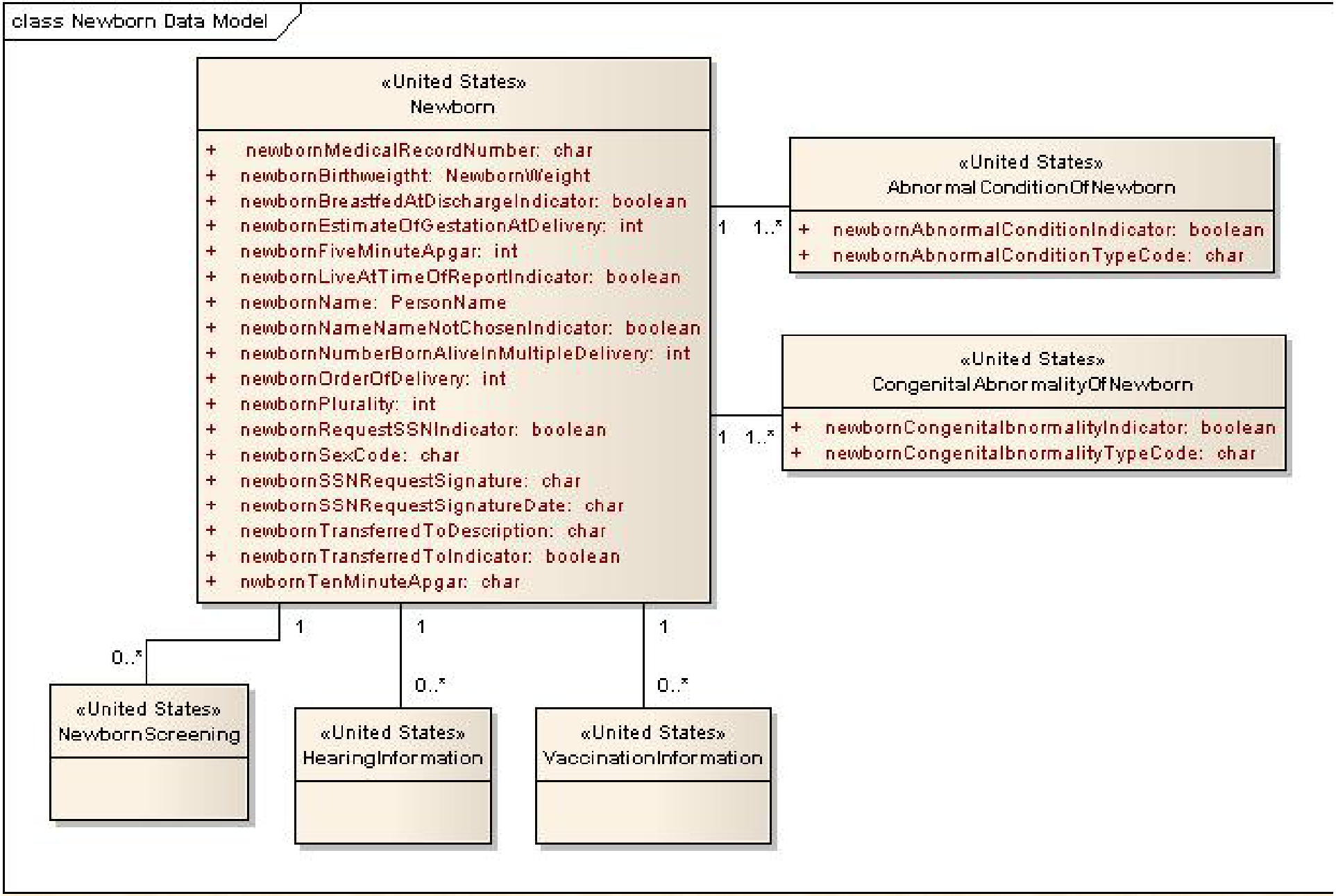
Base Model for Births I



Base Model for Births II



A model to Capture Newborn Information



A Class and its Attributes

Birth Core Data Model::Facility

Class: **A healthcare facility that provides care to pregnant mothers and newborn infants. For the most part, the facility will be licensed to perform these services.**

Facilities are relevant within this model when they serve as places where pregnant women go to deliver a child, or where women or newborns are transferred if needed.

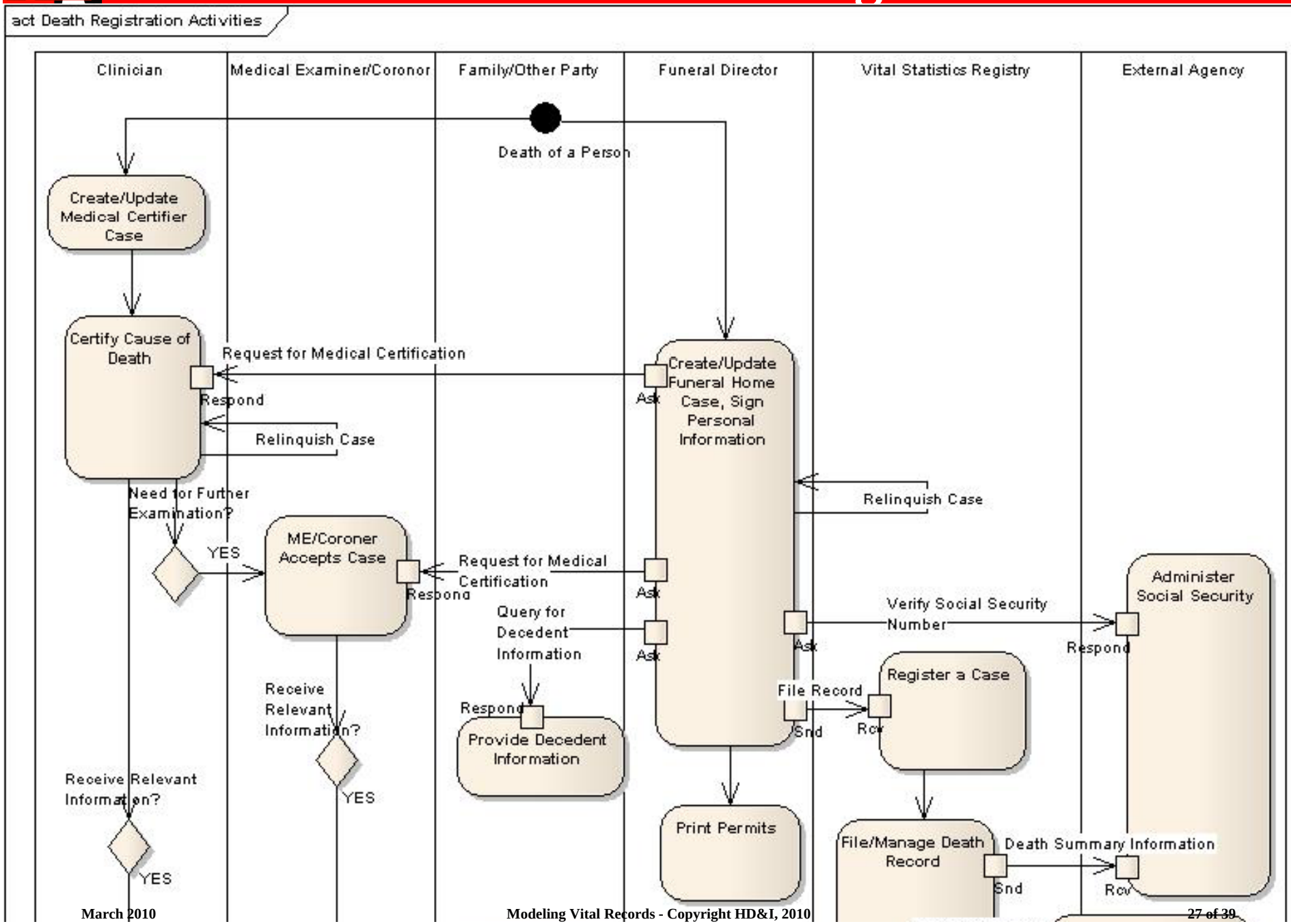
Birth Core Data Model::Facility Attributes

Attribute	Type	Notes
facilityAddress	*AddressLocation*	The address at which the facility is located, and that is used to direct mail to the facility.
facilityName	*char*	The name by which the organization is referred.
facilityNPI	*char*	A unique identifier for the provider organization. Within the United States, the identifier is known as a National Provider ID, and provided by the Center for Medicare Services (CMS).

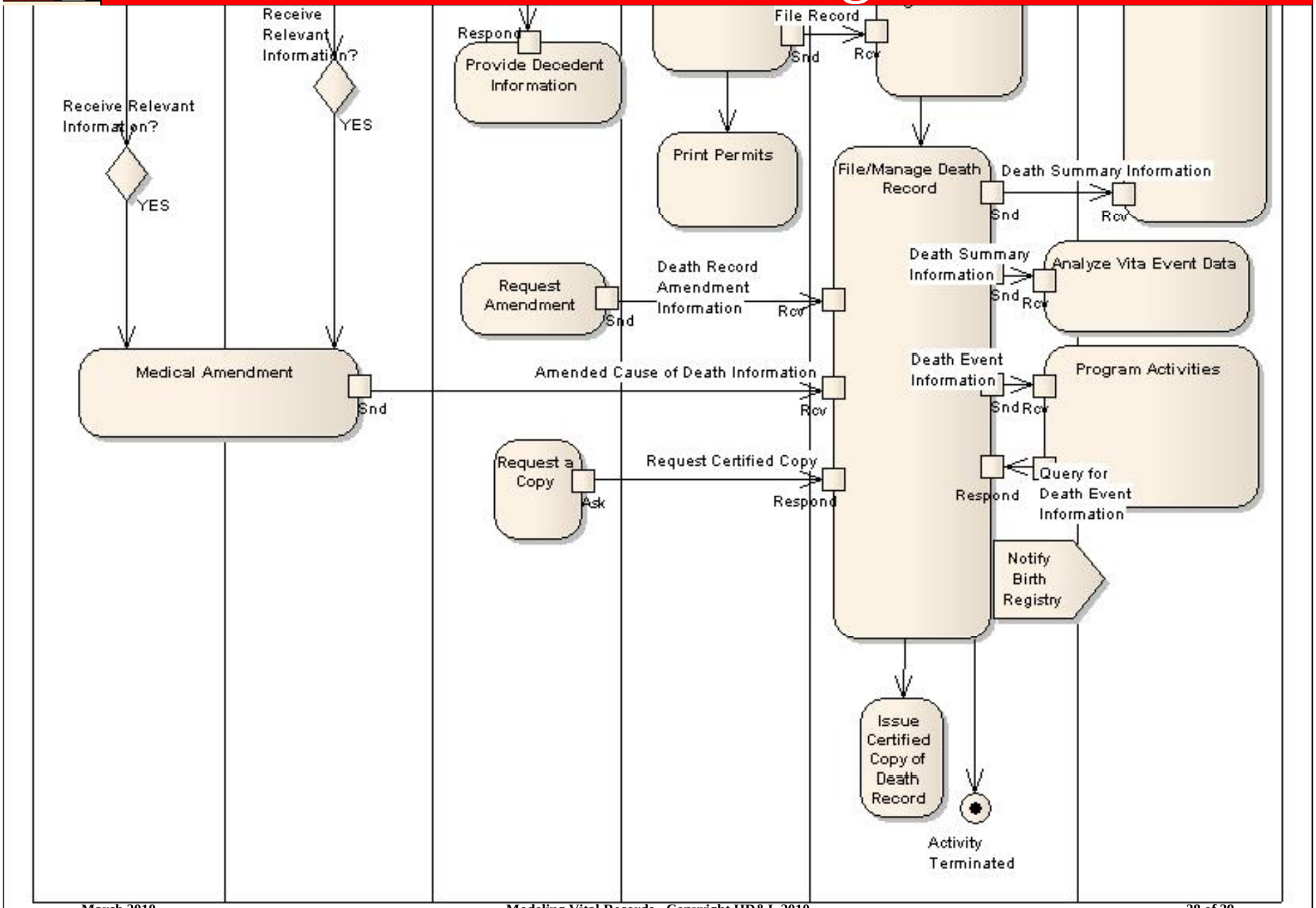
An Activity Model for Death Registration

- **Coverage:** Death certification, certification of the cause of death, burial, registration and management of the death record, use of death information
- **Parties involved:** Family member, medical facility/clinician, medical examiner/coroner, funeral director, Vital Statistics Registry, external agency
- **Information exchanges:** Request medical certification, Query for decedent information, Verify social security number, Submit vital record, Request amendment (death record, cause of death), Request record copy, Death summary information, Dearth record information

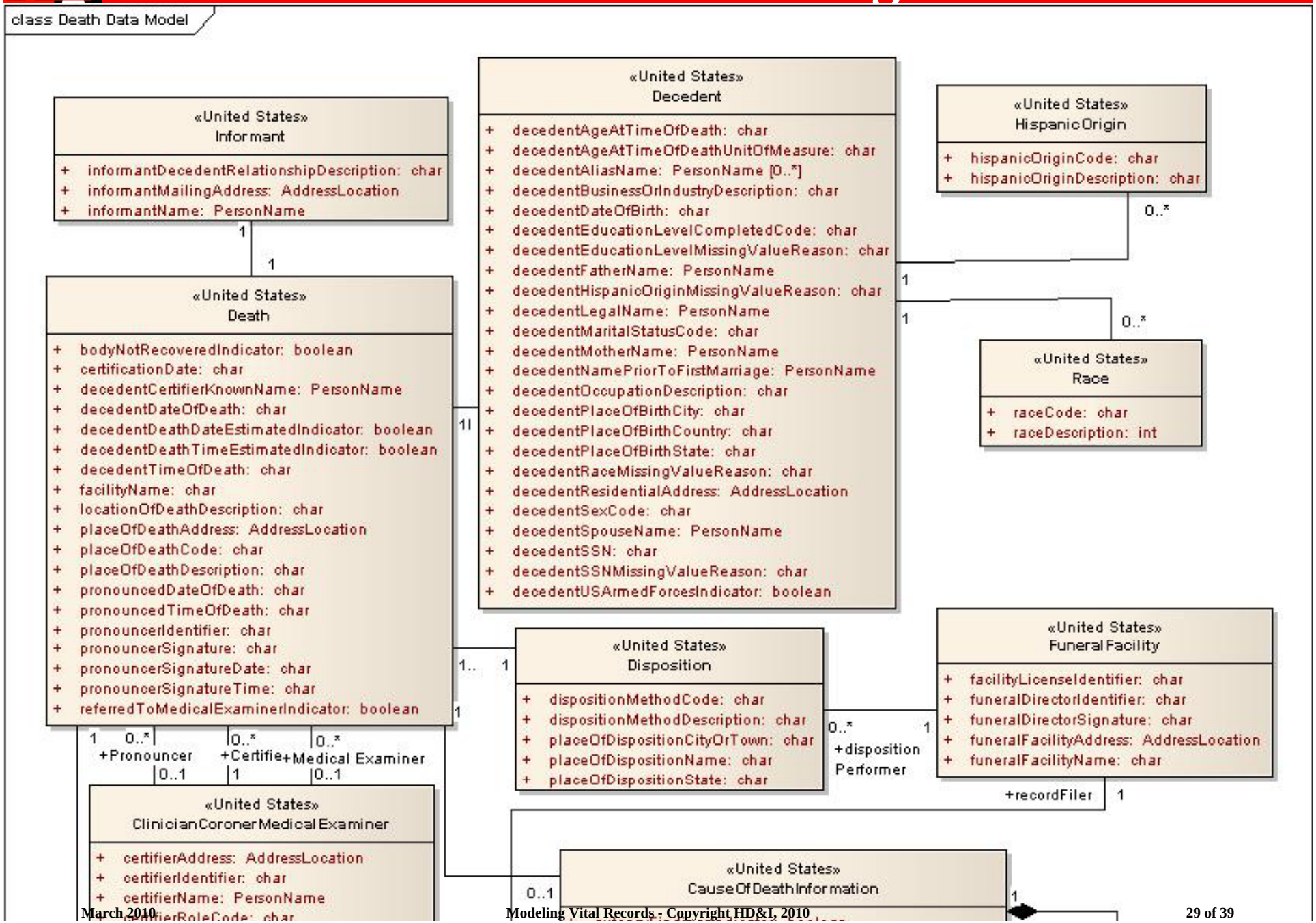
Activities for Death Registration I



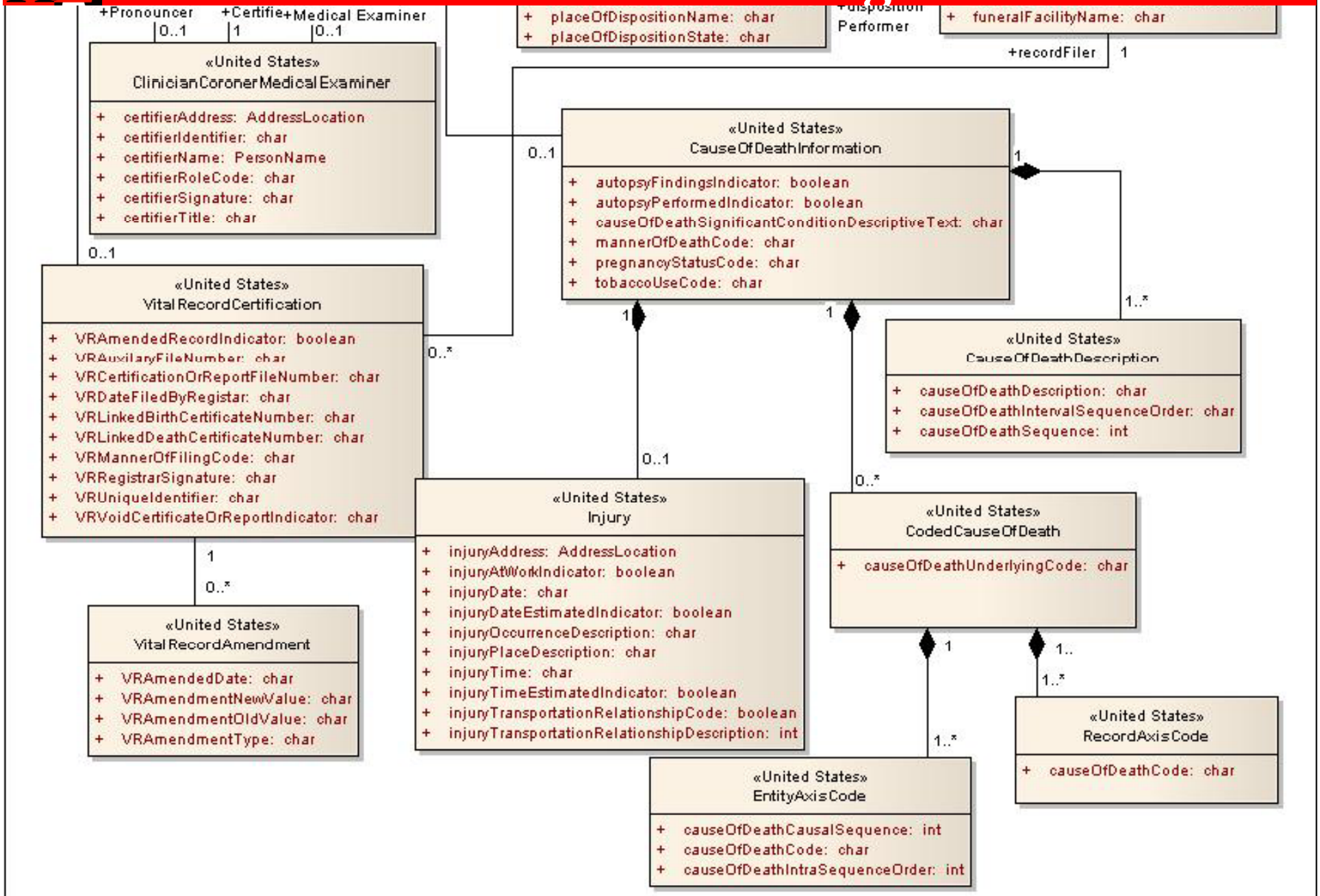
Activities for Death Registration II



Data to Define Death Registration I



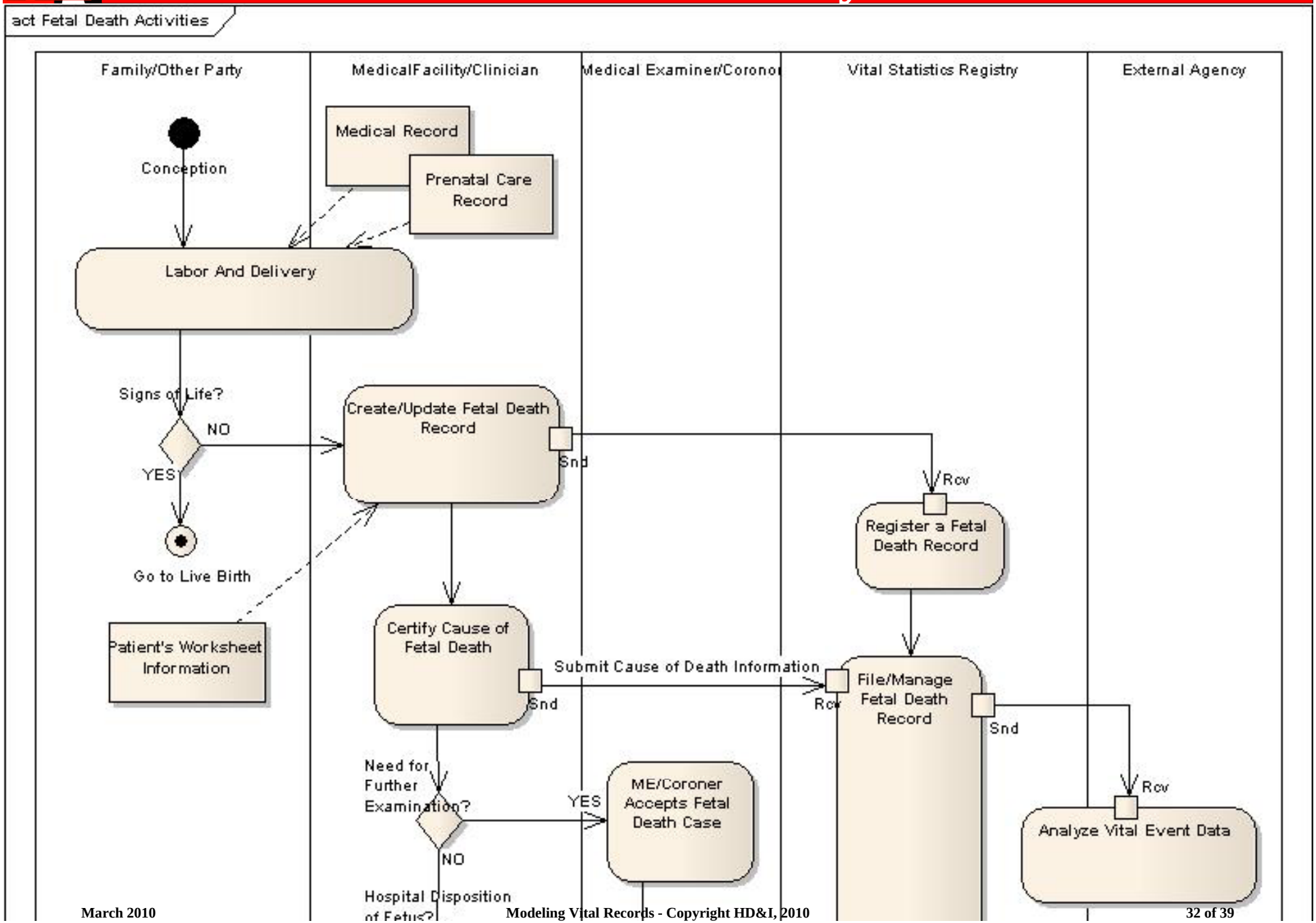
Data to Define Death Registration II



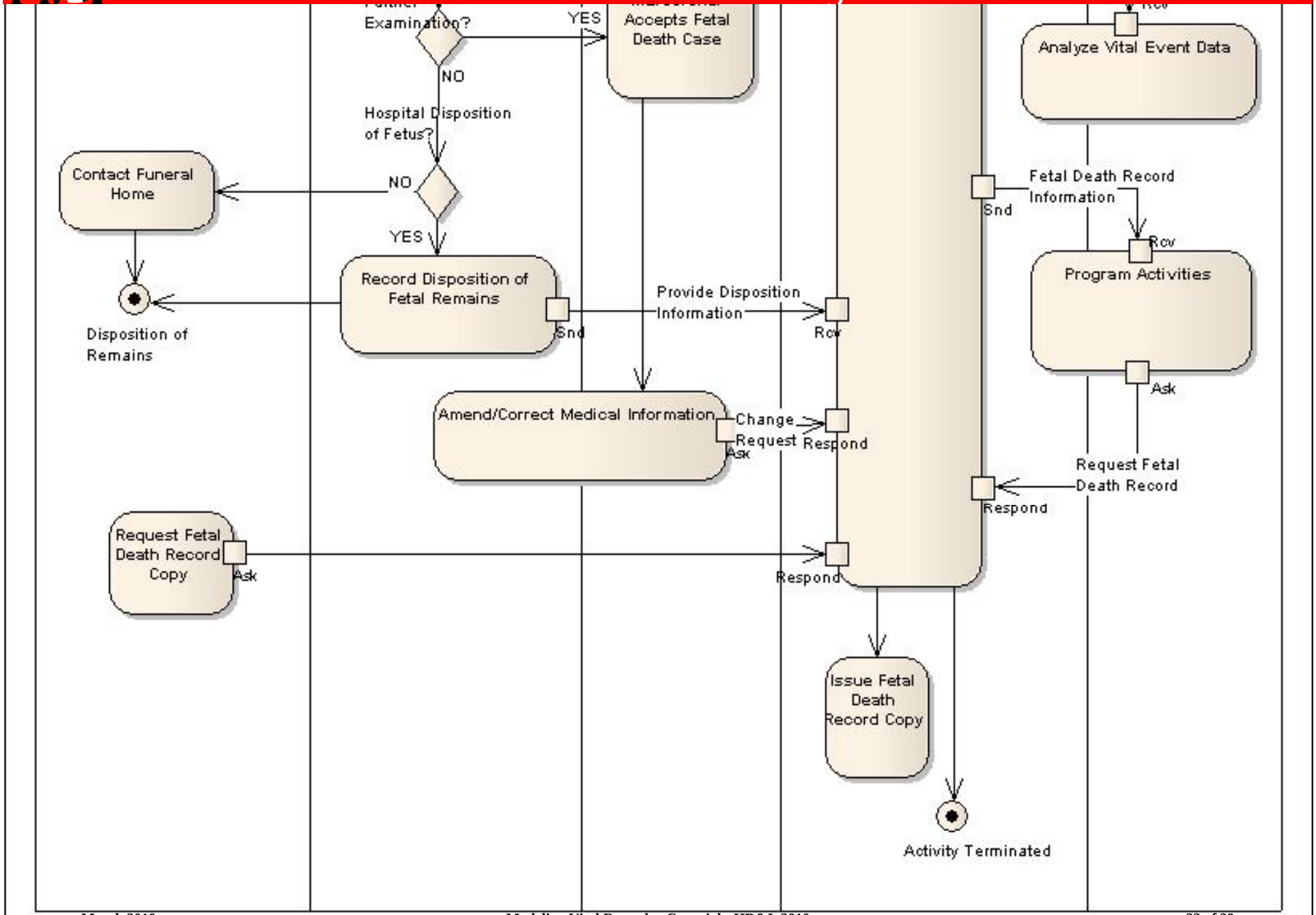
Reporting Fetal Deaths

- **The Vital Records models also represents activities and data for Fetal Death Reporting.**
- **As with birth and death, there are activity and class models.**
- **Not surprisingly, the model we created draws features from each of the other two.**

A look at the Activity Model I



A look at the Activity Model II



A note on Vocabulary

- **In order to reliably convey data, we need to have agreement on the possible values to be carried in a coded field. E.g.: education levels, manners of death, maternal morbidities.**
- **For each of the component models, there is a section labeled: Concept Domains**
- **This section has a brief description of each code set, and a list of the items within that code set.**
- **As with the rest of the model, the content is drawn from the US Standard Certificates.**

A Vocabulary Example

- **Education Level Code**
- **Associated with the "class" Education Levels.**
- **Description: A collection of the different education levels that may be attained by a person.**
- **Valid values (attributes):**
  - associateDegree
  - bachelorsDegree
  - collegeCredit
  - doctorateOrProfessionalDegree

Data Types

- **You will also see this section in the models.**
- **It includes definitions where it was helpful to treat multiple items in the certificate as one attribute. E.g., person name, address.**
- **The data type that applies is shown next to the attribute name in the class model.**

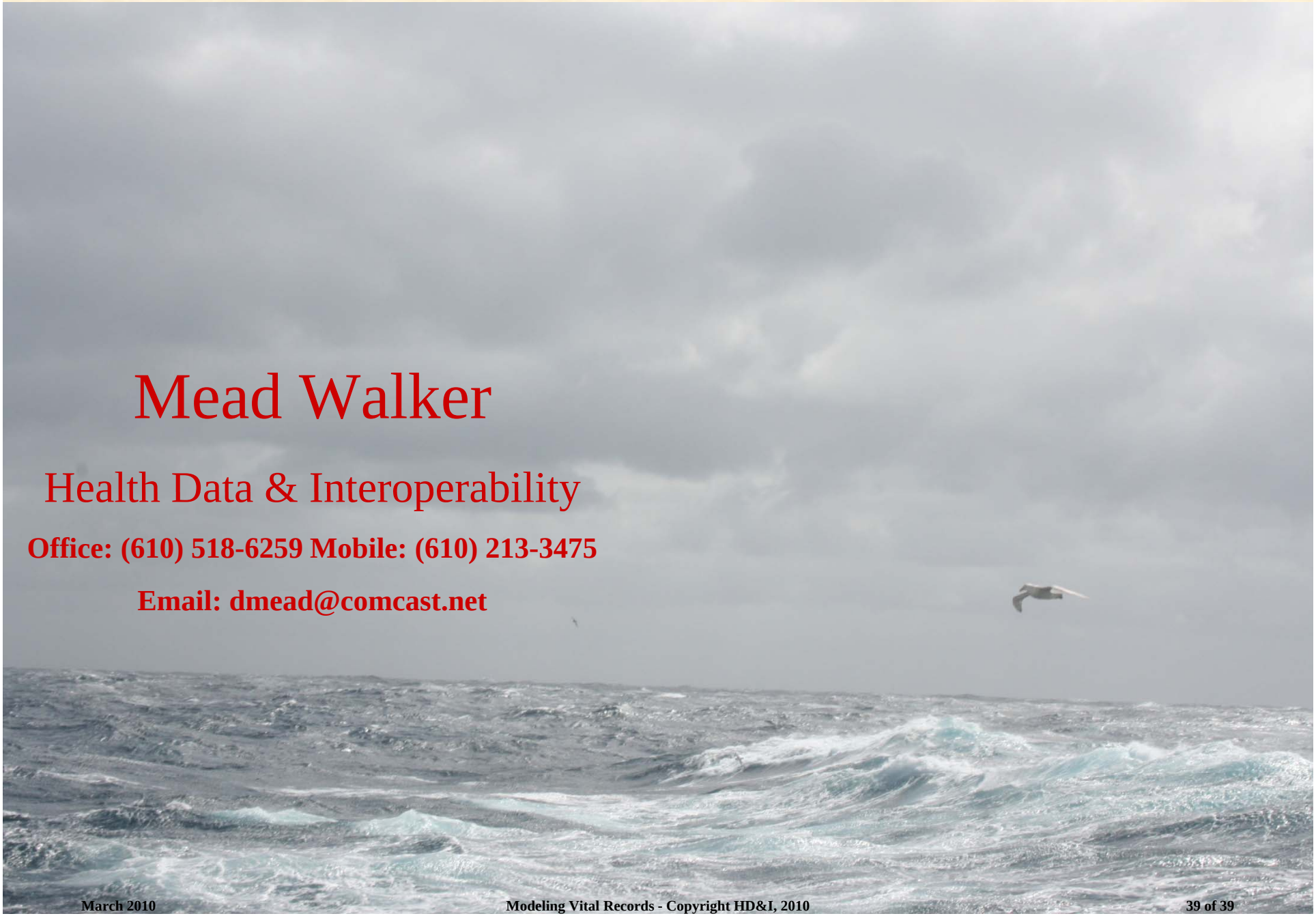
Items to Review

- **Ideally, Everything**
- **But, you might consider:**
  - Are critically important processes left out of the storyboards?
  - Does the flow of the activity models seem reasonable?
  - Is the way data is grouped into classes appropriate?
  - Are there data elements missing that really deserve to be there?
  - Are the descriptions of activities, classes, and attributes clear, useful, and sufficiently comprehensive?

Summary

- **Throughout this presentation I have tried to:**
  - Explain why creation of a domain analysis model is a reasonable thing to do.
  - Give you an introduction to the organization of the models, and the style used to create its diagrams.
  - Provide enough of an overview of the content of the models to get you interested in digging into them.

Thank You – Are there any questions?



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