INTERNATIONAL STANDARD

ISO 21549-2

First edition
2004-05-15

Health informatics — Patient healthcard data —

Part 2: Common objects

Informatique de santé — Données relatives aux cartes de santé des patients —

Partie 2: Objets communs

Reference number
ISO 21549-2:2004(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21549-2 was prepared by Technical Committee ISO/TC 215, *Health informatics*.

ISO 21549 consists of the following parts, under the general title *Health informatics — Patient healthcard data*:

— *Part 1: General structure*

— *Part 2: Common objects*

— *Part 3: Limited clinical data*

— *Part 4: Extended clinical data*

— *Part 5: Identification data*

— *Part 6: Administrative data*

— *Part 7: Electronic prescription (medication data)*

— *Part 8: Links*

At the time of publication of this part of ISO 21549, some of these parts were in preparation.

This work is being carried out by ISO/TC 215 in collaboration with CEN/TC 251, *Medical informatics*, under the Vienna Agreement, with ISO having the lead role. This new series of International Standards is intended to replace the European Prestandard ENV 12018 ratified by CEN in 1997.

Introduction

With a more mobile population, greater healthcare delivery in the community and at patients' homes, together with a growing demand for improved quality of ambulatory care, portable information systems and stores have increasingly been developed and used. Such devices are used for tasks ranging from identification, through portable medical records, and on to patient-transportable monitoring systems.

The functions of such devices are to carry and to transmit person-identifiable information between themselves and other systems; therefore, during their operational lifetime they may share information with many technologically different systems which differ greatly in their functions and capabilities.

Healthcare administration increasingly relies upon similar automated identification systems. For instance, prescriptions may be automated and data exchange carried out at a number of sites using patient-transportable computer-readable devices. Healthcare insurers and providers are increasingly involved in cross-region care, where reimbursement may require automated data exchange between dissimilar healthcare systems.

The advent of remotely accessible data bases and support systems has led to the development and use of "healthcare person" identification devices that are also able to perform security functions and transmit digital signatures to remote systems via networks.

With the growing use of data cards for practical everyday healthcare delivery, the need has arisen for a standardized data format for interchange.

The person-related data carried by a data card can be categorized into three broad types: identification (of the device itself and the individual to whom the data it carries relates), administrative and clinical. It is important to realize that a given healthcare data card *de facto* has to contain device data and identification data and may in addition contain administrative and clinical data.

Device data is defined to include:

— identification of the device itself;

— identification of the functions and functioning capabilities of the device.

Identification data may include:

— unique identification of the device holder or of all other persons to whom the data carried by the device are related.

Administrative data may include:

— complementary person-related data;

— identification of the funding of healthcare, whether public or private, and their relationships, i.e. insurer(s), contract(s) and policy(ies) or types of benefits;

— other data (distinguishable from clinical data) that are necessary for the purpose of healthcare delivery.

Clinical data may include:

— items that provide information about health and health events;

— their appraisal and labelling by a healthcare person (HCP);

— related actions planned, requested or performed.

Because a data card essentially provides specific answers to definite queries, whilst at the same time there is a need to optimize the use of memory by avoiding redundancies, a “high-level” object-modelling technique (OMT) has been applied with respect to the definition of healthcare data card data structures.

Data in the four categories above share many features. For instance, each may need to include ID numbers, names and dates. Some information may also have clinical as well as administrative uses. Therefore, it has been considered inadequate to provide a simple list of items carried by healthcare data cards without applying a generic organization, based upon the existence of basic data elements. These may be defined by their characteristics (e.g. their format), and from them compound data objects may be constructed. Several such objects may also share attributes.

This part of ISO 21549 describes and defines the common data objects used in or referenced by patient-held health data cards using UML, plain text and abstract syntax notation (ASN.1).

These data objects are utilized in all forms of healthcare data cards, and are used to construct compound data objects as defined in Parts 3 to 8 of ISO 21549.

Health informatics — Patient healthcard data —

Part 2:
Common objects

1 Scope

This part of ISO 21549 establishes a common framework for the content and the structure of common objects used to construct or referenced by other data-object data held on patient healthcare data cards.

It is applicable to situations in which such data are recorded on or transported by patient healthcards whose physical dimensions are compliant with those of ID-1 cards as defined by ISO/IEC 7810.

This part of ISO 21549 specifies the basic structure of the data, but does not specify or mandate particular data-sets for storage on devices.

The detailed functions and mechanisms of the following services are not within the scope of this part of ISO 21549 (although its structures can accommodate suitable data objects specified elsewhere):

— the encoding of free text data;

— security functions and related services which are likely to be specified by users for data cards, depending on their specific application, for example confidentiality protection, data integrity protection, and authentication of persons and devices related to these functions;

— access control services which may depend on active use of some data card classes such as microprocessor cards;

— the initialization and issuing process (which begins the operating lifetime of an individual data card, and by which the data card is prepared for the data to be subsequently communicated to it in accordance with this part of ISO 21549).

The following topics are therefore beyond the scope of this part of ISO 21549:

— physical or logical solutions for the practical functioning of particular types of data card;

— how the message is processed further “downstream” of the interface between two systems;

— the form which data take for use outside the data card, or the way in which such data are visibly represented on the data card or elsewhere.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ENV 1068:1993, *Medical informatics — Healthcare information interchange — Registration of coding schemes*

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 7498-2:1989, *Information processing systems — Open systems interconnection — Basis reference model — Part 2: Security architecture*

ISO/IEC 7810, *Identification cards — Physical characteristics*

ISO/IEC 9798-1:1997, *Information technology — Security techniques — Entity authentication — Part 1: General*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
country
code that identifies the country of origin of the device issuer

NOTE This may not necessarily be the same as the nationality of the device holder.

3.2
data integrity
the property that data have not been altered or destroyed in an unauthorized manner

[ISO 7498-2:1989]

3.3
data object
collection of data that has a natural grouping and may be identified as a complete entity

3.4
data sub-object
component of a data object that itself may be identified as a discrete entity

3.5
device holder
individual transporting a data card which contains a record with the individual identified as the major record person

3.6
entity authentication
corroboration that an entity is the one claimed

[ISO/IEC 9798-1:1997]

3.7
erasure
process whereby, after a given point in time, access to a data entity is permanently removed or access permanently denied to all parties

NOTE This may not necessarily involve physical removal from the device, but may merely be the result of altering security such that access is permanently denied to all parties.

3.8
healthcard holder
individual transporting a healthcare data card which contains a record with the individual identified as the major record person

3.9
healthcare data card
machine-readable card, conformant to ISO/IEC 7810, intended for use within the healthcare domain

3.10
major industry identifier
MII
code that identifies the sector/industry within which the data card is intended for use

NOTE The designated MII for healthcare is 80.

3.11
major record identifier
identifier linked to a primary record relating to a record person in a data card and a given healthcare delivery system

3.12
record
collection of data

3.13
record person
individual about whom there is an identifiable record containing person-related data

3.14
security
combination of confidentiality, integrity and availability

4 Symbols and abbreviated terms

ASN.1 Abstract syntax notation, version 1

EN European Standard

HCP Healthcare person

ICC Integrated-circuit card

IEC International Electrotechnical Commission

ISO International Organization for Standardization

MII Major industry identifier

UML Unified modelling language

UTC Coordinated universal time

5 Basic data object model for a healthcare data card — Patient healthcard data object structure

A set of basic data objects has been designed to facilitate the storage of clinical data in a flexible structure, allowing for future application-specific enhancements. These tools should help the implementation of common accessory characteristics of stored data in a way that allows efficient use of memory, an important feature for many types of data card.

The tools consist of a generic data structure based on an object-oriented model represented as a UML class diagram as shown below in Figure 1.

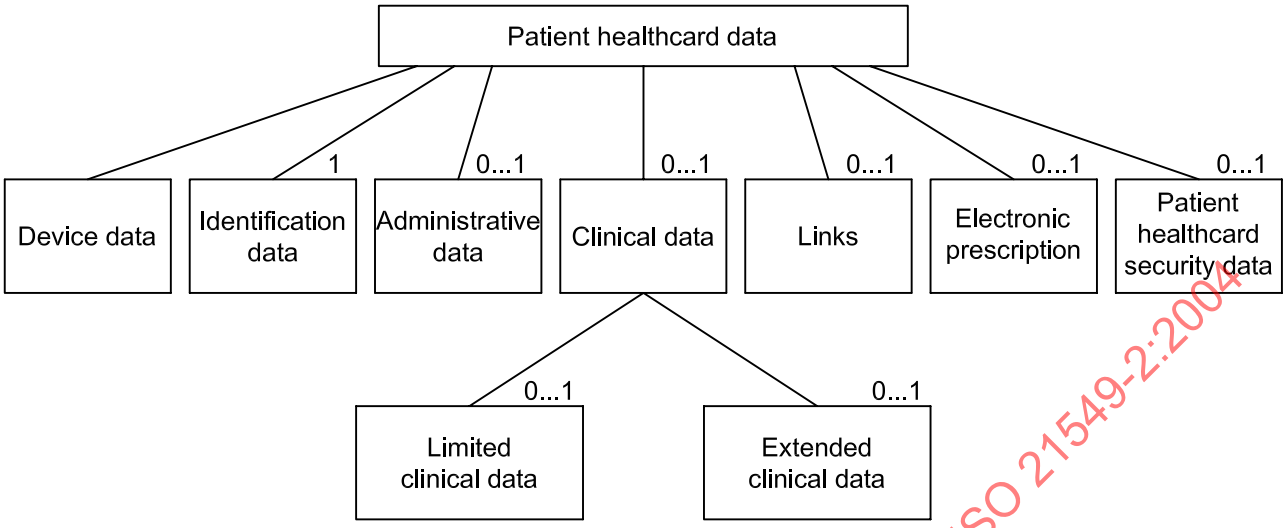

Figure 1 — Patient healthcard data — Overall structure

The content of this object-oriented structure is described below and intrinsically will also require the use of data objects not defined in this part of ISO 21549.

NOTE 1 This part of ISO 21549 is solely applicable to patient healthcards containing health data. Data objects containing financial and healthcare reimbursement data are not defined in this International Standard.

NOTE 2 It is possible to take the data objects and recombine them whilst preserving their context-specific tags, and to define new objects while still preserving interoperability.

In addition to the capability of building complex aggregate data objects from simpler building blocks, this International Standard allows associations between certain objects, so that information can be shared. This feature is mainly used to allow, for example, a set of accessory attributes to be used as services to several stored information objects.

6 Basic data objects for referencing

6.1 Overview

A series of generally useful data type definitions have been made that have no intrinsic value in themselves, but which are used to define other objects in this multi-part standard. Operations may be performed with these objects in association with other information objects to “add value”.

6.2 Internal links

6.2.1 General

A number of objects in the data model of this part of ISO 21549 are used mainly as a reference to other objects. One example is the RecordPerson data object that defines the basic identification information of a person to whom records on the device relate. Since this is a part of an aggregate object containing information on all record persons in a sequential order, the pointer may be a simple one-dimensional integer number. This type of pointer has the name RecPersPointer and is used extensively to indicate the record person to whom a certain information object is related.

NOTE This internal link RecPersPointer is especially useful where the healthcard contains records in relation to more than one identifiable individual.

In other situations, constructed objects contain a more general pointer called a RefPointer that is a sequence of tags allowing a reference to any object, including sub-objects that can only be referenced as part of a constructed object, using an application-specific tag and a number of context-specific tags to sufficient depth.

A RefPointer to the name of a healthcare person may contain the following information with the appropriate tags (here represented by their symbolic names):

HealthCarePersons	[7] HealthCarePerson No. 7	[1] HcpName
Application tag	*Context level 1*	*Context level 2*

There is also a third possibility that allows the creation of linkages between all objects using the *Linkages* object 5. This is an ordered list of link associations. All entries in this list are a sequential list of other objects, each defined with a RefPointer.

EXAMPLE Link No. 2 may link four objects:

1				
2	RefPointer1	RefPointer2	RefPointer3	RefPointer4
3				

An example of this process could be the linkage of the following objects as utilized in a patient data card containing clinical data:

Diagnosis	RefPointer1
MedicationPrescription	RefPointer2
MedicationNote	RefPointer3
MedicationDispensed	RefPointer4

This linkage table entry may be pointed to by the ClinRefPointer of each ClinDat object.

NOTE Even though the "Links" object itself is openly available, the linked objects may have restricted access.

The following reference objects may be associated with other information objects defined. This relation is not an aggregation. The reference object is not a part of the information object but stays independent and may be referenced by several objects. The concept used in this part of ISO 21549 is to reference (point at) the appropriate record person as well as a healthcare provider and relevant accessory attributes. These linkages add value to the data and may be used to provide context specificity.

6.2.2 The "Links" data object

The "Links" object is used to create internal references or linkages between any other defined data objects stored in the healthcard. It shall be constructed as a sequence of "Link" sub-objects. The data object "Link" shall consist of a sequence of references to other objects in the form of a sequence of "RefPointer" objects. This is pointed to by a "LinkagePointer" object.

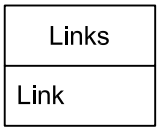

Figure 2 — The structure of the "Links" data object

Table 1 — The specification of individual entities within "Links"

	Data type	Multiplicity	Link	Comments
Link	Integer	1...M		This is a sequence of references to other objects.

6.2.3 The "ReferencePointer" and "ReferenceTag" data objects

A general reference pointer is defined in this part of ISO 21549 as an ordered list of tags pointing to the object or sub-object that is referenced. The data object "RefPointer" shall consist of a sequence of "RefTags" (of integer type). A "RefTag" is an APPLICATION-SPECIFIC tag of the object as defined in this part of ISO 21549. The following "RefTags" specify the CONTEXT-SPECIFIC tags in increasing depth.

Table 2 — The specification of "RefPointer"

	Data type	Multiplicity	Length	Comments
RefPointer	Integer	1...M		This is a sequence of references to other objects. The reference is the ASN.1 tag of another data object.

6.2.4 The "RecordPersonPointer" data object

The data object "RecPersPointer" is used to reference one of the record persons stored in the "RecordPersons" data object and shall be of the integer type.

NOTE The object RecordPersons is defined in part 5 (Identification data) of this International Standard.

Table 3 — The specification of "RecPersPointer"

	Data type	Multiplicity	Length	Comments
RecPersPointer	Integer	1		The data object "RecPersPointer" is used to reference one of the record persons stored in the "RecordPerson" data object.

6.3 Coded data

6.3.1 General

Coded values are understood by reference to the coding scheme to which they apply. The general principle in this part of ISO 21549 is that it is not mandatory to use a particular coding scheme, unless specified in this part of ISO 21549, when such codes act as parameters. One example is the use of ISO 3166-1 for country codes.

When a coding scheme is exclusively specified in this part of ISO 21549, no alternative coding scheme shall be allowed. Any references to coding schemes not so specified may, however, be modified in the future, independently of the rest of the standard.

6.3.2 The "CodingSchemesUsed" data object

Coding schemes not specified in this part of ISO 21549 may themselves be the subject of a registration within the coding schemes procedure as defined in ENV 1068:1993, and shall then be interpreted, if intepretation is necessary, in accordance with all conditions of that registration. ENV 1068:1993 specifies a procedure for registration of coding schemes and the allocation of a healthcare coding scheme designator (HCD). It is possible to reference both internationally registered coding schemes and unregistered coding schemes as defined in Clause 5 of ENV 1068:1993. The use of such private CodeIdentifiers may, however, create the potential risk of ambiguity if a device should be used in an open environment.

Code values from unregistered schemes (or registered schemes outside the scope of a particular application) cannot be understood, unless the recipient of information is party to an agreement with the originator to use additional or non-registered coding schemes.

The data object "CodingSchemesUsed" shall consist of an ordered sequence comprising the sub-object "CodingScheme", which shall itself consist of a code identifier (an octet string of 6 characters), a code length (of integer type), and an optional free-text comment (an octet string with a length of between 1 and 20 characters).

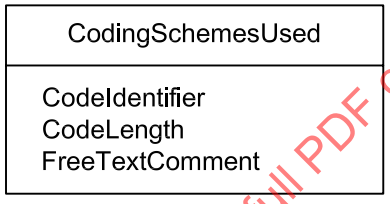

Figure 3 — The structure of "CodingSchemesUsed"

Table 4 — The specification of individual entities within "CodingSchemesUsed"

	Data type	Multiplicity	Length	Comments
CodingSchemesUsed	Class	1	N/A	
CodeIdentifier	Octet string	1	6	This identifies the particular coding scheme being referenced.
CodeLength	Integer	1		This identifies the length of the code.
FreeTextComment	Octet string	0...1		This optional element of free text allows the qualification in text of the coding scheme.

6.3.3 The "CodedData" data object

The data object "CodedData" shall include both a reference to coding schemes used and a code data value as well as optional free text and shall be constructed as a set of the sub-objects "CodingSchemeRef", "CodeDataValue" and, optionally, "CodeDataFreeText".

The object "CodingSchemeRef" is a RefPointer pointing at a value that identifies a particular coding scheme within the object coding schemes used. If CodingSchemeRef = 0, then the coding scheme is implicit in this International Standard.

The data type "CodeDataValue" has been defined to indicate the actual code value in a particular coding scheme. If the length of "CodeDataValue" is one OCTET, the following CodeDataValues are defined: "A" means "Administrative free text entry", "C" means "Clinical free-text entry". In other circumstances, where the octet length is greater than one then the CodeDataValue is the representation of an actual code value.

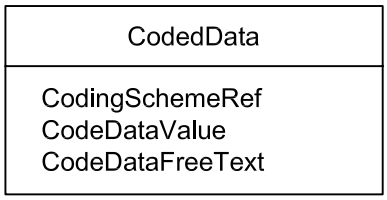

Figure 4 — The structure of "CodedData"

Table 5 — The specification of individual entities within "CodedData"

	Data type	Multiplicity	Length	Comments
CodedData	Class	1	N/A	
CodingSchemeRef	Integer	1		This is a RefPointer pointing at a value that identifies a particular coding scheme within the data object coding schemes used.
CodeDataValue	String	1		This string contains the value of the coded data. If the length is one octet and the values are A or C, then A = Admininstrative-data free text and C = Clinical-data free text.
CodeDataFreeText	String	0...1	80	This optional element of free text allows the qualification in text of the coding scheme.

6.4 Accessory attributes

The data object "AccessoryAttributes" shall consist of an ordered set of data that is essential to record an audit trail regarding both the originator of the information and the means via which it arrives at the recipient. It shall consist of the following:

— Date1, which shall represent the time/date of data being communicated to the data card across the interface.

— Date2, which shall represent the time/date of data being available to the originator of the message.

— Place1, which shall represent the identity/locator of the sender of the message and is linked with "Person1".

— Place2, which shall represent the identity/locator of the original author of the data.

— Personid3, which shall be either the code or the representation of the person/device/system that provided the information that was added to a system to become the data within the "message".

— SecurityLevels, which shall be constructed in accordance with the ASN.1 definition contained in Clause A.6 and shall represent the rights in relation to reading, writing, updating and erasing the data contained within the data object to which these accessory attributes are attached.

— CompressionMethodData, which shall be constructed in accordance with the ASN.1 definition contained in Clause A.6 and shall consist of a RefPointer pointing at a defined compression methodology within a compression methodology table. This represents the methodology applied to the data contained within the data object to which the accessory attributes are attached.

— ObjectSecurityAttributes.

The “AccessoryAttributes” data object shall be constructed as a set of the following optional data objects:

— “Date1” and “Date2” (of “Date” type);

— “Place/Person1” and “Place/Person2” (of “RefPointer” type);

— “Personid3” (a set of “PersonCodes” of RefPointer type, and free “PersonText” with a length of up to 30 characters);

— “ObjectSecAttributes” (a set of “SecurityServices”).

The data objects “SecurityServices” shall each consist of a sequence of digital signatures, as well as algorithms and keys for signature and encryption.

None of the above attributes is mandatory. However, all are highly desirable. It is recommended that all (with the possible exception of Personid3) should be delivered every time that the media system allows. A list of priorities in groupings follows and, in principle, should be followed as groups:

{Date1,Date2,Place1,Place2,Personid3,SecurityLevels,CompressionMethodData,ObjSecAttributes}

{Date1,Place1,Place2,SecurityLevels,CompressionMethodData,ObjSecAttributes}

{Date1,Place1,Place2,SecurityLevels,CompressionMethodData,ObjSecAttributes}

{Date1,Place2,SecurityLevels,CompressionMethodData,ObjSecAttributes}

{Date1,SecurityLevels,CompressionMethodData,ObjSecAttributes}

{SecurityLevels,CompressionMethodData,ObjSecAttributes}

{ObjSecAttributes}

NOTE This “AccessoryAttributes” data object can be associated to any other data object.

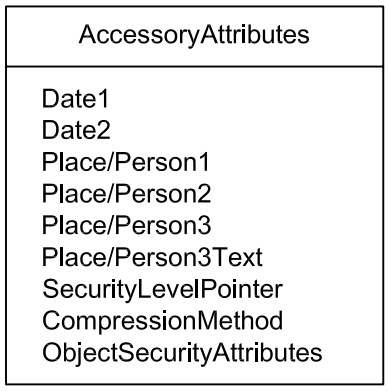

Figure 5 — The structure of “AccessoryAttributes”

Table 6 — The specification of "AccessoryAttributes"

	Data type	Multiplicity	Length	Comments
AccessoryAttributes	Class	1	N/A	
Date1	UTC Time	1	8	This is a RefPointer pointing at a value that identifies a particular coding scheme within the data object coding schemes used.
Date2	UTC time	0...1	8	
Place/Person1	Integer	1		
Place/Person2	Integer	0...1		
Place/Person3	Integer	0...1		
Place/Person3Text	String	0...1		
SecurityLevelPointer	Integer	0..1		
CompressionMethod	Integer	0...1		
ObjectSecurityAttributes	Class	0...1		Set of SecurityServices.
SecurityServices	Class	0...M		
SignatureAlgorithmID	Integer	0...1		This is a reference pointer to a line in the signature algorithm table.
SignatureVerificationKeyID	Integer	0...1		This is a reference pointer to a line in the signature verification key ID table.
DigitalSignature	Bit string	0...1		This contains the computed bit string of the digital signature.
EncryptionAlgorithmID	Integer	0...1		This is a reference pointer to a line in the EncryptionAlgorithmID table.
EncryptionKeyID	Integer	0...1		This is a reference pointer to a line in the encryption key table.
SecurityLevels	Class			Sequence of Boolean.
ReadSecAttribute	Boolean	0...1		If Boolean equals true, the object can be read.
WriteSecAttribute	Boolean	0...1		If Boolean equals true, the object can have data written to it.
UpdateSecAttribute	Boolean	0...1		If Boolean equals true, the object can be updated.
EraseSecAttribute	Boolean	0...1		If Boolean equals true, the object shall be interpreted by an application as erased.
CompressMethodData	Coded data	0...M		This contains coded data value representation of the compression methodology utilized.

7 Device and data security attributes

7.1 General

Data stored in data cards used in healthcare may be personally sensitive. For this reason, this part of ISO 21549 provides a series of security attributes in the form of data objects that may be required for the provision of security functions. The actual data content (value) is not within the scope of this International Standard, nor are the mechanisms that make use of these data elements. It is emphasized that the security attributes cannot satisfy given security requirements without the implementation of the appropriate security functions and mechanisms in the data card.

Such rights of “access” are attributable to specific individuals with respect to discrete data items. These rights will be defined by application developers and can be controlled by automated systems such as healthcare professional cards. The rights may be defined at the application level, thereby providing application and potential country specificity.

The “SecurityServices” data object provides for the storage of data required to deliver these security functions and mechanisms. These data can be “attached” to individual data elements, thereby preserving the original author's security requirements when the data object is transferred between different forms of data card. This mechanism may therefore ensure that, in the process of transferring data from active to passive media and then back to active media, the original security requirements are re-generated. This ability also allows exact replication of a data card, such as on re-generation after failure.

7.2 Data objects related to specific data-card security services

7.2.1 General

All the security service objects required to deliver security related to patient data held on and transmitted by data cards shall be constructed in accordance with the following definitions:

7.2.2 Data related to patient-device security

Patient-held data cards may require the following security services:

— authentication of the device;

— authentication of the data-card holder;

— authentication of the HCP (healthcare person) attempting to access data contained in the data card.

These services shall be provided by the following objects:

— data-card-holder verification, and its associated PatCardHolderVer;

— data-card authentication, and its associated DevClassAuthenticateData;

— data-card-authenticating HCP class for access control, and its associated HcpAuthenticateData.

7.2.3 Data from data cards held by healthcare persons

Data objects from data cards held by healthcare persons shall provide for the functions of identification, access control and signature. These functions are provided by a discrete number of sub-objects. The identification information related to a healthcare person and his or her responsible agency shall be provided by the data object “HcpData”. This “HcpData” data object shall be constructed as an implicit sequence of healthcare person identification data, of healthcare site location data, and of optional accessory attributes.

7.2.4 Data related to patient healthcard security

Healthcare cards require security services to control access to the medical data contained in them. These services are determined and controlled by PatientHealthcardSecurity.

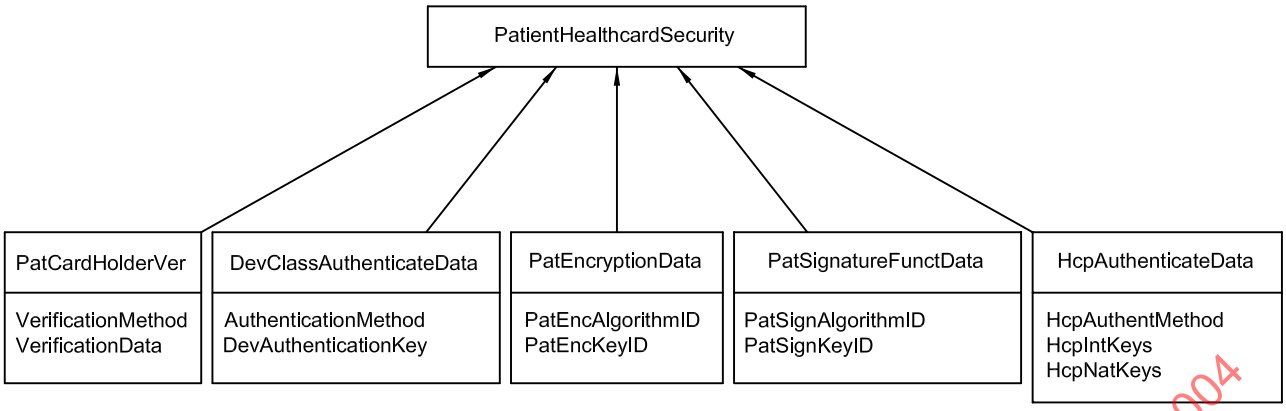

Figure 6 — The structure of "PatientHealthcardSecurity"

Table 7 — The specification of "PatientHealthcardSecurity"

	Data type	Multiplicity	Length	Comments
PatientHealthcardSecurity	Class	1	N/A	
PatCardHolderVer	Class	1	N/A	
VerificationMethod	Coded data	1		Contains coded data specifying the methodology to be used in conjunction with the data contained within VerificationData to obtain verification that the identity of the record person is as claimed.
VerificationData	Bit string	1		
DevClassAuthenticateData	Class	1	N/A	
AuthenticationMethod	Coded data	1		Coded data specifying the methodology to be used to authenticate the card.
DevAuthenticationKey	Bit string	1		Contains the device-authentication key.
PatEncryptionData	Class	1	N/A	
PatEncAlgorithmID	Bit string	1		Contains the OID of the encryption algorithm.
PatEncKeyID	Bit string	1		Contains the ID of the encryption key.
PatSignatureFunctData	Class	1	N/A	
PatSignAlgorithmID	Bit string	1		Contains the signature algorithm OID.
PatSignKeyID	Bit string	1		Contains the signature key ID.
HcpAuthenticateData	Class	1	N/A	
HcpAuthentMethod	Coded data	1		Coded data specifying the authentication methodology to be used to authenticate a healthcare person.
HcpIntKeys	Class			Containing a set of international access keys.
HcpIntKey	Bit string	1...8		A bit string containing an international access key.
HcpNatKeys	Class			Containing a set of national access keys. NOTE The national access keys are limited to use within the country of issue of the healthcare card.
HcpNatKey	Bit string	1...8		A bit string containing a national access key.

Annex A
(normative)

ASN.1 data definitions

A.1 "Links"

```
Links              ::= SEQUENCE OF Link
                                          -- This is a sequence of references to other objects
Link               ::= SEQUENCE OF LinkagePointer
LinkagePointer     ::= INTEGER
```

A.2 The "ReferencePointer" and "ReferenceTag" data objects

```
RefPointer         ::= SEQUENCE OF RefTag
RefTag             ::= INTEGER
                                          -- This object can hold the ASN.1-tag of another object
```

A.3 The "RecordPersonPointer" data object

```
RecPersPointer     ::= INTEGER
```

A.4 The "CodingSchemesUsed" data object

```
CodingSchemesUsed ::= SEQUENCE OF CodingScheme

CodingScheme       ::= SEQUENCE

{

CodeIdentifier     [0] OCTET STRING (SIZE 6)),

CodeLength         [1] INTEGER,

Comment            [2] OCTET STRING (SIZE(1...20)) OPTIONAL

}
```

A.5 The "CodedData" data object

```
CodedData          ::= SET
{
CodingSchemeRef        [0] RefPointer,
CodeDataValue          [1] OCTET STRING,
CodeDataFreeText       [2] OCTET STRING OPTIONAL
}
                                          -- CodingSchemeRef is a RefPointer pointing at a
                                          -- value that identifies a particular coding scheme
                                          -- within the object coding schemes used.
                                          -- If CodingSchemeRef = 0, then the coding scheme
```