



SLOVENSKI STANDARD

SIST-TP CR 12700:2003

01-oktober-2003

Supporting document to ENV 1613:1994 - Messages for Exchange of Laboratory Information

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Ta slovenski standard je istoveten z: **CR 12700:1997**
SIST-TP CR 12700:2003
<https://standards.iteh.ai/catalog/standards/sist/2155fbc1-12b6-4f59-9153-1eafb1213018/sist-tp-cr-12700-2003>

ICS:

35.240.80	Uporabniške rešitve IT v zdravstveni tehniki	IT applications in health care technology
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REPORT
RAPPORT
BERICHT

CR 12700:1997

January 1997
janvier 1997
Januar 1997

English version

Supporting document to ENV 1613:1994 -
Messages for Exchange of Laboratory Information

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This CEN REPORT has been prepared by Technical Committee CEN/TC 251 "Medical informatics" and has been approved by CEN on 1996-10-10.

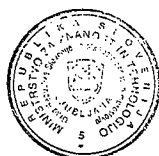
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Ref. no. CR 12700:1997 E

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Chapter 1

The definition of EDIFACT messages to support PT3-008 prENV

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Chapter 1 EDIFACT message definition**1. Summary**

This Supporting Document provides a complete implementable specification of the laboratory messages by providing message implementation guidelines to supplement the message definitions in Annex A. It also provides comprehensive data and structure tables which show rigorously how the EDIFACT messages meet the message specifications of PT3-008 prENV.

1.1 Use of the EDIFACT data interchange format (DIF)

A data interchange format for EDI messages needs to offer a transfer syntax able to support the following:

- Message structures
- Data structures
- Data element directories
- References to external coding schemes

The EDIFACT standard ISO 9735 defines a method of supporting these four properties of a DIF as follows:

Message Structure

Each message type defined is given a unique six character reference which is carried as part of the header information for each message. The EDIFACT standard groups a number of messages sent at the same time between the same sender and recipient as an Interchange. Both Sender and Recipient are identified in the header information for the Interchange level.

Data structure

EDIFACT provides a structure whereby data elements are assembled into composite data elements, which then are formed into directories of segments. Only one-to-many relationships can be directly supported, through nesting and repetition. Many-to-many relationships are supported indirectly through internal links in messages, or by appropriate repetitions of the relevant segment groups.

Data semantics

Existing data element directories provide the non-healthcare data elements needed. Healthcare-specific data elements need to be added for each specific requirement identified. Over time the directories will however become populated with relevant healthcare data elements and segments.

Coding scheme description

The growth and development of registered coding schemes for different sectors or application areas reduces the need for any particular DIF to have to maintain a specific set of codes to support the messages being exchanged.

Where external (non EDIFACT) coding schemes are used, the EDIFACT messages allow for the use of the Health Care Designator (HCD) to be used to reference the coding scheme. The same approach is used for coded identification schemes.

Transfer syntax

EDIFACT provides a transfer syntax, using a simple positional coding, with no explicit tagging of data fields. A limited number of specified character sets are available, with no binary coding supported. Fields are variable lengths using recognised field terminators.

1.2. EDIFACT message approval

The UN/ECE (United Nations Economic Commission for Europe), stimulated originally by the requirements of international trade, has developed a three part standardisation procedure for messages in EDIFACT. It has recently officially applied for its remit to be extended to all inter-organisational requirements for message definition. There are three major components to their work:

- Rules for the development of messages using ISO 9735: these consist of the UN/ECE syntax implementation guidelines and message design guidelines;

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- Procedures for approval of submitted messages;
- Maintenance of a directory of data elements, composites, segments and codes;

ISO 9735 explicitly requires that the ISO data element directory (UNTDDED) be exclusively used and as a consequence, the UN/ECE has endorsed a subset of that directory to build approved messages. This directory sub-set is only expanded where new messages create a requirement for additions. Associated segment and composite directories are also maintained.

The UN/ECE also maintains a codes directory. This serves a number of purposes. It holds:

- qualifiers needed to support the definition of generic data elements
- codes to reference external sector coding schemes
- full code sets where no sector-specific or application-specific coding scheme is available, or where a shared coding scheme has been judged to be useful

1.3. Using EDIFACT for laboratory messaging

The following issues have arisen in submitting these laboratory message for standardisation within the EDIFACT process:

The development of personal details segments in EDIFACT to meet the needs of healthcare (a need which is shared by other sectors such as insurance and social administration)

- The development of new segments specifically to carry the healthcare objects and attributes defined in this report.
- An extension to the current method of referencing external coding schemes to carry the healthcare designator

The messages developed in this report are being submitted to the UN/ECE for approval in 1995. The draft specifications indicated in this report show the submissions made to the UN/ECE. The final decisions of the UN/ECE in these areas, may vary from the drafts submitted. The three areas listed are now considered in more detail.

1.3.1 Personal details

Requirements have been developed within the UN/ECE, specifically in the Western European EDIFACT Board MD9 (healthcare) group in association with the MD10 (insurance/social administration) group. The relevant segments (PNA/ADR) are shown in Chapter 3, data mapping tables and in Chapters 5 and 6, Message Implementation Guidelines.

1.3.2 Other new segments

A number of other new segments have been developed to meet the laboratory messaging requirement. The relevant segments are shown in Chapter 3, data mapping tables and in Chapters 5 and 6, Message Implementation Guidelines.

1.3.3 HCD

The HCD is supported by changing the EDIFACT data elements which are the universal reference to external coding or identification schemes. The following change has been submitted to the UN/ECE:

The EDIFACT data element 1131 to be extended to eight characters to allow for the holding of the six character HCD.

Chapter 1 EDIFACT message definition

The ability to show any bilateral additional information, such as distinguishing a physically issued/dated code list version is not however supported. Until this change is implemented a temporary solution is required. This is indicated in Chapter 3.

1.4. Deriving EDIFACT messages from GMDs and object/attribute definitions

To create appropriate EDIFACT messages, the GMDs defined in this report which are networks of related objects must be converted into an EDIFACT hierarchical structure. The conversion method is described in 1.4.1 and 1.4.2 below. The resulting compliance tables are shown in Chapter 2.

To select/develop the appropriate EDIFACT data elements, a rigorous mapping from objects and attributes to corresponding elements in EDIFACT is carried out, supported by explicit data mapping tables, which are shown in Chapter 3. The Implementable Message Specifications in Chapters 5 and 6 also show these mappings.

1.4.1 Structure conversion

The development of the EDIFACT message follows the rules indicated. At various stages, there is scope for expert judgement on the best alternatives. It is possible therefore to arrive at more than one solution by applying these mapping rules in different ways:

- For each GMD a single object is chosen as the root of the EDIFACT message.
- Objects with a direct instance connection relationship to the root may also appear at the top level in the EDIFACT message.
- The instance connection relationships of objects at one or more levels of indirectness to the chosen root, will be resolved into hierarchical EDIFACT segment groups.
- Where a non-hierarchical connection exists in the instance connection network which constitutes the GMD, the relevant relationships require resolution.
- A judgement is made on selecting the stronger of the multiple relationships of the loop, and this relationship is used to construct the hierarchy.
- If the loop can be broken by not directly supporting a relationship without loss of functionality, then this is the preferred step.
- Where the loop cannot be broken in this way, a reference entity may need to be introduced to which can be attributed the semantics of the relationship.
- Specialisation of objects may affect both structure and data mappings. The specialisations may be able to be directly represented by qualifiers applied to the same EDIFACT segment or composite. They also share the properties of an instance connection in the way they need to be resolved to a hierarchic structure.
- Many-to-many relationships need to be specifically resolved. In this Supporting Document these relationships are often represented by the use of internal links to provide a cross-reference in the hierarchy.

1.4.2 Data mapping

A single set of tables is constructed for the objects and attributes associated with the DIM. These tables are shown in Chapter 3 in alphabetical order, following the Attributes layer description of this report:

- For each object, one or more segments are identified to support the attributes indicated.
- The relationships for any particular object are best represented by mapping to one or more segments.
- The mapping tables consists of a sequence of entries for each object. The first entry in the sequence shows the object to be mapped.
- Each mapping entry consists of either:
 - One attribute mapped to data elements in one or more segments
 - Several attributes mapped to data elements in one or more segments
- Where common attribute lists are cited in the objects/attributes definitions, each attribute in the list is reproduced in full in the mapping tables.

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- The location in the EDIFACT message of each segment is shown against each entry. This location is currently described in terms of the relevant segment group in the messages to which it applies. This information could be extended to identify the segment within the segment group and a particular instance of this segment where it is used in several instances/with different qualifier values.

1.5 Complete EDIFACT message specification

As well as the EDIFACT message definitions in Chapter 4, message implementation guidelines are required to further define how the messages are to be implemented.

Chapter 5 and subsequent chapters provides the Message Implementation Guidelines which provide additional constraints on message implementation, together with useful processing information.

In any particular interworking environment, additional enhancement of the MIG will be required. This may be at a national level for instance and will show the constraints placed on message use.

These constraints may include:

- Complete segment groups or segments (marked as optional) which are not to be implemented
- Data elements (marked as optional) not to be implemented
- Segments or data elements only to be transmitted subject to specific conditions being met
- Specific coding schemes to be supported in particular instances
- Particular ranges of coding schemes to be supported

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Chapter 2 Structure Tables

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Chapter 2 Structure Mapping Tables

2. Structure mapping tables

The following tables describe the mappings of relationships between the objects in the GMDs defined for laboratory messaging into the equivalent EDIFACT message definitions. Each group of tables corresponds to the mapping of one GMD to its EDIFACT equivalent. Each separate table corresponds to one of the model diagrams, which collectively define the GMD. The tables list each relationship in the relevant model diagram, starting with the superior object in the model and its relationships with other objects.

For each entry, the cardinalities in each relationship are shown, following the same conventions as used in the model. The final column indicates the equivalent EDIFACT structure, which can be checked against the relevant EDIFACT message definition, where the numbered segment groups (SGn) will be found in ascending sequence in the message.

2.1 New laboratory service order/modification (mapped to MEDREQ)

The GMD to which this refers are Figure 8 in 7.2.2 and Figure 12 in 7.3.2 of PT3-008 prENV:

Object	Cardinality	Relationship in GMD	Object	Cardinality	Equivalent relationship in MEDREQ
laboratory service order	1	instance connection	laboratory service requester	1,m	internal links from laboratory service order (SG2) to healthcare party (SG1)
laboratory service order	order: 1,m mod.: 1,m	instance connection	laboratory service provider	1,m	internal links from laboratory service order (SG2) to healthcare party (SG1)
laboratory service order	0,m	instance connection	copy destination	1	internal links from laboratory service order (SG2) to healthcare party (SG1)
laboratory service order	0,m	instance connection	intended recipient of report copy	1	internal links from laboratory service order (SG2) to healthcare party (SG1)
laboratory service order	1,m	instance connection	subject of investigation	1	subject (SG5) is nested in laboratory service order (SG2)
laboratory service order	1,m	whole-part	requested investigation	1	requested investigation is nested within subject (SG5), which itself is nested in laboratory service order (SG2)
requested investigation	0,1	instance connection	subject	0,m	requested investigation nested within subject (SG5)
requested investigation	0,m	instance connection	sample	0,m	internal links from req. invest. (SG12) to sample (SG10)
requested investigation	1	instance connection	investigation	1,m	attributes of investigation supported within requested investigation (SG12)
subject of investigation	0,m	whole-part	sample	order: 1 mod: 0,1	sample (SG10) is nested within subject (SG5)

Chapter 2 Structure Mapping Tables**2.2 New laboratory service report (mapped to MEDRPT)**

The GMD to which this refers is Figure 15 in 7.5.2 of PT3-008 prENV:

Object	Cardinality	Relation ship in GMD	Object	Cardinality	Equivalent relationship in MEDRPT
laboratory service report	0,m	instance connection	laboratory service order	1	laboratory service order (SG4) nested in laboratory service report (SG2)
laboratory service report	1	instance connection	laboratory service requester	1,m	internal links from healthcare parties (SG1) to laboratory service report (SG2)
laboratory service report	1	instance connection	laboratory service provider	1,m	internal links from healthcare parties (SG1) to laboratory service report (SG2)
laboratory service report	0,m	instance connection	copy destination	1	internal links from healthcare parties (SG1) to laboratory service report (SG2)
laboratory service report	1,m	instance connection	subject of investigation	1	subject of investigation(SG6) nested in laboratory service report (SG2)
laboratory service report	1,m	whole-part	result line	1	result line (SG13) nested within subject (SG6), which is itself nested within laboratory service report (SG2)
result line	0,1	instance connection	healthcare organisation	1,m	attributes of investigation are part of result line (SG13)
result line	0,m	Instance connection	healthcare organisation		
result line	1	Instance connection	investigation	1,m	attributes of investigation are part of result line (SG13)

Chapter 2 Structure Mapping Tables

The following tables are shown in common for order and report.

2.2 New laboratory service report (mapped to MEDRPT)

The GMD to which this refers is Figure 15 in 7.5.2 of PT3-008 prENV:

Object	Cardinality	Relation ship in GMD	Object	Cardinality	Equivalent relationship in MEDRPT
laboratory service report	0,m	instance connection	laboratory service order	1	laboratory service order (SG4) nested in laboratory service report (SG2)
laboratory service report	1	instance connection	laboratory service requester	1,m	internal links from healthcare parties (SG1) to laboratory service report (SG2)
laboratory service report	1	instance connection	laboratory service provider	1,m	internal links from healthcare parties (SG1) to laboratory service report (SG2)
laboratory service report	0,m	instance connection	copy destination	1	internal links from healthcare parties (SG1) to laboratory service report (SG2)
laboratory service report	1,m	instance connection	subject of investigation	1	subject of investigation(SG6) nested in laboratory service report (SG2)
laboratory service report	1,m	whole-part	result line	1	result line (SG13) nested within subject (SG6), which is itself nested within laboratory service report (SG2)
result line	0,1	instance connection	subject	0,m	result line (SG13) nested within subject (SG5)
result line	0,m	Instance connection	sample	0,m	internal links from sample (SG11) to result line (SG13)
result line	1	Instance connection			

The following tables are shown in common for order and report.

Chapter 2 Structure Mapping Tables**2.3 New laboratory service order/New laboratory service report: subject model for healthcare party**

The GMDs to which this refers are Figure 9 in 7.2.3 and Figure 16 in 7.5.3 of PT3-008 prENV:

Object	Cardinality	Relation-ship in GMD	Object	Cardinality	Equivalent relationship in MEDREQ/MEDRPT
healthcare party	0,m	instance connection	laboratory service requester/ provider, copy destination, intended recipient of report copy (order only), origin of clinical information, supervising healthcare party, sample collector, related laboratory service provider (report only)		qualification of healthcare party (SG1)
healthcare party	0,m	instance connection	healthcare professional		qualifier used in healthcare party (SG1)
healthcare party		gen-spec	healthcare organisation		qualifier used in healthcare party (SG1)
healthcare party		gen-spec		0,m	internal links implemented within healthcare parties (SG1)
healthcare party		gen-spec		0,1	internal links implemented within healthcare parties (SG1)
healthcare professional	0,1	whole-part	healthcare administrative information	0,1	internal links from healthcare administrative information (SG8) to healthcare parties (SG1)
healthcare organisation	0,m	recursion			
healthcare organisation	0,m	instance connection			

Chapter 2 Structure Mapping Tables

New laboratory service order/laboratory service report: subject model for subject of investigation

The GMD to which this refers is Figure 10 in 7.2.4 and Figure 16 in 7.5.4 (reference to Fig.10) of PT3-008 prENV:

Object	Cardinality	Relation ship in GMD	Object	Cardinality	Equivalent relationship in MEDREQ/MEDRPT
subject of investigation	0,m	recursion	subject of investigation	0,m	Repetition of subject of investigation (SG5)
subject		gen-spec	animal		common attributes in subject of investigation(MEDREQ: SG5, MEDRPT: SG6) with specific attributes in animal (MEDREQ: SG7, MEDRPT: SG8)
subject		gen-spec	patient		common attributes in subject of investigation(MEDREQ: SG5, MEDRPT: SG6) with specific attributes in patient (MEDREQ : SG6, MEDRPT: SG7)
subject		gen-spec	material		attributes included in subject of investigation (MEDREQ: SG5, MEDRPT: SG6)
subject	0,m	instance connection	item of clinical information	1	item of clinical information (SG9) nested in subject (MEDREQ: SG5, MEDRPT: SG6)
subject	0,m	instance connection	healthcare administrative information	1	healthcare administrative information (MEDREQ:SG8, MEDRPT: SG9) nested in subject (SG5)
subject	0,m	instance connection	supervising healthcare party	1,m	internal links from subject (MEDREQ: SG5, MEDRPT: SG6) and h/care parties (SG1)
item of clinical information	0,1	instance connection	origin of medical information	1,m	internal links between item of clinical information (MEDREQ : SG9, MEDRPT: SG10) and healthcare parties (SG1)
clinical information		gen-spec	clinical observation		attributes of clinical observation in item of clinical information (MEDREQ: SG9, MEDRPT: SG10)
clinical observation		gen-spec	measurable quantity		all attributes of measurable quantity in item of clinical information (MEDREQ: SG9, MEDRPT: SG10)
item of clinical information		gen-spec	intervention information		attributes of intervention information in item of clinical observation (MEDREQ: SG9, MEDRPT: SG10)
intervention information		gen-spec			all attributes of drug are in item of clinical information (MEDREQ: SG9, MEDRPT: SG10)