Office of Medical Investigator Database
Conceptual Design Document

Trey Sampson and Damian Franco

February 2022

Contents

1 The Office of Medical Investigator Database

The Forensic Anthropology Department at the Office of Medical Investigator (OMI) in Albuquerque investigates any death occurring in New Mexico that is sudden, violent, untimely, unexpected or where a person is found dead and the cause of death is unknown. The OMI, which is a special program within the Department of Pathology, determines the cause and manner of death in these cases, and provides formal death certification. The purpose of this paper is to determine the scope of the database and identify specific information requirements. Data within the database will be accessed by the database manager. They will be able to add and edit files alongside employees that have a case in progress.

2 Notation and definitions

The notion used: all upper case for entity names, lower case for the relationship names, and the first letter capitalized for attribute names.

The description of the entities starts with a sentence which explains their meaning. Then the attributes to describe the instances included. The relationships are described by a sentence and a list of attributes if needed.

Each attribute has a four-letter word code which describes the type of attribute according to the four classification criteria for attributes.

The format for this code is *(xyzw)*:

x tells that the attribute is simple (S) or composite (C)

y tells that the attribute has a single value (S) or is multivalued (M)

z tells that the attribute is primitive (stored) (P) or derived (D), in case it is derived, an explanation of how to deduce it from other attributes or a formula/ procedure must be specified

w tells that the attribute is fixed (F) (i.e. it must have a value that is not null) or optional (O), i.e. the domain of the attribute allows the null value

For example, an attribute that has the SSPF code is a simple attribute with a single value which is primitive and fixed. An example of this kind of attribute could be the Social Security Number (SSN). On the other hand, an attribute with the (CSPO) code is a composite attribute with a single value, primitive and optional. In this case, the date of birth could be an attribute with this code. If there is a single attribute that has the key constraint, it can be underlined. If the key constraint applies to more than one attribute or if there are several combinations of attributes with the key constraint property it is better to list them separately.

If there are attributes that are very common and are used more than once, they can be defined as general types to be used as the type of each attribute which uses the same format.

3 Conceptual Schema of the Database

The order of presentation of the conceptual schema is:

1. Entities: description and attributes
2. Relationships: description and attributes (if they have them)
3. EER diagram
4. Explicit Integrity Constraints

The order that the entities and relationships will be presented in from the center of the EER diagram to outer entities.

3.1 Entities

- CASE
- TAPHONOMY
- BODY
- DNA
- SKELETAL RECORDS
- DENTAL RECORDS
- STATUS
- PREHISTORIC
- MODERN
- HISTORIC
- DOES
- BIOLOGICAL PROFILE

A detailed description of each entity follows.

CASE: Features and descriptors of the case.

Attributes:	Case number	(SSPF)
	Status	(SSPF)

TAPHONOMY: Factors revolving the decay and fossilization of the body.

Attributes:	Date found (DD/MM/YYYY)	(SSPF)
	Time found (HH:MM:SS)	
	Location found	(SSPF)
	Orientation	(SSPF)
	Artifacts	(SMPO)
	Laboratory analysis	(SMPO)

BODY: Remains under investigation.

Attributes:	Skeletal element	(CMPF)
	Dental element	(CMPF)

DNA: Main individual identifier located in every body.

Attributes:	Profile	(SSPO)

SKELETAL_RECORDS: Individual skeletal components of the body.

Attributes:	Elements	(SSPO)
	Missing elements	(SSPO)

DENTAL_RECORDS: Individual dental components of the body.

Attributes:	Elements	(SSPO)
	Missing elements	(SSPO)

STATUS: Category that the body mostly applies to.

Attributes:	Description	(SMPF)

PREHISTORIC: Case that falls under the prehistoric context.

Attributes:	Significance	(SSPF)

MODERN: Case that falls under the historic context.

Attributes: Specific bone (SSPO)

HISTORIC: Case that falls under the historic context.

Attributes: Significance (SSPF)

DOES: Tracks all of the factors of decay and fossilization of the body.

Attributes: Race/Ethnicity (SSPO)

Sex (SSPO)

Age (SSPO)

BIOLOGICAL_PROFILE: All properties that biologically identify the body.

Attributes: First Name (SSPO)

Last Name (SSPO)

Middle Initial (SSPO)

Race/Ethnicity (SSPO)

Sex (SSPO)

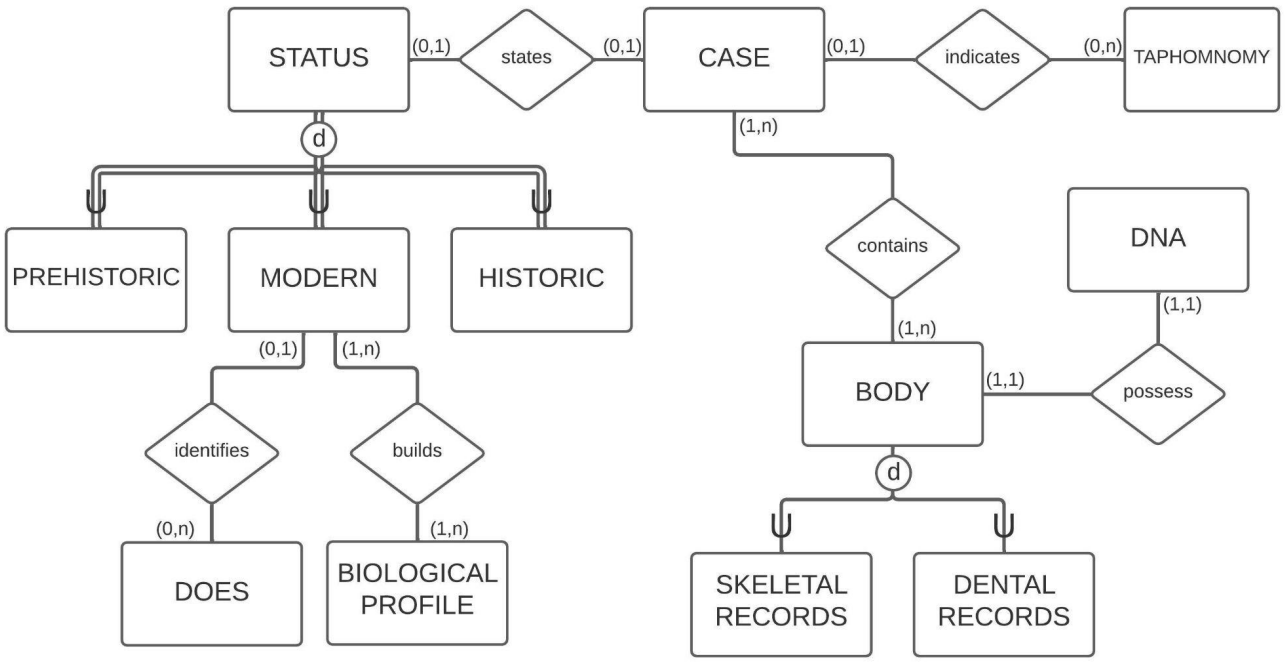
Age (SSPO)

3.2 Relationships

The relationships in this schema are listed in alphabetical order and described below. All relationships contain *no* attributes.

indicates
contains
possess
states
identifies
builds

3.3 EER Diagram



3.4 Explicit Integrity Constraints

Some examples of integrity constraints in our working example of a company database.

1. All cases require a case number.
2. All cases require a body.
3. All bodies require DNA.
4. All cases require a status to be selected.
5. All entities need to be easily identifiable
6. All relations must be easily identifiable

4 Example Queries

A list of the most important queries.

1. Cases by specific case number.
2. Cases with a certain date.
3. Cases with a specific time.
4. Cases with select skeletal features.
5. Cases with select dental features.
6. Cases categorized with a specific status.
7. Cases that involve a specific bone type.
8. Cases of a specific location.
9. Cases within a given time of death.
10. Cases by biological features i.e. age, gender, race, etc.

4.1 Possible extensions and additional comments

Some possible extensions include the option to have an attribute to account for peri-, post-, and premortem cases. Other extensions could be made for more depthness.