Designation: E2436 – 05 (Reapproved 2010)

An American National Standard

Standard Specification for the Representation of Human Characteristics Data in Healthcare Information Systems[1]

This standard is issued under the fixed designation E2436; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

This document presents a standardized representation for the content and structure of human characteristics data for use in electronic health records and healthcare information systems generally. Many of the data available to clinicians, health researchers and educators, and healthcare planners cannot be easily compared due to the variety in representing human characteristics. This document standardizes the representation of these characteristics at the data tier of health information systems.

1. Scope

1.1 This document presents a standardized representation for the content and structure of human characteristics data for use in healthcare information systems.

1.2 This specification may be extended to apply to characteristics of non-human living things, such as in data systems supporting veterinary medicine.

1.3 The following provisions are within the scope of this specification:

1.3.1 Logical representation of human characteristics data for individuals and populations.

1.3.2 Physical representation of human characteristics at the data tier of healthcare information systems.

1.4 The following provisions are outside the scope of this specification:

1.4.1 The standardization of policy or regulation concerning the employment of human characteristics data described in this specification.

1.4.2 The establishment or standardization of legal constraints over the use of human characteristics in conjunction with healthcare clinical or business processes.

1.4.3 Addressing or standardizing personal privacy, medicolegal, and system security provisions associated with documenting human characteristics or storing human characteristics data.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E1384 Practice for Content and Structure of the Electronic Health Record (EHR)

E1633 Specification for Coded Values Used in the Electronic Health Record

E2145 Practice for Information Modeling

2.2 *ANSI Standards*

ANSI 260.3-1993 Mathematical Signs and Symbols for Use in Physical Sciences and Technology (revision and redesignation of ANSI/ASME Y10.20-1990).

ANSI 1320.2-1998 IEEE Standard for Conceptual Modeling Language - Syntax and Semantics for IDEF1X97 (IDEFobject)

ANSI/ADA 1000 Standard Data Architecture for the Structure and Content of the Electronic Health Record, February 2001.

2.3 *ISO Standards*

ISO 639 Codes for the representation of names of languages

ISO 2955 Representation of SI Units

ISO 5218 Representation of the Human Sexes

ISO 8601 Representation of Dates

2.4 *Other Standards and Documents*

American Heritage Dictionary

ANSI/ADA Specification 1000 Implementation Guide

HL7 2.x reference values.

[1] This specification is under the jurisdiction of ASTM Committee E31 on Healthcare Informatics and is the direct responsibility of Subcommittee E31.25 on Healthcare Data Management, Security, Confidentiality, and Privacy.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

National Institute of Standards and Technology, Federal Information Processing Standards Publications 184 Integrated Definition for Information Modeling (IDEFIX), 23 December 1993.

3. Terminology

3.1 *Acronyms:*

ADA = American Dental Association
ANSI = American National Standards Institute
CCR = ASTM standard Continuity of Care Record
HL7 = Health Level Seven
IDEF = Integrated Definition language
ISO = International Standards Organization
LDM = Logical data model
LOINC = Logical Observation Identifiers Names and Codes
PDM = Physical data model
XML = Extensible Markup Language

3.2 *Definitions:*

3.2.1 *Ethnicity, n*—characteristics of a group of people sharing a common and distinctive racial, national, religious, linguistic, or cultural heritage.

American Heritage Dictionary

3.2.2 *Language, n*—A system of arbitrary signals, such as voice sounds, gestures, or written symbols, including its rules for combining its components, such as words, as used by a nation, people, or other distinct community for communication of thoughts and feelings.

American Heritage Dictionary

3.2.3 *Living Arrangement, n*—The setting or environment in which an individual lives, such as family setting, as may have impact on the individual's health and course of care.

3.2.4 *Physical characteristic, n*—a group of characteristics previously used by convention as a means to describe an individual, e.g. by hair color, eye color, build, etc.

3.2.5 *Race, n*—A local geographic or global human population distinguished as a more or less distinct group by genetically transmitted physical characteristics.

American Heritage Dictionary

3.2.6 *Religion, n*—A personal or institutionalized system grounded in such belief and worship. A set of beliefs, values, and practices based on the teachings of a spiritual leader.

American Heritage Dictionary

3.2.7 *Sex Characteristic, n*—Preferred term to more completely classify the multiple human sex characteristics. The term "Sex" is preferred as the biologically correct term rather than the grammatical term "gender."

3.3 *Definitions:*The following information modeling and technology terms are used in this document:

3.3.1 *Attribute, n*—In a logical data model, an identifiable characteristic or data element of an entity.

3.3.2 *Column, n*—In a database, a vertical space or dimension in a database table that represents a particular domain of data and hold values for a particular attribute; in the physical data model analogous to the attribute of the logical data model.

3.3.3 *Entity, n*—In a logical data model, a distinguishable object about which data is kept.

3.3.4 *Logical Data Model, n*—A graphical and textual representation of the data properties that describes a business function, process, or organization, consisting and all the relationships that exist among them.

3.3.5 *Metadata, n*—Data about data, or information about information, generally comprising a structured set of descriptive elements about any definable entity.

3.3.6 *Physical Data Model, n*—A graphical and textual representation of the structural properties that are implemented or able to be implemented in a database, consisting of tables, columns and rows, and all the relationships that exist among these.

3.3.7 *Table, n*—The basic unit of storage in a relational database management system; in the physical data model analogous to the entity of the logical data model.

4. Reference Data Model

4.1 This specification is based upon the ANSI/ADA Specification 1000 reference data model and expands upon data structures found in the "Individual Characteristics" and "Population Characteristics" subject areas.

4.1.1 The Individual Characteristics subject area of this specification has been extended to include two additional entities/tables.[3]

4.1.1.1 Living Arrangement to allow the characterization and textual description of the residential life patterns and interpersonal life-dependencies of a patient or related individual.

4.1.1.2 Individual Physical Characteristics to allow documentation of administrative characteristics (e.g. height, eye color, hair color, etc.) not otherwise documented in this model.

4.1.2 In this specification, several attributes are deleted from the Individual entity that are not relevant to personal characteristics, and this entity is extended by adding reported and derived dates of birth and death.

4.1.3 The following entities in the ANSI/ADA Specification 1000 Individual Characteristics subject area are not referenced in this specification:

4.1.3.1 Individual Object is employed in ANSI/ADA Specification 1000 to carry object data descriptive of an individual such as an identification image or biometric data. This data is not considered as characteristics within the context of this specification.

4.1.3.2 Individual Taxonomy associative entity is not used in human health information systems. Where this specification is extended to represent the characteristics of non-human living things, the taxonomy or genus reference and associative entities may be employed.

4.1.4 Associated Individual and Pair Bond Status are employed in ANSI/ADA Specification 1000 to allow the construction of complex networks of interpersonal relationships, such as in an extended family or patterns of epidemiological contacts. This specification does not address such relationships as these concepts are subsequently covered in a separate standard.

[3] These modifications and extensions are under consideration for inclusion in the next scheduled revision of ANSI/ADA Specification 1000.

4.2 Both Logical and Physical Data Models are presented in Annex A1.

4.2.1 Annex A1 illustrates the logical data model normalized to the Third Normal Form. At this level, the data structures demonstrate the ability to connect the type of name element, such as family name, with its text value.

4.2.2 Annex A1.6 illustrates a generic physical data model using Oracle 9.x datatypes.

4.3 The models illustrated in this document are presented in the ANSI standard IDEF1X data modeling notation.

4.4 Where the ANSI/ADA Specification 1000 data models have been enhanced, mixed case data names are employed to easily identify these changes.

5. Significance and Use

5.1 This specification promotes the interoperability of health information systems through enabling a single uniform representation of human characteristics at the data layer of healthcare information systems architecture (See Fig. 1).

It presents a data structure that allows the recording, storage, editing, and retrieval of human characteristics independent of technology and the language, nationality, or culture of persons or organizations involved in healthcare processes.

5.1.1 The intended use of this specification is to promote interoperability at the physical data tier in healthcare information systems, and to enhance the design and development of data subsystems that contain human characteristics data for individuals and populations.

5.1.2 The data structures in this specification can be readily transformed into presentation layer structures—for example, into XML for presentation in the ASTM Continuity of Care Record or the HL7 standard Clinical Document Architecture, or into standard HL7 2.x messages.

5.2 Clinical uses of this data structure include the classification and storage of human characteristics for individuals and populations—for example, for use in clinical decision support and epidemiology to compare the individual to populations consistent with best clinical and scientific practices.

5.3 This specification may be extended for use in veterinary medicine as described in Appendix X1. This extension includes a genus/taxonomy reference and associative entities/tables as cited in ANSI/ADA Specification 1000. This allows the characterization of individual non-human living things, and the inclusion of those of different species into mixed herds.

6. Specification

6.1 The logical data structure of a person's characteristics is composed of an association of reference entities with that person's identifying entity, with the component attributes reflecting the specific characteristics of the subject person. The structure and content of these associative entities varies with individuals and frequently over time. The physical structure and content of these characteristics, along with reference data sources, are specified in Fig. A1.2.

6.2 Age is a derived value calculated using the reported date of birth; therefore, the individual's age does not require data storage as a separate item.

6.3 The data structure in this specification provides a framework for recording or storing human characteristics data: this specification does not mandate or require that any specific human characteristic be obtained, recorded or stored in an information system.

7. Compliance

7.1 To be compliant with this specification, designers, developers, and vendors of healthcare applications and information systems shall use a physical data structure derived from the generic physical data model presented in this specification. Physical data names and characteristics must be retained to promote data interoperability.

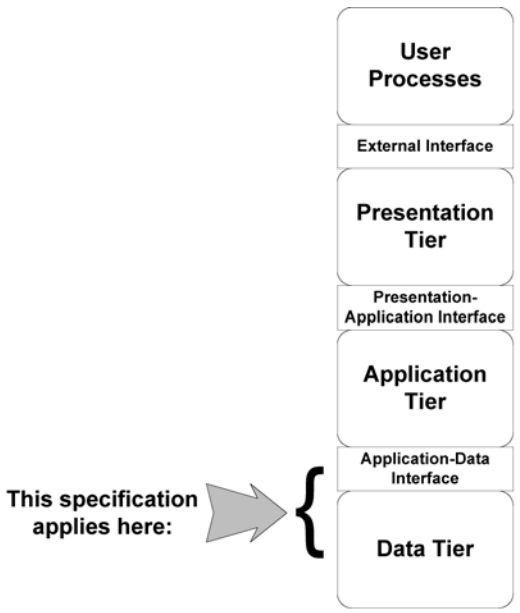

FIG. 1 Where This Specification Applies to System Architecture

7.2 System designers and developers may adjust this generic data structure, for example, denormalize, for performance and storage considerations as appropriate to their specific database management system.

7.3 System designers, developers, and vendors should transform these characteristics data for human interaction at the system presentation tier as appropriate to the ASTM CCR or HL7 CDA standards.

7.4 System designers, developers, and vendors should transform these characteristics data at the system presentation tier for messaging between systems as appropriate to healthcare messaging standards, for example, HL7 2.x, ASTM, ANSI X12N, NCPDP, etc.

7.5 System designers, developers, and vendors should use standard reference data to populate these tables, such as Specification E1633, HL7, LOINC, or the draft ASTM reference data set for ANSI/ADA Specification 1000.

7.5.1 Alternately, reference data used to populate these tables can be derived from CMS approved sources, such as HL7 or LOINC, or the draft ASTM reference data for ANSI/ADA Specification 1000. Users should weigh the benefits of using these reference data for internal use against the impact on achieving data interoperability across systems.

7.6 All database entries of these data must record the date and time of the observation (date-time stamp).

7.7 System designers, developers and vendors may extend the data structure beyond the representation in this specification by including additional characteristics tables and data elements.

7.7.1 ASTM Committee E31 should be notified of any extension to these data structures for consideration in future evolution of this standard.

8. Keywords

8.1 Ethnicity; Language; Living arrangement; Race; Religion; Sex characteristic

ANNEX

(Mandatory Information)

A1. REFERENCE DATA MODEL

PERSON CHARACTERISTICS LOGICAL DATA MODEL

A1.1 Fig. A1.1 illustrates the LDM Diagram.

A1.2 LDM narrative:

This specification and ANSI/ADA Specification 1000 take a patient-focused, or person-centric view of health and healthcare: the INDIVIDUAL is the core entity. Each individual can be described by numerous characteristics, personalized to that individual by populating any number of instances of eight associative entities:

A1.2.1

1. The INDIVIDUAL RACE associative entity allows the recording of the composition of a person's racial characteristics.

2. The INDIVIDUAL ETHNICITY associative entity allows recording of a person's ethnic composition.

3. The INDIVIDUAL LANGUAGE associative entity allows recording of a person's language usage and preference.

4. The INDIVIDUAL RELIGION associative entity allows recording of a person's religious beliefs.

5. The INDIVIDUAL LIVING ARRANGEMENT associative entity allows recording of a person's living characteristics.

6. The INDIVIDUAL SEX CHARACTERISTIC associative entity allows recording of various sex characteristics of a person.

7. The INDIVIDUAL PHYSICAL CHARACTERISTIC associative entity allows recording of various physical characteristics not elsewhere recorded.These associative entities link the individual to a reference entity containing standardized, encoded values for each of these characteristics. These associative entities provide the framework for recording data consistent with regulation and user policy, and do not mandate recording of any particular human characteristic.

A1.3 Individual Characteristics PDM diagram.

A1.4 In a functioning database, the person characteristics data structure is maintained in multiple tables, each connected through a unique person identifier, as illustrated in the physical data model (See Fig. A1.2).

A1.4.1 The INDIVIDUAL RACE table allows for administrative designation of a person's race, or characterization of single or mixed race as desired.

A1.4.1.1 *Column:* Race Identifier, identifies each human race.

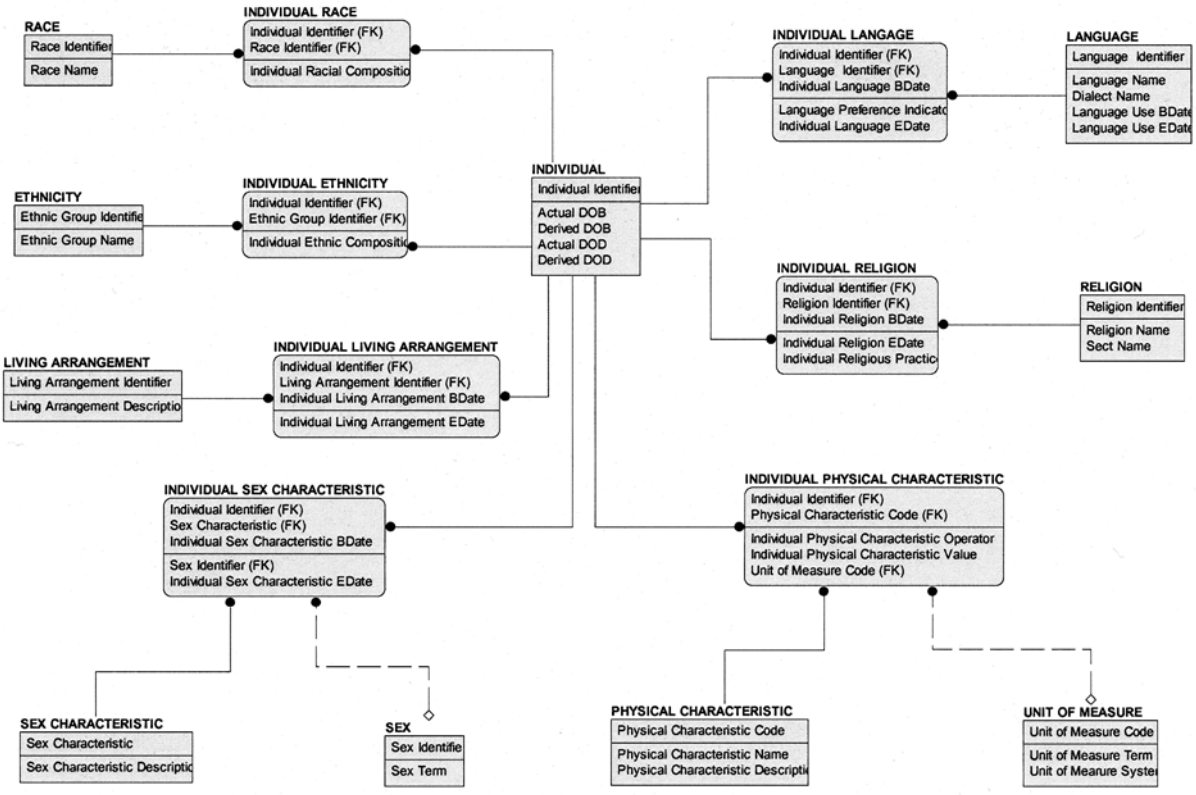

FIG. A1.1 Person Characteristics Logical Data Model

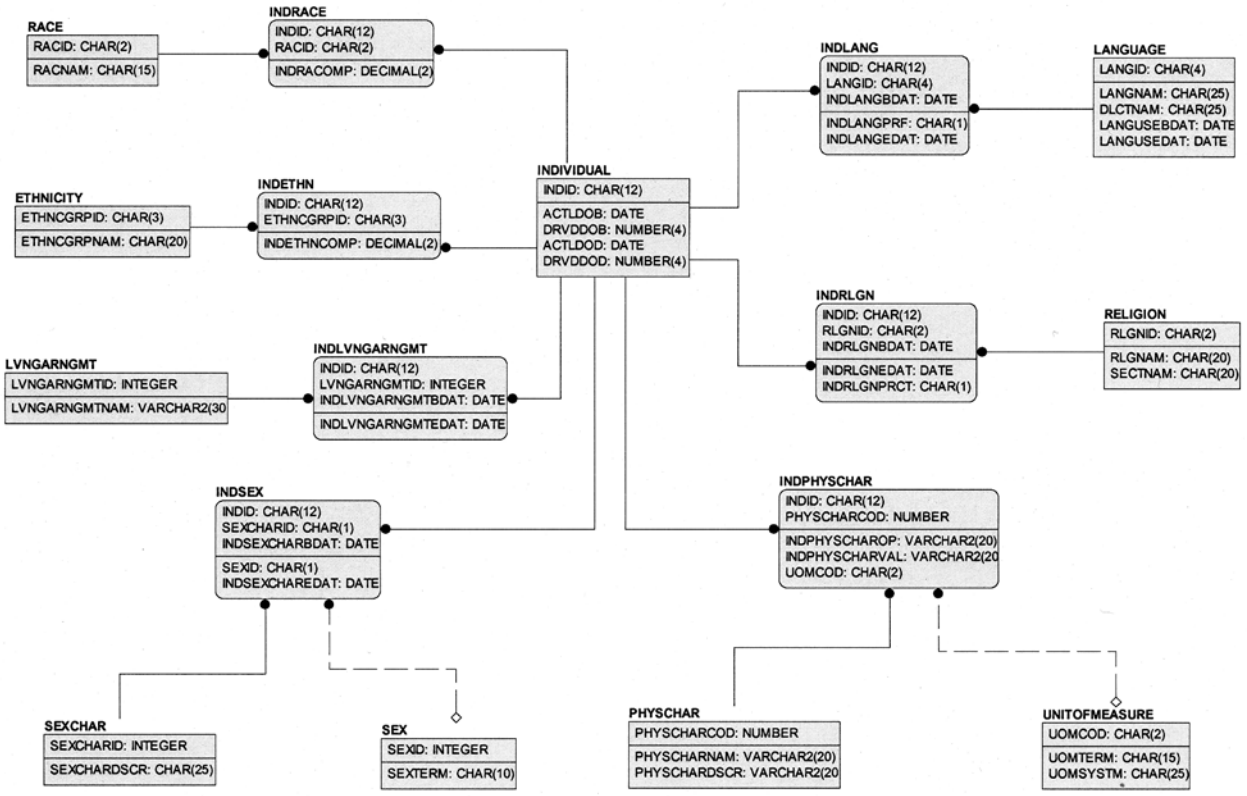

FIG. A1.2 Person Characteristics Generic Physical Data Model (Design Layer)

(1) Reference Data Source: Combination of Specification E1633 paragraph 5.2.3, referencing OMB Directive 15, and HL7 2.5 Table 0005 – Race

Value[4]	Description
1	American Indian, Eskimo/Aleut or Alaska Native
2	Asian/Pacific Islander
3	Black or African American
4	Caucasian/White
5	Native Hawaiian or Other Pacific Islander
6	Other Race
0	Unknown

A1.4.1.2 *Column:* Individual Race Composition, indicates the percentage contribution of the identified race; total must equal decimal value 1.0 or 100 %.

(1) Value as decimal.

A1.4.2 The INDIVIDUAL ETHNICITY table allows for administrative designation of a person's ethnicity, or characterization of single or mixed ethnicity, as desired.

A1.4.2.1 *Column:* Ethnic Group Identifier, identifies each human ethnic group. Reference data source: Specification E1633 Fig. 1 Ethnicity List, minimal or complete data set.

A1.4.2.2 *Column:* Individual Ethnic Composition, indicates the percentage contribution of the identified ethnic group; total must equal decimal value 1.0 or 100 %.

(1) Value as decimal.

A1.4.3 The INDIVIDUAL LANGUAGE table allows for administrative designation of a person's language, or identification of multilingual capability along with the individual's preference and the time envelope over which this language ability is applicable.

A1.4.3.1 *Column:* Language Identifier, identifies each human language.

(1) Reference Data Source: Specification E1633 Fig. 2 Language List.

A1.4.3.2 *Column:* Language Preference Indicator, indicates the individual's preference for their use of the specified language.

(1) Reference Data Source: Values—1 = preferred language, 0 = secondary language.

A1.4.3.3 This entity may be extended with an optional fluency indicator.

A1.4.4 The INDIVIDUAL RELIGION table allows for an administrative designation of a person's religion.

A1.4.4.1 *Column:* Religion Identifier, identifies each human religion or belief system.

(1) Reference Data Source: Specification E1633 Table 6 – Religion List, minimal or complete data set.

A1.4.4.2 *Column:* Individual Religious Practice, allows for the characterization of the individual's devotion to the cited religion. This column is optional: it is available to be populated when user business processes require this characteristic to be recorded.

(1) Reference Data Source: non-normative, user specified data.

[4] The natural keys of reference data tables in the logical data model are replaced by surrogate keys to improve performance of databases implemented using this schema.

A1.4.5 The INDIVIDUAL LIVING ARRANGEMENT table describes the environment in which the individual resides.

A1.4.5.1 *Reference Data Source:* Combination of Specification E1633 paragraph 5.2.26 Usual Living Arrangement (Index: 01085.) and HL7 2.5 Table 0220 -Living Arrangement

Living Arrangement Identifier	Living Arrangement Description
1	Lives alone
2	Lives with a family member other than spouse
3	Lives with parents
4	Lives in a group
5	Lives with spouse
6	Lives with a non-related person
7	Institutionalized
8	Other living arrangement
0	Unknown

A1.4.6 The INDIVIDUAL SEX CHARACTERISTICS table enables designation of multiple human sex characteristics such as the administrative designation of a person's sex, anatomic sex, or sexual preference. A variable number of sex characteristics can be recorded at the individual user's discretion.

A1.4.6.1 *Column:* Individual Sex Characteristic, identifies any number of multiple sex characteristics or parameters.

(1) Reference Data Source: Sex Characteristic reference table:

sex_characteristic	sex_characteristic_description
1	administrative sex
2	anatomic sex
3	genetic sex
4	physiologic sex
5	reproductive sex
6	sexual orientation or preference

A1.4.6.2 *Column:* Sex Identifier states the value assigned to the sex characteristic, as male, female, etc.

(1) Reference Data Source: Derived from a combination of Specification E1633 paragraph 5.2.20 Sex, Index: 01040, which references ISO 5218 Designation of the Human Sexes, and HL7 2.5 Table 0001 - Administrative Sex.

sex_identifier	sex_term
0	Unknown or not recorded
1	Male
2	Female
3	Male Pseudohermaphrodite
4	Female Pseudohermaphrodite
5	Hermaphrodite
6	Male changed to Female
7	Female changed to Male
8	Ambiguous, indeterminate, or other
9	Asexual or neutered

(2) The INDIVIDUAL PHYSICAL CHARACTERISTICS table enables recording of multiple human physical characteristics such as the administrative designation of a person's eye and hair color. A variable number of physical characteristics can be recorded at the individual user's discretion.

A1.4.7 *Column:* Individual Physical Characteristics Operator provides basic mathematical comparison indicators.

A1.4.7.1 *Reference Data Source:* ANSI 260.3-1993 (ANSI/ASME Y10.20-1990) operators, to include "=," ">," and "<," and "≈."

A1.4.8 Physical Characteristic Code may include:

Physical Characteristic Code	Physical Characteristic Name	Physical Characteristic Description
1	height	The person's height, standing erect, measured from the bottom of their feet to the top of their head.
2	weight	The person's weight, numerical value.
3	body mass index	The person's body mass index.
4	build	The person's general body build.
5	eye color	The color of the person's eyes.
6	hair color	The color of the person's hair.

A1.4.8.1 Data sources may be implemented as reference tables that include:

(1) Specification E1633 paragraph 5.2.38 *Color of Eyes* (Index: 01155.) value set:

Brown
Hazel
Blue
Green

(2) Specification E1633 paragraph 5.2.39 *Color of Hair* (Index: 010160.) value set:

Blond
Brown
Black
Red
Gray
White

(3) Specification E1633 paragraph 5.2.40 *Build for Identification* (Index: 01175.) value set:

Slender
Medium
Heavy

A1.4.9 Unit of Measure Code value set : ISO 2955.

A1.5 Table and column metadata are presented in the following tables:

A1.5.1 Column(s) of "ETHNICITY" Table

Name	Datatype
ETHNCGRPID	CHAR(3)
ETHNCGRPNAM	CHAR(20)

A1.5.2 Column(s) of "INDETHN" Table

Name	Datatype
INDID	CHAR(12)
ETHNCGRPID	CHAR(3)
INDETHNCOMP	DECIMAL(2)

A1.5.3 Column(s) of "INDIVIDUAL" Table

Name	Datatype
INDID	CHAR(12)
ACTLDOB	DATE
DRVDDOB	NUMBER(4)
ACTLDOD	DATE
DRVDDOD	NUMBER(4)

A1.5.4 Column(s) of "INDLANG" Table

Name	Datatype
INDID	CHAR(12)
LANGID	CHAR(4)
INDLANGBDAT	DATE
INDLANGPRF	CHAR(1)
INDLANGEDAT	DATE

A1.5.5 Column(s) of "INDLVNGARNGMT" Table

Name	Datatype
INDID	CHAR(12)
LVNGARNGMTID	INTEGER
INDLVNGARNGMTBDAT	DATE
INDLVNGARNGMTEDAT	DATE

A1.5.6 Column(s) of "INDPHYSCHAR" Table

Name	Datatype
INDID	CHAR(12)
PHYSCHARCOD	NUMBER
INDPHYSCHAROP	VARCHAR2(20)
INDPHYSCHARVAL	VARCHAR2(20)
UOMCOD	CHAR(2)

A1.5.7 Column(s) of "INDRACE" Table

Name	Datatype
INDID	CHAR(12)
RACID	CHAR(2)
INDRACOMP	DECIMAL(2)

A1.5.8 Column(s) of "INDRLGN" Table

Name	Datatype
INDID	CHAR(12)
RLGNID	CHAR(2)
INDRLGNBDAT	DATE
INDRLGNEDAT	DATE
INDRLGNPRCT	CHAR(1)

A1.5.9 Column(s) of "INDSEX" Table

Name	Datatype
INDID	CHAR(12)
SEXCHARID	CHAR(1)
INDSEXCHARBDAT	DATE
SEXID	CHAR(1)
INDSEXCHAREDAT	DATE

A1.5.10 Column(s) of "LANGUAGE" Table

Name	Datatype
LANGID	CHAR(4)
LANGNAM	CHAR(25)
DLCTNAM	CHAR(25)
LANGUSEBDAT	DATE
LANGUSEDAT	DATE

A1.5.11 Column(s) of "LVNGARNGMT" Table

Name	Datatype
LVNGARNGMTID	INTEGER
LVNGARNGMTNAM	VARCHAR2(30)

A1.5.12 Column(s) of "PHYSCHAR" Table

Name	Datatype
PHYSCHARCOD	NUMBER
PHYSCHARNAM	VARCHAR2(20)
PHYSCHARDSCR	VARCHAR2(20)

A1.5.13 Column(s) of "RACE" Table

Name	Datatype
RACID	CHAR(2)
RACNAM	CHAR(15)

A1.5.14 Column(s) of "RELIGION" Table

Name	Datatype
RLGNID	CHAR(2)
RLGNAM	CHAR(20)
SECTNAM	CHAR(20)

A1.5.15 Column(s) of "SEX" Table

Name	Datatype
SEXID	INTEGER
SEXTERM	CHAR(10)

A1.5.16 Column(s) of "SEXCHAR" Table

Name	Datatype
SEXCHARID	INTEGER
SEXCHARDSCR	CHAR(25)

A1.5.17 Column(s) of "UNITOFMEASURE" Table

Name	Datatype
UOMCOD	CHAR(2)
UOMTERM	CHAR(15)
UOMSYSTM	CHAR(25)

POPULATION CHARACTERISTICS LOGICAL DATA MODEL

A1.6 Fig. A1.3 illustrates the Population Characteristics Logical Data Model diagram.

A1.7 Population Characteristics LDM narrative:

A1.7.1 In this specification and in ANSI/ADA Specification 1000, the population data structure is an analog of the individual. This analogy allows an efficient comparison of patient-focused, person-centric health and healthcare from the context of the populations to which the patient belongs. In this structure, each population can be described by the same characteristics as the individual person:

1. POPULATION RACE associative entity allows the recording of the aggregate composition of a population's racial characteristics.

2. POPULATION ETHNICITY associative entity allows recording of a population's ethnic composition.

3. POPULATION LANGUAGE associative entity allows recording of a population's language usage and preferences.

4. POPULATION RELIGION associative entity allows recording of a population's religious beliefs.

5. POPULATION LIVING ARRANGEMENT associative entity allows recording of the living environment collectively shared among individual members of a population.

6. POPULATION SEX CHARACTERISTIC associative entity allows recording of various sex characteristics of a population.

7. POPULATION PHYSICAL CHARACTERISTIC associative entity allows recording of various population physical characteristics not elsewhere recorded.

These associative entities link the individual to a reference entity containing standardized, encoded values for each of these characteristics. These associative entities provide the framework for recording data consistent with regulation and user policy, and do not mandate recording of any particular human characteristic.

A1.8 Fig. A1.4 illustrates the Population Characteristics PDM diagram

A1.9 In a functioning database, the Population Characteristics data structure is analogous to the multiple tables of the

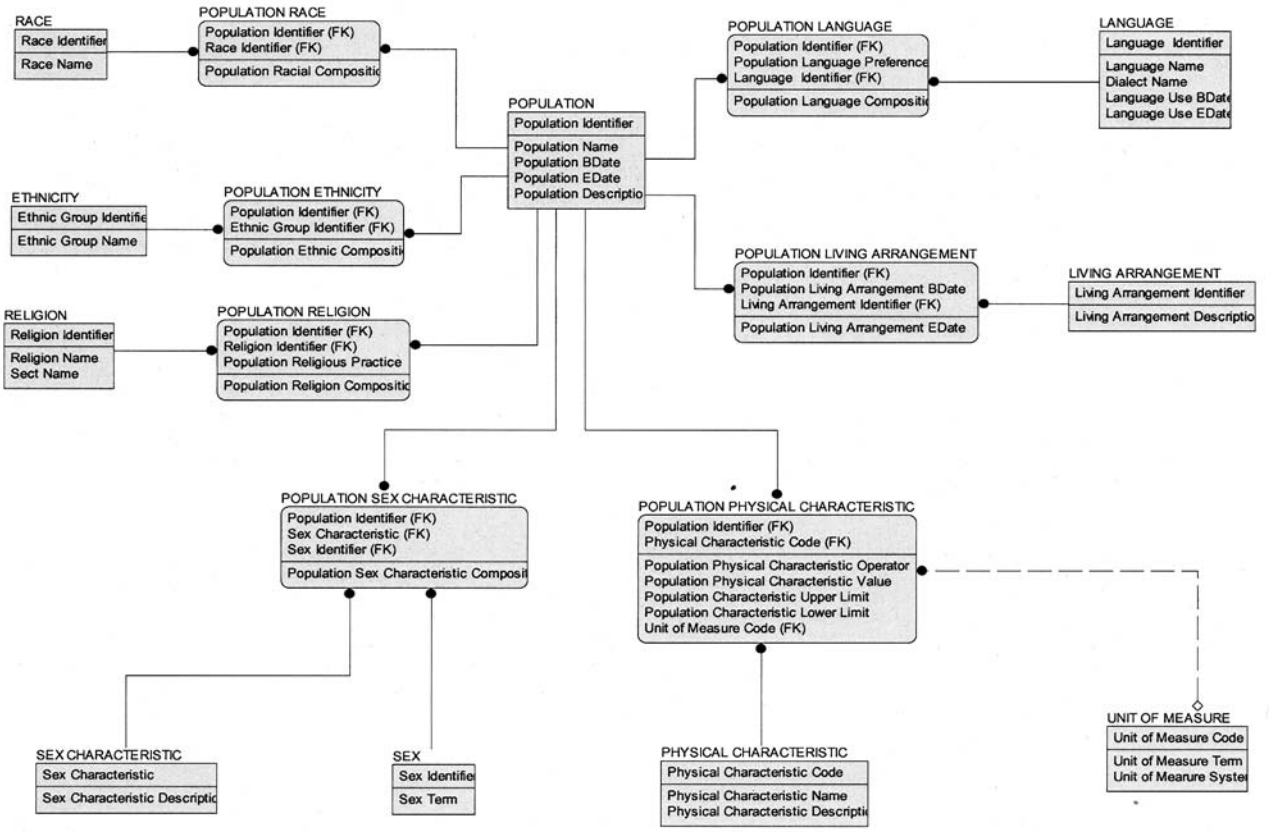

FIG. A1.3 Population Characteristics Logical Data Model

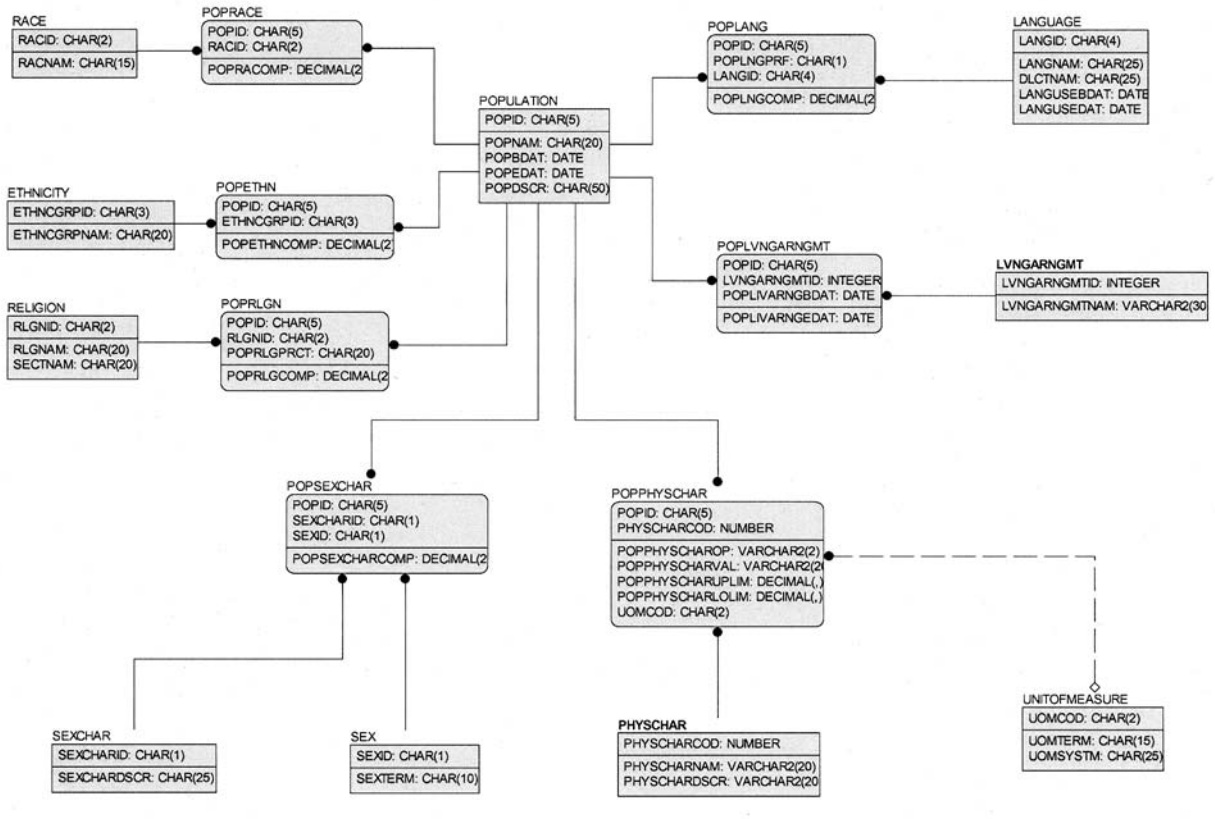

FIG. A1.4 Population Characteristics Generic Physical Data Model (Design Layer)

Individual Characteristics generic physical data model. Each table is connected through a unique population identifier.

A1.9.1 The POPULATION RACE table allows for administrative designation of the population's race, or characterization of single or mixed race as desired.

A1.9.1.1 *Column:* Race Identifier, identifies each human race.

(1) Reference Data Source: Specification E1633, previously cited.

A1.9.1.2 *Column:* Population Race Composition, indicates the percentage contribution of the identified race in the entire population; total must equal decimal value 1.0 or 100 %.

(1) Value as decimal.

A1.9.2 The POPULATION ETHNICITY table allows for administrative designation of the population's ethnicity, as single or mixed ethnicity as desired.

A1.9.2.1 *Column:* Ethnic Group Identifier, identifies each human ethnic group.

(1) Reference Data Source: Specification E1633, previously cited.

A1.9.2.2 *Column:* Population Ethnic Composition, indicates the percentage contribution of the identified ethnic group; total must equal decimal value 1.0 or 100 %.

(1) Value as decimal.

A1.9.3 The POPULATION LANGUAGE table allows for administrative designation of the population's language, or identification of multilingual capability along with the population's preference and the time envelope over which this language ability is applicable.

A1.9.3.1 *Column:* Language Identifier, identifies each human language.

(1) Reference Data Source: Specification E1633, previously cited.

A1.9.3.2 *Column:* Language Preference Indicator, indicates the population's preference for their use of the specified language.

(1) Reference Data Source: Values 1 = preferred language, 0 = secondary language.

A1.9.3.3 This entity may be extended with an optional fluency indicator.

A1.9.4 The POPULATION RELIGION table allows for an administrative designation of the population's religious classification.

A1.9.4.1 *Column:* Religion Identifier, identifies each human religion or belief system.

(1) Reference Data Source: Specification E1633, previously cited.

A1.9.4.2 *Column:* Population Religious Practice, allows for the characterization of the population's devotion to the cited religion.

(1) Reference Data Source: non-normative, user specified data.

A1.9.5 The POPULATION LIVING ARRANGEMENT table

A1.9.6 The POPULATION SEX CHARACTERISTICS table enables designation of multiple human sex characteristics such as the administrative designation of sex, anatomic sex, or sexual preference, for all members of the population. A variable number of sex characteristics can be recorded at the individual user's discretion.

A1.9.6.1 *Column:* Population Sex Characteristic, identifies any number of multiple sex characteristics or parameters.

(1) Reference Data Source: Sex Characteristic reference table as described in A1.1.4.7.1.1.

A1.9.6.2 *Column:* Sex Identifier states the value assigned to the sex characteristic, as male, female, etc.

A1.9.7 *Reference Data Source:* ASTM 1633 5.2.20 Sex, Index: 01040, references ISO 5218 Designation of the Human Sexes – table described in A1.1.4.7.2.1.

A1.9.8 The POPULATION PHYSICAL CHARACTERISTICS table enables recording of multiple human physical characteristics such as the administrative designation of eye and hair color shared by all members of the population. A variable number of physical characteristics can be recorded at the individual user's discretion.

A1.9.9 *Column:* Population Physical Characteristics Operator provides basic mathematical comparison indicators.

A1.9.9.1 *Reference Data Source:* ANSI 260.3-1993 (ANSI/ASME Y10.20-1990) operators, to include "=," ">," and "<," and "≈."

A1.9.10 Physical Characteristic Codes are cited in A2.1.4.8.

A1.9.10.1 Data sources may be implemented as reference tables that include:

(1) Specification E1633 paragraph 5.2.38 *Color of Eyes* (Index: 01155.) value set as in A1.4.8.1 *(1)*.

(2) Specification E1633 paragraph 5.2.39 *Color of Hair* (Index: 010160.) value set as in A1.4.8.1 *(2)*.

(3) Specification E1633 paragraph 5.2.40 *Build for Identification* (Index: 01175.) value set as in A1.4.8.1 *(3)*.

(4) Unit of Measure Code value set : ISO 2955 Representation of SI Units as in A1.1.4.8.1.4.

A1.9.11 Table and column metadata are presented in the following tables:

A1.9.11.1 Column(s) of "ETHNICITY" Table

Name	Datatype
ETHNCGRPID	CHAR(3)
ETHNCGRPNAM	CHAR(20)

A1.9.11.2 Column(s) of "LANGUAGE" Table

Name	Datatype
LANGID	CHAR(4)
LANGNAM	CHAR(25)
DLCTNAM	CHAR(25)
LANGUSEBDAT	DATE
LANGUSEDAT	DATE

A1.9.11.3 Column(s) of "LVNGARNGMT" Table

Name	Datatype
LVNGARNGMTID	INTEGER
LVNGARNGMTNAM	VARCHAR2(30)

A1.9.11.4 Column(s) of "PHYSCHAR" Table

Name	Datatype
PHYSCHARCOD	NUMBER
PHYSCHARNAM	VARCHAR2(20)
PHYSCHARDSCR	VARCHAR2(20)

A1.9.11.5 Column(s) of "POPETHN" Table

Name	Datatype
POPID	CHAR(5)
ETHNCGRPID	CHAR(3)
POPETHNCOMP	DECIMAL(2)

A1.9.11.6 Column(s) of "POPLANG" Table

Name	Datatype
POPID	CHAR(5)
POPLNGPRF	CHAR(1)
LANGID	CHAR(4)
POPLNGCOMP	DECIMAL(2)

A1.9.11.7 Column(s) of "POPLVNGARNGMT" Table

Name	Datatype
POPID	CHAR(5)
LVNGARNGMTID	INTEGER
POPLIVARNGBDAT	DATE
POPLIVARNGEDAT	DATE

A1.9.11.8 Column(s) of "POPPHYSCHAR" Table

Name	Datatype
POPID	CHAR(5)
PHYSCHARCOD	NUMBER
POPPHYSCHAROP	VARCHAR2(2)
POPPHYSCHARVAL	VARCHAR2(20)
POPPHYSCHARUPLIM	DECIMAL(,)
POPPHYSCHARLOLIM	DECIMAL(,)
UOMCOD	CHAR(2)

A1.9.11.9 Column(s) of "POPRACE" Table

Name	Datatype
POPID	CHAR(5)
RACID	CHAR(2)
POPRACOMP	DECIMAL(2)

A1.9.11.10 Column(s) of "POPRLGN" Table

Name	Datatype
POPID	CHAR(5)
RLGNID	CHAR(2)
POPRLGPRCT	CHAR(20)
POPRLGCOMP	DECIMAL(2)

A1.9.11.11 Column(s) of "POPSEXCHAR" Table

Name	Datatype
POPID	CHAR(5)
SEXCHARID	CHAR(1)
SEXID	CHAR(1)
POPSEXCHARCOMP	DECIMAL(2)

A1.9.11.12 Column(s) of "POPULATION" Table

Name	Datatype
POPID	CHAR(5)
POPNAM	CHAR(20)
POPBDAT	DATE
POPEDAT	DATE
POPDSCR	CHAR(50)

A1.9.11.13 Column(s) of "PRODCHAR" Table

Name	Datatype
PRODCOD	INTEGER
PRODVAL	VARCHAR2(2)
PRODDESCR	VARCHAR2(60)

A1.9.11.14 Column(s) of "RACE" Table

Name	Datatype
RACID	CHAR(2)
RACNAM	CHAR(15)

A1.9.11.15 Column(s) of "RELIGION" Table

Name	Datatype
RLGNID	CHAR(2)
RLGNAM	CHAR(20)
SECTNAM	CHAR(20)

A1.9.11.16 Column(s) of "SEX" Table

Name	Datatype
SEXID	CHAR(1)
SEXTERM	CHAR(10)

A1.9.11.17 Column(s) of "SEXCHAR" Table

Name	Datatype
SEXCHARID	CHAR(1)
SEXCHARDSCR	CHAR(25)

A1.9.11.18 Column(s) of "UNITOFMEASURE" Table

Name	Datatype
UOMCOD	CHAR(2)
UOMTERM	CHAR(15)
UOMSYSTM	CHAR(25)

APPENDIX

(Nonmandatory Information)

X1. OPTIONAL EXTENSION FOR NONHUMAN LIVING THINGS

X1.1 This specification may be extended to characterize individual non-human living beings. This extension includes a Production characteristic, defined as the reason for existence of the non-human living in the human environment.

X1.1.1 The logical data model for this Production characteristic, illustrated in Fig. X1.1, allows for multiple reasons through an associative entity.

X1.1.1.1 Logical Data Model Narrative

In this model, an Individual non-human living being, such as a horse, may be created and raised for specific purposes collectively described as "Production." In this example, purposes may include show, recreation, racing, breedstock, etc. There may be multiple purposes for an individual animal, accommodated in the data model through an associative entity INDIVIDUAL PRODUCTION CHARACTERISTIC, each characteristic of which has a time envelope defined by an Individual Production BDate and Individual Production EDate attributes. The begin date attribute is a primary key because a living being may have discontinuities in the course of a single purpose, such as a show horse becoming a breed horse and subsequently returned to showing.

X1.1.2 The physical data model for this extension is illustrated in Fig. X1.2.

X1.1.2.1 Reference values for the Production Characteristic Table, shown below, are derived from the HL7 User-defined Table 0429 - Production Class Code to expand animal values and augment these to also apply to plants.

Production Code	Production Value	Production Description
1	BR	Breeding/genetic stock
2	DA	Dairy
3	DR	Draft
4	FD	Non-dairy food source[A]
5	LY	Layer, Includes Multiplier flocks
6	NT	Natural existence
7	OT	Other
8	PL	Pleasure
9	RA	Racing
10	SH	Show
11	NA	Not Applicable
12	U	Unknown

[A]includes living entities grown as meat, grain, fruit, vegetable, and egg food sources.

X1.1.3 Table and column metadata are presented in the following tables:

X1.1.3.1 Column(s) of "INDIVIDUAL" Table

Name	Datatype
INDID	CHAR(12)
ACTLDOB	DATE
DRVDDOB	NUMBER(4)
ACTLDOD	DATE
DRVDDOD	NUMBER(4)

X1.1.3.2 Column(s) of "PRODCHAR" Table

Name	Datatype
PRODCOD	INTEGER
PRODVAL	VARCHAR2(2)
PRODDESCR	VARCHAR2(60)

X1.1.3.3 Column(s) of "INDPRODCHAR" Table

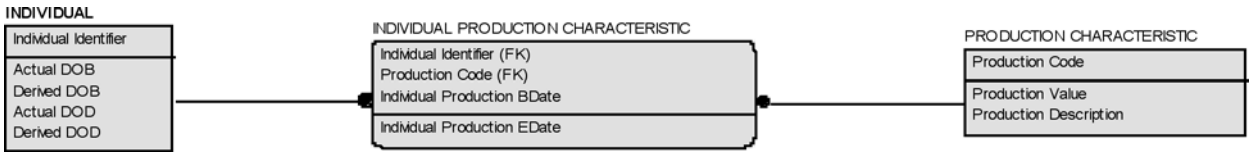

FIG. X1.1 Individual Production Logical Data Model

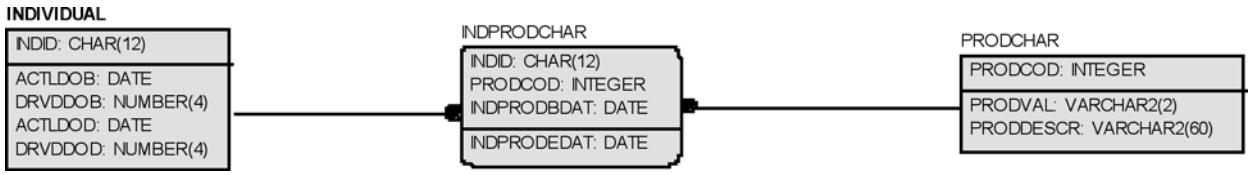

FIG. X1.2 Individual Production Physical Data Model

Name	Datatype
INDID	CHAR(12)
PRODCOD	INTEGER
INDPRODBDAT	DATE
INDPRODEDAT	DATE

X1.2 This specification may be extended to characterize populations of non-human living beings. This extension includes a Production characteristic, previously defined.

X1.2.1 The logical data model for this Production characteristic, illustrated in Fig. X1.3, allows for multiple reasons through an associative entity.

X1.2.1.1 Logical Data Model Narrative.

In Population Production model, a population of non-human living beings, such as a herd of dairy cattle, may be created and raised for specific purposes collectively described as "Production". In this example, purposes may include dairy, breedstock, etc. In a mixed herd, subpopulations are of specific species, breeds, etc., the production purpose of each can be accommodated in the data model through an associative entity POPULATION PRODUCTION CHARACTERISTIC. In this associative entity, each population characteristic has a time envelope defined by a Population Production BDate and Population Production EDate attributes. The begin date attribute is a primary key because the population may have discontinuities in the course of a single purpose, such as a dairy herd transitioned to breeding and subsequently returned to dairy production.

X1.2.2 The physical data model for this extension is illustrated in Fig. X1.4.

X1.2.3 Reference values for the Production Characteristic Table are presented in A2.1.2.1.

X1.2.4 Table and column metadata are presented in the following tables:

X1.2.4.1 Column(s) of "POPULATION" Table

Name	Datatype
POPID	CHAR(5)
POPNAM	CHAR(20)
POPBDAT	DATE
POPEDAT	DATE
POPDSCR	CHAR(50)

X1.2.4.2 Column(s) of "PRODCHAR" Table

Name	Datatype
PRODCOD	INTEGER
PRODVAL	VARCHAR2(2)
PRODDESCR	VARCHAR2(60)

X1.2.4.3 Column(s) of "POPPRODCHAR" Table

Name	Datatype
POPID	CHAR(5)
PRODCOD	INTEGER
POPPRODBDAT	DATE
POPPRODEDAT	DATE

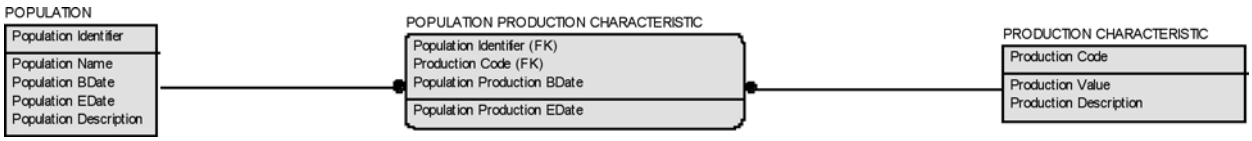

FIG. X1.3 POPULATION PRODUCTION LOGICAL DATA MODEL

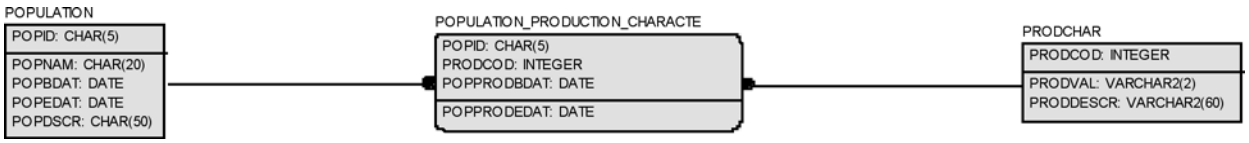

FIG. X1.4 Population Production Physical Data Model