
**Health informatics — Patient healthcard
data —**

**Part 8:
Links**

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

Partie 8: Liens



Reference number
ISO 21549-8:2010(E)

© ISO 2010

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2010

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	2
5 Requirements	2
6 Structure	2
Annex A (normative) ASN.1 data definitions	5
Annex B (informative) Examples	7
Bibliography	9

.....

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 21549-8 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: Medication data*
- *Part 8: Links*

Introduction

The ISO 21549 series of International Standards is intended to replace the European Prestandard ENV 12018 adopted by CEN in 1995. This series of International Standards provides data structures and definitions for data objects on patient data cards.

Healthcare becomes more and more integrated and is changing from having a local character to being regional and – with increasing mobility – even international. Typically, a patient's health history consists of many service episodes distributed over time and space. Sometimes patients are getting services from separate service providers at the same time. Each service provider such as hospital, health centre and physician has his own local patient record system. Thus the patient's health data is distributed more and more over specialities and space inside one country and also worldwide.

Patients can be better cared for if the health professional in charge has access to the patient's most recent data. Physicians at different locations have to be able to simultaneously see and edit a patient record from remote locations.

This requires on the one hand, information systems that are able to communicate and, on the other hand, standardized methods to locate the information. The Internet, which is able to distribute information to geographically-distant users, offers a securable technological solution for handling electronic patient records. However, it is necessary to access the data required in an easy and timely way. Not only does this mean that the relevant information has to be made available by its authors, but also that it has to be retrieved from a mass of irrelevant information whenever and wherever needed.

Patient data are especially sensitive and a secure basic infrastructure is absolutely necessary. Therefore, besides the secure transmission of data, the persons handling the record, for example health professionals and/or the patients have to be identified and authenticated. Further services like integrity and privacy protection, accountability, accessibility etc. need to be addressed as well.

Health cards can help to provide the necessary security in the sensitive health domain – including data integrity and data protection. They enable authentication for data on the card and can also provide links to several additional data objects stored elsewhere. Health cards may contain both a subset of critical clinical data stored on the card itself and links to data distributed nationally or worldwide over many medical information systems.

Health informatics — Patient healthcard data —

Part 8: Links

1 Scope

This part of ISO 21549 defines a way to facilitate access to distributed patient records and/or administrative information using healthcards. It defines the structure and elements of “links” typically stored in healthcards and representing references to individual patients' records as well as to subcomponents of them. Access control mechanisms, data protection mechanisms, access methods and other security services are outside the scope of this part of ISO 21549.

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.

ISO 21549-2, *Health informatics — Patient healthcard data — Part 2: Common objects*

ISO 21549-4, *Health informatics — Patient healthcard data — Part 4: Extended clinical data*

HL7v3, *Health Level Seven — Messaging Standard Version 3*, Normative Edition 2006

IETF RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax*

3 Terms and definitions

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

3.1 reference

information that provides the unambiguous identification of a certain part of a distributed record

3.2 linkage information

data set that provides the complete information to locate the resource of a certain part of a distributed record

3.3 ISO OID organization code

unique worldwide organization code defined and managed following the ISO/IEC 9834 series of International Standards

3.4 Uniform Resource Identifier

compact sequence of characters which identifies an abstract or physical resource

3.5

Uniform Resource Locator

standardized address used for referring to resources by their location

3.6

Uniform Resource Name

location-independent standardized label identifying an object by its name serving as persistent, location-independent resource identifier

4 Abbreviated terms

- OID Object Identifier
- URI Uniform Resource Identifier
- URL Uniform Resource Locator
- URN Uniform Resource Name
- XML eXtended Markup Language

5 Requirements

Typically, organizations are using internal data object identification systems for patient data records and images (e.g. DICOM numbering system consisting of an ISO OID organization code, a local archiving code and accumulative yearly number). The data object identifiers may be globally unique (as DICOM identifiers of studies, series and frames) or locally unique (as laboratory accession numbers). References to these data objects enable access to data objects that cannot be handled by use of the healthcard itself (e.g. for reasons of timing or storage capacity). The logical structure of these references should be compatible with the structure of references used in messages sent between healthcare information systems.

6 Structure

A link consists of the following data elements (see Figure 1).

- **URI** contains the physical reference (e.g. an internet/email address) and the unique ID (OID or proprietary ID) labelling the referenced data.
- **Description** gives a short characterization of the kind of data.
- **Accessory** specifies who stored the data and the date the link was created. Moreover it may contain the author and the date of collection of the data.

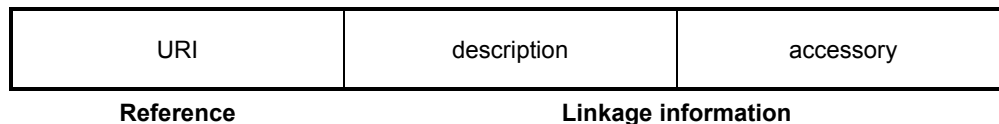


Figure 1 — Schematic representation of a link

URI represents the **Reference** part of a Link. Additional **linkage information** is provided by the optional sections, description and constraints. The constraints elements are used according to the specification for accessory attributes in ISO 21549-2.

The proposed structure of healthcard links data area intended for storage of internal and external references is shown below in Figure 2 as a UML class diagram.

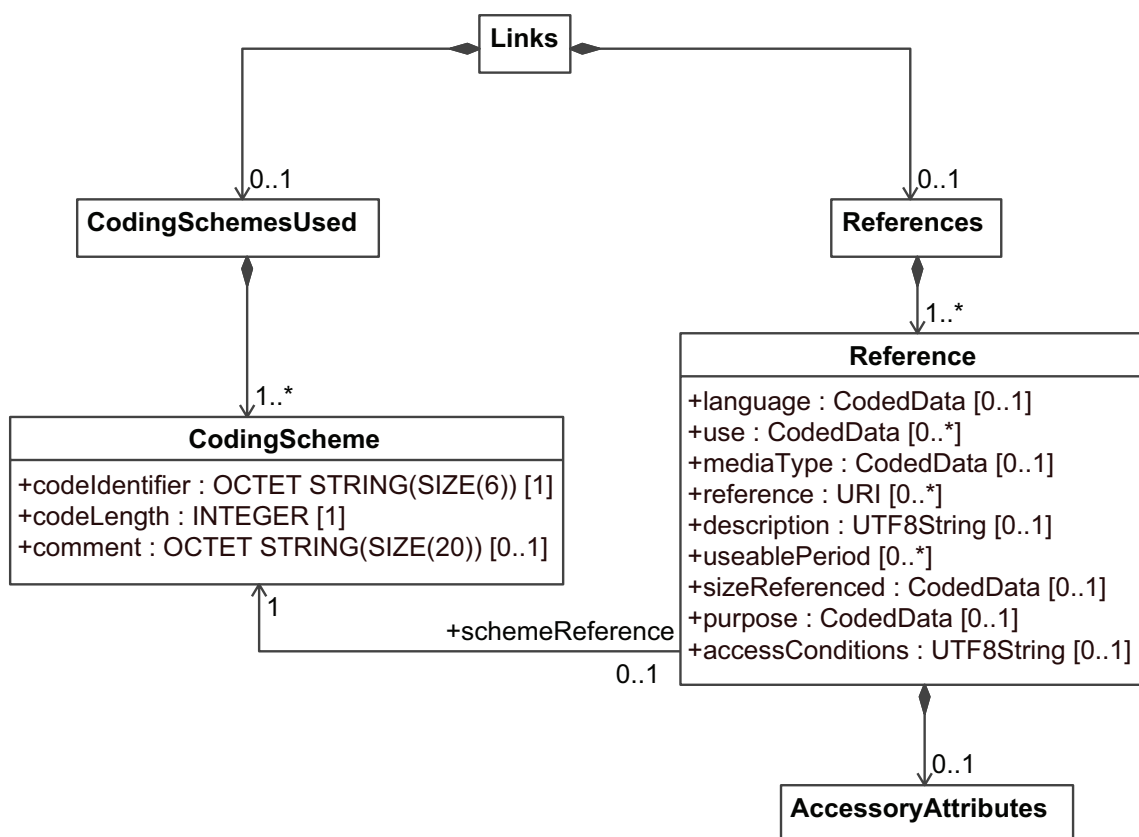


Figure 2 — Patient healthcard links data structure

This structure extends the structure of the object links defined in ISO 21549-2 with the following two optional objects.

- Object CodingSchemesUsed is defined in ISO 21549-2. It contains the identifiers and the short descriptions of the coding schemes used in the other parts of ISO 21549.
- Object References contains references to external data objects which may be complemented by a concise characterization of the kind of data and the AccessoryAttributes as specified in ISO 21549-2.

Due to the different usage, references can be divided into the two subtypes: **relay** and **standalone**.

Reference of type **relay** provides a kind of extension point for data objects stored on the healthcard itself. If there are additional data for a ClinicalEvent data object specified in ISO 21549-4 available from an external source, this can be referenced by use of an object Reference. A **standalone** reference is independent from other data objects on the healthcard and may be used discretely.

The structure of the object Reference is derived from data type Encapsulated Data defined in Health Level Seven Reference Information Model and used in Health Level Seven Clinical Document Architecture, Release Two. The attribute description is of type CWE (HL7 “Code With Exception”) and allows to have code only, code with text or text only.

Table 1 — The specification of individual entities within object Reference

Object name	Object Type	Multiplicity	Comments
label	String	0..1	Information of the referenced data for display purposes (man-machine interface).
description	CWE	0..n	A short description of the kind of referenced data.
mediaType	CodedData	0..1	Identifies the type of the referenced data and identifies a method to interpret or render the data.
language	CodedData	0..1	For character-based information the language property specifies the human language of the text.
reference	URI	0..n	A unified resource identifier in accordance with IETF RFC 3986, such as a URL for HTTP or FTP provides the link to an external data object. Any identifier in this set points to the same data object and is used as an alternative way to receive access to these objects. May also contain identifiers intended for human use for example 'phone number of a patient's physician.
useablePeriod	TimeRange	0..n	Indicates that the external data may only be available for a limited period of time. Whether the reference is limited by a usablePeriod or not, the content of the reference is fixed for all time. Any application using the reference must always receive the same data. The reference cannot be re-used to send a different version of the same data or different data.
sizeReferenced	CodedData	0..1	Approximately the size of the referenced data ENUMERATED {<100kB(0), <1MB(1), <10MB(2), <100MB(3), <1GB(4), other(9)}
purpose	CodedData	0..1	purpose of the referenced data: ENUMERATED {expert opinion(1), second opinion(2), referral(3), single-point information(4), fragment of record(5)}
accessConditions	UTF8string	0..1	constraints limiting sensitivity level (e.g. authorization, confidentiality code)

Annex A (normative)

ASN.1 data definitions

Links DEFINITIONS ::= BEGIN

-- AccessoryAttributes, CodingSchemesUsed, CodedData, RefPointer are defined in ISO 21549-2

IMPORTS AccessoryAttributes, CodingSchemesUsed, CodedData, RefPointer FROM CommonDataTypes;

Links ::= SET

```
{
    codingSchemesUsed [0] CodingSchemesUsed OPTIONAL,
    references          [1] References          OPTIONAL
}
```

References ::= SEQUENCE

```
{
    label           [0] UTF8String           OPTIONAL,
    language        [1] CodedData            OPTIONAL,
    use             [2] SET OF CodedData     OPTIONAL,
    mediaType       [3] CodedData            OPTIONAL,
    reference       [4] SET OF URI           OPTIONAL,
    description     [5] UTF8String           OPTIONAL,
    useablePeriod   [6] SET OF TimeRange     OPTIONAL,
    sizeReferenced [7] CodedData            OPTIONAL,
    purpose         [8] CodedData            OPTIONAL,
    accessConditions [9] UTF8String          OPTIONAL,
    schemeReference [10] RefPointer           OPTIONAL, -- This is a pointer to a coding scheme referenced
    accessoryAttributes [11] AccessoryAttributes OPTIONAL
}
```

TimeRange ::= SEQUENCE

```
{  
  value          [0] OCTET STRING, -- This is a representation of time range  
  operator       [1] ENUMERATED {  
    intersect (0), -- Form the intersection with the value  
    exclude (1), -- Form the set-difference with this value, i.e.,  
                  -- exclude this element or set from the resulting set  
    convexHull (2), -- Form the convex hull with the value. The convex hull  
                  -- is defined over ordered domains and is the smallest  
                  -- contiguous superset (interval) of all the operand sets  
    include (3), -- Form the union with this value, i.e., include this  
                  -- element or set in the resulting set  
    periodicHull (4)-- Form the periodic hull with the value. The periodic  
                  -- hull is defined over ordered domains and is the periodic set  
                  -- that contains all contiguous supersets of pairs  
                  -- of intervals generated by the operand periodic intervals  
  } OPTIONAL  
}
```

URI ::= UTF8String -- This is a URI representation

END

Annex B (informative)

Examples

B.1 Usage

Because of the different usage of links they can be divided into the three subtypes: **reference**, **relay**, **standalone**.

A link of type **reference** can be used to provide linkage to a coding scheme that is provided elsewhere. Therefore a special class of links is introduced: **CodingSchemesUsed**. Examples for this kind of reference could be a portal or an entry point. In this case the provision of a URI is sufficient; no additional linkage information is necessary.

Links of type **relay** provide a sort of extension point for data objects stored on the healthcard itself. If there is additional data for a ClinicalEvent data object specified in ISO 21549-4 available from an external source this can be referenced by use of a link entry. In this case the URI and the constraints elements will be provided.

Standalone links are independent from other data objects on the healthcard. In this case the reference part has to be extended by the linkage information in order to enable a comprehensive use as described in the example in B.2.

B.2 Example

B.2.1 Structure

The ByMedCard project (http://medis.gsf.de/forschung/bymedcard/bc_001.php) used the following scheme to store links on the DIABCARD patient data card.

mailto:docuserver@gsf.de ?serverId=ZKA.123456789	X-ray image/jpeg	Zentralklinikum Augsburg- Radiology, 23.09.2005, Dr. Müller, 05.09.2005
---	---------------------	---

Figure B.1 — Schematic representation of a sample link

B.2.2 XML Representation

```
<?xml version="1.0" encoding="UTF-8"?>
<Links xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceLocation="D:\ThinkPad_D\tc215\ISOIS2~1\Model\Links.xsd">
  <CodingSchemesUsed>
    <CodingScheme>
      <codeIdentifier>C1</codeIdentifier>
      <codeLength>50</codeLength>
      <comment>mimeType</comment>
    </CodingScheme>
  </CodingSchemesUsed>
  <References>
    <Reference>
      <label>Link to examination Result</label>
      <mediaType>
        <codeDataValue>image/jpeg</codeDataValue>
        <codeSchemaRef>C1</codeSchemaRef>
      </mediaType>
      <reference>mailto:docuserver@gsf.de?serverId=ZKA.123456789</reference>
      <description>Zentralklinikum Augsburg - Radiology, 23.09.2005, Dr.
Muller, 05.09.2005</description>
    </Reference>
  </References>
</Links>
```

Bibliography

- [1] EN 13606-4, *Health informatics — Electronic health record communication — Part 4: Security*
- [2] ISO/IEC 6523-1, *Information technology — Structure for the identification of organizations and organization parts — Part 1: Identification of organization identification schemes*
- [3] ISO/IEC 6523-2, *Information technology — Structure for the identification of organizations and organization parts — Part 2: Registration of organization identification schemes*
- [4] ISO/IEC 9834 (all parts), *Information technology — Open Systems Interconnection — Procedures for the operation of OSI Registration Authorities*
- [5] ISO 8824 (all parts), *Information technology — Abstract Syntax Notation One (ASN.1)*
- [6] ISO/IEC 7810, *Identification cards — Physical characteristics*
- [7] ISO 22600 (all parts), *Health informatics — Privilege management and access control*
- [8] Further information concerning ISO OID can be found on <http://www.oid-info.com/index.htm>
- [9] IETF RFC 3061, *A URN Namespace of Object Identifiers*

ICS 35.240.80

Price based on 9 pages