SIEMENS

DICOM Conformance Statement for LANTIS 8.3

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List of Sections

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DICOM Documents

DICOM Conformance 8.3

1. INTRODUCTION

1.1 PURPOSE

This document is the DICOM Conformance Statement for the DICOM Communication Module 8.30. It describes compliance with the DICOM Version 3.0 standard including supported DICOM Services Classes, Information Objects and Communication Protocols. This document has been written in accordance with part PS 3.2 of the DICOM Version 3.0 standard. Familiarity with the DICOM standard is assumed.

This Conformance Statement is intended for use by software developers of DICOM interfaces, customers, and system integrators who wish to connect DICOM equipment with the DICOM Communication Module. This document specifies conformance with the DICOM standard, including limitations and restrictions on conformance. Careful review and comparison of this Conformance Statement with the Conformance Statements of other equipment must be done to determine whether integration will achieve a desired result. This document is essential to integrating DICOM-compliant applications and equipment, but does not guarantee system functionality by itself.

1.2 SCOPE

This Conformance Statement covers the DICOM Communication Module (DCM) 8.30 application release.

1.3 REFERENCES

This document references the following documents:

DID	TITLE
RTP Link Utility Interface Specification	RTP Link Utility Radiotherapy Treatment Planning Import/Export Interface Specification, published by Siemens Medical Systems, Inc.
DICOM RT Plan Translation 8.3	DCM 8.30 RT Plan Translation Interface Specification, published by Siemens Medical Systems, Inc.
N/A	Digital Imaging and Communications in Medicine (DICOM), parts 1-14; published by NEMA; further referenced as {DICM}

1.4 DOCUMENTATION CONVENTIONS

The following conventions are used throughout this document:

- Menu options and control buttons are indicated by **Bold Print**. Menu commands that are executed one directly after another are separated by vertical lines. Example: **File | Tools | Options.**
- Window and dialog box titles and icons are in Arial.
- Window elements (e.g. fields, radio buttons, check boxes, and tabs) and footnotes are in italics.
- Text that you need to type exactly as shown, such as commands or responses, is shaded.
- File names, file paths, databases, and database fields are printed in mixed-case `Courier New` typeface.
- Words or phrases that are specifically defined and could potentially be misunderstood are initially in “quotes”.
- Function keys and booster keys appear in upper case bold print. Example: **F2** or **CTRL**. Multiple keys that you press simultaneously are separated by a plus sign. Example: **CTRL + F4**.

1.5 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

AE	Application Entity, a DICOM application.
AE Title	Application Entity Title, the publicly known name of a DICOM AE.
association	One entire communication session between two DICOM AEs. An association is initiated by an SCU. The association may be terminated by either the SCU or SCP.
Asynchronous Window Operations Negotiation	A “window” of opportunity in the association establishment phase, between two DICOM AEs, during which “asynchronous” (non-handshake) operations may be negotiated.
attribute	A unit of data that has a value and is identified by a 4 byte number called a tag.
DICOM	Digital Imaging and Communications in Medicine. A standard developed by the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA) for the electronic transfer of digital images and associated information.
DICOM file	An instance of an IOD that is stored on a physical disk drive or file server. As used by DCM, a DICOM file conforms to the DICOM Version 3.0 standard file format, except it does not contain the file meta information. It consists of attributes with a tag of (0008,0000) and greater.
DICOM message	A combination of a DICOM command, request or response and its associated IOD instance.
IMAGE^{RT}	The LANTIS medical image management system product.
Import area	A directory where DCM writes DICOM files received from other DICOM AEs over a network.
IOD	Information Object Definition, a class of data defined in the DICOM standard.
Namer	The LANTIS application that imports images into the image management system database.
Real-World Activity	A command given to a DICOM application by a user or the result of such a command (in the “Real World”).
SCP	Service Class Provider, a DICOM AE is an SCP when it provides DICOM services (like a server) over a network.
SCU	Service Class User, a DICOM AE is an SCU when it requests DICOM services (like a client) over a network.
SOP	Service/Object Pair, an actual occurrence of an Information Object and a communication context.
TCP/IP	Transmission Control Protocol/Internet Protocol, the suite of network protocols developed and used by DARPA and US DOD.
UID	Unique Identifier.

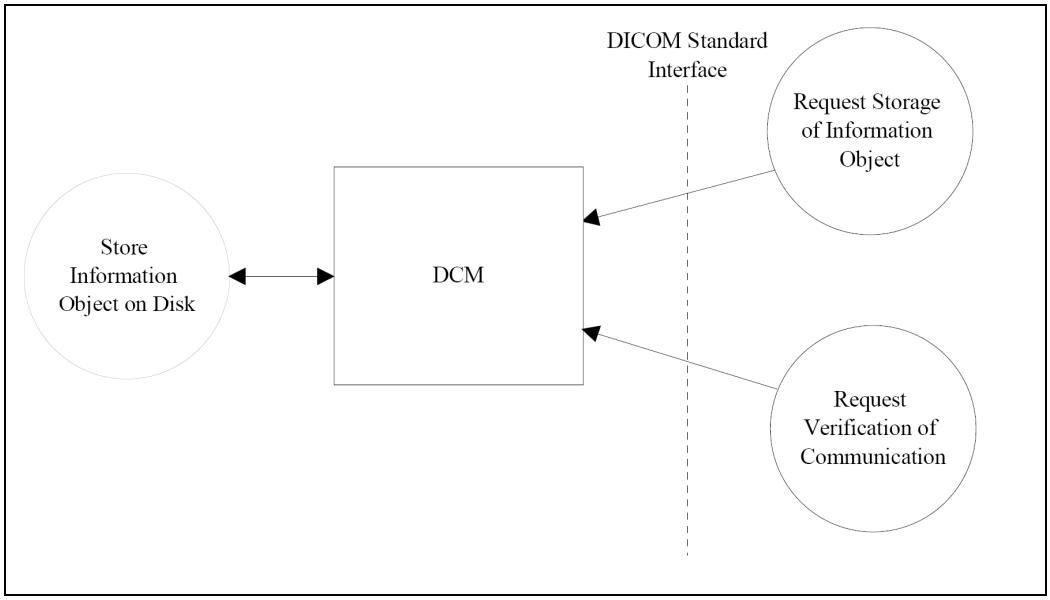
2. IMPLEMENTATION MODEL

DCM is a 32-bit application designed to operate on Intel x86 based platforms running the Microsoft Windows NT/2000/XP operating system. DCM incorporates the MergeCOM-3 implementation of DICOM provided by Merge Technologies, Inc.

Generally, DCM starts automatically on a workstation or server as part of the initialization sequence. Once started, it runs as a background task, usually in a minimized state.

2.1 APPLICATION DATA FLOW DIAGRAM

The relationships of DCM to Real-World Activities are shown below:



DCM is invoked by the following Real-World Activities:

- Request Storage of Information Object.
- Request Verification of Communication.

Request Storage of Information Object:

- When DCM accepts an association request from a remote AE, it processes the Information Objects and saves them to disk.

Request Verification of Communication:

- When DCM receives an Echo request from a remote AE, it returns an Echo response.

2.2 FUNCTIONAL DEFINITIONS OF AES

DCM is a single DICOM AE that is an SCP.

DCM will:

- Wait for an association request from an SCU AE.
- Accept an association for a supported SOP Class.
- Receive DICOM messages sent from the SCU AE over the association.
- Process each DICOM message and store it to disk as a DICOM file. If an error occurs, DCM aborts the association.
- Send appropriate response messages to the SCU AE.

2.3 SEQUENCING OF REAL-WORLD ACTIVITIES

Not Applicable.

3. AE SPECIFICATIONS

3.1 DCM - SPECIFICATION

DCM provides Standard Conformance to the following DICOM Version 3.0 SOP Classes as an SCP:

SOP Class Name	SOP Class UID
CR (Computed Radiography) Image Storage	1.2.840.10008.5.1.4.1.1.1
CT (Computed Tomography) Image Storage	1.2.840.10008.5.1.4.1.1.2
MR (Magnetic Resonance) Image Storage	1.2.840.10008.5.1.4.1.1.4
SC (Secondary Capture) Image Storage	1.2.840.10008.5.1.4.1.1.7
RT (Radiotherapy) Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT (Radiotherapy) Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
Verification (Echo)	1.2.840.10008.1.1

3.1.1 Association Establishment Policies

3.1.1.1 General

The maximum Protocol Data Unit (PDU) size accepted by DCM is configurable within the range of 1K byte to 32K bytes, with a default size of 16K bytes.

3.1.1.2 Number of Associations

The maximum number of simultaneous associations supported by DCM as an SCP is configurable with a default of

5. The total number of simultaneous associations may be limited by the resources of the server on which DCM is running.

3.1.1.3 Asynchronous Nature

DCM does not support multiple outstanding transactions over an association; it will not perform asynchronous operations window negotiation.

3.1.1.4 Implementation Identifying Information

Implementation Class UID	Implementation Version Name
1.2.840.113854.0.1	DCM_810

3.1.2 Association Initiation Policy

DCM will not attempt to initiate an association.

3.1.3 Association Acceptance Policy

DCM polls the TCP/IP port at specified intervals for association requests from SCUs. DCM only accepts associations pertaining to the specified SOP Classes.

3.1.3.1 Request Storage of Information Object

3.1.3.1.1 Associated Real-World Activity

Once an association has been established, DCM responds to standard DICOM C-STORE requests for those presentation contexts listed below. DCM optionally validates the DICOM messages received for conformance with the related IOD outlined in DICOM Version 3.0 standard {DICM}. DCM creates a uniquely named DICOM file within the specified import area for each DICOM message. DCM does not modify the content of a DICOM message in producing the DICOM file. A standard C-STORE response is sent to the SCU for each request received by DCM indicating the success or failure of the storage request.

DCM generates an image series based on the Series Instance UID, Image Position and Image Orientation attributes. All DICOM messages received within a single open association that have a valid value for Image Position and have the same value for Series Instance UID are presented to Namer as an image series. DCM processes the Image Position and Image Orientation attributes to properly order the images in the series. Therefore, if a client SCU wishes to associate a collection of image objects as an image series, they must all be sent over the same association, have the same value for Series Instance UID and have a valid value for Image Position. Image objects that are truly unrelated should be sent over separate associations.

3.1.3.1.2 Presentation Context Table

DCM accepts the following SOP Presentation Contexts:

PRESENTATION CONTEXT TABLE

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

3.1.3.1.3 SOP Specific Conformance

DCM provides Standard Conformance for the DICOM Storage Classes listed above. In the event of a successful CSTORE operation, the DICOM message is written to disk as a DICOM file. Otherwise, DCM returns one of the following status codes to the SCU:

- A700 (Out of Resources) - Indicates that the disk space is insufficient to store the Information Object or an error occurred while writing the Information Object to disk.
- A780 (Resources not configured) - Indicates that no disk location has been configured to store the Information Object.
- A900 (Data Set does not match SOP Class) - Indicates that the Information Object does not encode an instance of the SOP Class specified. This indicates a problem with the SCU of the Service Class.
- C000 (Cannot understand) - Indicates that DCM cannot parse the Information Object into elements. This indicates a problem with the SCU.

DCM supports the standard SOP Class for RT Plan Storage; refer to Appendix B - Specific Conformance for RT Plan IOD. For all other DICOM Storage Classes listed above, refer to Appendix A - Specific Conformance for Image IODs.

3.1.3.1.4 Presentation Context Acceptance Criterion

DCM supports the Presentation Contexts for the SOP Classes listed in the table above. Any other Presentation Context will be rejected.

3.1.3.1.5 Transfer Syntax Selection Policies

If DCM is offered a choice of Transfer Syntaxes in a Presentation Context, it applies the following priority to the choice of Transfer Syntax:

- Explicit Little Endian Syntax.
- Implicit Little Endian Syntax.
- Explicit Big Endian Syntax.

3.1.3.2 Request Verification of Communication

3.1.3.2.1 Associated Real-World Activity

DCM responds to echo requests with a DICOM C-Echo response.

3.1.3.2.2 Presentation Context Table

DCM accepts the following Verification Service Presentation Contexts:

PRESENTATION CONTEXT TABLE					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification Service Class	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

4. COMMUNICATION PROFILES

4.1 SUPPORTED COMMUNICATION STACKS

4.1.1 TCP/IP Stack

4.1.1.1 API

DCM uses the Windows Sockets API inherent to the Microsoft Windows NT/2000/XP operating system.

4.1.1.2 Physical Media Support

All physical media supported by the TCP/IP stack may be used with DCM. This includes, but is not limited to, 10Base-2, 10-Base-T, 100-Base-T, fiber optic and Internet.

5. EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

5.1 STANDARD EXTENDED / SPECIALIZED / PRIVATE SOPS

None Supported.

5.2 PRIVATE TRANSFER SYNTAXES

None Supported.

6. CONFIGURATION

DCM references the merge.ini file, which is located in the LANTIS application directory:

`merge.ini`	Specifies the configurable parameters for DCM, and the names and locations of the other three standard configuration files.

DCM references three standard configuration files. These files specify the parameters for the MergeCOM-3 implementation of DICOM provided by Merge Technologies, Inc. They are as follows:

`mergecom.pro`	Specifies run-time parameters for the MergeCOM-3 implementation.
`mergecom.app`	Specifies the services supported by the MergeCOM-3 implementation.
`mergecom.srv`	Service definitions for the MergeCOM-3 implementation.

6.1 AE TITLE / PRESENTATION ADDRESS MAPPING

The AE Title for DCM is SIEMENS_DCM_SCP.

6.2 CONFIGURABLE PARAMETERS

None.

7. SUPPORT OF EXTENDED CHARACTER SETS

None Supported.

8. APPENDIX A

8.1 SPECIFIC CONFORMANCE FOR IMAGE IODS

8.1.1 Image Object Import and Storage

DICOM files created by DCM that contain an image object are processed by the Namer application. Namer performs an import process that extracts information from the DICOM file and stores the digital image and associated information in the database. DCM and Namer work together as an SCP of the Storage Service Class for the following Composite Image IODs: CR, CT, MR, SC and RT Image.

All attributes of an image object are stored; none are discarded or modified. This provides Level 2 (Full) conformance as an SCP.

See §8.4 for an important statement regarding import process limitations when extracting and storing image pixel data.

Images stored in the database are accessed by the IMAGE^{RT} application for display, annotation, etc. Images are stored indefinitely, but may be deleted from the database using IMAGE^{RT}.

8.2 IMAGE IOD MODULES

The following table identifies the modules used when importing an image object into the database. A module is shown with a reference of Not Used if none of its attributes are accessed during import.

Module Name	Reference	Usage by IOD				
		CR	CT	MR	SC	RT Image
Patient	§8.3.1	M	M	M	M	M
Clinical Trial Subject	Not Used	U	U	U	U	U
General Study	§8.3.2	M	M	M	M	M
Patient Study	Not Used	U	U	U	U	U
Clinical Trial Study	Not Used	U	U	U	U	U
General Series	§8.3.3	M	M	M	M	
Clinical Trial Series	Not Used	U	U	U	U	U
CR Series	Not Used	M				
RT Series	§8.3.4					M
Frame Of Reference	Not Used		M	M		U
General Equipment	§8.3.5	M	M	M	U	M
SC Equipment	§8.3.6				M	
General Image	§8.3.7	M	M	M	M	M
Image Plane	§8.3.8		M	M		
Image Pixel	§8.3.9	M	M	M	M	M
Contrast / Bolus	Not Used	C	C	C		C
Cine	Not Used					C

Module Name	Reference	Usage by IOD				
		CR	CT	MR	SC	RT Image
Multi-frame	Not Used					C
CR Image	§8.3.10	M				
CT Image	Not Used		M			
MR Image	Not Used			M		
SC Image	§8.3.11				M	
RT Image	§8.3.12					M
Approval	Not Used					U
Overlay Plane	Not Used	U	U	U	U	
Curve	Not Used	U				U
Audio	Not Used					U
Modality LUT	Not Used	U			U	U
VOI LUT	§8.3.13	U	U	U	U	U
SOP Common	§8.3.14	M	M	M	M	M

Refer to {DICM} for a complete definition of the Usage notation, summarized as follows:

M mandatory Module.
C conditional Module.
U user option Module.

8.3 MODULE ATTRIBUTES

This section lists the attributes of each module that are used by the import process; attributes that are not accessed during import are not shown. Restrictions on attribute values and usage are also listed. Refer to {DICM} for a complete definition of the Type notation, summarized as follows:

1 The attribute must be included and have a valid value.

1C The attribute must be included under certain conditions. If included, it must have a valid value.

2 The attribute must be included. If the value is unknown, it can be null (empty).

2C The attribute must be included under certain conditions. If included and the value is unknown, it can benull (empty).

3 The attribute is optional. It may or may not be included in the module. If included, the attribute may or may not have a null value.

8.3.1 Patient Module

The following table lists the attributes that are used to match the image object with a patient in the database. If the patient in the image object cannot be identified and uniquely matched with an existing patient in the database, the image object is not imported.

Once the patient is identified and matched, the Image Management System uses none of the patient information contained in the image object. The patient information already stored in the database is used for further reference and is not affected by patient information contained in the image object.

Tag	Name	Type	Description
(0010,0010)	Patient's Name	2	Patient's full name. The import process may be configured to use this attribute, in addition to Patient ID, to match the image object with a patient in the database. Only the first 40 characters of the last name in this attribute are used.
(0010,0020)	Patient ID	2	Primary hospital identification number or code for the patient. The image object is only imported if the Patient ID can be uniquely matched with an existing patient's Primary ID in the database. Only the first 20 characters of this attribute are used.

8.3.2 General Study Module

Tag	Name	Type	Description
(0008,0020)	Study Date	2	Date the Study started. If the value is unknown, the import process defaults to the current date of import.
(0008,0030)	Study Time	2	Time the Study started. If the value is unknown, the import process defaults to the current time of import, or optionally midnight.
(0008,1030)	Study Description	3	Institution-generated description or classification of the Study. This attribute may be used instead of Image Comments. Only the first 60 characters of this attribute are used. If the attribute is absent or the value is unknown, the import process defaults to blank.

8.3.3 General Series Module

The Modality attribute in this module is used to identify the source of the image object. In addition to matching the image object with a patient, the image source must be identified. Otherwise the image object is not imported. Identification of the image source also allows the import process to apply image enhancements that are customized for that source. For an RT Image IOD, the Modality attribute in the RT Series Module is used. For an SC Image IOD, the Conversion Type attribute in the SC Equipment Module takes precedence.

Tag	Name	Type	Description
(0008,0060)	Modality	1	Type of equipment that originally acquired the data used to create the image. It must have the corresponding value for the following Image IODs: IOD Value CR CR CT CT MR MR
(0008,103E)	Series Description	3	User provided description of the Series. This attribute may be used instead of Image Comments. Only the first 60 characters of this attribute are used. If the attribute is absent or the value is unknown, the import process defaults to blank.
(0020,000E)	Series Instance UID	1	Unique identifier of the Series. DCM uses this to generate an image series for the import process. For more information, see §3.1.3.1.1.

8.3.4 RT Series Module

The Modality attribute in this module is used to identify the image source for an RT Image IOD.

Tag	Name	Type	Description
(0008,0060)	Modality	1	Type of equipment that originally acquired the data. The value must be RTIMAGE.

8.3.5 General Equipment Module

The following table lists the attributes in this module that are used to identify the image source. For an SC Image IOD, the SC Equipment Module takes precedence.

Tag	Name	Type	Description
(0008,0070)	Manufacturer	2	Manufacturer of the equipment that produced the image. This attribute may be used, in addition to Modality, to identify the image source. This allows the import process to differentiate image objects with the same Modality. Only the first 40 characters of this attribute are used.
(0008,1010)	Station Name	3	User defined name identifying the machine that produced the image. This attribute may be used, in addition to Modality, to identify the image source. This allows the import process to differentiate image objects with the same Modality and Manufacturer.
(0008,1090)	Manufacturer's Model Name	3	Manufacturer's model name of the equipment that produced the image. This attribute may be used, in addition to Modality, to identify the image source. This allows the import process to differentiate image objects with the same Modality. Only the first 40 characters of this attribute are used.

8.3.6 SC Equipment Module

The Conversion Type attribute in this module is used to identify the image source for an SC Image IOD.

Tag	Name	Type	Description
(0008,0064)	Conversion Type	1	Describes the kind of image conversion. The import process only recognizes the following values: DF, DI, DV and WSD
(0018,1016)	Secondary Capture Device Manufacturer	3	Manufacturer of the Secondary Capture Device. This attribute may be used, in addition to Conversion Type, to identify the image source. This allows the import process to differentiate image objects with the same Conversion Type. Only the first 40 characters of this attribute are used.
(0018,1018)	Secondary Capture Device Manufacturer's Model Name	3	Manufacturer's model number of the Secondary Capture Device. This attribute may be used, in addition to Conversion Type, to identify the image source. This allows the import process to differentiate image objects with the same Conversion Type. Only the first 40 characters of this attribute are used.

8.3.7 General Image Module

Tag	Name	Type	Description
(0008,0023)	Content Date	2C	The date the image pixel data creation started. This attribute may be used instead of Study Date. If the value is unknown, the import process defaults to the current date of import.
(0008,0033)	Content Time	2C	The time the image pixel data creation started. This attribute may be used instead of Study Time. If the value is unknown, the import process defaults to the current time of import, or optionally midnight.
(0020,4000)	Image Comments	3	User-defined comments about the image. Only the first 60 characters of this attribute are used. If the attribute is absent or the value is unknown, the import process defaults to blank.

8.3.8 Image Plane Module

Tag	Name	Type	Description
(0018,0050)	Slice Thickness	2	Nominal slice thickness, in mm. If the value is unknown, the import process defaults to 0.
(0020,0032)	Image Position (Patient)	1	The x, y, and z coordinates of the upper left hand corner of the image, in mm. DCM uses this to generate an image series for the import process. For more information, see §3.1.3.1.1.
(0020,0037)	Image Orientation (Patient)	1	The direction cosines of the first row and the first column with respect to the patient. DCM uses this to generate an image series for the import process. For more information, see §3.1.3.1.1.
(0020,1041)	Slice Location	3	Relative position of exposure expressed in mm. If the attribute is absent or the value is unknown, the import process defaults to 0.
(0028,0030)	Pixel Spacing	1	Physical distance in the patient between the center of each pixel, in mm. If the row and column spacing values are not equal (pixels are not square), the image appears distorted when displayed and measurements made on the image are inaccurate.

8.3.9 Image Pixel Module

See §8.4 for an important statement regarding import process limitations when extracting and storing image pixel data.

Tag	Name	Type	Description
(0028,0002)	Samples per Pixel	1	Number of samples (planes) in this image. This attribute is not explicitly used; the value is assumed to be 1. Otherwise the image object is not imported.
(0028,0004)	Photometric Interpretation	1	Specifies the intended interpretation of the pixel data. This attribute is not explicitly used; the value is assumed to be MONOCHROME2. Otherwise, if the value is MONOCHROME1, the image is displayed with an inverted grayscale; if the value is anything else, the import process does not properly interpret the image.
(0028,0010)	Rows	1	Number of rows in the image. The value must be within the range 16 to 4096. Otherwise the image object is not imported.
(0028,0011)	Columns	1	Number of columns in the image. The value must be within the range 16 to 4096. Otherwise the image object is not imported.
(0028,0034)	Pixel Aspect Ratio	1C	Ratio of the vertical size and horizontal size of the pixels in the image. This attribute is not explicitly used; pixel aspect ratio is assumed to be 1\1. Otherwise the image appears distorted when displayed and measurements made on the image

Tag	Name	Type	Description
			are inaccurate.
(0028,0100)	Bits Allocated	1	Number of bits allocated for each pixel sample. The value must be 8 or 16. Otherwise the image object is not imported.
(0028,0101)	Bits Stored	1	Number of bits stored for each pixel sample. The value must be within the range 1 to Bits Allocated. Otherwise the import process defaults to Bits Allocated.
(0028,0102)	High Bit	1	Most significant bit for pixel sample data. This attribute is not explicitly used; the value is assumed to be Bits Stored - 1. Otherwise the import process does not properly interpret the image.
(0028,0103)	Pixel Representation	1	Data representation of the pixel samples. The value must be 1 or 0. A value of 1 indicates that the pixel values are signed, and 0 unsigned.
(7FE0,0010)	Pixel Data	1	A data stream of the pixel samples that comprise the image.

8.3.10 CR Image Module

Tag	Name	Type	Description
(0018,1164)	Imager Pixel Spacing	3	Physical distance between the center of each pixel in mm. If the row and column spacing values are not equal (pixels are not square), the image appears distorted when displayed and measurements made on the image are inaccurate.

8.3.11 SC Image Module

Tag	Name	Type	Description
(0018,1012)	Date of Secondary Capture	3	The date the Secondary Capture Image was captured. This attribute may be used instead of Study Date. If the attribute is absent or the value is unknown, the import process defaults to the current date of import.
(0018,1014)	Time of Secondary Capture	3	The time the Secondary Capture Image was captured. This attribute may be used instead of Study Time. If the attribute is absent or the value is unknown, the import process defaults to the current time of import, or optionally midnight.

8.3.12 RT Image Module

Tag	Name	Type	Description
(0008,0008)	Image Type	1	Image identification characteristics. Only the third value of this attribute is used.
(3002,0002)	RT Image Label	1	User-defined label for RT Image. This attribute may be used instead of RT Image Name to match the image with a radiotherapy treatment Field ID for the patient in the database. Only the first 5 characters of this attribute are used.
(3002,0003)	RT Image Name	3	User-defined name for RT Image. This is used to match the image with a radiotherapy treatment Field ID for the patient in the database. Only the first 5 characters of this attribute are used. If the attribute is absent or the value is unknown, the import process does not associate the image with a treatment field.
(3002,000C)	RT Image Plane	1	Describes whether or not image plane is normal to beam axis. The value must be NORMAL. Otherwise the image object is not imported.
(3002,000D)	X-Ray Image Receptor Translation	3	Position in (x,y,z) coordinates of origin of IEC X-RAY IMAGE RECEPTOR System in the IEC GANTRY coordinate system (mm). The x and y values are used to calculate image scaling; the z value is ignored. If the attribute is absent or the values are unknown, the import process defaults to 0,0,0.
(3002,000E)	X-Ray Image Receptor Angle	2	Orientation of IEC X-RAY IMAGE RECEPTOR coordinate system with respect to IEC GANTRY coordinate system (degrees). This attribute is used to calculate image scaling. If the value is unknown, the import process defaults to 0.
(3002,0010)	RT Image Orientation	2C	The direction cosines of the first row and the first column with respect to the IEC X-RAY IMAGE RECEPTOR coordinate system. If the attribute is present and has values other than 1,0,0,0,-1,0, the image object is not imported.

Tag	Name	Type	Description
(3002,0011)	Image Plane Pixel Spacing	2	Physical distance (in mm) between the center of each image pixel. This attribute is used to calculate image scaling. If the row and column spacing values are not equal (pixels are not square), the image appears distorted when displayed and measurements made on the image are inaccurate. If the values are unknown or not equal, image scaling cannot be calculated.
(3002,0012)	RT Image Position	2	The x and y coordinates (in mm) of the upper left hand corner (first pixel transmitted) of the image, in the IEC XRAY IMAGE RECEPTOR coordinate system. This attribute is used to calculate image scaling. If the values are unknown, image scaling cannot be calculated.
(3002,0020)	Radiation Machine Name	2	User-defined name identifying radiation machine used in acquiring or computing image. If the value is unknown, the import process defaults to 'Unknown'.
(3002,0022)	Radiation Machine SAD	2	Radiation source to Gantry rotation axis distance of radiation machine used in acquiring or computing image (mm). This attribute is used to calculate image scaling. If the value is unknown, the import process defaults to 0 and image scaling cannot be calculated.
(3002,0024)	Radiation Machine SSD	3	Source to patient surface distance (in mm) of radiation machine used in acquiring or computing image. If the attribute is absent or the value is unknown, the import process defaults to 0.
(3002,0026)	RT Image SID	2	Distance from radiation machine source to image plane (in mm) along radiation beam axis. This attribute is used to calculate image scaling. If the value is unknown, the import process defaults to 0 and image scaling cannot be calculated.

8.3.13 VOI LUT Module

The Window Center and Window Width attributes in this module are used by the import process to produce the display image in the database. The import process assumes no Modality LUT transformation is required and applies the VOI LUT transformation (using Window Center and Window Width) directly to the stored pixel values. If a Modality LUT transformation is required, the application of the VOI LUT transformation directly to the stored pixel values results in incorrect image display.

Tag	Name	Type	Description
(0028,1050)	Window Center	3	Window Center for display. If multiple values are present, only the first value is used. If the attribute is absent or the value is unknown, the import process does not apply the VOI LUT transformation.
(0028,1051)	Window Width	1C	Window Width for display. If multiple values are present, only the first value is used. If the attribute is absent or the value is unknown, the import process does not apply the VOI LUT transformation.

8.3.14 SOP Common Module

Tag	Name	Type	Description
(0008,0005)	Specific Character Set	1C	Character Set that expands or replaces the Basic Graphic Set. This attribute is not explicitly used; all characters in strings are assumed to be from the Default Character Repertoire as defined in {DICM}. Otherwise string comparisons with data from the database may fail, and applications that access the imported character strings may not print or display them correctly.
(0008,0012)	Instance Creation Date	3	Date the SOP Instance was created. This attribute may be used instead of Study Date. If the attribute is absent or the value is unknown, the import process defaults to the current date of import.
(0008,0013)	Instance Creation Time	3	Time the SOP Instance was created. This attribute may be used instead of Study Time. If the attribute is absent or the value is unknown, the import process defaults to the current time of import, or optionally midnight.

8.4 IMPORT PROCESS LIMITATIONS WHEN EXTRACTING AND STORING IMAGE PIXEL DATA

The import process makes assumptions about certain attribute values that it does not explicitly use, but are nonetheless important for proper interpretation of the image pixel data. All assumptions and restrictions are listed in the tables in the preceding section, and cases that result in a failure to import an image object are described. Assumptions about Pixel Spacing, Photometric Interpretation and Pixel Aspect Ratio may result in incorrect image display, but do not otherwise affect the stored pixel data.

Certain assumptions may result in undesired modification of image pixel data, however, even though the image object is otherwise successfully imported. The following two cases constitute these limitations:

8.4.1 Bits Stored less than Bits Allocated, High Bit equal to Bits Stored - 1

In this case, the import process masks off any extra-pixel data (e.g. an overlay encoded in the bits above the High Bit). The stored pixel data has 0 for all such bits, but the original pixel sample values are stored and image display is correct.

8.4.2 Bits Stored less than Bits Allocated, High Bit not equal to Bits Stored - 1

Since the import process assumes High Bit equal to Bits Stored - 1, this case results in incorrect extraction of the pixel data. As in the case above, data above the assumed High Bit (Bits Stored - 1) is masked off. This data may contain pixel sample as well as extra-pixel data. The effect on image display varies depending on how many bits of the actual pixel sample are lost and whether extra-pixel data is encoded in the least significant bits of each pixel. Regardless, the stored pixel data is an incorrect representation of the original pixel sample and image display is not correct.

9. APPENDIX B

9.1 SPECIFIC CONFORMANCE FOR RT PLAN IOD

The Radiotherapy Plan Information Object Definition (RT Plan IOD) is used to transfer treatment plans generated by manual entry, a virtual simulation system or a treatment planning system before or during a course of treatment.

RT Plans received by DCM are translated to RTP Link Utility files that the LANTIS application imports. The LANTIS application performs an import process that extracts information from the RTP Link Utility file and stores the information in the database. DCM and the LANTIS application work together, acting as an SCP of the Storage Service Class for the RT Plan IOD.

DCM provides Standard Conformance to the standard extended DICOM RT Plan Storage Class at Level 0 (Local) as an SCP. Information stored in the database is accessed by the LANTIS application for display, editing, etc. Information may be stored indefinitely or deleted from the database using LANTIS.

9.2 RT PLAN IOD MODULES

The following table identifies the modules used when translating an RT Plan object to the RTP Link Utility file and importing the file into the database. A module is shown with a reference of Not Used if none of its attributes are accessed during translation or import.

Module Name	Reference	Usage
Patient	§9.3.1	M
General Study	Not Used	M
Patient Study	Not Used	U
RT Series	§9.3.2	M
General Equipment	§9.3.3	M
RT General Plan	§9.3.4	M
RT Prescription	§9.3.5	U
RT Tolerance Tables	§9.3.6	U
RT Patient Setup	Not Used	U
RT Fraction Scheme	§9.3.7	U
RT Beams	§9.3.8	C – Required if RT Fraction Scheme Module exists and Number of Beams is greater than zero for one or more fraction groups.
RT Brachy Application Setups	Not Used	C – Required if RT Fraction Scheme Module exists and Number of Brachy Application Setups is greater than zero for one or more fraction groups.
Approval	§9.3.9	U
Audio	Not Used	U
SOP Common	§9.3.10	M

Refer to {DICM} for a complete definition of the Usage notation, summarized as follows:
M mandatory Module.
C conditional Module.
U user option Module.

9.3 MODULE ATTRIBUTES

This section lists the attributes of each module that are used by the translation and import process; attributes that are not accessed are not shown. Restrictions on attribute values and usage are also listed. Refer to {DICM} for a complete definition of the Type notation, summarized as follows:

1 The attribute must be included and have a valid value.

1C The attribute must be included under certain conditions. If included, it must have a valid value.

2 The attribute must be included. If the value is unknown, it can be null (empty).

3 The attribute is optional. It may or may not be included in the module. If included, the attribute may or may not have a null value.

9.3.1 Patient Module

The following table lists the attributes that are used to match the RT Plan with a patient in the database. If the patient in the RT Plan cannot be identified and uniquely matched with an existing patient in the database, the RT Plan is not imported.

Once the patient is identified and matched, the Information Management System uses none of the patient information contained in the RT Plan. The patient information already stored in the database is used for further reference and is not affected by patient information contained in the RT Plan.

Tag	Name	Type	Description
(0010,0010)	Patient's Name	2	Patient's full legal name. The import process is configured to use the last name in this attribute, in addition to Patient ID, to match the RT Plan with a patient in the database. The first 40 characters of the last name and the first 20 characters of the first name in this attribute are used.
(0010,0020)	Patient ID	2	Primary hospital identification number or code for the patient. The RT Plan will only be imported if this attribute and Patient's Name can be uniquely matched with an existing patient in the database. Only the first 20 characters of this attribute are used.

9.3.2 RT Series Module

Tag	Name	Type	Description
(0008,0060)	Modality	1	Type of equipment that originally acquired the data. Enumerated value must be RTPLAN.

9.3.3 General Equipment Module

Tag	Name	Type	Description
(0008,0070)	Manufacturer	2	This attribute is translated to RTP_Mfg. Only the first 20 characters of this attribute are used.
(0008,1090)	Manufacturer's Model Name	3	This attribute is translated to RTP_Model. Only the first 20 characters of this attribute are used.
(0018,1020)	Software Version	3	This attribute is translated to RTP_Version. Only the first 10 characters of this attribute are used.

9.3.4 RT General Plan Module

Tag	Name	Type	Description
(0008,1070)	Operator's Name	2	Name of operator creating treatment plan. This attribute is translated to Author_Last_Name (20 characters), Author_First_Name (20 characters) and Author_Minitial (1 character).
(300A,0002)	RT Plan Label	1	This attribute is translated to Plan_ID (first 15 characters only). If this attribute consists of numbers, the first 2 digits are translated to Course_ID (1-99).
(300A,0006)	RT Plan Date	2	This attribute is translated to Plan_Date (yyyymmdd).
(300A,0007)	RT Plan Time	2	This attribute is translated to Plan_Time (hhmmss).
(300A,0009)	Treatment Protocols	3	This attribute is translated to Technique and only the first 20 characters are used.

9.3.5 RT Prescription Module

The following table lists the attributes that are used to create primary and secondary treatment sites for the patient. If Dose Reference Description conflicts with an existing Primary Treatment Site Name or Secondary Treatment Region Name in the database, the dose reference is not imported.

Tag	Name	Type	Description
(300A,000E)	Prescription Description	3	This attribute is translated to RX_Note. Only the first 60 characters are used.
(300A,0010)	Dose Reference Sequence	3	Introduces sequence of Dose References.
(300A,0012)	> Dose Reference Number	1C	Identification number of the Dose Reference. This attribute is translated to Rx_Site_Name or Region_Name (see description below) if Dose Reference Description does not exist or is NULL.
(300A,0016)	> Dose Reference Description	3	This attribute is translated to Rx_Site_Name if Dose Reference Type (300A,0020) is TARGET, or Region_Name if Dose Reference Type is ORGAN_AT_RISK. Only the first 20 characters of this attribute are used.
(300A,001A)	> Nominal Prior Dose	3	Dose (in Gy) from prior treatment to this Dose Reference. This attribute is translate to Region Prior Dose (Gy to cGy) and ranges from 1 to 99999 cGy.
(300A,0020)	> Dose Reference Type	1C	Enumerated values are TARGET or ORGAN_AT_RISK.
(300A,0022)	> Delivery Warning Dose	3	The dose which when reached or exceeded should cause some action to be taken. This attribute is translated to Action Dose (Gy to cGy) and ranges from 1 to 99999 cGy.
(300A,0026)	> Target Prescription Dose	3	Prescribed dose to Dose Reference if Dose Reference Type (300A,0020) is TARGET. This attribute is translated to Dose_TTL (Gy to cGy) and ranges from 1 to 99999; and is used in calculating Dose_TX (Gy to cGy), i.e. Dose_Tx is equal to Target Prescription Dose divided by Number of Fractions Planned (300A,0078). It ranges from 1 to 9999 cGy.

9.3.6 RT Tolerance Tables Module

The following table lists the attributes used to match the RT Plan with an existing Tolerance Table in the database. If the Tolerance Table Label does not match an existing Tolerance Table ID in the database, the attributes in this module are not imported.

Tag	Name	Type	Description
(300A,0040)	Tolerance Table Sequence	3	Introduces sequence of tolerance tables.
(300A,0043)	> Tolerance Table Label	3	Tolerance Table ID. Valid values are 1-9 inclusive and must match an existing ID in the database.

9.3.7 RT Fraction Scheme Module

Tag	Name	Type	Description
(300A,0070)	Fraction Group Sequence	1	Introduces sequence of Fraction Groups in current Fraction Scheme. Each Fraction Group is translated to a Prescription Site.
(300A,0078)	> Number of Fractions Planned	2	This attribute, together with Target Prescription Dose (300A,0026), is used to calculate Dose_Tx.
(300A,0080)	> Number of Beams	1	Number of Beams in current Fraction Group. This attribute is translated to Number of Fields (1-999) for the current Prescription Site.
(300C,0004)	> Referenced Beam Sequence	1C	Introduces sequence of treatment beams in current Fraction Group. Required if Number of Beams is greater than zero. Each Beam is translated to a Treatment Field within the current Prescription Site.
(300A,0084)	>> Beam Dose	3	This attribute is translated to Field Dose (Gy to cGy) and ranges from 0.01 to 9999.99 cGy.
(300A,0086)	>> Beam Meterset	3	If the Primary Dosimeter Unit (300A, 00B3) is MU, this attribute is translated to Field_Monitor_Units (0.01-9999.99) if Treatment Delivery Type (300A, 00CE) is TREATMENT; and Wedge_Monitor_Units (0-9999.99) if Wedge Position (300A,0118) is IN and Wedge Type (300A,00D3) is MOTORIZED.
(300C,0006)	>> Referenced Beam Number	1C	Uniquely identifies Beam specified by Beam Number within Beam Sequence in RT Beams module.
(300C,0050)	> Referenced Dose Reference Sequence	3	Introduces sequence of Dose References for the current Fraction Group.
(300C,0051)	>> Referenced Dose Reference Number	1C	Uniquely identifies Dose Reference specified by Dose Reference Number within Dose Reference Sequence in RT Prescription module.

9.3.8 RT Beams Module

The following table lists the attributes that are used to create a new treatment field for the patient. Only Beams with a Treatment Delivery Type of TREATMENT are translated to treatment fields. Beams that do not have the Treatment Delivery Type attribute are considered to be TREATMENT beams. If Beam Number conflicts with an existing Treatment Field ID for the patient in the database, the existing treatment field's revision is incremented and the imported field is imported as the current revision. Otherwise a new treatment field is created. If the Treatment Machine Name does not match an existing Treatment Machine in the database, this attribute is not used and the Treatment Machine for this treatment field is set to blank.

Tag	Name	Type	Description
(300A,00B0)	Beam Sequence	1	Introduces sequence of treatment beams for current RT Plan.
(0008,0070)	> Manufacturer	2	This attribute is translated to MLC_Type. If this attribute is "GE", set to 1; "PHILIPS" or "ELEKTA", set to 2; "SCANDATRONICS", set to 3; "SIEMENS", set to 4; "VARIAN", set to 5; "BRAINLAB", set to 6; "RADIONICS", set to 7; "LIEBINGER-FISHER", set to 8; "WELLHOFER", set to 9; "MITSUBISHI", set to 10; "MRC", set to 12; Otherwise, set to 11.
(300A,00B2)	> Treatment Machine Name	2	This attribute is translated to Treatment_Machine and only the first 20 characters of this attribute are used. This attribute is used to match with an existing machine in the database so that conversion of treatment geometry attributes from IECbased coordinate system to machine-based native coordinate system can be performed.
(300A,00B3)	> Primary Dosimeter Unit	3	Measurement unit of machine dosimeter. Enumerated values are MU or MINUTE.
(300A,00B4)	> Source to Axis Distance	3	Radiation source to Gantry rotation axis distance. This attribute is translated to SAD and ranges from 30.0 to 999.9 centimeters.
(300A,00B6)	> Beam Limiting Device Sequence	1	Introduces sequence of beam limiting device (collimator) jaw or leaf (element) sets.

Tag	Name	Type	Description
(300A,00BC)	>> Number of Leaf/Jaw Pairs	1	Number of leaf (element) or jaw pairs (equal to 1 for standard beam limiting device jaws). This attribute is translated to ML C Leaves (20-100) if Beam Limiting Device Type (300A,00B8) is either MLCX or MLCY.
(300A,00C0)	> Beam Number	1	Identification number of the Beam. This attribute is translated to Field_ID if Beam Name (300A,00C2) does not exist or is NULL. Only the first 5 characters of this attribute are used.
(300A,00C2)	> Beam Name	3	This attribute is translated to the Field_ID (first 5 characters).
(300A,00C3)	> Beam Description	3	This attribute is translated to Field_Name (first 20 characters).
(300A,00C4)	> Beam Type	1	Motion characteristic of Beam. Enumerated values are STATIC or DYNAMIC.
(300A,00C6)	> Radiation Type	2	Particle type of Beam. This attribute is translated to Modality. An enumerated value of PHOTON is translated to Xrays, a value of ELECTRON to Elect, and all other enumerated values are translated to NULL.
(300A,00CE)	> Treatment Delivery Type	3	Only Beams with Treatment Delivery Type of TREATMENT are translated to treatment fields. If this attribute is missing, the Beam is considered to be a TREATMENT beam.
(300A,00D0)	> Number of Wedges	1	Number of wedges associated with current Beam. Only a value of 1 is supported.
(300A,00D1)	> Wedge Sequence	1C	Introduces sequence of treatment wedges. Required if Number of Wedges is non-zero.
(300A,00D3)	>> Wedge Type	2C	STANDARD = standard (static) wedge DYNAMIC = moving beam limiting device jaw simulating wedge MOTORIZED = single wedge that can be remotely removed from the beam
(300A,00D4)	>> Wedge ID	3	This attribute is translated to Wedge and Dynamic_Wedge if Wedge Type (300A,00D3) is MOTORIZED. Only the first 10 characters of this attribute are used.
(300A,00E0)	> Number of Compensators	1	Number of Compensators associated with current Beam.
(300A,00E3)	> Compensator Sequence	1C	Introduces sequence of treatment compensators. Required if Number of Compensators is non-zero.

Tag	Name	Type	Description
(300A,00E5)	>> Compensator ID	3	This attribute is translated to Compensator if Radiation Type (300A, 00C6) is PHOTON, or eField Def Aperture if Radiation Type is ELECTRON. Only the first 10 characters of this attribute are used.
(300A,00F0)	> Number of Blocks	1	Number of shielding blocks associated with Beam.
(300A,00F4)	> Block Sequence	1C	Introduces sequence of blocks associated with Beam. Required if Number of Blocks is non-zero.
(300A,00F5)	>> Block Tray ID	3	This attribute is translated to Block. Only the first 10 characters of this attribute are used.
(300A,0107)	> Applicator Sequence	3	Introduces sequence of Applicators. Only a single item shall be permitted in this sequence.
(300A,0108)	>> Applicator ID	1C	This attribute is translated to eApplicator if Radiation Type (300A, 00C6) is ELECTRON. Only the first 10 characters of this attribute are used.
(300A,010E)	> Final Cumulative Meterset Weight	1C	Value of Cumulative Meterset Weight (300A, 0134) for final Control Point. This attribute is used to calculate Monitor_Units (= Cumulative Meterset Weight divided by Final Cumulative Meterset Weight).
(300A,0110)	> Number of Control Points	1	This attribute is translated to Total_Control_Points and ranges in value from 1 to 999. If Beam Type (300A,00C4) is STATIC, Total_Control_Points is set to 1.
(300A,0111)	> Control Point Sequence	1C	Introduces sequence of machine configurations describing treatment beam. Two or more items may be included in this sequence.
(300A,0112)	>> Control Point Index	1C	Index of current Control Point, starting at 0 for first Control Point. This attribute is translated to Control_Pt_Number and ranges in value from 0 to 999.
(300A,0114)	>> Nominal Beam Energy	3	Nominal Beam Energy at control point (MV/MeV). This attribute is translated to Energy and ranges from 0 to 99.99 MeV.
(300A,0115)	>> Dose Rate Set	3	This attribute is translated to Doserate (MU/min) and ranges from 1 to 9999.
(300A,0116)	>> Wedge Position Sequence	3	Introduces sequence of Wedge positions.
(300A,0118)	>>> Wedge Position	1C	Position of Wedge at current control point. Enumerated values are IN or OUT.

Tag	Name	Type	Description
(300A,011A)	>> Beam Limiting Device Position Sequence	1C	Introduces sequence of beam limiting device (collimator) jaw or leaf (element) positions.
(300A,00B8)	>>> Beam Limiting Device Type	1C	X = symmetric jaw pair in X direction Y = symmetric jaw pair in Y direction ASYMX = asymmetric jaw pair in X direction ASYMY = asymmetric jaw pair in Y direction MLCX = multileaf jaw pair in X direction MLCY = multileaf jaw pair in Y direction.
(300A,011C)	>>> Leaf/Jaw Positions	1C	Positions (mm) of beam limiting device leaf or jaw pairs. This attribute is translated to Field_X (00.0-50.0 cm), Field_Y (00.0-50.0 cm), Collimator_X1 (-20.0-25.0 cm), Collimator_X2 (-20.0-25.0 cm), Collimator_Y1 (-20.0-25.0 cm), Collimator_Y2 (-20.0-25.0 cm), and MLC_LPn (-25.0025.00 cm) depending on Beam Limiting Device Type (300A, 00B8).
(300A,011E)	>> Gantry Angle	1C	This attribute translates to Arc_Start_Angle, Arc_Stop_Angle and Gantry_Angle, and ranges from –360.0 to 360.0 degrees.
(300A,011F)	>> Gantry Rotation Direction	1C	Direction of gantry rotation when viewing gantry from isocenter. CW = clockwise CC = counter-clockwise NONE = no rotation. This attribute is translated to Arc_Direction and Gantry_Dir.
(300A,0120)	>> Beam Limiting Device Angle	1C	This attribute is translated to Collimator_Angle and ranges from –360.0 to 360.0 degrees.
(300A,0121)	>> Beam Limiting Device Rotation Direction	1C	Direction of beam limiting device rotation when viewing beam limiting device from radiation source. CW = clockwise CC = counter-clockwise NONE = no rotation. This attribute is translated to Collimator_Dir.
(300A,0122)	>> Patient Support Angle	1C	This attribute is translated to Couch_Angle and ranges from –20.0 to 380.0 degrees.
(300A,0123)	>> Patient Support Rotation Direction	1C	Direction of patient support rotation when viewing table from above. CW = clockwise CC = counter-clockwise NONE = no rotation. This attribute is translated to Couch_Dir.
(300A,0125)	>> Table Top Eccentric Angle	1C	This attribute is translated to Couch_Pedestal and ranges from –20.0 to 380.0 degrees.

Tag	Name	Type	Description
(300A,0126)	>> Table Top Eccentric Rotation Direction	1C	Direction of table top eccentric rotation when viewing table from above. CW = clockwise CC = counter-clockwise NONE = no rotation. This attribute is translated to Couch_Ped_Dir.
(300A,0128)	>> Table Top Vertical Position	2C	Table Top Vertical Position (mm). This attribute is translated to Couch_Vertical and ranges from -999.9 to 999.9 cm.
(300A,0129)	>> Table Top Longitudinal Position	2C	Table Top Longitudinal Position (mm). This attribute is translated to Couch_Longitudinal and ranges from -999.9 to 999.9 cm.
(300A,012A)	>> Table Top Lateral Position	2C	Table Top Lateral Position (mm). This attribute is translated to Couch_Lateral and ranges from -999.9 to 999.9 cm.
(300A,0130)	>> Source to Surface Distance	3	Source to Patient Surface distance (mm). This attribute is translated to SSD and ranges from 10.0 to 999.9 cm.
(300A,0134)	>> Cumulative Meterset Weight	2C	Cumulative Weight to current control point. This attribute is used for calculating Monitor_Units (= Cumulative Meterset Weight divided by Final Cumulative Meterset Weight).
(300C,0050)	>> Referenced Dose Reference Sequence	3	Introduces sequence of Dose References for current Beam. Each Dose Reference translates to either a Primary Site (if Dose Reference Type is TARGET) or Secondary Site (if Dose Reference Type is ORGAN_AT_RISK) for the current Beam.
(300A,010C)	>>> Cumulative Dose Reference Coefficient	2C	Coefficient used to calculate cumulative dose contribution from this Beam to the referenced Dose Reference. This attribute is translated to Reg_Coeff and ranges from 0 to 9.99999.
(300C,0051)	>>> Referenced Dose Reference Number	1C	Uniquely identifies Dose Reference specified by Dose Reference Number in Dose Reference Sequence in RT Prescription module.

9.3.9 Approval Module

Tag	Name	Type	Description
(300E,0002)	Approval Status	1	Approval status at the time the SOP Instance was created. APPROVED = Reviewer recorded that object met an implied criterion UNAPPROVED = No review of object has been recorded REJECTED = Reviewer recorded that object failed to meet an implied criterion
(300E,0008)	Reviewer's Name	2C	Name of person who reviewed object. Required if Approval Status (300E, 0002) is APPROVED or REJECTED. This attribute is translated to MD_Approve_LName (20 characters), MD_Approve_FName (20 characters) and MD_Approve_Minitial (1 character).

9.3.10 SOP Common Module

Tag	Name	Type	Description
(0008,0005)	Specific Character Set	1C	Character Set that expands or replaces the Basic Graphic Set. This attribute is not explicitly used; all characters in strings are assumed to be from the Default Character Repertoire as defined in {DICM}. Otherwise string comparisons with data from the database may fail, and applications that access the imported character strings may not print or display them correctly.

DICOM Documents

DICOM RT Plan Translation 8.3

1. INTRODUCTION

1.1 PURPOSE

This document describes the process of translating a DICOM RT Plan object into an RTP Link Utility Import file. The translation process is part of the operation of Siemens LANTIS DICOM Communication Module (DCM) product.

This document is intended for use by software developers of DICOM interfaces, customers and system integrators who wish to send RT Plans to DCM.

1.2 SCOPE

This document is limited to the definition of the data items and rules used when extracting information from a DICOM RT Plan object to be embedded in an RTP Link Utility Import file. This document refers to the DICOM Standard and Appendix B of DICOM Conformance 8.3, the DICOM Conformance Statement for DCM, for a description of the RT Plan Storage Service Class, and RTP Link Utility Interface Specification, the RTP Link Utility Interface Specification, for a description of the RTP Link Utility Import File format.

1.3 REFERENCES

This document references the following documents:

TITLE
Digital Imaging and Communications in Medicine (DICOM), parts 1-14; published by NEMA.
RTP Link Utility Interface Specification, RTP Link Utility Radiotherapy Treatment Planning Import/Export Interface Specification; published by Siemens Medical Systems, Inc.
DICOM Conformance 8.3, DICOM Communication Module 8.30 DICOM Conformance Statement; published by Siemens Medical Systems, Inc.

1.4 WHAT'S CHANGED?

The following items are new or were changed for the release of DCM 8.30:

♦ The version is now 8.30.

1.5 DOCUMENTATION CONVENTIONS

The following conventions are used throughout this document:

- `Courier new` font indicates a record name, field element or explicit RTP Link Utility Import File value.

1.6 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

CRC Cyclical Redundancy Check

DCM DICOM Communication Module

DICOM Digital Imaging and Communications in Medicine. A standard developed by the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA) for electronic transfer of digital images and associated information.

RT Radiotherapy

RTP Radiotherapy Treatment Planning

2. GENERAL DESCRIPTION

2.1 OVERVIEW

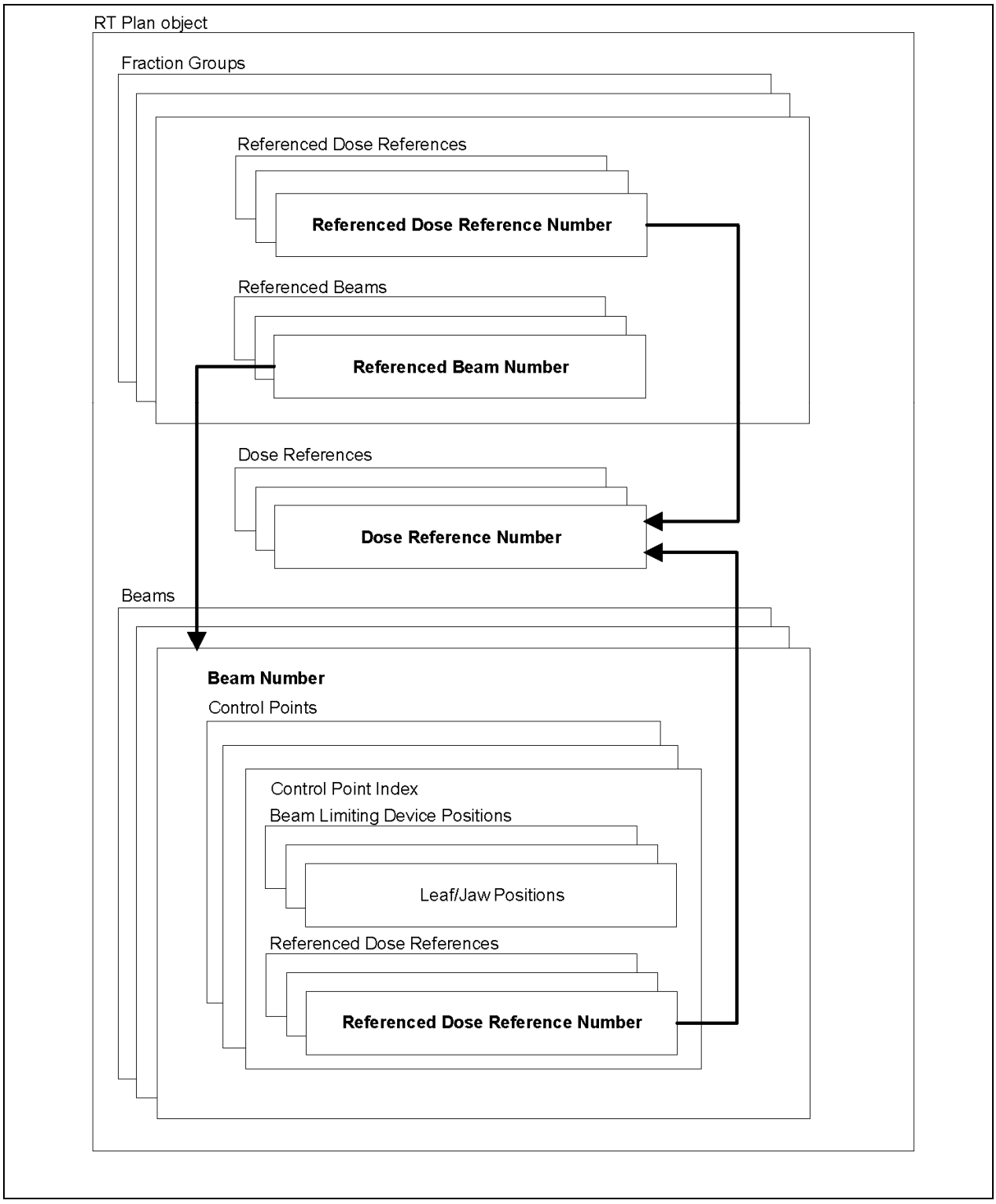
The DICOM RT Plan object is used to transfer treatment plans generated by manual entry, a virtual simulation system or a treatment planning system before or during a course of treatment. It contains geometric and dosimetric data that specifies a course of external beam and/or brachytherapy treatment, for example beam angles, collimator openings, beam modifiers and brachytherapy specifications.

RT Plans received by DCM are translated into RTP Link Utility Import files intended for import by the LANTIS application. LANTIS performs the import process that extracts information from the RTP Link Utility Import file and stores the information in the Information Management System database. For a detailed description of the RTP Link Utility Import file format, refer to RTP Link Utility Interface Specification, the RTP Link Utility Interface Specification.

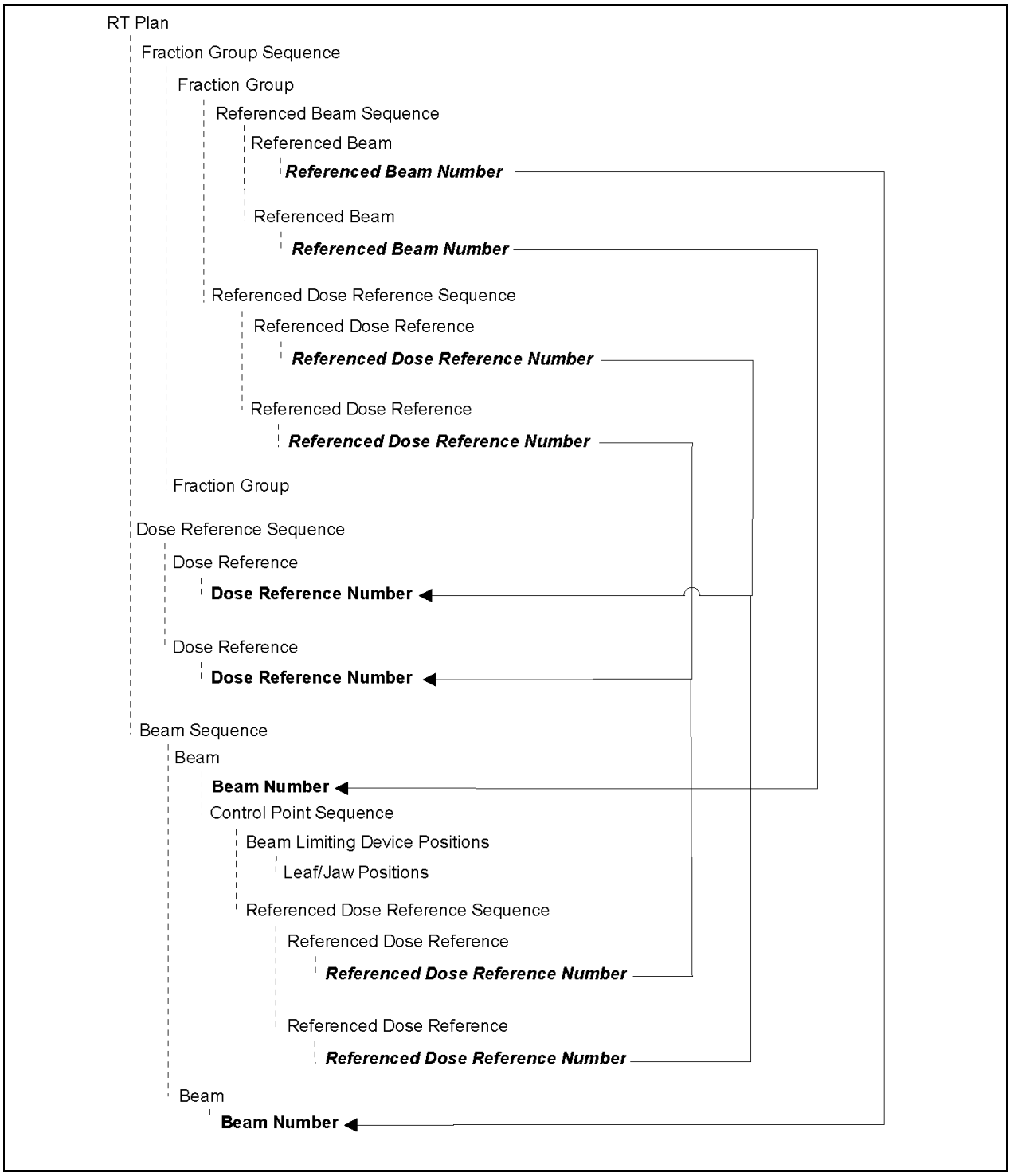
2.1.1 DICOM RT Plan

An RT Plan object may contain zero or more Fraction Groups, Beams and Dose References. Each Fraction Group contains references to Dose References and Beams. Each Beam contains Control Points and each Control Point contains Beam Limiting Device Positions and zero or more references to Dose References.

The following diagrams describe the RT Plan object. For a detailed description, refer to the DICOM Standard.

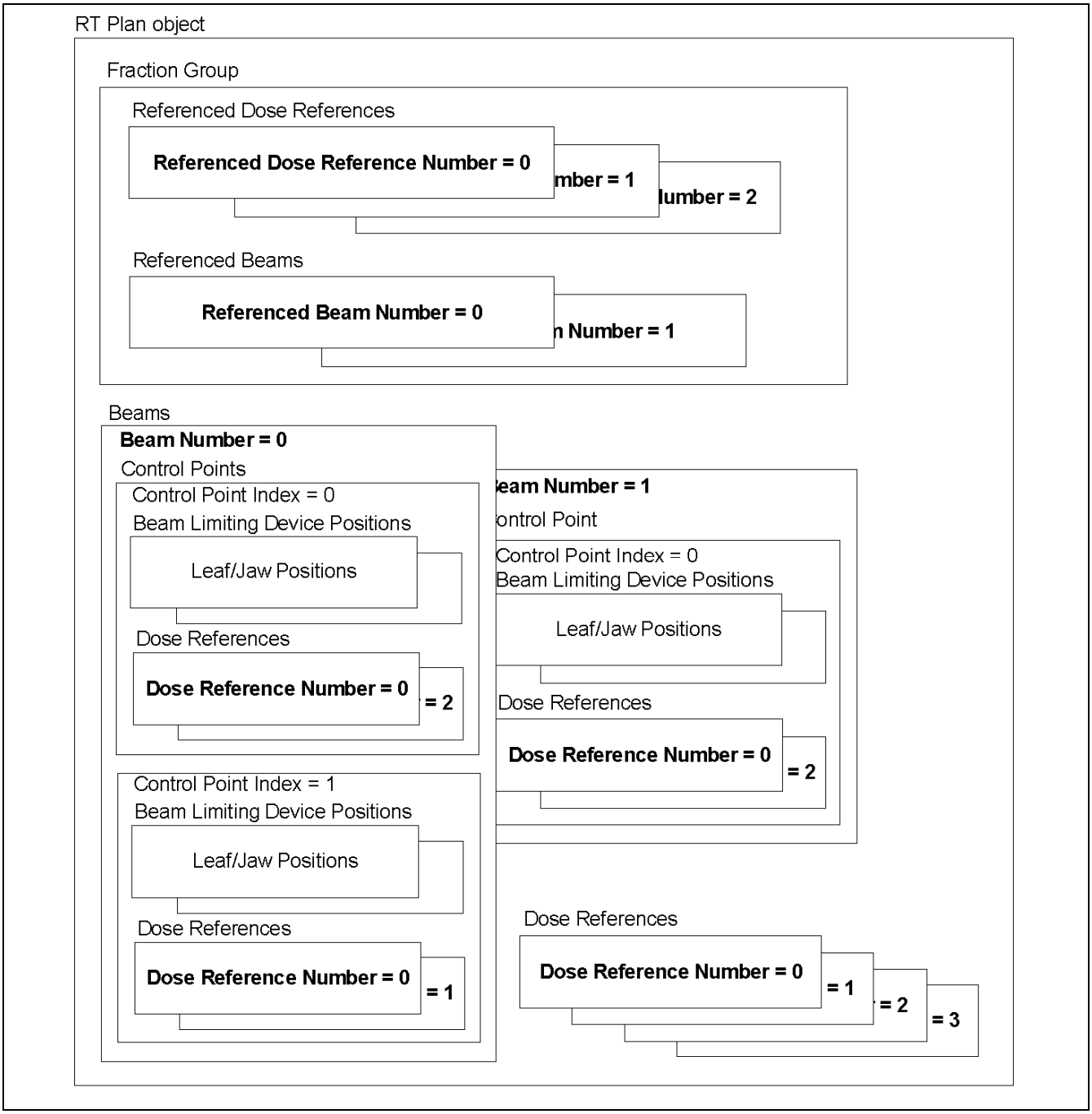


The following describes the RT Plan object in a hierarchical diagram:



2.1.1.1 Example of DICOM RT Plan

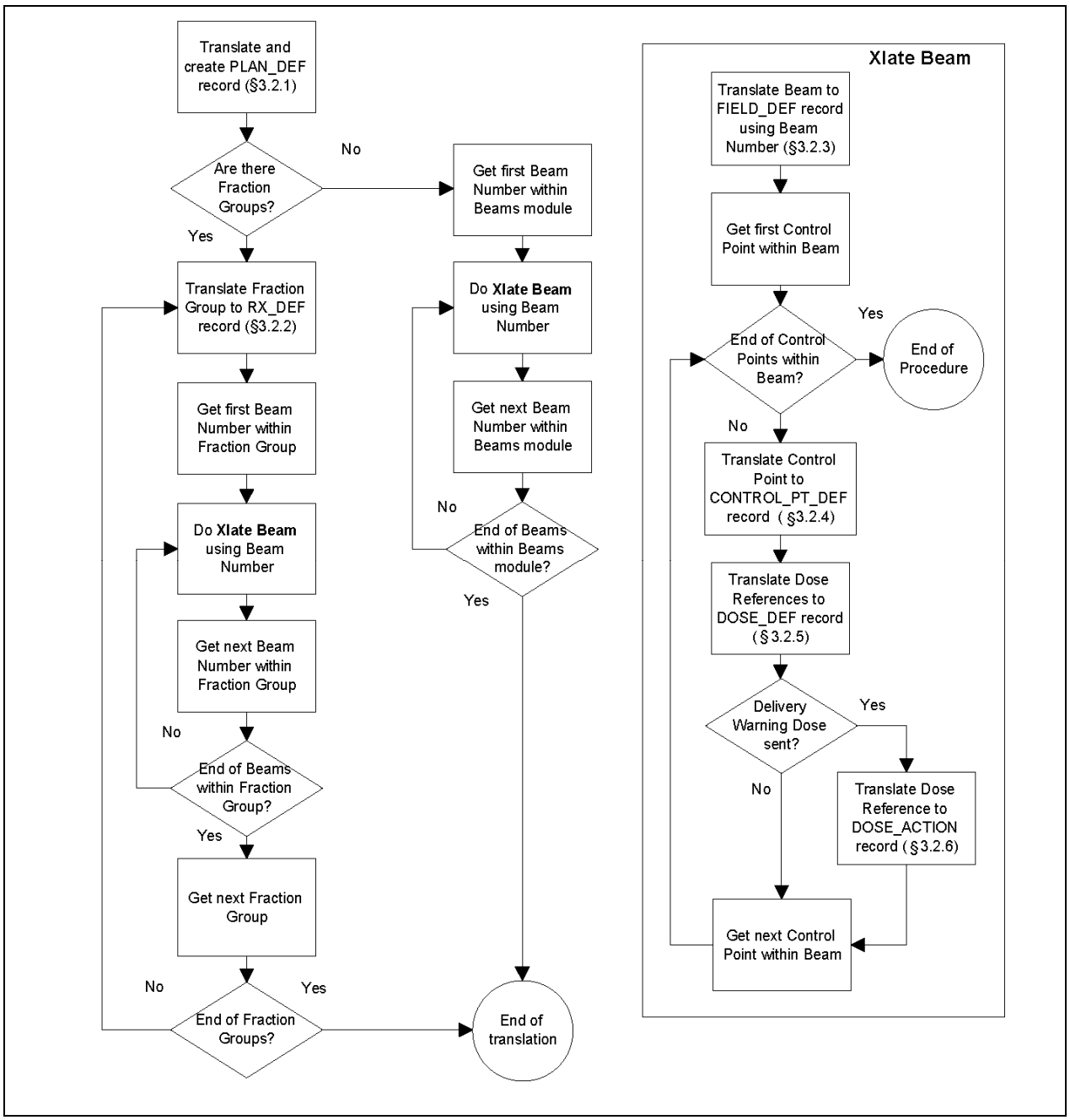
The following diagram is an example of an RT Plan object:



3. DETAILED DESCRIPTION

3.1 TRANSLATION PROCESS

The following flowchart describes the translation process:



3.2 RT PLAN TRANSLATION CONVENTIONS

3.2.1 General Assumptions

The translation process performs the following:

- Rounds/truncates numeric attributes to the nearest value before validating them.
- Retains leading spaces and ignores trailing spaces of string attributes.
- Truncates excess trailing characters from string attributes when the source is larger than the destination.
- Sets the destination to NULL (i.e. "") when a source attribute contains invalid data.
- Sets the destination to NULL when a source attribute lacks data, the data is invalid or the data otherwise fails to meet process criteria.

3.2.2 Specific Numeric Operations

Round[1]

- Round to integer value. E.g. 1.3 becomes 1, 1.5 becomes 2, -1.3 becomes -1, -1.5 becomes -2.
- Round to 1 decimal place. E.g. 3.12 becomes 3.1, 3.15 becomes 3.2, -3.12 becomes -3.1, -3.15 becomes -3.2.
- Round to 2 decimal places. E.g. 3.122 becomes 3.12, 3.157 becomes 3.16, -3.122 becomes -3.12, -3.156 becomes -3.16.

Round[2]

- Identify the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>RT Beam Limiting Device Type (300A,00B8). If the attribute MLCX or MLCY is found, round down to integer value, e.g. 1.3 becomes 1, 1.5 becomes 1, -1.3 becomes -2, -1.5 becomes –2; else round to integer value, e.g. 1.3 becomes 1, 1.5 becomes 2, -1.3 becomes –1, -1.5 becomes -2.

Round[3]

- Identify the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>RT Beam Limiting Device Type (300A,00B8). If the attribute MLCX or MLCY is found, round up to integer value, e.g. 1.3 becomes 2, 1.5 becomes 2, -1.3 becomes -1, -1.5 becomes –1; else round to integer value, e.g. 1.3 becomes 1, 1.5 becomes 2, -1.3 becomes –1, , -1.5 becomes -2.

First[1]

- First two consecutive digits. E.g. 123 and a123bcd become 12, ab1c23d becomes 1.

3.2.3 Specific String Operations

Name Parsing[1]

- In the DICOM Standard, the PN (Person Name) Value Representation (data type) is defined as a character string delimited by caret "^" characters (5EH). The character string before the first caret delimiter, or the whole character string if no caret delimiter is found, shall be used as the last name. The character string between the first caret delimiter and the next delimiter or space character (20H) shall be used as the first name. If a third caret delimiter is present, the character string between the second and third delimiter shall be the middle name; else the character string between the first space character after the first caret delimiter and the next space character shall be the middle name.

3.3 RTP LINK UTILITY RECORDS CREATED FROM TRANSLATED DICOM ATTRIBUTES

3.3.1 RTP Link Utility Record: PLAN_DEF

Only one PLAN_DEF record is created in an RTP Link Utility Import file. The following table maps the fields within the PLAN_DEF record to the DICOM attributes.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Keyword	—	PLAN_DEF
Patient_ID	S(20)	Patient ID (0010,0020)
Patient_Last_Name	S(40)	Patient's Name (0010,0010). Follow Name Parsing[1] convention
Patient_First_Name	S(40)	Patient's Name (0010,0010). Follow Name Parsing[1] convention
Patient_MInitial	S(01)	Patient's Name (0010,0010). Follow Name Parsing[1] convention
Plan_ID	S(15)	RT Plan Label (300A,0002)
Plan_Date	YYYYMMDD	RT Plan Date (300A,0006)
Plan_Time	HHMMSS	RT Plan Time (300A,0007)
Course_ID	See §3.4	RTP Link Utility Common Element
Diagnosis	—	NULL
MD_Last_Name	—	NULL
MD_First_Name	—	NULL
MD_MInitial	—	NULL
MD_Approve_LName	S(20)	Reviewer Name (300E,0008). Follow Name Parsing[1] convention
MD_Approve_FName	S(20)	Reviewer Name (300E,0008). Follow Name Parsing[1] convention
MD_Approve_MInitial	S(01)	Reviewer Name (300E,0008). Follow Name Parsing[1] convention
Phy_Approve_LName	S(20)	NULL
Phy_Approve_FName	S(20)	NULL
Phy_Approve_MInitial	S(01)	NULL
Author_Last_Name	S(40)	Operator's Name (0008,1070). Follow Name Parsing[1] convention
Author_First_Name	S(40)	Operator's Name (0008,1070). Follow Name Parsing[1] convention
Author_MInitial	S(01)	Operator's Name (0008,1070). Follow Name Parsing[1] convention
RTP_Mfg	S(20)	Manufacturer (0008,0070)
RTP_Model	S(20)	Manufacturer's Model Name (0008,1090)
RTP_Version	S(10)	Software Version (0018,1020)
RTP_IF_Protocol	S(20)	SIEMENS_DCM_SCP
RTP_IF_Version	S(10)	8.30
CRC	—	Calculated CRC

3.3.2 RTP Link Utility Record: RX_DEF

If there are no Fraction Groups, a single RX_DEF record is created with a Course_IDof "Site 01".

For each existing Fraction Group, determine the Primary Site by looping through all the Reference Beams in the Referenced Beam Sequence (300C,0004). Match the Referenced Beam Number (300C,0006) with a Beam Sequence >Beam Number (300A,00C0). If the Beam Sequence >Treatment Delivery Type (300A,00CE) is TREATMENT, loop through all the Referenced Dose References in Beam Sequence >Control Point Sequence >Referenced Dose Reference Sequence (300C,0050) and match the Referenced Dose Reference Number (300C,0051) with a Dose Reference Sequence >Dose Reference Number (300A,0012). The Primary Site is the first Dose Reference with the Dose Reference Type (300A,0020) of TARGET. If no Dose Reference with a Dose Reference Type of TARGET is found, the first Referenced Dose Reference will be the Primary Site.

Creating RX_DEF records based on fraction groups and the derived Primary Site:

```
FOR each fraction group in a Fraction Group Sequence (300A,0070)
   FOR each reference beam in the Referenced Beam Sequence (300C,0004)
      READ the Referenced Beam Number (300C,0006)
      IF the Referenced Beam Number matches the Beam Sequence >Beam Number (300A,00C0)
         IF the Beam Sequence >Treatment Delivery Type (300A,00CE) is TREATMENT (or
         attribute doesn't exist)
            FOR each referenced dose in Beam Seq >Control Point Seq >Referenced Dose
            Reference Seq (300C,0050)
               READ the Referenced Dose Reference Number (300C,0051)
               IF the Referenced Dose Ref Number matches the Dose Reference Seq >Dose Ref
               Number (300A,0012)
                  IF the Dose Reference Type (300A,0020) is TARGET
                     SET Primary Site (RX_DEF will be created with this Primary Site)
                     END search for Primary Site for this fraction group
                  ELSE keep looping through referenced doses
               ELSE keep looping through referenced doses
            ENDFOR (referenced doses)
            IF Primary Site not found/set
               SET Primary Site to the first ref dose in Beam Seq >Control Point Seq
               >Referenced Dose Reference Seq (RX_DEF will be created with this Primary
               Site)
               END search for Primary Site for this fraction group
            ELSE keep looping through referenced beams
         ELSE keep looping through referenced beams
      ELSE keep looping through referenced beams
   ENDFOR (referenced beams)
   IF Primary Site not found/set
      SET Primary Site to NULL (default RX_DEF will be created for this fraction group)
   ELSE keep looping through fraction groups
ENDFOR (fraction group)
```

Each Fraction Group within the Fraction Group Sequence (300A,0070) is translated to one RX_DEFrecord. For each Fraction Group, all Referenced Dose References except the Dose Reference identified as the Primary Site become Secondary Sites.

The following table maps the fields within the RX_DEF record to the DICOM attributes.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Keyword	—	RX_DEF
Course_ID	See §3.4	RTP Link Utility Common Element
Rx_Site_Name	See §3.4	RTP Link Utility Common Element
Technique	S(20)	Treatment Protocols (300A,0009)
Modality	S(10)	Within the **first** beam of the Referenced Beam Sequence (300C,0004) of the **current** Fraction Group Sequence (300A,0070), match the Referenced Beam Number (300C,0006) with a Beam Sequence >Beam Number (300A,00C0); get the Beam Sequence >Radiation Type (300A,00C6): Radiation Type — Modality PHOTON — Xrays ELECTRON — Elect Otherwise — NULL
Dose_Spec	—	NULL
Rx_Depth	—	NULL
Dose_TTL	1-32767 cGy	Within the primary site's Dose Reference (for the current fraction group), use Target Prescription Dose (300A,0026), format: float (Gy). Multiply float by 100 and truncate to integer.
Dose_Tx	1-9999 cGy	Multiply TPD (float) by 100, divide by Number of Fractions Planned (integer) and truncate to integer: TPD: within the primary site's Dose Reference Sequence, get Target Prescription Dose (300A,0026); NFP: within the Fraction Group Sequence (300A,0070), get Number of Fractions Planned (300A,0078).
Pattern	—	NULL
Rx_Note	S(60)	Prescription Description (300A,000E)
Number_of_Fields	1-999	Within the **current** Fraction Group Sequence, use Number of Beams (300A,0080).
CRC	—	Calculated CRC

3.3.3 RTP Link Utility Record: FIELD_DEF

Each Beam within the Beam Sequence (300A,00B0) that has the Treatment Delivery Type (300A,00CE) TREATMENT is translated to one FIELD_DEF record. Beams that lack the Treatment Delivery Type attribute are assumed to be TREATMENT beams. The Beam is retrieved from the Beam Sequence (300A,00B0) using the Beam Number.

The following table maps the fields within the FIELD_DEF record to the DICOM attributes.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Keyword	—	FIELD_DEF
Rx_Site_Name	See §3.4	RTP Link Utility Common Element
Field_Name	S(20)	Within the current Beam Sequence, use Beam Description (300A,00C3).
Field_ID	See §3.4	RTP Link Utility Common Element
Field_Note	S(60)	NULL
Field_Dose	0.01-9999.99 cGy	Within the current Fraction Group Sequence, within the Referenced Beam Sequence, find the Referenced Beam that has matching Beam Number (300C,0006). Use Beam Dose (300A,0084) of the Referenced Beam; format: float (Gy). Multiply float by 100 and truncate to 2 decimal places
Field_Monitor_Units	0.01-9999.99 MU	If Beam Sequence >Primary Dosimeter Unit (300A,00B3) is MU, then use Beam Sequence >Beam Number (300A,00C0) as the derived beam. Identify the Fraction Group Sequence >Referenced Beam Sequence (300C,0004) from the current Fraction Group Sequence, where Fraction Group Sequence >Referenced Beam Sequence >>Referenced Beam Number (300C,0006) is equal to the derived beam. Use the Fraction Group Sequence >Referenced Beam Sequence >>Beam Meterset (300A,0086) attribute from the Referenced Beam Sequence identified above. Truncate float to 2 decimal places.
Wedge_Monitor_Units	0-9999.99 MU	Within the Beam Sequence: If Primary Dosimeter Unit (300A,00B3) is MU and Wedge Type (300A,00D3) is MOTORIZED, determine the Cumulative Meterset Weight (300A,0134) from the last Control Point where Wedge Position (300A,0118) is IN. Divide Cumulative Meterset Weight by Final Cumulative Weight (300A,010E), multiply by Beam Meterset (300A,0086) for current beam, and truncate float to 2 decimal places.
Treatment_Machine	S(20)	Within the current Beam Sequence, use Treatment Machine Name (300A,00B2). NOTE: This element is used to match with an existing machine in the database so that conversion of treatment geometry attributes from IEC-based coordinate system to machine-based native coordinate system can be performed.
Treatment_Type	See §3.3.3.1	

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Modality	S(05)	Within the current Beam Sequence, get Radiation Type (300A,00C6): Radiation Type Modality PHOTON Xrays ELECTRON Elect Otherwise NULL
Energy	See §3.4	RTP Link Utility Common Element
Time	—	NULL
Doserate	See §3.4	RTP Link Utility Common Element
SAD	30.0-999.9 cm	Within the current Beam Sequence, use Source to Axis Distance (300A,00B4), format: float (mm). Divide float by 10 and Round$_1$ to 1 decimal place
SSD	See §3.4	RTP Link Utility Common Element
Gantry_Angle	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Collimator_Angle	-360.0-360.0 degrees	Within the current Beam Sequence, within the **first** Control Point Sequence, use Beam Limiting Device Angle (300A,0120), format: float (deg). Round$_1$ float to 1 decimal place
Field_X_Mode	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Field_X	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Collimator_X1	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Collimator_X2	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Field_Y_Mode	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Field_Y	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Collimator_Y1	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Collimator_Y2	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Couch_Vertical	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Couch_Lateral	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Couch_Longitudinal	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Couch_Angle	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Couch_Pedestal	See §3.4	Within the current Beam Sequence, within the **first** Control Point Sequence: RTP Link Utility Common Element
Tolerance_Table	1-9	Identify the Tolerance Table from the Tolerance Table Sequence (300A,0040) where Tolerance Table Sequence >Tolerance Table Number (300A,0042) is equal to Referenced Tolerance Table Number (300C,00A0), use Tolerance Table Label (300A,0043).
Arc_Direction	S(03)	If FIELD_DEF:Treatment_Type is determined to be ARC, then continue; otherwise NULL. Within the **first** Control Point Sequence, get Gantry Rotation Direction (300A,011F): Gantry Rotation Direction — Arc_Direction CW — CW CC — CCW Otherwise — NULL
Arc_Start_Angle	-360.0-360.0 degrees	If FIELD_DEF:Treatment_Type is determined to be ARC, then continue; otherwise NULL. Within the **first** Control Point Sequence, use Gantry Angle (300A,011E), format: float (deg). Round$_1$ float to 1 decimal place.
Arc_Stop_Angle	-360.0-360.0 degrees	If FIELD_DEF:Treatment_Type is determined to be ARC, then continue; otherwise NULL. Within the **last** Control Point Sequence, use Gantry Angle (300A,011E), format: float (deg). Round$_1$ float to 1 decimal place.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Arc_MU_Degree	0.0-99.99 MU/degree	If FIELD_DEF:Treatment_Type is determined to be ARC, then continue; otherwise NULL. Use the Fraction Group Sequence >Referenced Beam Sequence >>Beam Meterset (300A,0086) attribute where Fraction Group Sequence >Referenced Beam Sequence >>Referenced Beam Number (300C,0006) is equal to the Beam Number of the current Beam Sequence. Divide Beam Meterset by the difference between the Gantry Angles (300A,011E) in the **first** Control Point Sequence and the **last** Control Point Sequence. Round[1] float to 2 decimal places. **Note**: The difference between the Gantry Angles in the first Control Point Sequence and the last Control Point Sequence is calculated based on the Gantry Rotation Direction (300A,011F): Gantry Rotation Direction — Difference in Gantry Angles CW — If `Arc_Start_Angle> Arc_Stop_Angle` Difference = `Arc_Stop_Angle + 360 – Arc_Start_Angle` Else Difference = `Arc_Stop_Angle – Arc_Start_Angle` End CC — If `Arc_Stop_Angle> Arc_Start_Angle` Difference = `Arc_Start_Angle + 360 – Arc_Stop_Angle` Else Difference = `Arc_Start_Angle– Arc_Stop_Angle` End
Wedge	S(10)	Within the current Beam Sequence, get Number of Wedges (300A,00D0): if it is 1, within Wedge Sequence, use Wedge ID (300A,00D4).
Dynamic_Wedge	S(10)	NULL
Block	S(10)	Within the Block Sequence (300A,00F4), use Block Tray ID (300A,00F5).
Compensator	S(10)	Within the current Beam Sequence, get Radiation Type (300A,00C6): if it is PHOTON, within the **first** Compensator Sequence (300A,00E3), use Compensator ID (300A,00E5).
e_Applicator	S(10)	Within the current Beam Sequence, get Radiation Type (300A,00C6): if it is ELECTRON, within the Applicator Sequence (300A,0107), use Applicator ID (300A,0108).
e_Field_Def_Aperture	S(10)	Within the current Beam Sequence, get Radiation Type (300A,00C6): if it is ELECTRON, within the **first** Compensator Sequence (300A,00E3), use Compensator ID (300A,00E5).
Bolus	—	NULL
Portfilm_MU_Open	—	NULL
Portfilm_Coeff_Open	—	NULL

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Portfilm_Delta_Open	—	NULL
Portfilm_MU_Treat	—	NULL
Portfilm_Coeff_Treat	—	NULL
CRC	—	Calculated CRC

3.3.3.1 RTP Link Utility Record: FIELD_DEF:Treatment_Type

Within the current Beam Sequence,

Set Treatment_Type to FIXED

IF one or more geometric parameters changes during beam on within Control Points

    Set Treatment_Type to DYNAMIC

ELSE

    IF Number of Control Points (300A,0110) is 2

        IF Gantry Angle (300A,011E) changes within Control Points

            Set Treatment_Type to ARC

        ENDIF

    ELSEIF Number of Control Points (300A,0110) is 4

        IF Wedge Position (300A,0118) and Gantry Angle (300A,011E) change within Control Points

            Set Treatment_Type to ARC

        ENDIF

    ENDIF

ENDIF

3.3.4 RTP Link Utility Record: CONTROL_PT_DEF

If FIELD_DEF:Treatment_Type is determined (§3.3.3.1) to be FIXED or ARC, and no geometric parameters change with the Control Points; then only the **first** Control Point is translated to a single CONTROL_PT_DEF record and the following fields are set to NULL: Energy, Doserate, SSD, Gantry_Angle, Gantry_Dir, Collimator_Angle, Collimator_Dir, Field_X_Mode, Field_X, Collimator_X1, Collimator_X2, Field_Y_Mode, Field_Y, Collimator_Y1, Collimator_Y2. Otherwise, each Control Point is translated to one CONTROL_PT_DEF record.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Keyword		CONTROL_PT_DEF
Field_ID	See §3.4	RTP Link Utility Common Element
MLC_Type	See §3.3.4.1	
MLC_Leaves	0, 20-100	Within the current Beam Sequence, within Beam Limiting Device Sequence, if RT Beam Limiting Device Type (300A,00B8) is MLCX or MLCY, use Number of Leaf Jaw Pairs (300A,00BC).
Total_Control_Points	1-999	If FIELD_DEF:Treatment_Type is determined to be not DYNAMIC 1; otherwise within the current Beam Sequence, use Number of Control Points (300A,0110).
Control_Pt_Number	0-998	Within the Beam Sequence, within the current Control Point Sequence, use Control Point Index (300A,0112).
MU_Convention	1-2	1. (1 means fractional MU, 2 means Absolute MU).
Monitor_Units	0-1.000000 MU	Divide float by float (CMW / fCMW) and truncate float to 6 decimal places: CMW: within the Beam Sequence, within the current Control Point Sequence, use Cumulative Meterset Weight (300A,0134); fCMW: within the Beam Sequence, within the current Control Point Sequence, use Final Cumulative Meterset Weight (300A,010E).
Wedge_Position	IN, OUT	Within the Beam Sequence, within the current Control Point Sequence, within the first Wedge Position Sequence, use Wedge Position (300A,0118).
Energy	See §3.4	RTP Link Utility Common Element
Doserate	See §3.4	RTP Link Utility Common Element
SSD	See §3.4	RTP Link Utility Common Element
Scale_Convention	1-2	2. (1 means Native, 2 means IEC 1217 Convention).
Gantry_Angle	See §3.4	RTP Link Utility Common Element

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Gantry_Dir	S(03)	Within the current Beam Sequence, within the current Control Point Sequence, get Gantry Rotation Direction (300A,011F): Gantry Rotation Direction — Gantry_Dir CW — CW CC — CCW Otherwise — NULL
Collimator_Angle	-360.0-360.0 degrees	Within the current Beam Sequence, within the **current** Control Point Sequence, use Beam Limiting Device Angle (300A,0120), format: float (deg). Round1 float to 1 decimal place.
Collimator_Dir	S(03)	Within the current Beam Sequence, within the current Control Point Sequence, get Beam Limiting Device Rotation Direction (300A,0121): Beam Limiting Device Rotation Direction — Collimator_Dir CW — CW CC — CCW Otherwise — NULL
Field_X_Mode	See §3.4	RTP Link Utility Common Element
Field_X	See §3.4	RTP Link Utility Common Element
Collimator_X1	See §3.4	RTP Link Utility Common Element
Collimator_X2	See §3.4	RTP Link Utility Common Element
Field_Y_Mode	See §3.4	RTP Link Utility Common Element
Field_Y	See §3.4	RTP Link Utility Common Element
Collimator_Y1	See §3.4	RTP Link Utility Common Element
Collimator_Y2	See §3.4	RTP Link Utility Common Element
Couch_Vertical	See §3.4	RTP Link Utility Common Element
Couch_Lateral	See §3.4	RTP Link Utility Common Element
Couch_Longitudinal	See §3.4	RTP Link Utility Common Element
Couch_Angle	See §3.4	RTP Link Utility Common Element
Couch_Dir	See §3.4	RTP Link Utility Common Element
Couch_Pedestal	See §3.4	RTP Link Utility Common Element
Couch_Ped_Dir	See §3.4	RTP Link Utility Common Element

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
MLC_LP$_{1\text{-}100}$	-25.00-25.00 cm	Within the current Beam Sequence, within Beam Limiting Device Sequence, if RT Beam Limiting Device Type (300A,00B8) is MLCX or MLCY, use the **first** n values of Leaf Jaw Positions (300A,011C), where n is determined from within the current Beam Sequence, within Beam Limiting Device Sequence, Number of Leaf Jaw Pairs (300A,00BC). If n < 100, the remaining MLC_LP$_{n+1}$ to MLC_LP$_{100}$ fields are set to NULL. For Leaf Jaw Positions (300A,011C), format: float (mm); Round$_1$ float to 1 decimal place and divide by 10.
MLC_LP$_{101\text{-}200}$	-25.00-25.00 cm	Within the current Beam Sequence, within Beam Limiting Device Sequence, if RT Beam Limiting Device Type (300A,00B8) is MLCX or MLCY, use the **next** n values of Leaf Jaw Positions (300A,011C), where n is determined from within the current Beam Sequence, within Beam Limiting Device Sequence, Number of Leaf Jaw Pairs (300A,00BC). If n < 100, the remaining MLC_LP$_{n+1}$ to MLC_LP$_{200}$ fields are set to NULL. For Leaf Jaw Positions (300A,011C), format: float (mm); Round$_1$ float to 1 decimal place and divide by 10.
CRC		Calculated CRC

3.3.4.1 RTP Link Utility Record: CONTROL_PT_DEF:MLC_Type

Within the current Beam Sequence,

Set MLC_Type to NULL

Get the RT Beam Limiting Device Type (300A,00B8) from the first Control Point

IF RT Beam Limiting Device Type is “MLCX” or “MLCY”

Set MLC_Type to 11

IF Manufacturer (0008,0070) is “GE”

Set MLC_Type to 1

ELSE IF Manufacturer is “PHILIPS” or “ELEKTA”

Set MLC_Type to 2

ELSE IF Manufacturer is “SCANDATRONICS”

Set MLC_Type to 3

ELSE IF Manufacturer is “SIEMENS”

Set MLC_Type to 4

ELSE IF Manufacturer is “VARIAN”

Set MLC_Type to 5

ELSE IF Manufacturer is “BRAINLAB”

Set MLC_Type to 6

ELSE IF Manufacturer is “RADIONICS”

Set MLC_Type to 7

ELSE IF Manufacturer is “LIEBINGER-FISHER”

Set MLC_Type to 8

ELSE IF Manufacturer is “WELLHOFER”

Set MLC_Type to 9

ELSE IF Manufacturer is “MITSUBISHI”

Set MLC_Type to 10

ELSE IF Manufacturer is “MRC”

Set MLC_Type to 12

ENDIF

ENDIF

3.3.5 RTP Link Utility Record: DOSE_DEF

Each Dose Reference within the Dose Reference Sequence (300A,0010) that has been referenced in any Fraction Group is translated to a DOSE_DEF record. Using the Dose Reference Number (300A,0012) within the Dose Reference Sequence, find all Beams in the Beam Sequence that have a matching Referenced Dose Reference Number (300C,0051) within the Referenced Dose Reference Sequence (300C,0050) of the Control Point Sequence (300A,0111) of that Beam. A maximum of 10 Beams per Dose Reference can be described in one DOSE_DEF record. More than one DOSE_DEF record for the same Dose Reference (i.e. the same Region_Name) can be used when more than 10 Beams contribute to one Dose Reference.

The following table maps the fields within the DOSE_DEF record to the DICOM attributes.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Keyword	—	DOSE_DEF
Region_Name	See §3.4	RTP Link Utility Common Element
Region_Prior_Dose	0-32767 cGy	Within the Dose Reference Sequence, use Nominal Prior Dose (300A,001A), format: float (Gy). Multiply float by 100 and Round$_1$ to integer
Field_ID & Reg_Coeff Pairs	—	Ten Field_ID and Reg_Coeff pairs occur in each record, where n is 1-10
Field_ID$_n$	S(05)	Identify a Beam Sequence, where Beam Sequence >Control Point Sequence >>Referenced Dose Reference Sequence >>>Referenced Dose Reference Number (300C,0051) matches Dose Reference Sequence >Dose Reference Number (300A,0012). Use the Beam Sequence >Beam Name (300A,00C2) attribute from the Beam Sequence identified above: • If the attribute isn't NULL, convert to upper case characters. • If the attribute is NULL, then use Beam Sequence >Beam Number (300A,00C0).
Reg_Coeff$_n$	0-9.99999	Use Cumulative Dose Reference Coefficient (300A,010C); which is found within the Beam Sequence, within the Control Point Sequence, within Referenced Dose Reference Sequence with the matching Referenced Dose Reference Number (300C,0051). Round$_1$ float to 5 decimal places.
Actual_Dose	—	NULL
Actual_Fractions	—	NULL
CRC	—	Calculated CRC

3.3.6 RTP Link Utility Record: DOSE_ACTION

Each Dose Reference within the Dose Reference Sequence (300A,0010) that has been referenced in any Fraction Group and has a Delivery Warning Dose (300A,0022) attribute that is not NULL, is translated to a DOSE_ACTION record.

The following table maps the fields within the DOSE_ACTION record to the DICOM attributes.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Keyword	—	DOSE_ACTION
Region_Name	See §3.4	RTP Link Utility Common Element
Action_Dose	1-32767 cGy	Within the Dose Reference Sequence, use Delivery Warning Dose (300A,0022), format: float (Gy). Multiply float by 100 and truncate to integer
Action_Note	S(20)	Undefined
CRC	—	Calculated CRC

3.4 RTP LINK UTILITY COMMON ELEMENTS

The following elements appear in more than one RTP Link Utility record; they are consolidated here in order to avoid redundancy.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Collimator_X1	-25.0-25.0 cm	Identify the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>RT Beam Limiting Device Type (300A,00B8). If this attribute is ASYMX, then use the first value of Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>Leaf/Jaw Positions (300A,011C), format: float (mm). Round$_2$ float to integer and divide by 10.
Collimator_X2	-25.0-25.0 cm	Identify the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>RT Beam Limiting Device Type (300A,00B8). If this attribute is ASYMX, then use the second value of Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>Leaf/Jaw Positions (300A,011C), format: float (mm). Round$_3$ float to integer and divide by 10.
Collimator_Y1	-25.0-25.0 cm	Identify the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>RT Beam Limiting Device Type (300A,00B8). If this attribute is ASYMY, then use the first value of Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>Leaf/Jaw Positions (300A,011C), format: float (mm). Round$_2$ float to integer and divide by 10.
Collimator_Y2	-25.0-25.0 cm	Identify the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>RT Beam Limiting Device Type (300A,00B8). If this attribute is ASYMY, then use the second value of Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>Leaf/Jaw Positions (300A,011C), format: float (mm). Round$_3$ float to integer and divide by 10.
Course_ID	1-99	RT Plan Label (300A,0002), format: S(16). First$_1$ two consecutive digits found in string
Doserate	10-9999 MU/min	Within the current Beam Sequence, within the first Control Point Sequence, use Dose Rate Set (300A,0115), format: float (MU/min). Round$_1$ float to integer
Energy	1-99 MeV	Within the current Beam Sequence, within the first Control Point Sequence, use Nominal Beam Energy (300A,0114), format: float (MeV). Truncate float to integer
Field_ID	S(05)	Use the Beam Sequence >Beam Name (300A,00C2) attribute from the current Beam Sequence: • If the attribute isn't NULL, convert to upper case characters. • If the attribute is NULL, then use Beam Sequence >Beam Number (300A,00C0).
Field_X	0.0-50.0 cm	Identify the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>RT Beam Limiting Device Type (300A,00B8). If this attribute is X, then use the first 2 values of Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>Leaf/Jaw Positions (300A,011C), format: float (mm). Subtract the first value from the second value, Round$_3$ float to integer and divide by 10.

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Field_X_Mode	S(03)	Get the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>Beam Limiting Device Type (300A,00B8): Beam Limiting Device Type — Field_X_Mode X — SYM ASYMX — ASY Otherwise — NULL
Field_Y	0.0-50.0 cm	Identify the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>RT Beam Limiting Device Type (300A,00B8). If this attribute is Y, then use the first 2 values of Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>Leaf/Jaw Positions (300A,011C), format: float (mm). Subtract the first value from the second value, Round$_3$ float to integer and divide by 10.
Field_Y_Mode	S(03)	Get the Beam Sequence >Control Point Sequence >>Beam Limiting Device Position Sequence >>>Beam Limiting Device Type (300A,00B8): Beam Limiting Device — Type Field_Y_Mode Y — SYM ASYMY — ASY Otherwise — NULL
Gantry_Angle	-360.0-360.0 degrees	Within the current Beam Sequence, within the first Control Point Sequence, use Gantry Angle (300A,011E), format: float (deg). Round$_1$ float to 1 decimal place
Couch_Vertical	-999.9 – 999.9 cm	Within the current Beam Sequence, within the first Control Point Sequence, use Table Top Vertical Position (300A,0128) , format: float (mm). Round$_1$ float to integer and divide by 10.
Couch_Lateral	-999.9 – 999.9 cm	Within the current Beam Sequence, within the first Control Point Sequence, use Table Top Lateral Position (300A,012A) , format: float (mm). Round$_1$ float to integer and divide by 10.
Couch_Longitudinal	-999.9 – 999.9 cm	Within the current Beam Sequence, within the first Control Point Sequence, use Table Top Longitudinal Position (300A,0129) , format: float (mm). Round$_1$ float to integer and divide by 10.
Couch_Angle	-20.0-380.0 degrees	Within the current Beam Sequence, within the first Control Point Sequence, use Patient Support Angle (300A,0122), format: float (deg). Round$_1$ float to 1 decimal place
Couch_Dir	S(03)	Within the current Beam Sequence, within the current Control Point Sequence, get Patient Support Rotation Direction (300A,0123): Patient Support Rotation — Direction Couch_Dir CW — CW CC — CCW Otherwise — NULL
Couch_Pedestal	-20.0-380.0 degrees	Within the current Beam Sequence, within the first Control Point Sequence, use Table Top Eccentric Angle (300A,0125), format: float (deg). Round$_1$ float to 1 decimal place

RTP Link Utility Element	Format	Value / RT Plan Attribute / Translation Description
Couch_Ped_Dir	S(03)	Within the current Beam Sequence, within the current Control Point Sequence, get Table Top Eccentric Rotation Direction (300A,0126): Table Top Eccentric Rotation Direction — Couch_Ped_Dir CW — CW CC — CCW Otherwise — NULL
Region_Name	S(20)	Use the Dose Reference Sequence >Dose Reference Description (300A,0016), unless the attribute is NULL. If the attribute is NULL, then use Site α, where α is the Dose Reference Sequence >Dose Reference Number (300A,0012).
Rx_Site_Name	S(20)	Within the Primary Site's Dose Reference Sequence (300A,0010), use the Dose Reference Sequence >Dose Reference Description (300A,0016); unless the attribute is NULL. • If Dose Reference Description is NULL, then use Site α, where α is the Dose Reference Sequence >Dose Reference Number (300A,0012). • If Dose Reference Sequence does not exist, then use Site 01.
SSD	10.0-999.9 cm	Within the current Beam Sequence, within the first Control Point Sequence, use Source to Surface Distance (300A,0130), format: float (mm). Divide float by 10 and Round$_1$ to 1 decimal place

RTP Import

RTP Link Utility Interface Specification

1. INTRODUCTION

1.1 PURPOSE

This document specifies the data items and formatting rules used to create an ASCII file to transfer information between a radiotherapy treatment management (RTM) system and a radiotherapy treatment planning (RTP) system. Data may be imported or exported from an RTM system or RTP system using this interface definition.

1.2 SCOPE

This document is limited to the definition of the data file at an application level. It does not attempt to define the physical transfer mechanism of the file or the operation of the respective import/export programs on the RTM or RTP side. Vendors are encouraged to maintain an RTP Import/Export protocol Conformance Statement describing the level of support for the protocol and other version-specific implementation details. A subset of representative import validation rules for an RTM system is specified in Appendix B.

1.3 REFERENCES

MS-DOS 6.0 Technical Reference.

RTP Link Utility Conformance Statement. The version-specific Conformance Statement must be referenced together with this document to completely define the RTP Link Utility interface.

1.4 DOCUMENT CONVENTIONS

Actual file data elements are shown in `Courier new` font, e.g., Rx_Site_Name.

1.5 WHAT'S CHANGED

Added SITE_SETUP_DEF:Patient_Orientation under Section 2.4 and Section 4 Data Item Definition.

1.6 ASSUMPTIONS & CONSTRAINTS

The RTM system must be capable of generating an MS-DOS 6.0 ASCII file.

The RTP system must be capable of generating an MS-DOS 6.0 ASCII file. The file must conform to the 8.3 naming convention.

2. RECORD STRUCTURE AND KEYWORD DEFINITIONS

2.1 TREATMENT DEFINITION HIERARCHY

As defined by the American College of Surgeons Commission on Cancer, the first **cours**e of therapy is restricted to any and all procedures or treatments administered during or after the first clinical diagnosis of the cancer. Further, if a recurrence or a new cancer is diagnosed after the completion of a previous treatment, or if there is a change to a course of therapy due to the apparent failure of the originally planned and administered therapy, then a new course of therapy should be recorded for the patient. Using this definition of a treatment course as a basis, only one plan may be defined for each treatment course. However, it is not uncommon for oncologists to prescribe treatments to multiple sites in the same course. A patient may have the tumor volume treated, then the lymph system—at different locations. These sites will most likely have different treatment techniques employed and quite different field definitions.

These variations in treatment planning definitions are accommodated using the system of plan definition described below. This specification defines a treatment plan (course) with multiple treatment (prescription) sites, and multiple treatment fields. Figure 1 below illustrates the treatment planning data hierarchy.

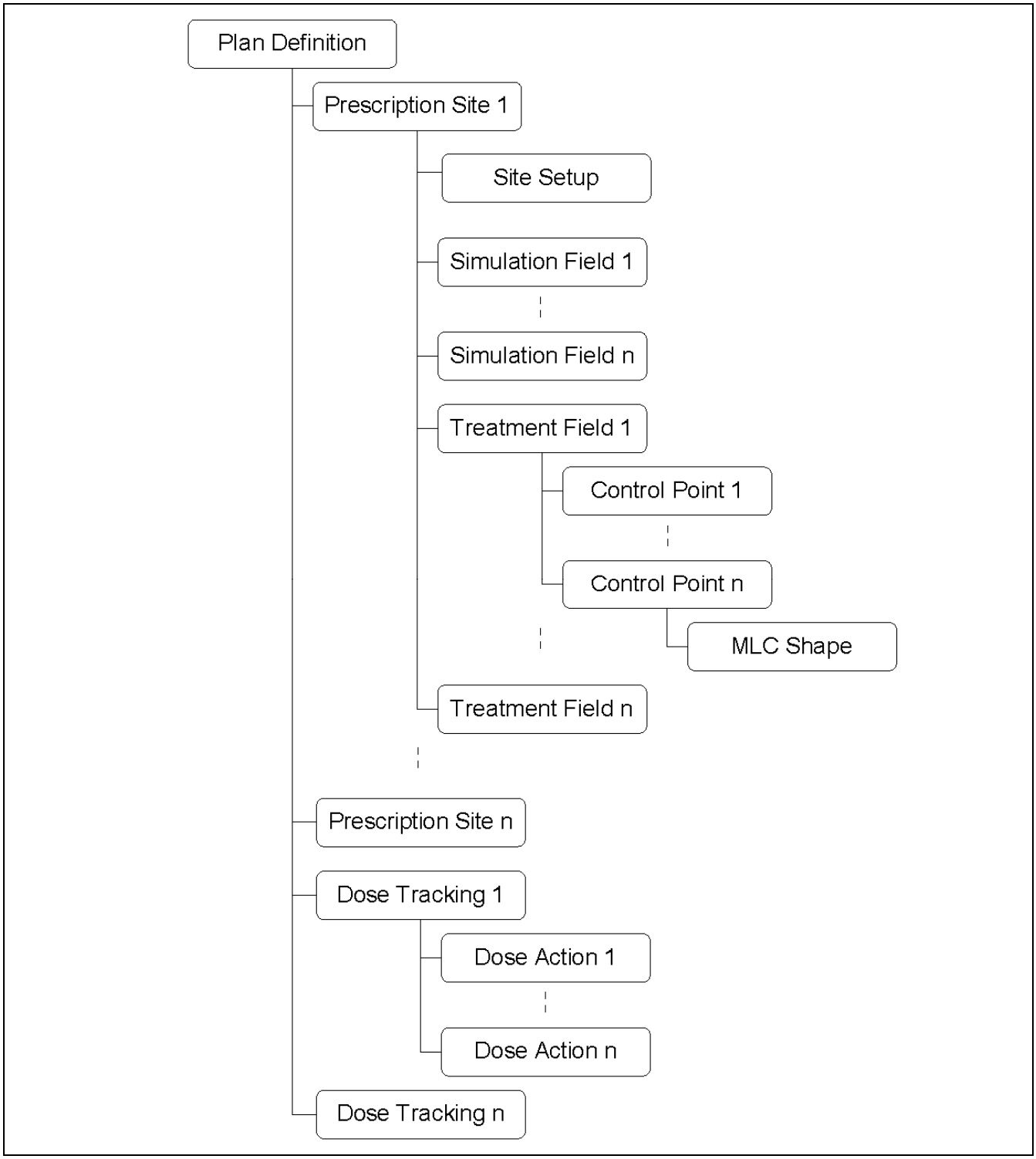


Figure 1—RTP Import/Export Data Hierarchy

The following sections describe the records of the data file that correspond to the structure illustrated above. The KEYWORDS, their data elements, and the order in which their data elements must appear in the particular record are specified. The individual data items and the file construction rules are specified in a later section. Data elements shown with an asterisk (*) are required elements.

2.2 PLAN DEFINITION RECORD [PLAN_DEF]

The keyword PLAN_DEF identifies the record that contains the treatment plan identifiers for the patient, the plan, and the staff member who generated the plan. The PLAN_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Patient_ID *
3. Patient_Last_Name
4. Patient_First_Name
5. Patient_MInitial
6. Plan_ID
7. Plan_Date
8. Plan_Time
9. Course_ID *
10. Diagnosis
11. MD_Last_Name
12. MD_First_Name
13. MD_MInitial
14. MD_Approve_LName
15. MD_Approve_FName
16. MD_Approve_MInitial
17. Phy_Approve_LName
18. Phy_Approve_FName
19. Phy_Approve_MInitial
20. Author_Last_Name
21. Author_First_Name
22. Author_MInitial
23. RTP_Mfg
24. RTP_Model
25. RTP_Version
26. RTP_IF_Protocol
27. RTP_IF_Version
28. CRC *

Note: RTP_Mfg, RTP_Model and RTP_Version should identify the radiotherapy treatment planning (RTP) vendor product used to create the data file. Though not required, Siemens strongly recommends that vendors populate these elements with the respective information so that the origin of a given RTP file is documented within.

2.3 PRESCRIPTION SITE RECORD [RX_DEF]

The keyword RX_DEF identifies the record that contains prescription site and treatment technique information. The RX_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Course_ID *
3. Rx_Site_Name *
4. Technique
5. Modality
6. Dose_Spec
7. Rx_Depth
8. Dose_TTL
9. Dose_Tx
10. Pattern
11. Rx_Note
12. Number_of_Fields
13. CRC *

2.4 SITE SETUP RECORD [SITE_SETUP_DEF]

The keyword SITE_SETUP_DEF identifies the record that contains the site setup information for the prescription site. The SITE_SETUP_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Rx_Site_Name *
3. Patient_Orientation
4. Isocenter_Position_X
5. Isocenter_Position_Y
6. Isocenter_Position_Z
7. Structure_Set_UID
8. Frame_Of_Reference_UID
9. CRC *

2.5 SIMULATION FIELD RECORD [SIM_DEF]

The keyword SIM_DEF identifies the records that contain simulation field information. The SIM_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Rx_Site_Name
3. Field_Name
4. Field_ID *
5. Field_Note
6. Treatment_Machine
7. Gantry_Angle
8. Collimator_Angle
9. Field_X_Mode
10. Field_X
11. Collimator_X1
12. Collimator_X2
13. Field_Y_Mode
14. Field_Y
15. Collimator_Y1
16. Collimator_Y2
17. Couch_Vertical
18. Couch_Lateral
19. Couch_Longitudinal
20. Couch_Angle
21. Couch_Pedestal
22. SAD
23. AP_Separation
24. PA_Separation
25. Lateral_Separation
26. Tangential_Separation
27. Other_Label_1
28. SSD_1
29. SFD_1
30. Other_Label_2
31. Other_Measurement_1
32. Other_Measurement_2
33. Other_Label_3
34. Other_Measurement_3
35. Other_Measurement_4
36. Other_Label_4
37. Other_Measurement_5 (reserved for future use)
38. Other_Measurement_6 (reserved for future use)
39. Blade_x_mode
40. Blade_x
41. Blade_x1
42. Blade_x2
43. Blade_y_mode
44. Blade_y
45. Blade_y1
46. Blade_y2
47. II_Lateral
48. II_Longitudinal
49. II_Vertical
50. KVP
51. MA
52. Seconds
53. CRC *

2.6 TREATMENT FIELD RECORD [FIELD_DEF]

The keyword FIELD_DEF identifies the records that contain treatment field information. The FIELD_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Rx_Site_Name
3. Field_Name
4. Field_ID *
5. Field_Note
6. Field_Dose
7. Field_Monitor_Units
8. Wedge_Monitor_Units
9. Treatment_Machine
10. Treatment_Type
11. Modality
12. Energy
13. Time
14. Doserate
15. SAD
16. SSD
17. Gantry_Angle
18. Collimator_Angle
19. Field_X_Mode
20. Field_X
21. Collimator_X1
22. Collimator_X2
23. Field_Y_Mode
24. Field_Y
25. Collimator_Y1
26. Collimator_Y2
27. Couch_Vertical
28. Couch_Lateral
29. Couch_Longitudinal
30. Couch_Angle
31. Couch_Pedestal
32. Tolerance_Table
33. Arc_Direction
34. Arc_Start_Angle
35. Arc_Stop_Angle
36. Arc_MU_Degree
37. Wedge
38. Dynamic_Wedge
39. Block
40. Compensator
41. e_Applicator
42. e_Field_Def_Aperture
43. Bolus
44. Portfilm_MU_Open
45. Portfilm_Coeff_Open
46. Portfilm_Delta_Open
47. Portfilm_MU_Treat
48. Portfilm_Coeff_Treat
49. CRC *

2.7 MULTILEAF COLLIMATOR RECORD [MLC_DEF]

The keyword MLC_DEF identifies the record that contains the MLC leaf positions for a treatment field. The MLC_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Field_ID *
3. MLC_Type *
4. MLC_Leaves *
5. MLC_LP_1 (A_1):

   :

54. MLC_LP_{50} (A_{50})
55. MLC_LP_{51} (B_1):

    :

104. MLC_LP_{100} (B_{50})
105. CRC *

Note: For MLCs with greater than 50 leaves per side, or for IMRT treatments, it is required that the Control Point Record be used instead of the Multileaf Collimator Record.

2.8 CONTROL POINT RECORD [CONTROL_PT_DEF]

The keyword CONTROL_PT_DEF identifies the record that contains the geometric and monitor unit parameters for large leaf count MLCs (i.e. greater than 50 leaves/side) and IMRT (step and shoot and dynamic) applications. The CONTROL_PT_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Field_ID *
3. MLC_Type *
4. MLC_Leaves *
5. Total_Control_Points *
6. Control_Pt_Number
7. MU_Convention
8. Monitor_Units
9. Wedge_Position
10. Energy
11. Doserate
12. SSD
13. Scale_Convention *
14. Gantry_Angle
15. Gantry_Dir
16. Collimator_Angle
17. Collimator_Dir
18. Field_X_Mode
19. Field_X
20. Collimator_X1
21. Collimator_X2
22. Field_Y_Mode
23. Field_Y
24. Collimator_Y1
25. Collimator_Y2
26. Couch_Vertical
27. Couch_Lateral
28. Couch_Longitudinal
29. Couch_Angle
30. Couch_Dir
31. Couch_Pedestal
32. Couch_Ped_Dir
33. MLC_LP_1 (A_1):

    :

132. MLC_LP_{100} (A_{100})
133. MLC_LP_{101} (B_1):

    :

232. MLC_LP_{200} (B_{100})
233. CRC *

NOTES:

- If Control Point records are utilized in a field definition, then the geometric parameters contained in the corresponding FIELD_DEF record are superceded by the values in the Control Point zero record. Monitor_Unitsof FIELD_DEF must match the value (properly scaled) in the last Control Point.
- Total_Control_Pts: This element specifies the total number of control points that will be used (i.e., total number of CONTROL_PT_DEF records for a given FIELD_DEF record). An IMRT field is indicated by specifying a value >1. An IMRT field must have FIELD_DEF:Treatment_Type of 'DMLC', 'StepNShoot', 'VMAT' or 'Dynamic'.
    - **SPECIAL CASE:** If Total_Control_Pts =1, then only the required data elements and the MLC parameter elements of the Control Point record are utilized. All of the other elements shall be NULL.
- Control_Pt_Number: This element is used to identify a given control point within a set of Total_Control_Pts. The RTP system must define the treatment order of the control points. For IMRT fields, the first control point is numbered zero. Each subsequent control point record is incremented by one.
- MU_Convention: This element details how Monitor Units are specified in the subsequent Monitor_Units element.
    - A value of one (1) in this element indicates that the Monitor_Units element contains the cumulative fraction of the total MU to be delivered, up to and including this control point. Any value between 0.000000-1.000000, inclusive, is valid. The first control point value must equal 0.000000, and the last control point value must equal 1.000000. Sequential control points may have the same MU value to indicate geometric movement without radiation.
    - A value of two (2) in this element indicates that the Monitor_Units element contains the absolute value of centi-Monitor Units to be delivered, up to and including this control point (i.e., cumulative). Any value between 0-999999, inclusive, is valid. The first control point value must equal 0. If the final control point value does not equal FIELD_DEF:Field_Monitor_Units (x100), the value in the control point shall take precedence. Sequential control points may have the same MU value to indicate geometric movement without radiation.

  Please note that the MU may need to be computed to a resolution different from that specified in a Control Point record, in order to be utilized on a particular treatment unit.

  - The Scale_Convention element indicates whether the geometric parameters are represented in the target machine's native readout format (1), or in the IEC 1217 convention (2). The Scale_Convention must be the same for all control points for a given a Field. The Scale_Convention in the control points also applies to the geometric parameters in the FIELD_DEF record.
  - For rotation angles, the rotation direction is specified as "CW", "CCW" or NULL for none. The rotation direction for a parameter must be NULL in a Control Point record if the parameter value does not change from this control point to the next. All rotation directions must be NULL in the last Control Point record.
  - All geometric treatment parameters except couch are specified in absolute machine coordinates. For couch geometric parameters, if the first control point contains a NULL value, then all subsequent control point values for that particular parameter are specified relative to the initial value; otherwise, the position shall be interpreted as absolute. If relative values are used for a couch parameter, the initial value used for verification shall be the value in FIELD_DEF.

- With the exception of couch parameters as noted above, all geometric parameters must be specified in control point 0 for multiple control point fields. Parameters that change at any control point of the field shall be explicitly specified in all control point records, including those preceding the change. Parameters that do not change at any control point of the field may be specified in control point 0 and be NULL in remaining control points.
- The Field_ID is used to associate the control points with the treatment field (FIELD_DEF). The limit on the number of control points associated with a treatment field in this specification is 999. There may be a different limitation for the receiving treatment unit.

2.9 MLC SHAPE RECORD [MLC_SHAPE_DEF]

The keyword MLC_SHAPE_DEF identifies the records which define the shape associated with an MLC record. The MLC_SHAPE_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Field_ID *
3. Control_Pt_Number *
4. Total_Shape_Points *
5. $X\_Coordinate_1$
6. $Y\_Coordinate_1$:
   :
323. $X\_Coordinate_{160}$
324. $Y\_Coordinate_{160}$
325. CRC *

NOTES:

- Control_Pt_Number: This element is used to link the MLC “shape” (field outline) to a specific control point defined in the Control Point record [CONTROL_PT_DEF]. For non-Control Point MLC fields (i.e., those that use the MLC_DEF record), this element must be NULL.
- Total_Shape_Points: This element is used to indicate the total number of coordinate points (x, y) that define a given shape.
- X_Coordinate and Y_Coordinate shall be specified in centimeters in relation to isocenter. Isocenter is referenced as 0. The following diagram is oriented as a beam’s eye view, with the collimator angle in its origin position (i.e. 0 degrees IEC). The maximum number of x and y coordinate pairs is 160. Fewer than the maximum coordinate pairs may be used—any remaining unused points should be NULL.

2.10 DOSE TRACKING RECORD [DOSE_DEF]

The keyword DOSE_DEF identifies the records that contain the primary and secondary site information for dose tracking purposes. If the Region_Name matches exactly a prescription site name, then the dose tracking shall be set as a primary (prescription) site; otherwise, it shall be set as a secondary (non-prescription) site. Up to ten fields can contribute dose to a particular site, as specified by the Field_ID/Reg_Coeff pairs. The Reg_Coeffis multiplied by the Field_Dose for each pair and all of the products are summed to determine the amount of dose contributed to a particular site.

The DOSE_DEF record contains the following data elements in the order that follows:

1. Keyword *
2. Region_Name *
3. Region_Prior_Dose
4. $Field\_ID_1$ *
5. Reg_Coeff_1* :

   :

22. $Field\_ID_{10}$
23. Reg_Coeff_{10}
24. Actual_Dose
25. Actual_Fractions
26. CRC *

NOTES:

- Multiple DOSE_DEF records for the same Region may be included in the same file if more than ten coefficients are needed. The value of the Region_Prior_Dose in the last DOSE_DEF record for a Region_Name will supercede the values in earlier records for that Region_Name.

2.11 DOSE ACTION POINTS [DOSE_ACTION]

The keyword DOSE_ACTION identifies the records that contain Dose Action Points that are used to generate dose related treatment actions for the defined sites. The DOSE_ACTION record contains the following data elements in the order that follows:

1. Keyword *
2. Region_Name *
3. Action_Dose *
4. Action_Note
5. CRC *

3. FILE STRUCTURE

3.1 FILE LAYOUT

- The RTP import/export files can have any valid DOS filename and extension. It is recommended that all files containing treatment planning data have the same filename extension (e.g., IMPORT1.RTP, IMPORT2.RTP, etc.) to facilitate batch importing/exporting.
- The RTP Import/Export files shall conform to standard DOS (i.e., Microsoft DOS 6.0) comma delimited ASCII text files.
- All data elements shall be passed as strings, contained in double quotes.
- There must not be any spaces between the quote-comma-quote (",") sequence separating successive data items.
- The end of a DOS ASCII file is marked with a Ctrl-Z character (ASCII Code 26).
- A NULL data item is represented by two successive quotes, e.g., "data_item_n-1","","data_item_n+1".
- Successive records are delimited by a carriage return/line feed (ASCII Codes 13/10), or a line feed/carriage return (ASCII Codes 10/13).
- The last field of each record shall be the calculated CRC for all of the preceding fields in that record, including quotations and commas. See Appendix A for CRC calculation information.
- The records in the DOS ASCII file shall be ordered as specified in section 2 above, specifically: PLAN_DEF, RX_DEF, SITE_SETUP_DEF, SIM_DEF, FIELD_DEF, MLC_DEF, CONTROL_PT_DEF, MLC_SHAPE_DEF, DOSE_DEF, DOSE_ACTION.

3.2 MINIMUM RECORD CONTENT

- Record content and length are variable. The first element of each record shall begin with a **keyword** to identify the contents of the record. Keywords indicate the order of elements that follow and the data type for each element. Keywords are case insensitive.
- The first record in each file shall be the PLAN_DEF record.
- A file shall contain one and only one PLAN_DEF record, i.e., only one patient per file.
- The structure of each record must conform **exactly** to the structure identified in Section 2 of this document. Data element labels **shall not** be included in the record data.
- Element data shall conform to the formats shown in the table in Section 4.

3.3 DATA FORMATTING RULES

The following sections describe the data formatting rules for numeric, string, date, and time data elements.

3.3.1 Numeric Elements

- Data of numeric type may only contain numbers, decimal points and the + or - signs. Commas, percentage signs and/or alpha characters are not permitted. Negative numbers must have a minus (-) sign preceding the number. Numbers are assumed to be positive if no sign is specified.
- Each numeric data element shall have a specific format, as shown in the Data Format column of the Section 4 table.
- It is not necessary to add leading or trailing zeros to conform to the format definition, e.g., “3.42” is acceptable for data type nn.nn.
- It is not necessary to append a decimal point or decimal place values if the fractional portion of an element is zero.
- NULL numeric data items shall be initialized to zero upon import.
- All numbers related to field size use isocenter as the reference point.

3.3.2 Alphanumeric Elements

- Data of alphanumeric type may contain any ASCII character between ' ' (SPACE, 20h) and '~' (TILDE, 7Eh).
- Data items requiring alphanumeric data formats are shown as S(n), where S implies it is string type data and n indicates maximum length (e.g., S(20) implies an alphanumeric format of maximum length 20).
- It is not necessary to add leading or trailing spaces or other characters to match the maximum string length.
- NULL string data items shall remain NULL upon import.

3.3.3 Date Elements

Date information shall be presented as the concatenation of the year, month and day (format yyyymmdd). All characters shall be numbers; e.g., August 3, 1994 shall be shown as 19940803, 2 January 1995 shall be shown as 19950102.

3.3.4 Time Elements

Time information shall be presented as the concatenation of hours, minutes and seconds using a 24-hour clock as a convention (format hhmmss). All characters shall be numbers; e.g., 2:10 PM shall be shown as 141000, 8:15 and 30 seconds AM shall be shown as 081530.

4. DATA ITEM DEFINITION

The items in the following table indicate which data may be imported/exported from an RTP system to an RTM system. Required data elements for each record are shown in Section 2, marked with asterisks. Data elements contained within curly brackets {} in the Notes column represent the only valid selections for that particular data item.

RTP Import/Export Keyword	Element Label	Data Format	Unit of Measure	Min Value	Max Value	Notes
N/A	KEYWORD	S(20)				Record Identifier, case insensitive
PLAN_DEF	Patient_ID	S(20)				Patient's Primary ID Number
PLAN_DEF	Patient_Last_Name	S(40)				Patient's Last Name
PLAN_DEF	Patient_First_Name	S(40)				Patient's First Name
PLAN_DEF	Patient_MInitial	S(1)				Patient's Middle Initial
PLAN_DEF	Plan_ID	S(15)				ID of Treatment Plan
PLAN_DEF	Plan_Date	yyyymmdd		19900101	20991231	Date Plan Approved
PLAN_DEF	Plan_Time	hhmmss		000000	235959	Time Plan Approved
PLAN_DEF, RX_DEF	Course_ID	nn		1	99	Course ID Number
PLAN_DEF	Diagnosis	S(20)				Diagnosis category, e.g., Breast, Lung, Prostate
PLAN_DEF	MD_Last_Name	S(40)				Last name of patient's radiation oncologist.
PLAN_DEF	MD_First_Name	S(40)				First name of patient's radiation oncologist.
PLAN_DEF	MD_MInitial	S(1)				Middle initial of patient's radiation oncologist
PLAN_DEF	MD_Approve_LName	S(20)				Last name of radiation oncologist who approved plan.
PLAN_DEF	MD_Approve_FName	S(20)				First name of radiation oncologist who approved plan.
PLAN_DEF	MD_Approve_MInitial	S(1)				Middle initials of radiation oncologist who approved plan
PLAN_DEF	Phy_Approve_LName	S(20)				Last name of radiation physicist who approved plan.
PLAN_DEF	Phy_Approve_FName	S(20)				First name of radiation physicist who approved plan.
PLAN_DEF	Phy_Approve_MInitial	S(1)				Middle initials of radiation physicist who approved plan.

RTP Import/Export Keyword	Element Label	Data Format	Unit of Measure	Min Value	Max Value	Notes
PLAN_DEF	Author_Last_Name	S(40)				Last name of staff who generated/edited plan
PLAN_DEF	Author_First_Name	S(40)				First name of staff who generated/edited plan
PLAN_DEF	Author_MInitial	S(1)				Middle initials of staff who generated/edited plan
PLAN_DEF	RTP_Mfg	S(20)				RTP Manufacturer Name
PLAN_DEF	RTP_Model	S(20)				RTP Product Name
PLAN_DEF	RTP_Version	S(10)				RTP Software Version Number
PLAN_DEF	RTP_IF_Protocol	S(20)				RTP Interface Protocol Description.
PLAN_DEF	RTP_IF_Version	S(10)				RTP Interface Protocol Version Number.
RX_DEF, SITE_SETUP_DEF, SIM_DEF, FIELD_DEF	Rx_Site_Name	S(20)				Prescription site name
RX_DEF	Technique	S(20)				Treatment technique
RX_DEF	Modality	S(10)				{Elect, Xrays, Co-60, Iridium, Orthovolt}
RX_DEF	Dose_Spec	S(10)				Where dose is specified
RX_DEF	Rx_Depth	nnn.n				Treatment depth in centimeters
RX_DEF	Dose_TTL	nnnnn	cGray	1	32767	Total dose prescribed for tx technique
RX_DEF	Dose_Tx	nnnn	(cGy/tx)	1	9999	Treatment dose per fraction
RX_DEF	Pattern	S(60)				Pattern of delivery (e.g., Daily, BID, etc.)
RX_DEF	Rx_Note	S(60)				Note for prescription (e.g., Treat w/full bladder)
RX_DEF	Number_of_Fields	nnn		1	999	Number of treatment fields for this technique.
SITE_SETUP_DEF	Patient_Orientation	S(10)				Enumerated values: HFS HFP HFDL HFDR FFS FFP FFDL FFDR
SITE_SETUP_DEF	Isocenter_Position_X	-nnn.nn	cm	-999.99	999.99	Isocenter Position X in centimeters
SITE_SETUP_DEF	Isocenter_Position_Y	-nnn.nn	cm	-999.99	999.99	Isocenter Position Y in centimeters
SITE_SETUP_DEF	Isocenter_Position_Z	-nnn.nn	cm	-999.99	999.99	Isocenter Position Z in centimeters
SITE_SETUP_DEF	Frame_Of_Reference_UID	S(64)				Frame Of Reference UID

RTP Import/Export Keyword	Element Label	Data Format	Unit of Measure	Min Value	Max Value	Notes
SITE_SETUP_DEF	Structure_Set_UID	S(64)				Structure Set UID
SIM_DEF, FIELD_DEF	Field_Name	S(20)				Name of simulator or treatment field
SIM_DEF, FIELD_DEF, MLC_DEF, CONTROL_PT_DEF, MLC_SHAPE_DEF, DOSE_DEF	Field_ID	S(5)				Unique field identifier (alphanumeric allowed)
SIM_DEF, FIELD_DEF	Field_Note	S(60)				Setup note associated with this field
SIM_DEF, FIELD_DEF	Treatment_Machine	S(20)				Name of treatment machine
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Gantry_Angle	-nnn.n	degrees	-360.0	360.0	Gantry angle for treatment
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Collimator_Angle	-nnn.n	degrees	-360.0	360.0	Collimator angle for treatment
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Field_X_Mode	S(3)				{Sym, Asy} Symmetric, Asymmetric
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Field_X	nn.n	cm	00.0	50.0	If X Mode = Asy, X = X1 + X2 If X Mode = Sym, X1/X2 ignored
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Collimator_X1	-nn.n	cm	-25.0	25.0	Collimator X1 position
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Collimator_X2	-nn.n	cm	-25.0	25.0	Collimator X2 position
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Field_Y_Mode	S(3)				{Sym, Asy} Symmetric, Asymmetric
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Field_Y	nn.n	cm	00.0	50.0	If Y Mode = Asy, Y = Y1 + Y2 If Y Mode = Sym, Y1/Y2 ignored
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Collimator_Y1	-nn.n	cm	-25.0	25.0	Collimator Y1 position
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Collimator_Y2	-nn.n	cm	-25.0	25.0	Collimator Y2 position
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Couch_Vertical	-nnn.n	cm	-999.9	999.9	Vertical position of couch
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Couch_Lateral	-nnn.n	cm	-999.9	999.9	Lateral position of couch
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Couch_Longitudinal	-nnn.n	cm	-999.9	999.9	Longitudinal position of couch
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Couch_Angle	-nnn.n	degrees	-20.0	380.0	Couch turntable rotation position
SIM_DEF, FIELD_DEF, CONTROL_PT_DEF	Couch_Pedestal	-nnn.n	degrees	-20.0	380.0	Couch top rotation position
SIM_DEF, FIELD_DEF	SAD	nnn.n	cm	30.0	999.9	Source Axis Distance

RTP Import/Export Keyword	Element Label	Data Format	Unit of Measure	Min Value	Max Value	Notes
SIM_DEF	AP_Separation	nn.n	cm			AP Separation
SIM_DEF	PA_Separation	nn.n	cm			PA Separation
SIM_DEF	Lateral_Separation	nn.n	cm			Lateral Separation
SIM_DEF	Tangential_Separation	nn.n	cm			Tangential Separation
SIM_DEF	Other_Label_1	S(10)				“Other” Label 1
SIM_DEF	SSD1	nnn.n	cm	10.0	999.9	Source Surface Distance
SIM_DEF	SFD1	nnn.n	cm			Source Film Distance
SIM_DEF	Other_Label_2	S(10)				“Other” Label 2
SIM_DEF	Other_Measurement_1	nnn.n	cm			Other Measurement 1
SIM_DEF	Other_Measurement_2	nnn.n	cm			Other Measurement 2
SIM_DEF	Other_Label_3	S(10)				“Other” Label 3
SIM_DEF	Other_Measurement_3	nnn.n	cm			Other Measurement 3
SIM_DEF	Other_Measurement_4	nnn.n	cm			Other Measurement 4
SIM_DEF	Other_Label_4	S(10)				“Other” Label 4
SIM_DEF	Blade_X_Mode	S(3)				{Sym, Asy} Symmetric, Asymmetric
SIM_DEF	Blade_X	nn.n	cm	00.0	50.0	Blade X Opening If X Mode = Asy, X = X1 + X2 If X Mode = Sym, X1/X2 ignored
SIM_DEF	Blade_X1	-nn.n	cm	-25.0	25.0	Blade X1
SIM_DEF	Blade X2	-nn.n	cm	-25.0	25.0	Blade X2
SIM_DEF	Blade_Y_Mode	S(3)				{Sym, Asy} Symmetric, Asymmetric
SIM_DEF	Blade_Y	nn.n	cm	00.0	50.0	Blade Y opening If Y Mode = Asy, Y = Y1 + Y2 If Y Mode = Sym, Y1/Y2 ignored
SIM_DEF	Blade_Y1	-nn.n	cm	-25.0	25.0	Blade Y1
SIM_DEF	Blade Y2	-nn.n	cm	-25.0	25.0	Blade Y2
SIM_DEF	II_Lateral	nn.n	cm			Image Intensifier lateral position
SIM_DEF	II_Longitudinal	nn.n	cm			Image Intensifier longitudinal position
SIM_DEF	II_Vertical	nn.n	cm			Image Intensifier vertical position

RTP Import/Export Keyword	Element Label	Data Format	Unit of Measure	Min Value	Max Value	Notes
SIM_DEF	KVP	nnn	kVP			Kilovolts peak for xray tube
SIM_DEF	MA	nnn	MA			Milliamps of xray tube current
SIM_DEF	Seconds	nnnn.nn	seconds			Seconds for exposure
FIELD_DEF	Field_Dose	nnnn.nn	cGray	.01	9999.99	Dose planned for this field
FIELD_DEF	Field_Monitor_Units	nnnn.nn	MU	.01	9999.99	MU planned for field
FIELD_DEF	Wedge_Monitor_Units	nnnn.nn	MU	0.00	9999.99	MU delivered w/wedge inbeam (for Philips machines w/autowedge)
FIELD_DEF	Treatment_Type	S(10)				{Arc, Dynamic, Static, VMAT, DMLC, StepNShoot}
FIELD_DEF	Modality	S(5)				{Co-60, E/HD, Elect, Xrays}
FIELD_DEF, CONTROL_PT_DEF	Energy	nn	MeV	1	99	Energy of Treatment Beam
FIELD_DEF	Time	nn.nn	Minutes	1	99.99	Treatment Time in minutes
FIELD_DEF	Doserate	nnnn	MU/Min	10	9999	MU/min dose rate output
FIELD_DEF, CONTROL_PT_DEF	SSD	nnn.n	cm	10.0	999.9	Source Surface Distance
FIELD_DEF	Tolerance_Table	n		0	99	1-99 (RTP & RTM must coordinate)
FIELD_DEF	Arc_Direction	S(3)				{CW,CCW}
FIELD_DEF	Arc_Start_Angle	-nnn.n	degrees	-360.0	360.0	Arc therapy start angle
FIELD_DEF	Arc_Stop_Angle	-nnn.n	degrees	-360.0	360.0	Arc therapy stop angle
FIELD_DEF	Arc_MU_Degree	nn.nn	MU/Deg	0.00	99.99	MU/Degree for arc therapy
FIELD_DEF	Wedge	S(10)				Wedge type
FIELD_DEF	Dynamic_Wedge	S(10)				Dynamic wedge type
FIELD_DEF	Block	S(10)				Block code or name
FIELD_DEF	Compensator	S(10)				Compensator code or name
FIELD_DEF	e_Applicator	S(10)				electron applicator type
FIELD_DEF	e_Field_Def_Aperture	S(10)				Final elec applicator aperture code or name
FIELD_DEF	Bolus	S(10)				Bolus size
FIELD_DEF	Portfilm_MU_Open	nn.nn	MU	0	20	Open port exposure MU

RTP Import/Export Keyword	Element Label	Data Format	Unit of Measure	Min Value	Max Value	Notes
FIELD_DEF	Portfilm_Coeff_Open	n.nnnnn		0	1.00000	Open exposure dose coefficient
FIELD_DEF	Portfilm_Delta_Open	nn.nn	cm	0	50	Delta opening beyond tx field
FIELD_DEF	Portfilm_MU_Treat	nn.nn	MU	0	20	Treat port exposure MU
FIELD_DEF	Portfilm_Coeff_Treat	n.nnnnn		0	1.00000	Treat exposure dose coefficient
MLC_DEF	MLC_Type	n		1	5	1 = GE, 2 = Philips, 3 = Scandatronics, 4 = Siemens, 5 = Varian
MLC_DEF	MLC_Leaves	nn		20	50	Number of MLC leaves per side
MLC_DEF, CONTROL_PT_DEF	MLC_LPn	-nn.nn	cm	-25.0	25.0	MLC Leaf Position
CONTROL_PT_DEF	MLC_Type	nn		1	12	1 = GE, 2 = Elekta /Philips, 3 = Scandatronics, 4 = Siemens, 5 = Varian, 6=BrainLab, 7=Radionics, 8=Liebinger-Fisher, 9=Wellhofer, 10=Mitsubishi, 11=Other, 12 = MRC
CONTROL_PT_DEF	MLC_Leaves	nnn		0,20	100	Number of MLC leaves per side
CONTROL_PT_DEF	Total_Control_Points	nnn		1	999	Total number of control points associated with the given field.
CONTROL_PT_DEF, MLC_SHAPE_DEF	Control_Pt_Number	nnn		0	998	Used to identify a control point. Must start at 0.
CONTROL_PT_DEF	MU_Convention	n				1 – MU as fraction 2 – cMU as absolute
CONTROL_PT_DEF	Monitor_Units	n.nnnnnn nnnnnn	cMU	0.000000 0	1.000000 999999	Fraction of total MU or Absolute cMU
CONTROL_PT_DEF	Wedge_Position	S(3)				{In,Out}
CONTROL_PT_DEF	Doserate	nnnn	MU/min	0	9999	Doserate output
CONTROL_PT_DEF	Scale_Convention	n				1=Native, 2=IEC
CONTROL_PT_DEF	Gantry_Dir	S(3)				{CW,CCW,NULL}
CONTROL_PT_DEF	Collimator_Dir	S(3)				{CW,CCW,NULL}
CONTROL_PT_DEF	Couch_Dir	S(3)				{CW,CCW,NULL}
CONTROL_PT_DEF	Couch_Ped_Dir	S(3)				{CW,CCW,NULL}
MLC_SHAPE_DEF	Total_Shape_Points	nnn		1	160	Total number of X,Y pairs that are used to define a

RTP Import/Export Keyword	Element Label	Data Format	Unit of Measure	Min Value	Max Value	Notes
						MLC shape (polygon).
MLC_SHAPE_DEF	X_Coordinate$_n$	-nn.nn	cm	-25.00	+25.00	X coordinate value of coordinate pair that specifies the location of a point in 2D space.. The center of this coordinate space is 0 and refers to the isocenter in a beams eye view.
MLC_SHAPE_DEF	Y_Coordinate$_n$	-nn.nn	cm	-25.00	+25.00	Y coordinate value of coordinate pair that specifies the location of a point in 2D space. The center of this coordinate space is 0 and refers to the isocenter in a beams eye view.
DOSE_DEF, DOSE_ACTION	Region_Name	S(20)				Name of region of interest
DOSE_DEF	Region_Prior_Dose	nnnnn	cGray	1	32767	Starting dose for this region
DOSE_DEF	Reg_Coeff	n.nnnnn		0	9.99999	Coefficient of prescribed field dose that will be delivered to this site. (Primary sites will typically have a coefficient of 1.00000)
DOSE_DEF	Actual_Dose	nnnnn	cGray	0	32767	Actual dose delivered (for export only)
DOSE_DEF	Actual_Fractions	nnn		0	999	Actual fractions delivered (for export only)
DOSE_ACTION	Action_Dose	nnnnn	cGray	1	32767	Dose action point for this region
DOSE_ACTION	Action_Note	S(60)				Note on action to be taken (e.g., cone down)
ALL	CRC	nnnnn		0	65536	16 bit Cyclic Redundancy Check See Appendix A

APPENDIX A: CYCLICAL REDUNDANCY CHECK (CRC) RULES

The last field of each record shall contain a calculated CRC for that record. The CRC shall be a 16 bit unsigned CRC, calculated according to the CCITT algorithm with a seed value of 0521 hex. Rules for calculating the CRC value follow:

- All characters in the record shall be used in the calculation, including KEYWORDS, data items, quotes and field delimiting commas.
- The first character to be used for the CRC calculation shall be the start quote for the KEYWORD.
- The last character to be used for the CRC calculation shall be the comma delimiting the last field prior to the CRC field in the record.
- Once the CRC is calculated for a record, the value shall be placed in quotes in the last field for that record, according to the specifications in the File Format section of this document.

The following is sample code to calculate record CRC values. This code can be used directly by any ANSI Standard C compiler. To use this code, build up a buffer containing the record up to and including the last comma before the CRC value, and pass this function the address and length of the buffer.

```
unsigned int rtpcrc(char *buf, unsigned int len)
  {
  unsigned int seed = 0x0521;
  static unsigned int crc_tbl[] = {

      0x0000, 0xC0C1, 0xC181, 0x0140, 0xC301, 0x03C0, 0x0280, 0xC241,
      0xC601, 0x06C0, 0x0780, 0xC741, 0x0500, 0xC5C1, 0xC481, 0x0440,
      0xCC01, 0x0CC0, 0x0D80, 0xCD41, 0x0F00, 0xCFC1, 0xCE81, 0x0E40,
      0x0A00, 0xCAC1, 0xCB81, 0x0B40, 0xC901, 0x09C0, 0x0880, 0xC841,
      0xD801, 0x18C0, 0x1980, 0xD941, 0x1B00, 0xDBC1, 0xDA81, 0x1A40,
      0x1E00, 0xDEC1, 0xDF81, 0x1F40, 0xDD01, 0x1DC0, 0x1C80, 0xDC41,
      0x1400, 0xD4C1, 0xD581, 0x1540, 0xD701, 0x17C0, 0x1680, 0xD641,
      0xD201, 0x12C0, 0x1380, 0xD341, 0x1100, 0xD1C1, 0xD081, 0x1040,
      0xF001, 0x30C0, 0x3180, 0xF141, 0x3300, 0xF3C1, 0xF281, 0x3240,
      0x3600, 0xF6C1, 0xF781, 0x3740, 0xF501, 0x35C0, 0x3480, 0xF441,
      0x3C00, 0xFCC1, 0xFD81, 0x3D40, 0xFF01, 0x3FC0, 0x3E80, 0xFE41,
      0xFA01, 0x3AC0, 0x3B80, 0xFB41, 0x3900, 0xF9C1, 0xF881, 0x3840,
      0x2800, 0xE8C1, 0xE981, 0x2940, 0xEB01, 0x2BC0, 0x2A80, 0xEA41,
      0xEE01, 0x2EC0, 0x2F80, 0xEF41, 0x2D00, 0xEDC1, 0xEC81, 0x2C40,
      0xE401, 0x24C0, 0x2580, 0xE541, 0x2700, 0xE7C1, 0xE681, 0x2640,
      0x2200, 0xE2C1, 0xE381, 0x2340, 0xE101, 0x21C0, 0x2080, 0xE041,
      0xA001, 0x60C0, 0x6180, 0xA141, 0x6300, 0xA3C1, 0xA281, 0x6240,
      0x6600, 0xA6C1, 0xA781, 0x6740, 0xA501, 0x65C0, 0x6480, 0xA441,
      0x6C00, 0xACC1, 0xAD81, 0x6D40, 0xAF01, 0x6FC0, 0x6E80, 0xAE41,
      0xAA01, 0x6AC0, 0x6B80, 0xAB41, 0x6900, 0xA9C1, 0xA881, 0x6840,
      0x7800, 0xB8C1, 0xB981, 0x7940, 0xBB01, 0x7BC0, 0x7A80, 0xBA41,
      0xBE01, 0x7EC0, 0x7F80, 0xBF41, 0x7D00, 0xBDC1, 0xBC81, 0x7C40,
      0xB401, 0x74C0, 0x7580, 0xB541, 0x7700, 0xB7C1, 0xB681, 0x7640,
      0x7200, 0xB2C1, 0xB381, 0x7340, 0xB101, 0x71C0, 0x7080, 0xB041,
      0x5000, 0x90C1, 0x9181, 0x5140, 0x9301, 0x53C0, 0x5280, 0x9241,
      0x9601, 0x56C0, 0x5780, 0x9741, 0x5500, 0x95C1, 0x9481, 0x5440,
      0x9C01, 0x5CC0, 0x5D80, 0x9D41, 0x5F00, 0x9FC1, 0x9E81, 0x5E40,
      0x5A00, 0x9AC1, 0x9B81, 0x5B40, 0x9901, 0x59C0, 0x5880, 0x9841,
      0x8801, 0x48C0, 0x4980, 0x8941, 0x4B00, 0x8BC1, 0x8A81, 0x4A40,
      0x4E00, 0x8EC1, 0x8F81, 0x4F40, 0x8D01, 0x4DC0, 0x4C80, 0x8C41,
      0x4400, 0x84C1, 0x8581, 0x4540, 0x8701, 0x47C0, 0x4680, 0x8641,
      0x8201, 0x42C0, 0x4380, 0x8341, 0x4100, 0x81C1, 0x8081, 0x4040,
      };

  while(len--)
      seed = crc_tbl[*((unsigned char *) buf)++ ^ (unsigned char) seed] ^

                  (unsigned char) (seed >> 8);
  return(seed);
  }
```

APPENDIX B: SAMPLE IMPORT VALIDATION RULES

The following file/record validation rules are a subset of those utilized by Siemens LANTIS import program, available in version 4.00 of LANTIS management system. Please see Siemens RTP Import/Export protocol conformance statement for version-specific implementation details. The rules below are offered as a guideline for vendors who wish to develop their own RTP Import/Export protocol conformance statement. LANTIS conformance statement, in combination with the RTP vendor's, should help reduce the number of iterations needed for a successful import into LANTIS management system. *These rules are not part of the formal specification and may change at any time*. They also need not be applied to other uses of the RTP Import/Export process.

- The calculated CRC at the end of each record must match the value in the CRC field of the record, or else the import shall be aborted.
- The first record must be the PLAN_DEF record.
- Continue with import if and only if the following condition exists: *Patient Primary ID* matches an existing patient.
- If an import candidate PLAN_DEF:Course_ID conflicts with an existing course, the imported course shall be discarded and a warning message shall be generated. Otherwise, a new course shall be created.
- If an import candidate RX_DEF:Rx_Site_Name conflicts with an existing prescription, the imported prescription shall be discarded and a warning message shall be generated. Otherwise, a new prescription shall be created.
- If an import candidate SIM_DEF:Field_ID conflicts with an existing simulation field ID, the imported simulation field shall be discarded and a warning message shall be generated. Otherwise, a new simulation field shall be created.
- If an import candidate FIELD_DEF:Field_ID conflicts with an existing treatment field ID, the existing treatment field's revision shall be incremented and the imported field shall be imported as the current revision. A warning message shall be generated for any conflicts. Otherwise, a new treatment field shall be created.
- The prescription site name (*Rx_Site_Name*) for an imported simulation field and treatment field shall be set if and only if a match is detected with an already defined prescription site. If a match is not found for the specified Rx Site, a warning message shall be generated and the item shall be left blank.
- The *Treatment Machine* for an imported simulation field and treatment field shall be set if and only if a match is detected with an already defined *Treatment Machine*. If a match is not found for the specified *Treatment Machine*, a warning message shall be generated and the item shall be left blank.
- If an import candidate MLC_DEF:Field_ID does not match an existing treatment field, the MLC record shall be discarded and a warning message shall be generated. Otherwise, the MLC definition shall be added to the field.
- If an import candidate DOSE_DEF:Region_Name conflicts with an existing dose tracking site, the imported record shall be discarded and a warning message shall be generated. Otherwise, a new dose tracking site shall be created.
- If an import candidate DOSE_DEF:Field_ID conflicts with an existing dose coefficient, the existing coefficient shall be overwritten and a warning message shall be generated. Otherwise, a new dose tracking coefficient shall be created.
- If an import candidate DOSE_ACTION:Region_Name exists, the imported record shall be discarded and a warning message shall be generated. Otherwise, the dose action point shall be added.
- CONTROL_PT_DEF and MLC_SHAPE_DEF records are not implemented in version 4.00 of the LANTIS management system.

RTP Import

RTP Link Utility 8.30 Conformance Statement

1. INTRODUCTION

1.1 PURPOSE

This document specifies the conformance of the LANTIS RTP Link Utility product, available in LANTIS 8.30, with the LANTIS RTP Link Utility Radiotherapy Treatment Planning Import/Export Interface Specification. The intended audience for this Conformance Statement is the Radiotherapy Treatment Planning (RTP) vendor and end-user. This Conformance Statement, in combination with the Conformance Statement from an RTP vendor, should help reduce the number of iterations needed for a successful import into the LANTIS management system.

1.2 SCOPE

RTP Link Utility is integrated with LANTIS 8.30 and available to customers as an optional product. RTP Link Utility is used to import/export data to/from LANTIS using the LANTIS RTP Link Utility Radiotherapy Treatment Planning Import/Export Interface.

1.3 REFERENCES

This document references the following documents:

DID	TITLE
RTP Link Utility Interface Specification	RTP Link Utility Radiotherapy Treatment Planning Import/Export Interface Specification, ©2002 Siemens Medical Systems, Inc.

1.4 DIFFERENCES BETWEEN RTP LINK UTILITY IN LANTIS VERSIONS 8.20 AND 8.30

The following items are new or were changed in this version of RTP Link Utility and differ from those in RTP Link Utility Interface Specification:

The version of LANTIS.

1.5 DOCUMENTATION CONVENTIONS

The following conventions are used throughout this document:

- File names, file paths, databases, and database fields are printed in mixed-case Courier typeface.

1.6 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

This section provides an alphabetical list of definitions, acronyms, and abbreviations.

IEC Refers to the IEC Standard 1217: Radiotherapy Equipment – Coordinates, Movements and Scales (CEI/IEC 1217: 1996).

MLC Multi-Leaf Collimator

RTP Radiotherapy Treatment Planning

1.7 ASSUMPTIONS & CONSTRAINTS

LANTIS 8.30 must be properly installed with RTP Link Utility enabled.

2. CONFORMANCE

On Import, for all records, the calculated CRC for each record must match the value in the CRC field of the record, or the Import process will be disabled.

Sections 2.1 – 2.9 below pertain to each RTP Import/Export record defined in RTP Link Utility Interface Specification. Each of these sections for supported records contains a table with one row per record data element defined in RTP Link Utility Interface Specification. For each data element, the indicator for "Supported" on "Import" entry is "Y" if the element can be imported by RTP Link Utility from the import file into LANTIS, or "N" if it cannot. Also for each data element, the indicator for "Supported" on "Export" entry is "Y" if the element is exported by RTP Link Utility from LANTIS to the export file, or "N" if it is not. The "Notes" entry contains details as necessary.

RTP Link Utility Interface Specification must be referenced together with this document for a complete definition of the RTP Link Utility interface. Each data element shall conform to the format shown in the table in Section 4 of RTP Link Utility Interface Specification. Data of alphanumeric type shall be truncated if the specified maximum length is exceeded.

2.1 PLAN DEFINITION RECORD [PLAN_DEF]

Support of the Data Elements in the Plan Definition Record is indicated in the following table:

DATA ELEMENT LABEL	SUPPORTED		NOTES
	IMPORT	EXPORT	
1. Keyword	Y	Y	"PLAN_DEF"
2. Patient_ID	Y	Y	On Export, the patient's primary ID. Import will proceed only if Patient_IDmatches an existing patient. The Patient_ID (not Patient_Last_Name) is used to match the plan to an existing patient. If the Patient_Last_Name in the DB does not match the Last Name specified in the plan file, then a warning message displays regarding that import field. The patient's last name, first name and initial in the DB will not be modified based on the respective data in the plan file.
3. Patient_Last_Name	Y	Y	On Import, this item does not affect the existing value.
4. Patient_First_Name	N	Y	On Import, this item does not affect the existing value.
5. Patient_MInitial	N	Y	On Import, this item does not affect the existing value.
6. Plan_ID	N	N	
7. Plan_Date	N	N	
8. Plan_Time	N	N	
9. Course_ID	Y	Y	On Import, if Course_ID conflicts with (for example, equals) an existing course number, the import candidate course will be discarded and a warning message will display; otherwise, a new course will be created. On Export, exports the course number from the patient's last course. If no course is defined for the patient, then Course_ID = 0.
10. Diagnosis	N	Y	On Import, this item does not affect the existing value.
11. MD_Last_Name	Y	Y	On Import, if an MD with a matching name exists in the Siemens LANTIS DB, this MD is assigned to the patient. The

DATA ELEMENT LABEL	SUPPORTED		NOTES
	IMPORT	EXPORT	
			name comparison is case insensitive.
12. MD_First_Name	Y	Y	See MD_Last_Name.
13. MD_MInitial	Y	Y	See MD_Last_Name.
14. MD_Approve_LName	N	N	
15. MD_Approve_FName	N	N	
16. MD_Approve_MInitial	N	N	
17. Phy_Approve_LName	N	N	
18. Phy_Approve_FName	N	N	
19. Phy_Approve_MInitial	N	N	
20. Author_Last_Name	N	N	
21. Author_First_Name	N	N	
22. Author_MInitial	N	N	
23. RTP_Mfg	Y	N	On Import, Machine Characterization conversion uses these data elements to find a matching source machine.
24. RTP_Model	Y	N	See RTP_Mfg.
25. RTP_Version	Y	N	See RTP_Mfg.
26. RTP_IF_Protocol	N	Y	On Export, "IMPAC-OpenRTP".
27. RTP_IF_Version	N	Y	On Export, "2.0"
28. CRC	Y	Y	

2.2 PRESCRIPTION SITE RECORD [RX_DEF]

Support of the Data Elements in the Prescription Site Record is indicated in the following table:

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
1. Keyword	Y	Y	"RX_DEF"
2. Course_ID	Y	Y	On Import, if no course with this number exists or will be created as a result of this Import, an error message displays. On Export, one Prescription Site Record is generated for each Radiotherapy Prescription defined for the patient as part of the Course of therapy in the Plan Definition Record.
3. Rx_Site_Name	Y	Y	On Import, if Rx_Site_Name conflicts with an existing prescription (for example, the name is the same), the imported prescription will be discarded and a warning message will display; otherwise, a new prescription will be created.
4. Technique	Y	Y	
5. Modality	Y	Y	
6. Dose_Spec	Y	Y	
7. Rx_Depth	Y	Y	
8. Dose_TTL	Y	Y	On Import, values greater than 9999 and less than 32768 will be imported, but will cause a display overflow (for example, "####") in some windows. On Import, if Dose_TTL is either negative or greater than 32767, an error message will display and the Import process will be disabled. On Export, the data format is nnnn. Values greater than 9999 will be exported as "####".
9. Dose_Tx	Y	Y	On Import, if Dose_Tx is negative, an error message will display and the Import process will be disabled.
10. Pattern	Y	Y	
11. Rx_Note	Y	Y	
12. Number_of_Fields	Y	Y	
13. CRC	Y	Y	

2.3 SIMULATION FIELD RECORD [SIM_DEF]

Support of the Data Elements in the Simulation Field Record is indicated in the following table:

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
1. Keyword	Y	Y	"SIM_DEF"
2. Rx_Site_Name	Y	Y	On Import, set if and only if a match is detected with an already defined prescription site. If a match is not found for the specified Rx_Site_Name, a message to that effect will display and the Import process will be disabled.
3. Field_Name	Y	Y	
4. Field_ID	Y	Y	On Import, if Field_ID conflicts with an existing simulation field ID, the import candidate simulation field will be discarded and a warning message will display; otherwise, a new simulation field will be created.
5. Field_Note	Y	Y	
6. Treatment_Machine	Y	Y	On Import, if no match with an already defined treatment machine is detected, a warning message will display and the item will be left blank in the imported simulation field.
7. Gantry_Angle	Y	Y	
8. Collimator_Angle	Y	Y	
9. Field_X_Mode	Y	Y	
10. Field_X	Y	Y	On Import, if Field_X is negative, an error message will display and the Import process will be disabled. On Import, if Field_X_Mode is asymmetric, Field_X is derived from Collimator_X1and Collimator_X2.
11. Collimator_X1	Y	Y	On Import, if Field_X_Mode is symmetric, Collimator_X1 is derived from Field_X.
12. Collimator_X2	Y	Y	On Import, if Field_X_Mode is symmetric, Collimator_X2 is derived from Field_X.
13. Field_Y_Mode	Y	Y	
14. Field_Y	Y	Y	On Import, if Field_Y is negative, an error message will display and the Import process will be disabled. On Import, if Field_Y_Mode is asymmetric, Field_Y is derived from Collimator_Y1and Collimator_Y2.
15. Collimator_Y1	Y	Y	On Import, if Field_Y_Mode is symmetric, Collimator_Y1 is derived from Field_Y.
16. Collimator_Y2	Y	Y	On Import, if Field_Y_Mode is symmetric, Collimator_Y2 is derived from Field_Y.
17. Couch_Vertical	Y	Y	
18. Couch_Lateral	Y	Y	

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
19. Couch_Longitudinal	Y	Y	
20. Couch_Angle	Y	Y	
21. Couch_Pedistal	Y	Y	
22. SAD	Y	Y	
23. AP_Separation	Y	Y	
24. PA_Separation	Y	Y	
25. Lateral_Separation	Y	Y	
26. Tangential_Separation	Y	Y	
27. Other_Label_1	Y	Y	
28. SSD_1	Y	Y	
29. SFD_1	Y	Y	
30. Other_Label_2	Y	Y	
31. Other_Measurement_1	Y	Y	
32. Other_Measurement_2	Y	Y	
33. Other_Label_3	Y	Y	
34. Other_Measurement_3	Y	Y	
35. Other_Measurement_4	Y	Y	
36. Other_Label_4	Y	Y	
37. Other_Measurement_5	N	N	
38. Other_Measurement_6	N	N	
39. Blade_x_Mode	Y	Y	
40. Blade_x	Y	Y	On Import, if Blade_x is negative, an error message will display and the Import process will be disabled. On Import, if Blade_x_Mode is asymmetric, Blade_x is derived from Blade_x1and Blade_x2.
41. Blade_x1	Y	Y	On Import, if Blade_x_Mode is symmetric, Blade_x1 is derived from Blade_x.
42. Blade_x2	Y	Y	On Import, if Blade_x_Mode is symmetric, Blade_x2 is derived from Blade_x.

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
43. Blade_y_Mode	Y	Y	
44. Blade_y	Y	Y	On Import, if Blade_y is negative, an error message will display and the Import process will be disabled. On Import, if Blade_y_Mode is asymmetric, Blade_y is derived from Blade_y1and Blade_y2.
45. Blade_y1	Y	Y	On Import, if Blade_y_Mode is symmetric, Blade_y1 is derived from Blade_y.
46. Blade_y2	Y	Y	On Import, if Blade_y_Mode is symmetric, Blade_y2 is derived from Blade_y.
47. II_Lateral	Y	Y	
48. II_Longitudinal	Y	Y	
49. II_Vertical	Y	Y	
50. KVP	Y	Y	
51. MA	Y	Y	
52. Seconds	Y	Y	
53. CRC	Y	Y	

2.4 TREATMENT FIELD RECORD [FIELD_DEF]

Support of the Data Elements in the Treatment Field Record is indicated in the following table. The table indicates that some geometry elements may be translated based on Machine Characterizations of the Source and Target machines.

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
1. Keyword	Y	Y	"FIELD_DEF"
2. Rx_Site_Name	Y	Y	On Import, set if and only if a match is detected with an already defined prescription site. If a match is not found for the specified Rx_Site_Name, an error message will display and the Import process will be disabled.
3. Field_Name	Y	Y	
4. Field_ID	Y	Y	On Import, if Field_ID conflicts with an existing treatment field ID, a warning message will display and the user will be asked if the import candidate FIELD_DEF Record should overwrite the existing treatment field. If the user chooses to overwrite, the import candidate will become the new current version of the treatment field. If required by Siemens LANTIS record revision management scheme, the pre-existing treatment field will be saved as a historical version. If there is no field ID conflict, a new treatment field will be created.
5. Field_Note	Y	Y	
6. Field_Dose	Y	Y	On Import, if Field_Dose is negative, a message to that effect will display and the Import process will be disabled. On Import and Export, rounded to the nearest whole cGy.
7. Field_Monitor_Units	Y	Y	On Import, if Field_Monitor_Units is negative, a message to that effect will display and the Import process will be disabled. On Import and Export, rounded to the nearest precision specified in the 'Fractional MU" key under the [CONSOLE] section for the machine characterization record of the treatment machine.
8. Wedge_Monitor_Units	Y	Y	On Import, if Wedge_Monitor_Units is negative, a message to that effect will display and the Import process will be disabled. On Import and Export, rounded to the nearest whole MU.
9. Treatment_Machine	Y	Y	On Import, the Treatment_Machine field is used to find a matching treatment machine already defined in the database. • If the Scale is IEC and no match is found, a message to that effect will display and the Import process will be disabled. • If the Scale is not IEC and no match is found, a warning message will display. • If CONTROL_PT_DEF:Total_Control_Points > 1, the [IMRT] section must be defined in the machine characterization record for the treatment machine; else a message to that effect will display and the Import process will be disabled.
10. Treatment_Type	Y	Y	On Import, if Treatment_Type is Skip Arcs, a message to that effect will display and the Import process will be disabled.
11. Modality	Y	Y	

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
12. Energy	Y	Y	On Import, if Energy is negative, a message to that effect will display and the Import process will be disabled.
13. Time	Y	Y	On Import, if Time is negative, a message to that effect will display and the Import process will be disabled.
14. Doserate	Y	Y	On Import, if Doserate is negative, a message to that effect will display and the Import process will be disabled.
15. SAD	N	N	
16. SSD	Y	Y	
17. Gantry_Angle	Y	Y	On Import, Gantry_Angle is translated based on source and target machine characterizations.
18. Collimator_Angle	Y	Y	On Import, Collimator_Angle is translated based on source and target machine characterizations.
19. Field_X_Mode	Y	Y	On Import, if multiple CONTROL_PT_DEF records are found for Field_ID, the corresponding CONTROL_PT_DEF:Field_X_Mode value in the first control point is used.
20. Field_X	Y	Y	On Import: • If multiple CONTROL_PT_DEF records are found for Field_ID, the corresponding CONTROL_PT_DEF:Field_X value in the first control point is used. • If a MLC_DEF record is found, or a CONTROL_PT_DEF record is found where CONTROL_PT_DEF:MLC_Leaves > 0, Field_Xis rounded out to 1 decimal place. Otherwise, it is rounded mathematically to 1 decimal place. • If Field_X is negative, a message to that effect will display and the Import process will be disabled. • Field_X is translated based on source and target machine characterizations. • If Field_X_Mode is asymmetric: • If the scale is IEC, subtracting Collimator_X1 from Collimator_X2 derives Field_X. • If the scale is not IEC, adding Collimator_X1 and Collimator_X2 derives Field_X.
21. Collimator_X1	Y	Y	On Import: • If multiple CONTROL_PT_DEF records are found for Field_ID, the corresponding CONTROL_PT_DEF:Collimator_X1 value in the first control point is used. • If a MLC_DEF record is found, or a CONTROL_PT_DEF record is found where CONTROL_PT_DEF:MLC_Leaves > 0, Collimator_X1 is rounded out to 1 decimal place. Otherwise, it is rounded mathematically to 1 decimal place. • Collimator_X1 is translated based on source and target machine characterizations. • If Field_X_Mode is symmetric, subtracting the calculated Collimator_X2 from Field_Xderives Collimator_X1.

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
22. Collimator_X2	Y	Y	On Import: • If multiple CONTROL_PT_DEF records are found for Field_ID, the corresponding CONTROL_PT_DEF:Collimator_X2 value in the first control point is used. • If a MLC_DEF record is found, or a CONTROL_PT_DEF record is found where CONTROL_PT_DEF:MLC_Leaves > 0, Collimator_X2 is rounded out to 1 decimal place. Otherwise, it is rounded mathematically to 1 decimal place. • Collimator_X2 is translated based on source and target machine characterizations. • If Field_X_Mode is symmetric, dividing Field_X by 2 derives Collimator_X2.
23. Field_Y_Mode	Y	Y	On Import, if multiple CONTROL_PT_DEF records are found for Field_ID, the corresponding CONTROL_PT_DEF:Field_Y_Mode value in the first control point is used.
24. Field_Y	Y	Y	On Import: • If multiple CONTROL_PT_DEF records are found for Field_ID, the corresponding CONTROL_PT_DEF:Field_Y value in the first control point is used. • If a MLC_DEF record is found, or a CONTROL_PT_DEF record is found where CONTROL_PT_DEF:MLC_Leaves > 0, Field_Yis rounded out to 1 decimal place. Otherwise, it is rounded mathematically to 1 decimal place. • If Field_Y is negative, a message to that effect will display and the Import process will be disabled. Field_Y is translated based on source and target machine characterizations. • If Field_Y_Mode is asymmetric: • If the scale is IEC, subtracting Collimator_Y1 from Collimator_Y2 derives Field_Y. • If the scale is not IEC, adding Collimator_Y1 and Collimator_Y2 derives Field_Y.
25. Collimator_Y1	Y	Y	On Import: • If multiple CONTROL_PT_DEF records are found for Field_ID, the corresponding CONTROL_PT_DEF:Collimator_Y1 value in the first control point is used. • If a MLC_DEF record is found, or a CONTROL_PT_DEF record is found where CONTROL_PT_DEF:MLC_Leaves > 0, Collimator_Y1 is rounded out to 1 decimal place. Otherwise, it is rounded mathematically to 1 decimal place. • Collimator_Y1 is translated based on source and target machine characterizations. • If Field_Y_Mode is symmetric, subtracting the calculated Collimator_Y2 from Field_Yderives Collimator_Y1.

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
26. Collimator_Y2	Y	Y	On Import: • If multiple CONTROL_PT_DEF records are found for Field_ID, the corresponding CONTROL_PT_DEF:Collimator_Y2 value in the first control point is used. • If a MLC_DEF record is found, or a CONTROL_PT_DEF record is found where CONTROL_PT_DEF:MLC_Leaves > 0, Collimator_Y2 is rounded out to 1 decimal place. Otherwise, it is rounded mathematically to 1 decimal place. • Collimator_Y2 is translated based on source and target machine characterizations. • If Field_Y_Mode is symmetric, dividing Field_Y by 2 derives Collimator_Y2.
27. Couch_Vertical	Y	Y	On Import: • If Couch_Vertical is non-zero, the [Couch Vertical] section must be defined in the machine characterization record for the treatment machine; else a warning message to that effect will be displayed and Couch_Vertical is ignored. • Couch_Vertical is translated based on source and target machine characterizations.
28. Couch_Lateral	Y	Y	On Import: • If Couch_Lateral is non-zero, the [Couch Lateral] section must be defined in the machine characterization record for the treatment machine; else a warning message to that effect will be displayed and Couch_Lateral is ignored. • Couch_Lateral is translated based on source and target machine characterizations.
29. Couch_Longitudinal	Y	Y	On Import: • If Couch_Longitudinal is non-zero, the [Couch Longitude] section must be defined in the machine characterization record for the treatment machine; else a warning message to that effect will be displayed and Couch_Longitudinal is ignored. • Couch_Longitudinal is translated based on source and target machine characterizations.
30. Couch_Angle	Y	Y	On Import: • If Couch_Angle is non-zero, the [Couch Angle] section must be defined in the machine characterization record for the treatment machine; else a warning message to that effect will be displayed and Couch_Angle is ignored. • Couch_Angle is translated based on source and target machine characterizations.
31. Couch_Pedestal	Y	Y	On Import: • If Couch_Pedestal is non-zero, the [Couch Top] section must be defined in the machine characterization record for the treatment machine; else a warning message to that effect will be displayed and Couch_Pedestal is ignored. • Couch_Pedestal is translated based on source and target machine characterizations.
32. Tolerance_Table	Y	Y	
33. Arc_Direction	Y	Y	If Treatment_Typeis not Arc: • On Import, Arc_Directionis ignored. • On Export, Arc_Direction is set to null.

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
34. Arc_Start_Angle	Y	Y	On Import, Arc_Start_Angle is translated based on source and target machine characterizations. If Treatment_Typeis not Arc: • On Import, Arc_Start_Angle is ignored. • On Export, Arc_Start_Angle is set to null.
35. Arc_Stop_Angle	Y	Y	On Import, Arc_Stop_Angle is translated based on source and target machine characterizations. If Treatment_Typeis not Arc: • On Import, Arc_Stop_Angle is ignored. • On Export, Arc_Stop_Angle is set to null.
36. Arc_MU_Degree	Y	Y	On Import, if Arc_MU_Degree is negative, a message to that effect will display and the Import process will be disabled. If Treatment_Typeis not Arc: • On Import, Arc_MU_Degreeis ignored. • On Export, Arc_MU_Degree is set to null.
37. Wedge	Y	Y	On Import, if Wedge is null and Dynamic_Wedgeis not null, the value in Dynamic_Wedgeis moved to Wedge.
38. Dynamic_Wedge	N	N	On Import, if Dynamic_Wedge is not null, a message to that effect will display and the Import process will be disabled.
39. Block	Y	Y	
40. Compensator	Y	Y	
41. e_Applicator	Y	Y	
42. e_Field_Def_Aperture	Y	Y	
43. Bolus	Y	Y	
44. Portfilm_MU_Open	Y	Y	On Import, if Portfilm_MU_Open is negative, a message to that effect will display and the Import process will be disabled. On Import and Export, rounded to the nearest whole MU.
45. Portfilm_Coeff_Open	Y	Y	On Import, if Portfilm_Coeff_Open is negative, a message to that effect will display and the Import process will be disabled. On Import and Export, rounded to the nearest thousandth of cGy/MU. The format after Export is n.nnn.
46. Portfilm_Delta_Open	Y	Y	On Import, if Portfilm_Delta_Open is negative, a message to that effect will display and the Import process will be disabled.
47. Portfilm_MU_Treat	Y	Y	On Import, if Portfilm_MU_Treat is negative, a message to that effect will display and the Import process will be disabled. On Import and Export, rounded to the nearest whole MU.
48. Portfilm_Coeff_Treat	Y	Y	On Import, if Portfilm_Coeff_Treat is negative, a message to that effect will display and the Import process will be disabled. On Import and Export, rounded to the nearest thousandth of cGy/MU. The format after Export is n.nnn.
49. CRC	Y	Y	

2.5 MULTI-LEAF COLLIMATOR RECORD [MLC_DEF]

Multi-Leaf Collimator Records are supported only on Import. Support for the Data Elements in the Multi-Leaf Collimator Record is indicated in the following table:

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
1. Keyword	Y	N	"MLC_DEF"
2. Field_ID	Y	N	On Import: • The Field_ID must match a field ID in an existing treatment field or in an import candidate FIELD_DEF record. • If the field **hadn't** previously existed in the DB, import the MLC data. • If the field **had** previously existed and it **was** overwritten with the related FIELD_DEF record, import the MLC data.
3. MLC_Type	Y	N	On Import, if FIELD_DEF:Treatment_Machine matches an already defined treatment machine, MLC_Type must match the value defined for that treatment machine. If it does not match, an error message will display and the Import process will be disabled.
4. MLC_Leaves	Y	N	On Import, if FIELD_DEF:Treatment_Machine matches an already defined treatment machine, MLC_Leaves must match the value defined for that treatment machine. If it does not match, an error message will display and the Import process will be disabled.
5. MLC_LP$_1$ (A_1)	Y	N	On Import, MLC_LP$_1$ is translated based on source and target machine characterizations.
:	Y	N	
54. MLC_LP$_{50}$ (A_{50})	Y	N	On Import, MLC_LP$_{50}$ is translated based on source and target machine characterizations.
55. MLC_LP$_{51}$ (B_1)	Y	N	On Import, MLC_LP$_{51}$ is translated based on source and target machine characterizations.
:	Y	N	
104. MLC_LP$_{100}$ (B_{50})	Y	N	On Import, MLC_LP$_{100}$ is translated based on source and target machine characterizations.
105. CRC	Y	N	

2.6 CONTROL POINT RECORD [CONTROL_PT_DEF]

The Data Elements in the Control Point Record are supported as indicated in the following table.

A special use of the Control Point Record is to indicate that the geometry data in the related FIELD_DEF record is within the IEC Scale; thereby enabling RTP Link Utility to translate the geometry data from IEC to machine native coordinates. When the Control Point Record is used in this way, MLC_Leaves may be 0 and Scale_Convention must be 2.

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
1. Keyword	Y	Y	"CONTROL_PT_DEF"
2. Field_ID	Y	Y	On Import: • The Field_ID must match a field ID in an existing treatment field or in an import candidate FIELD_DEF record. • If the field **hadn't** previously existed in the DB, import the Control Point data. • If the field **had** previously existed and it **was** overwritten with the related FIELD_DEF record, import the Control Point data.
3. MLC_Type	Y	Y	On Import: • If FIELD_DEF:Treatment_Machinematches an already defined treatment machine; • If MLC_Type = 11, MLC_Typeis set to the value defined for that treatment machine. • Else, MLC_Type must match the value defined for that treatment machine. If it does not match, an error message will display and the Import process will be disabled.
4. MLC_Leaves	Y	Y	On Import, if FIELD_DEF:Treatment_Machine matches an already defined treatment machine, MLC_Leaves must match the value defined for that treatment machine. If it does not match, an error message will display and the Import process will be disabled.
5. Total_Control_Points	Y	Y	On Import: • If FIELD_DEF:Treatment_Type is Arc, Total_Control_Points must be 1.
6. Control_Pt_Number	Y	Y	On Import, Control_Pt_Number must be in the correct order.
7. MU_Convention	Y	Y	On Import, if Monitor_Units is sent, MU_Convention must be 1 (fractional). MU_Convention of 2 (absolute centi-MU) is currently not supported. On Export, Monitor_Units is set to 1.
8. Monitor_Units	Y	Y	On Import, if Total_Control_Points > 1: • Monitor_Units must not be in decreasing order within the Control Point Records. • If FIELD_DEF:Treatment_Type <> Arc, Total_Control_Points must be 1. On Import, rounded to the nearest thousandth of MU.
9. Wedge_Position	Y	Y	On Import, if Wedge_Position is IN, set TXM:Wedge_In to 1; else set TXM:Wedge_In to zero. On Export, if TXM:Wedge_In is 1, set Wedge_Position to IN; else set Wedge_Position to NULL.
10. Energy	N	N	
11. Doserate	N	N	

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
12. SSD	N	N	
13. Scale_Convention	Y	Y	On Export, Scale_Convention is set to 1.
14. Gantry_Angle	Y	Y	
15. Gantry_Dir	Y	Y	On Import, if Total_Control_Points is greater than 1, Gantry_Dir must either be NULL or the same in all Control Point Records except the last record.
16. Collimator_Angle	N	N	
17. Collimator_Dir	N	N	
18. Field_X_Mode	Y	Y	
19. Field_X	Y	Y	On Import: • If Field_X is negative, a message will display and the Import process will be disabled. • Field_X is rounded out to 1 decimal place. • Field_X is translated based on source and target machine characterizations. • If Field_X_Mode is asymmetric: • If the scale is IEC, subtracting Collimator_X1 from Collimator_X2 derives Field_X. • If the scale is not IEC, adding Collimator_X1 and Collimator_X2 derives Field_X.
20. Collimator_X1	Y	Y	On Import: • Collimator_X1 is rounded out to 1 decimal place. • Collimator_X1 is translated based on source and target machine characterizations. • If Field_X_Mode is symmetric, subtracting the calculated Collimator_X2 from Field_Xderives Collimator_X1.
21. Collimator_X2	Y	Y	On Import: • Collimator_X2 is rounded out to 1 decimal place. • Collimator_X2 is translated based on source and target machine characterizations. • If Field_X_Mode is symmetric, dividing Field_X by 2 derives Collimator_X2.
22. Field_Y_Mode	Y	Y	
23. Field_Y	Y	Y	On Import: • If Field_Y is negative, a message to that effect will display and the Import process will be disabled. • Field_Y is rounded out to 1 decimal place. • Field_Y is translated based on source and target machine characterizations. • If Field_Y_Mode is asymmetric: • If the scale is IEC, subtracting Collimator_Y1 from Collimator_Y2 derives Field_Y. • If the scale is not IEC, adding Collimator_Y1 and

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
			Collimator_Y2 derives Field_Y.
24. Collimator_Y1	Y	Y	On Import: • Collimator_Y1 is rounded out to 1 decimal place. • Collimator_Y1 is translated based on source and target machine characterizations. • If Field_Y_Mode is symmetric, subtracting the calculated Collimator_Y2 from Field_Yderives Collimator_Y1.
25. Collimator_Y2	Y	Y	On Import: • Collimator_Y2 is rounded out to 1 decimal place. • Collimator_Y2 is translated based on source and target machine characterizations. • If Field_Y_Mode is symmetric, dividing Field_Y by 2 derives Collimator_Y2.
26. Couch_Vertical	N	N	
27. Couch_Lateral	N	N	
28. Couch_Longitudinal	N	N	
29. Couch_Angle	N	N	
30. Couch_Dir	N	N	
31. Couch_Pedestal	N	N	
32. Couch_Ped_Dir	N	N	
33. MLC_LP$_1$ (A$_1$)	Y	Y	On Import, MLC_LP$_1$ is translated based on source and target machine characterizations.
:	Y	Y	
132. MLC_LP$_{100}$ (A$_{100}$)	Y	Y	On Import, MLC_LP$_{100}$ is translated based on source and target machine characterizations.
133. MLC_LP$_{101}$ (B$_1$)	Y	Y	On Import, MLC_LP$_{101}$ is translated based on source and target machine characterizations.

2.7 MLC SHAPE RECORD [MLC_SHAPE_DEF]

Support of the Data Elements in the MLC Shape Record is indicated in the following table:

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
1. Keyword	Y	Y	"MLC_SHAPE_DEF"
2. Field_ID	Y	Y	On Import: • The Field_ID must match a field ID in an existing treatment field or in an import candidate FIELD_DEF record. • If the field **hadn't** previously existed in the DB, import the Shape data. • If the field **had** previously existed and it **didn't** have MLC data, import the Shape data. • If the field **had** previously existed and it **did** have MLC data: • If the field was overwritten, import the Shape data. • If the Control Point **was** overwritten, import the Shape data.
3. Control_Pt_Number	Y	Y	
4. Total_Shape_Points	Y	Y	
5. $X\_Coordinate_1$ 6. $Y\_Coordinate_1$: 323. $X\_Coordinate_{160}$ 324. $Y\_Coordinate_{160}$	Y	Y	
325. CRC	Y	Y	

2.8 DOSE TRACKING RECORD [DOSE_DEF]

Support of the Data Elements in the Dose Tracking Record is indicated in the following table:

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
1. Keyword	Y	Y	"DOSE_DEF"
2. Region_Name	Y	Y	If the import candidate Region_Name conflicts with the name of an existing dose tracking site, the import DOSE_DEF Record will be discarded and a warning message will display; otherwise, a new dose tracking site will be created.
3. Region_Prior_Dose	Y	Y	On Import, values greater than 9999 and less than 32768 will be imported, but will cause a display overflow (for example, "####") in some windows. On Import, if Region_Prior_Dose is either negative or greater than 32767, a message to that effect will display and the Import process will be disabled. On Import, rounded to the nearest whole cGy. On Export, the data format is nnnn. Values greater than 9999 will be exported as "####".
4. Field_ID$_1$	Y	Y	On Import, if the Field_ID does not match one in an existing treatment field or in an import candidate FIELD_DEF record, a message will display and the Import process will be disabled. On Import, if an import candidate Field_ID conflicts with the one in an existing dose site coefficient, the existing coefficient will be overwritten and a warning message to that effect will display; otherwise, a new dose tracking coefficient will be created. (up to 10 Field_ID, Reg_Coeff pairs)
5. Reg_Coeff$_1$	Y	Y	On Import, if Reg_Coeff is negative, a message to that effect will display and the Import process will be disabled. On Import and Export, rounded to the nearest thousandth of cGy/MU. The format after Export is n.nnn. (up to 10 Field_ID, Reg_Coeff pairs)
:			
22. Field_ID$_{10}$	Y	Y	
23. Reg_Coeff$_{10}$	Y	Y	
24. Actual_Dose	N	N	
25. Actual_Fractions	N	N	
26. CRC	Y	Y	

2.9 DOSE ACTION POINTS [DOSE_ACTION]

Support of the Data Elements in the Dose Action Points Record is indicated in the following table:

DATA ELEMENT LABEL	SUPPORTED		
	IMPORT	EXPORT	NOTES
1. Keyword	Y	Y	"DOSE_ACTION"
2. Region_Name	Y	Y	If an import candidate Region_Name exists, the imported record will be discarded and a warning message will display; otherwise, the dose action point will be added.
3. Action_Dose	Y	Y	On Import, values greater than 9999 and less than 32768 will be imported, but will cause a display overflow (i.e., "####") on some windows. On Import, if Action_Dose is either negative or greater than 32767, a message to that effect will display and the Import process will be disabled. On Export, the data format is nnnn. Values greater than 9999 will be exported as "####".
4. Action_Note	Y	Y	
5. CRC	Y	Y	

SIEMENS

ESI Gateways

ADT, Charge Export, Lab Results Import

1. INTRODUCTION

1.1 PURPOSE

This document specifies the interface used to exchange data between an external system and the Siemens Oncology Management System. Siemens believes that the information in this specification is accurate and reliable but accepts no responsibility for any consequences arising from unforeseen events.

The information contained in this document is subject to change. Revisions and updates will be issued from time to time to document changes and/or additions.

1.2 SCOPE

This specification is written primarily for those individuals who develop and maintain the external system interface (ESI). Hereafter the LANTIS External System Interface will be referred to as LANTIS ESI or ESI.

1.3 REFERENCES

This document references the following documents:

DID	TITLE
Ver. 2.3.1	Health Industry Level 7 Interface Standard (HL7) Version 2.1~2.3.1, published by The HL7 Working Group.

1.4 OVERVIEW

This document specifies the exchange of data between the LANTIS system and an external system. Data items required for transmission are explained, as well as the process required for exchange. User configurable options and logging for transactions and errors are also explained. The appendices provide information about data tables, examples of LANTIS ESI messages, and ESI mapping to HL7 codes.

1.5 DOCUMENTATION CONVENTIONS

The following conventions are used throughout this document:

- Window and dialog box titles and icons are in SMALL CAPITAL LETTERS.
- File names, file paths, databases, and database fields in tables are printed in mixed-case Couriertypeface.
- Text that you need to type exactly as shown, such as commands or responses, is shaded.
- Words or phrases that are specifically defined and could potentially be misunderstood are initially in “quotes”.
- Function keys and booster keys appear in upper case bold print. Example: **F2** or **CTRL**. Multiple keys that you press simultaneously are separated by a plus sign. Example: **CTRL + F4**.
- Because the referenced document HL7 version 2.3.1 does not conform to Siemens labeling conventions, specific sections of this document do not conform to Siemens labeling conventions. The sword symbol (†) shall indicate deviations from Siemens labeling conventions.

1.6 GENERAL CONSTRAINTS

The ADT, Financial and Laboratory Observation messages that ESI supports are HL7 compatible; however, they do not represent the full range of HL7 transaction messages. If required in later revisions of ESI, these additional messages may be added without disturbing the functionality specified in this document. Because ESI is based on the HL7 standard, it may receive and accept data that LANTIS subprograms ignore.

Although the HL7 Standard is defined in terms of the client-server (remote operation) model, this standard is equally applicable to file transfers. LANTIS ESI supports batch file transfers (Section 4.1, Transport Mechanism) and accepts one or more messages encoded according to the encoding rules and grouped in a file. Responses (if supported by the external system) are also grouped in a file and similarly transmitted. Discussion of any file transfer protocol is not within the scope of this document. ESI follows the HL7 standard for batch or TCP/IP message transmission. The processing mode supported by ESI is immediate processing.

If ESI is down for an extended period of time, the sending external system should hold all transactions until ESI returns to operational status.

There are data items that must be coordinated between external systems and LANTIS ESI users. This coordination is accomplished through a data table scheme described in Section 4.4 on page 120. Data tables that are site-editable are specified in APPENDIX A. TABLES on page 145

2. GENERAL DESCRIPTION

2.1 PRODUCT DESCRIPTION

The LANTIS ESI is a Health Industry Level 7 Interface Standard (HL7) Version 2.1 ~ 2.3.1 compliant interface that allows data to be transmitted between the LANTIS system and external systems. LANTIS ESI receives registration, billing, observation results and other information, and exports billable procedures that are captured and stored in the LANTIS system. ESI accepts the following transaction messages from an external system:

Gateway Patient Import Message Interface (Inbound)	
(A01) Admit a Patient	(A19) Patient Query
(A02) Transfer a Patient	(A23) Delete a Patient Record
(A03) Discharge a Patient	(A28) Add Person or Patient Information
(A04) Register a Patient	(A30) Merge Person Information
(A05) Pre-Admit a Patient	(A31) Update Person Information
(A06) Transfer Outpatient to Inpatient	(A34) Merge Patient Information - Patient ID
(A08) Update Patient Information	(A35) Merge Patient Information - Account Number Only
(A17) Swap Patients	(A36) Merge Patient Information - Patient ID and Account Number
(A18) Merge Patient Information	(A40) Merge Patient - Patient Identifier List
(P01) Add/Update Patient Accounts	(P02) Purge Patient Accounts
(Z01) Physician Add/Update/Delete	(Z02) Insurance Add/Update/Delete
ESI:Doc (Inbound)	
(R01) Unsolicited Transmission of an observation message	(T02) Original Document Notification and Content
Gateway Lab. Results Import Interface (Inbound)	
(R01) Unsolicited Transmission of an observation message	(R04) Query for Results of Observation
(R02) Query for Results of Observation	
Gateway Procedure Export-IN Interface (Inbound)	
(P03) Post Detail Financial Transactions	
Gateway Procedure Export-OUT Interface (Outbound)	
(P03) Post Detail Financial Transactions	

Gateway Lab. Results Import_ORDERS (Outbound)	
(O01) General Order Message	
ESI:PHARMACY_ORDERS (Outbound)	
(O01) General Order Message	

LANTIS ESI also acknowledges receipt of incoming messages, if required, with the response type: General Acknowledgement (message type ACK).

ESI transaction messages are compatible with the HL7 Version 2.1 ~ Version 2.3.1 and are external system independent. They include an information superset that may be received from external systems. HL7 uses a variable position, variable length format.

LANTIS ESI can be configured to accept transaction messages either:

- In “Interactive mode” (process only one batch file at a time)
- In “Polling mode” (process all new batch files at a user defined interval).
- In “TCP/IP mode” (process incoming messages received on the defined socket)

LANTIS ESI can export financial messages to a file via Interactive mode only.

The HL7 Query Acknowledgment message is supported. The Query Acknowledgment message occurs in response to a query sent to an external system (Event Code A19). The Query Acknowledgment is treated either as an admit or update. Note that only the acknowledgment is supported, not the initiating message. External systems that prefer not to screen messages can set up a process that initiates a query when a patient comes into an institution. See Section

3.2.19 of the HL7 Interface Specification V2.1 ~ 2.3.1.

3. ENVIRONMENT

The LANTIS hardware and software requirements document specifies the requirements for the ESI dedicated workstation and should be considered the primary source for hardware and software requirements. In addition, any third party systems that may be run on the ESI workstation may have hardware and software requirements above and beyond those specified in the LANTIS Hardware and Software Requirements. The specifications below are listed for reference only.

3.1 HARDWARE / SOFTWARE SPECIFICATIONS

LANTIS ESI requires a dedicated PC configured as follows:

- ♦ Pentium II (Intel only), 400 MHz minimum.
- ♦ 128 Megabytes RAM.
- ♦ 1 Gigabyte hard drive.
- ♦ VGA color monitor (256 color capability and 1024 x 768 Resolution; 4MB Video RAM).
- ♦ Networked access to the server containing the LANTIS database, 32 bit network adapter card/PCI Net Card
- ♦ 56K baud external modem (for remote configuration and support).

Gateway Patient Import Message and Gateway Procedure Export operate in conjunction with the following third party software:

- ♦ Microsoft Windows 98/2000/NT/XP Professional (Windows Me, XP Home, Linux are NOT supported and Windows 95 is no longer supported).
- ♦ pcAnywhere 32 for windows, Version 9.0 or greater (Version 10.5 for Windows 2000).

ESI:Lab Orders, ESI:Lab Results, ESI: Doc Export, and File-to-IP operate in conjunction with the following third party software:

- ♦ Microsoft Windows 2000/XP Professional (Windows 98, NT, Windows Me, XP Home, Linux are NOT supported.
- ♦ pcAnywhere 32 for windows, Version 9.0 or greater (Version 10.5 for Windows 2000).

4. SPECIFIC FUNCTIONAL REQUIREMENTS

4.1 TRANSPORT MECHANISM

This section describes the mechanisms utilized to transfer ADT, Charge and Laboratory Result information between the External System Database and the LANTIS database.

4.1.1 Operational Requirements of the External System

If not using TCP/IP for sending/receiving messages, the external system must be able to read and write DOS ASCII files on the LANTIS fileserver or to a local disk on a workstation that is connected to the network on which the LANTIS fileserver resides.

If using the TCP/IP mechanism, the external system must be able to create Sockets, put the information into a message buffer, and send and receive messages.

If a local workstation disk is utilized, the workstation must be able to execute a standard DOS program, have DOS ASCII file access (read/write) to the local disk and have network access to the LANTIS fileserver.

4.2 DEFINITIONS

4.2.1 Messages

A “message” is a unit of data transferred between external systems and LANTIS ESI. It consists of a group of “segments” sent from one system to another. Each message has a message type that defines its purpose. Each message type is represented by a 3-character code contained within the message. The LANTIS ESI currently supports one patient per message.

The event that initiates an exchange of messages is called a trigger event. Table 0003 in Appendix A contains the codes that represent all trigger events accepted by LANTIS ESI. LANTIS ESI uses two locally defined messages (i.e., messages with HL7 data types and segments, but not part of the HL7 standard message set). In accordance with the HL7 standard, these messages use message type and trigger event codes beginning with the letter Z.

A “segment” is a logical grouping of data fields. Segments of a message may be required or optional. They may occur only once in a message or they may be allowed to repeat. Each segment is given a name. For example, the Patient Visit ADT message contains the following segments: Message Header (MSH), Event Type (EVN), Patient ID (PID) and Patient Visit (PV1).

Each segment is identified by a unique 3-character code known as the “Segment ID”. LANTIS ESI uses two locally defined segments. The locally defined segments have Segment IDs that begin with the letter Z.

Within a message definition, brackets ([and]) are used to specify when segments are optional. Braces ({ and }) are used to specify when segments may repeat one or more times. Some sample message definitions are provided below.

Example 1: A message (MS1) consists of the ABC segment that is followed by one or more DEF segments, each of which is followed by a single GHI segment followed by zero or more JKL segments.†

```
MS1  ABC  {

DEF

   GHI  {  [JKL]

    }  }
```

Example 2: If the GHI and JKL segments need to appear in pairs but the pairs are optional and can repeat, MS1 would be revised as follows.

```
MS1  ABC  {
DEF

         [  {  GHI  JKL

                    }

                    ]

                    }
```

Example 3: If at least one pair of GHI and JKL segments must follow a DEF, then MS1 would be revised as follows.

```
MS1  ABC  {
DEF

       {  GHI

            JKL

            }

            }
```

† The Example format follows that found in HL7 ver. 2.3.

4.2.2 Data Fields

The segment data fields are defined in the sections that use them. Descriptions of the data fields and characteristics of their usage are also specified.

In sections that specify data segments the following acronyms are used:

♦ SEQ - Sequence Number.
♦ LEN - Length of a single occurrence.
♦ TYPE - Data Types.
♦ R/O - Required/Optional.
♦ REP - Repeatable.

The “SEQ” provides the position of the data field within the segment. This number is used to refer to the data field in the text comments that follow the segment definition table.

The “LEN” specifies the maximum number of characters that one occurrence of the data field may occupy in any message. It is calculated assuming that the LANTIS ESI encoding rules are applied. As such, it includes the defined component and sub-component separators. Because it specifies the length of a single occurrence, the repetition character is not used when calculating maximum length.

The “TYPE” specifies the contents of the data field. The data types and their formats are further defined in section 4.3.3 Data Types.
The “R/O” specifies whether a data field is required (R) or optional (O).
The “REP” designates whether a field may repeat (Y) or not (N). If the number of repetitions is limited, then REP = Y will be followed by a number specifying the limit.
“TABLE” refers to the number of a table file (see section 4.4 on page 120 and Appendix A on page 145), ITEM refers to an HL7 data dictionary reference number, and NAME gives the specified data field name.

Note: *The HL7 data dictionary reference numer is given in order to provide users with further references. Any other reference to or use of this item number is beyond the scope of this document. LANTIS ESI specified local segments provide no ITEM numbers.*

4.2.3 Message Encoding Rules

This section describes the process of constructing data that makes up the segments.

4.2.4 Special Character Definitions

In constructing a message, the following special characters are used:

- segment terminator.
- field separator.
- component separator.
- sub-component separator.
- repetition separator.

The “segment terminator” is the last character of every segment. The default is the ASCII CR character (hex 0D). LANTIS ESI also accepts the ASCII CR LF character (Hex 0D 0A) sequence.

The “field separator” separates two adjacent data fields within a segment. It also separates the segment ID from the first data field in the segment. The value that represents the field separator may be defined differently for each message. The character that is the fourth character of the Message Header (MSH) segment (i.e., between the segment ID and the Encoding Characters data field) serves as the field separator for all segments in the message. Absent other considerations, it is recommended that all sending applications use “ | ” as the field separator. However, LANTIS ESI accepts whichever character is included in this position and uses it to parse the message.

The “component separator” separates adjacent components of some data fields. Its use is described in the descriptions of the relevant data fields. The character that represents the component separator is specified for each message as the first character in the Encoding Characters data field of the MSH segment. Absent other considerations, it is recommended that all sending applications use “^“ as the component separator. However, LANTIS ESI accepts whichever character is included in the Message Header and uses it to parse the message.

The “sub-component separator” separates adjacent sub-components of some data fields. Its use is described in the descriptions of the relevant data fields. The character that represents the sub-component separator is specified for each message as the fourth character in the Encoding Characters data fields of the MSH segment. Aside from other considerations, Siemens recommends that all sending applications use “&“ as the sub-component separator. However, LANTIS ESI accepts whichever character is included in the Message Header and uses it to parse the message.

The “repetition separator” separates multiple occurrences of a particular field in some data fields. It is used only where specifically authorized in the descriptions of the relevant data fields. The character that represents the repetition separator is specified for each message as the second character in the Encoding Characters data field of the MSH segment. Absent other considerations, it is recommended that all sending applications use “~” as the repetition separator. However, LANTIS ESI accepts whichever character is included in the Message Header and uses it to parse the message.

In text fields (Data Type TX) the “escape character” is also allowed. The single character that represents the escape character is specified as the third character in the Encoding Characters data field of the MSH segment. LANTIS ESI does not currently include segments that use the TX data type and therefore ignores any characters occurring as the third character of the Encoding Characters data field.

4.2.5 Message Construction Rules

(1) Construct the segments in the order defined for the message. Each message is constructed as follows:

a) The first three characters are the segment ID code.

b) Each data field in sequence is inserted in the segment in the following manner:

i) A field separator is placed in the segment.

ii) If the value is “not present,” no further characters are required.

iii) If the value is present, but null, the characters "" (two consecutive double quote marks) are placed in the field.

iv) Otherwise, place the characters of the value in the segment. As many characters can be included as the maximum defined for the data field. It is not necessary to pad fields to fixed lengths. However, padding to fixed lengths is permitted.
Encode the individual data fields as shown in Section 4.2.6, Data Types on page 116.

v) If the field definition calls for a field to be broken into components, the following rules are used:

(a) If more than one component is included separate them using the component separator.

(b) Components that are present but null are represented by the characters "".

(c) Components that are not present are treated by including no characters in the component.

(d) Components that are not present at the end of a field need not be represented by component separators. For example, the two following data fields are equivalent:

|QRS^TUV^^| and |QRS^TUV|

vi) If the field definition calls for a field to be broken into sub-components, the following rules are used:

(a) If more than one sub-component is included, separate them using the subcomponent separator.

(b) Sub-components that are present but null are represented by the characters "".

(c) Sub-components that are not present are treated by including no characters in the sub-component.

(d) Sub-components that are not present at the end of a field need not be represented by sub-component separators. For example, the following two data components are equivalent:

^AAA&BBB&&^ and ^AAA&BBB^

vii) If the field definition permits repetition of a field, the repetition separator is used only if more than one occurrence is actually present and is placed between occurrences (If three occurrences are transmitted, two repetition separators are used.) In the example below, two occurrences of telephone number are being sent:

|324-7120~699-1292X129|

c) Repeat step (b) as long as there are any data elements present to be sent. If all the data fields remaining in the segment definition are not present there is no requirement to include any more delimiters.

d) End each segment with an ASCII carriage return character.

(2) Repeat step (1) until all segments have been generated.

The following rules apply to receiving LANTIS ESI messages and converting their contents to data values:

(1) Ignore segments, fields, components and extra repetitions of a field that are present but were not expected.

(2) Treat segments that were expected but are not present as consisting entirely of fields that are not present.

(3) Treat fields and components that are expected but were not included in a segment as not present.

(4) If LANTIS ESI cannot make a distinction between data fields that are not present and those that are null, it will treat data fields that are not present as null.

4.2.6 Data Types

Data Types represent restrictions on the contents of the data fields. The following types are defined†:

ST String **-** Any display characters are allowed. String data is left justified with trailing blanks optional. Example:
`|almost any data at all|`

NM Numeric -A leading "+" or "-" sign may be included. In the absence of a sign, the number is assumed to be positive. A decimal point may be included. If there is no decimal point, the number is assumed to be an integer. Leading zeros, or trailing zeros after a decimal point, are not significant. The two values "01.20" and "1.2" are identical. Example:
`|888|`
`|-123.456|`

DT Date - Always includes 4-digit year (YYYYMMDD). Example:
`|20010704|` July 4, 2001

TM Time - Always in the format HHMM[SS][+/-ZZZZ]* using a 24 hour clock notation. Seconds are optional. Seconds not present are interpreted as 00. The time zone (+/-ZZZZ) is optional. If not otherwise specified, the local time zone of the sender is assumed. Midnight is represented as 0000. Example:
`|0900|` Nine AM.
`|235959|` One second before midnight.

TS Time Stamp -Contains the exact time of an event, including the date (YYYYMMDDHHMM[SS][+/ZZZZ]*). Seconds are optional. Seconds not present are interpreted as 00. The time zone is optional, but if present either the + or - sign must be included, but not both. Midnight is represented as 0000 combined with the date of the day that is just beginning. The maximum length of a TS field is 19 characters. 199407050000 represents midnight on the night extending from July 4 to July 5, 2001 in the local time zone of the sender. Examples:
`|20010704010159|` 1:01:59 on July 4, 2001.

PT Processing Type **-** Specifies the type of database used. Components are: [Processing ID (ID)]^[Processing Mode(ID)].

PL Person Location -This data type is used to specify a patient location within a healthcare institution, in Point of care [(IS)] ^ [room (IS)] ^ [bed (IS)] format. Example:
|RADT^200^100|

† The format of these definitions does not conform to either Siemens LANTIS or HL7 documentation conventions. * This data field is not used by the current version of LANTIS ESI.

PN Person Name - Specified as multiple components: last name, first name, middle initial or name, suffix (e.g.: JR or III), prefix (e.g.: DR), and degree (e.g. MD). The sending system may send upper and lower case or all upper case. The receiving system may convert to all upper case if required. Example:
|KILDARE^MIKE^R^""^DR^PHD|
|BART^BLACK^A^III^""^""|

XPN Person Name **-** In version 2.3 replaces the PN data type. Additional components are not used by LANTIS ESI.

TN "Telephone Number **-** Always in the form:
[NN][(999)]999-9999[X99999][B99999][C any text]

The optional first two digits are the country code. The optional X portion gives an extension. While no explicit limit is placed on the text field, receiving systems may be expected to truncate values that are more than 10 characters long. Examples:
|(555)555-5555X222|
|555-5555|

XTN Telephone Number **-** In version 2.3 replaces the TN data type. Additional components are not used by LANTIS ESI.

AD Address **-** Consists of the following components separated by the component separator: street address, other designation, city, state or providence, zip, country. For use within the United States, state or province should be represented by the official US Postal service two-letter codes. For use within the United States, zip takes the form 99999[-9999]. For use within the United States, the country code is assumed to be USA if null. Example:
|101 MARINA BLVD^#32^ANYPLACE^CA^94105^""|

XAD Address **-**In version 2.3 replaces the AD data type. Additional components are not used by LANTIS ESI.

ID Coded Value **-**The value of such a field follows the formatting rules for an ST field except that it is drawn from a table of legal values. Examples of ID fields include physician ID, religion, and gender. Any time the ID data field appears, the legal values for that data field appear in a table.

The manner in which the valid values are defined for ID fields vary. Certain fields, such as Physician ID or Patient Location, have values that vary from institution to institution. Others, like Event type, are limited because they affect the interpretation of messages that contain them.

IS Coded Value for user defined table **-** The value of such a field follows the formatting rules for an ST field except that it is drawn from a user defined table of legal values.

SI Sequence ID **-**Always a positive, non-zero integer in the form of an NM field. Certain segments may repeat within a message. A field of this type is included as the second data field within each such segment. The fields follow the syntactic rules for a Numeric field. Generally, in an initial message they follow the sequence 1, 2, 3, ... for repetitions of the same segment type.

The segment IDs in response messages or in updates of previous messages occur in arbitrary order and identify the specific occurrence of the segment data fields being referred to or being altered. Because of the way information is stored and used within the LANTIS system, Sequence IDs are generally not used to uniquely identify previously sent information.

CE Coded Element – A field that contains codes and the text associated with that code. To allow all six types of this data type to be valued, the maximum length of this data type must be at least sixty.

CM Composite -A field that is a combination of other meaningful data fields. Each portion is called a component. Certain specific composites have been separately identified and are described below.

CK Composite ID with check digit - A composite consisting of three components: an id number, a check digit, and a code indicating the check digit scheme employed. If an external system requires use a check digit scheme, LANTIS ESI accepts the check digit and appends it on the end of the ID for use in the LANTIS system. If required for export, the ID is re-formatted according to the check digit scheme and exported. Example:
`|1289526|`
`|128952^6^M11|` If received, this CK is stored as 1289526 in LANTIS.

CN Composite ID and Name -A field identifying a person both as a coded value and with a text name. The

first component is the coded ID according to a site-specific table. The second and subsequent components

are the person's name in the form of a PN field.

For physician IDs, ESI requires only a valid, unique ID number. Names may be used when an external

system does not support unique IDs. However, both first and last name must match those stored in LANTIS. A name may be included along with an ID, but the ID will be used during processing. Examples:

`|00087^Doctor^This^""^MD|`

`|00087|`

`|^Doctor^This|`

EI Entity Identifier - The entity identifier defines a given entity within a specified series of identifiers.

Components are: [entity identifier (ST)] ^ [namespace ID (IS)[^ [universal ID (ST)] ^ [universal ID type (ID)].

XCN Composite ID and Name - In version 2.3 replaces the CN data type. Additional components are not used by LANTIS ESI.

Note: *The HL7 TX, FT, and CQ data types are not used by LANTIS ESI segments specified in this document. As stated above the CK and CN data tyes are accepted, but only portions of the components included within the data type may be used, depending on the site-specific configuration.*

4.2.7 Processing Rules

The processing rules described here apply to all LANTIS ESI message exchanges. LANTIS ESI processes messages in accordance with HL7 original acknowledgement mode.

In the original acknowledgement-processing mode, LANTIS ESI validates the message syntactically, processes it and sends an acknowledgement to the initiating external system.

LANTIS ESI requires no acknowledgment from external systems following output of transaction messages.

An external system creates a message with data values as defined in the appropriate chapter of this document. The data values provided in the Message Header (MSH) segment must include as a minimum the required data fields. The message is encoded according to the applicable rules and grouped as one or more messages in a batch file and delivered to LANTIS ESI. Upon receiving a message from an external system LANTIS ESI:

(1) Accepts the message.

(2) Partially validates it syntactically and against the rules described below:

a) The Message Type in the MSH segment is acceptable.

b) The Processing ID in the MSH segment is appropriate.

c) The Receiving Facility in the MSH segment matches configured value.

d) The Receiving Application in the MSH segment matches configured value.

If any of these fail, the message is rejected (General Acknowledgment (ACK) message with Application Reject ('AR') in the Acknowledgment Code)

(3) When processing the message, one of the following functions will occur:

a) The message is processed successfully, generating the response message (message type ACK). The MSA segment of the response message contains “AA” in the Acknowledgment Code field.

-OR-

b) An error response message is sent, providing error information in functional segments to be included in the response message. The MSA segment of the response message contains Application Error (“AE”) in the Acknowledgment Code.

-OR-

c) The message is rejected for reasons unrelated to its content or format (system down, internal error, etc.). The MSA segment of the response message contains Application Reject ('AR') in the Acknowledgment Code.

(4) Sends the response, error, or reject message to the sending external system. The message is type ACK.

The MSH segment in the response is constructed following the rules used to create the initial message. In particular, the date, time, and message control ID refer to the response message; they are not echoes of the fields in the initial message. The Receiving Application and Receiving Facility, and Processing ID fields contain codes that are copied from the Sending Application, Sending Facility and Processing ID fields of the external system message.

LANTIS ESI does not currently support either the Sequence Number Protocol or Continuation Messages and Segments HL7 message protocol variants.

Each ACK message is either sent back individually via TCP/IP or grouped together in a file as defined in the interface definition.

4.3 PROCESSING MODE

Messages can be processed via different processing modes. The user can select a particular processing mode for each interface definition.

4.3.1 Interactive Mode

Interactive mode enables the user to process the messages from an ASCII file. This mode only processes one file at a time. The interactive mode is intended for use in testing interfaces, one time data imports and manual file based interfaces.

Interactive mode can be used with or without FTP functionality. Without FTP functionality, the user specified file is processed through the ESI. With FTP functionality, the file is pulled from an FTP server based on the FTP settings and is copied to the user specified Destination prior to being processed through the ESI. Note that the input file is not deleted from the original directory. Results are written to the interface log file.

4.3.2 Polling Mode

Polling mode enables the user to process the messages from several ASCII files. Based on a user defined polling interval, the Polling interface searches for files matching the user-defined settings. If any files are found, they will be processed through the ESI. All files residing in the Destination directory will be processed. Note that wildcards can be used when specifying the Input File specifications.

Input file(s) are deleted from their original location to prevent duplicate file processing. Once processed, the files will be moved from the Destination directory to a subdirectory labeled “**BACK”** if the interface is configured to “Backup Files After Processing”. Otherwise, the files will be deleted.

Polling mode can be used with or without FTP functionality. Without FTP, the ESI searches for the user specified input file(s). If any files are found, these files are copied to the user specified Destination and processed through the ESI. With FTP functionality, the input files(s) are pulled from an FTP server based on the FTP settings and copied to the user specified Destination prior to being processed through the ESI. Results are written to the interface log file.

4.3.3 TCP/IP Mode

The TCP/IP mode is intended for use in real-time interfaces. Based on a user defined setting, the ESI waits for and receives HL7 messages wrapped in “MLLP” (minimum lower level protocol). ESI expects each message to be sent in its entirety; messages will not be reconstructed by ESI. Each message is processed and results are written to the interface log. The interface can be configured to send an ACK (acknowledgement) back to the originator of the message. The interface can also be configured to send messages on to up to three additional ports with either the same or different IP addresses.

4.4 TABLES

Some of the data fields in the HL7 messages must be specified in terms of a coded value that represents a text equivalent. The relationship between the coded value and the text equivalent is defined in a table. Some of the tables are HL7 standard tables and some are maintained within LANTIS tables. The tables are specified in the message segment definition sections using four character numbers.

Although some tables are considered HL7 standard, such as table 0006, RELIGION, the values in the tables can be changed if LANTIS ESI and the external system agree on the contents. Default values for these tables are listed, by table number, in Appendix A. Some of the tables listed in Appendix A are user defined, and as such, may contain values other than the default values listed. Alternatively, translation code mapping may be defined within LANTIS should the LANTIS ESI and the external system require different coded values for the same field. A translation code-mapping document can be obtained from Siemens Customer Services if required.

4.5 LANTIS ESI MESSAGES

4.5.1 Control Messages

As specified in section 4.2.7, Processing Rules on page 118, LANTIS ESI uses HL7 original acknowledgment mode for processing messages.

ACK: General Acknowledgment

The ACK message is sent after LANTIS ESI has received and processed a message following the structure:

ACK	**General Acknowledgment**
MSH	Message Header
MSA	Message Acknowledgment
[ERR]	Error

By default, ESI writes all ACK messages to the transaction log file (Section 7). LANTIS ESI can provide the messages directly to the sending application if the interface is configured for TCP/IP communications. This option is described in Section 5.1, Configurable Options on page 139.

4.5.2 Batch Processing

This section makes no assumptions concerning the file transfer protocol.

Batch processing is currently used for HL7 charge export processing. The structure of a LANTIS ESI HL7 compatible batch file is given in Figure 3 below.

```
[FHS]                    File Header Segment
{   [BHS]                 Batch Header Segment
            {MSH         One or more HL7 Encoded
                         Messages
...
...
...
}
[BTS]                    Batch Trailer Segment
}
[FTS]                     File Trailer Segment
```

FIGURE 3. LANTIS ESI BATCH FILE FORMAT

4.5.3 Admission/Discharge/Transfer (ADT) Messages

The ADT Transaction Set provides for transmitting new or updated information about patients. Generally, information is entered into the ADT system and passed to LANTIS ESI in the form of an unsolicited update.

Each triggering event supported by the Gateway Patient Import Message product is listed below, along with the applicable form of the message exchange.

4.5.3.1 Event Code: A01 - Admit / Visit Notification

An A01 event is intended to be used for “Admitted” patients only. An A01 event is sent as a result of a patient undergoing the admission process which assigns the patient to a bed. It signals the beginning of a patient’s stay in a healthcare facility. Normally, this information is entered in the primary Patient Administration system and broadcast to the nursing units and ancillary systems.

ADT^A01	**ADT Message**	**Rep#**		**ACK^A01**	**General Acknowledgment**
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[{ NK1 }]	Next of Kin /Associated Parties	2			
PV1	Patient Visit				
[{ DG1 }]	Diagnosis Information	4			
[{ GT1 }]	Guarantor	1			
[{ IN1 }]	Insurance	5			

LANTIS ESI inserts or updates (configurable, see section 5.1.1.2) patient demographic for A01, A04, A05, A08 and A28 events. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.) see section 0 for more details.

See the mapping for each HL7 segment for more details.

4.5.3.2 Event Code: A02 – Transfer a Patient

An A02 event is issued as a result of the patient changing his or her assigned physical location.

ADT^A02	ADT Message	Rep#		ACK^A02	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
PV1	Patient Visit				

- LANTIS ESI updates patient demographic data for A02. The information to be updated includes: PID – Patient Demographics (name, address, phone, … etc.)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)

4.5.3.3 Event Code: A03 – Discharge / End Visit

Event Code A03: An A03 event signals the end of a patient's stay in a healthcare facility. It signals that the patient's status has changed to "discharged" and that a discharge date has been recorded. The patient is no longer in the facility. The patient's location prior to discharge should be entered in PV1-3-assigned patient location.

ADT^A03	ADT Message	Rep#		ACK^A03	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
PV1	Patient Visit				

LANTIS ESI limits the data being updated for this event code to the following:

- PV1:3 (Assigned Patient Location) – Used to update ADM:room_num, ADM:nurse_unit and ADM:bed_num.
- PV1:45 (Discharge Date / Time) – Used to update ADM:discharge

4.5.3.4 Event Code: A04 - Register a Patient

Event Code A04: An A04 event signals that the patient has arrived or checked in as a one-time, or recurring outpatient, and is not assigned to a bed.

ADT^A04	ADT Message	Rep#		ACK^A04	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[{ NK1 }]	Next of Kin /Associated Parties	2			
PV1	Patient Visit				
[{ DG1 }]	Diagnosis Information	4			
[{ GT1 }]	Guarantor	1			
[{ IN1 }]	Insurance	5			

LANTIS ESI inserts or updates (configurable, see section 5.1.1.2) patient demographic for A01, A04, A05, A08 and A28 events. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.) see section 0 for more details. See the mapping for each HL7 segment for more details.

4.5.3.5 Event Code: A05 – Pre-Admit a Patient

An A05 event is sent when a patient undergoes the pre-admission process. During this process, episode-related data is collected in preparation for a patient's visit or stay in a healthcare facility.

ADT^A05	ADT Message	Rep#		ACK^A05	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[{ NK1 }]	Next of Kin /Associated Parties	2			
PV1	Patient Visit				
[{ DG1 }]	Diagnosis Information	4			
[{ GT1 }]	Guarantor	1			
[{ IN1 }]	Insurance	5			

LANTIS ESI inserts or updates (configurable, see section 5.1.1.2) patient demographic for A01, A04, A05, A08 and A28 events. For LANTIS purposes this event will be treated like an A01. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.) see section 0 for more details.

See the mapping for each HL7 segment for more details.

4.5.3.6 Event Code: A06 – Change an Outpatient to Inpatient

An A06 event is sent when a patient who was present for a non-admitted visit is being admitted after an evaluation of the seriousness of the patient's condition. This event changes a patient's status from "non-admitted" to "admitted." The new patient location should appear in PV1-3-assigned patient location.

ADT^A06	**ADT Message**	**Rep#**		**ACK^A06**	**General Acknowledgment**
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[{ NK1 }]	Next of Kin /Associated Parties	2			
PV1	Patient Visit				
[{ DG1 }]	Diagnosis Information	4			

LANTIS ESI updates patient demographic for A06. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code

4.5.3.7 Event Code: A07 – Change an Inpatient to Outpatient

An A07 event is sent when a patient who was admitted changes his/her status to “no longer admitted” but is still being seen for this episode of care. This event changes a patient from an “admitted” to a “non-admitted” status. The new patient location should appear in PV1-3-assigned patient location.

ADT^A07	ADT Message	Rep#		ACK^A07	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[{ NK1 }]	Next of Kin /Associated Parties	2			
PV1	Patient Visit				
[{ DG1 }]	Diagnosis Information	4			

LANTIS ESI updates patient demographic for A06. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code

4.5.3.8 Event Code: A08 - Update Patient Information

This trigger event is used when any patient information has changed but when no other trigger event has occurred. For example, an A08 event can be used to notify the receiving systems of a change of address or a name change.

ADT^A08	ADT Message	Rep#		ACK^A08	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[{ NK1 }]	Next of Kin /Associated Parties	2			
PV1	Patient Visit				
[{ DG1 }]	Diagnosis Information	4			
[{ GT1 }]	Guarantor	1			
[{ IN1 }]	Insurance	5			

LANTIS ESI inserts or updates (configurable, see section 5.1.1.2) patient demographic for A01, A04, A05, A08 and A28 events. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.) see section 0 for more details.

See the mapping for each HL7 segment for more details.

4.5.3.9 Event Code: A17 - Swap Patient Location

Event code A17 is used when it is decided that two patients will exchange beds. The patient ID and visit data are repeated for the two patients changing places.

ADT^A17	ADT Message	Rep#		ACK^A17	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
PV1	Patient Visit				
PID	Patient Identification				
PV1	Patient Visit				

LANTIS ESI updates patient demographics for A17 and swaps the room and bed numbers for the two patients identified in the message. The information to be updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)

4.5.3.10 Event Code: A18 - Merge Patient Information

The A18 event is used to merge current and previous patient identification numbers: PID-3-patient identifier list, PID-2-patient ID, PID-4-alternate patient ID-PID, and PID-18-patient account number. The PID segment contains the surviving patient ID information. The MRG segment contains the non-surviving information.

Note: All IMRG patient IDs must match the corresponding Mulit-Access IDs for the patient record being updated.

ADT^A18	ADT Message	Rep#		ACK^A18	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
MRG	Merge Information				
PV1	Patient Visit				

LANTIS ESI limits the data being updated for this event code to the following:

- PID:2 (Patient ID – External) – Used to update one of IDT:pat_ida – IDT:pat_idf
- PID:3 (Patient ID – Internal) – Used to update IDT:pat_ida or IDT:pat_idb
- PID:4 (Alternate Patient ID) – Used to update one of IDT:pat_ida – IDT:pat_idf
- PID:18 (Patient Account Number) – Used to update one of IDT:pat_ida – IDT:pat_idf

4.5.3.11 Event Code: A19 - Patient Query

Another application determines a need for ADT data about a patient and sends a query to an external ADT system. The **Who** Filter in the QRD identifies the patient ID upon which the query is defined and the Format Code must be **R** (record oriented). The ADT Event Type Segment, if included in the response, describes the event for which the ADT system initiated an unsolicited update.

The Query Acknowledgment message occurs in response to a query sent to an external system. Note that only the acknowledgment is supported, not the initiating message. External systems that prefer not to screen messages can configure a process that initiates a query when a patient comes into an institution.

ADT^A01	ADT Message	Repeat
MSH	Message Header	
QRD	Query Definition	

LANTIS ESI accepts the following ADT Response from the QRY Message. The Format Code must be **R** (record oriented) and the **Who** Filter must contain PATIENT ID - INTERNAL. Event types of A01, A08, and P01 are accepted, if the optional EVN segment is not included, the default shall be A08. Although EVN, PID, and PV1 segments may repeat for the ADT response, only those with PATIENT ID - INTERNAL matching the Who Filter will be accepted.

ADT^19	ADT Message	Rep#		ACK^A19	General Acknowledgment
MSH	Message Header			MSH	Message Header
MSA	Message Acknowledgment			MSA	Message Acknowledgment
QRD	Query Definition			[ERR]	Error
{ [EVN]	Event Type				
PID	Patient Identification				
PV1	Patient Visit				
}					

4.5.3.12 Event Code: A23 - Delete a Patient Record

The A23 event is used to delete patient and associated records from the database. LANTIS ESI supports the A23 event code using the LANTIS Database Maintenance API; therefore, the functionality of this request is restricted to the existing capabilities of DBM. Specifically, patients can only be deleted if no charge or billing records exist for the patient.

ADT^A23	ADT Message	Rep#		ACK^A23	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
PV1	Patient Visit				

4.5.3.13 Event Code: A28 – Add Person or Patient Information

For LANTIS purposes this event will be treated like an A04.

ADT^A28	ADT Message	Rep#		ACK^A28	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[{ NK1 }]	Next of Kin /Associated Parties	2			
PV1	Patient Visit				
[{ DG1 }]	Diagnosis Information	4			
[{ GT1 }]	Guarantor	1			
[{ IN1 }]	Insurance	5			

LANTIS ESI inserts or updates (configurable, see section 5.1.1.2) patient demographic for A01, A04, A05, A08 and A28 events. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.) see section 0 for more details.

See the mapping for each HL7 segment for more details.

4.5.3.14 Event Code: A30 - Merge Person Information

The A30 event is used to merge person information on an MPI. For LANTIS this event will be treated as an A34 event.

ADT^A30	ADT Message	Rep#	ACK^A30	General Acknowledgment
MSH	Message Header		MSH	Message Header
EVN	Event Type		MSA	Message Acknowledgment
PID	Patient Identification		[ERR]	Error
MRG	Merge Information			

LANTIS ESI limits the data being updated for this event code to the following:

♦ PID:3 (Patient ID – Internal) – Used to update IDT:pat_ida or IDT:pat_idb

4.5.3.15 Event Code: A31 - Update Person Information

An A31 event can be used to update person information on an MPI. For LANTIS purposes this event will be treated like an A08.

ADT^A31	ADT Message	Rep#		ACK^A31	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[{ NK1 }]	Next of Kin /Associated Parties	2			
PV1	Patient Visit				
[{ DG1 }]	Diagnosis Information	4			
[{ GT1 }]	Guarantor	1			
[{ IN1 }]	Insurance	5			

LANTIS ESI inserts or updates (configurable, see section 5.1.1.2) patient demographic for A01, A04, A05, A08 and A28 events. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.) see section 0 for more details.

See the mapping for each HL7 segment for more details.

4.5.3.16 Event Code: A34 - Merge Patient Information - Patient ID Only

The A34 event is used to merge current and previous patient IDs only. The PID segment contains the surviving patient ID information. The MRG segment contains the non-surviving information. Only PID-3-patient identifier list is updated as a result of the merge.

ADT^A34	ADT Message	Rep#		ACK^A34	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
MRG	Merge Information				

LANTIS ESI limits the data being updated for this event code to the following:

- PID:3 (Patient ID – Internal) – Used to update IDT:pat_ida or IDT:pat_idb

4.5.3.17 Event Code: A35 - Merge Patient Information - Account Number Only

The A35 event is used to merge current and previous patient account numbers only. The PID segment contains the surviving patient ID information. The MRG segment contains the non-surviving information.

ADT^A35	ADT Message	Rep#		ACK^A35	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
MRG	Merge Information				

LANTIS ESI limits the data being updated for this event code to the following:

- PID:18 (Patient Account Number) – Used to update one of IDT:pat_ida – IDT:pat_idf

4.5.3.18 Event Code: A36 - Merge Patient Information - Patient ID and Account Number

The A36 event is used to merge current and previous patient IDs and account numbers only. The PID segment contains the surviving patient ID information. The MRG segment contains the non-surviving information.

ADT^A36	ADT Message	Rep#		ACK^A36	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
MRG	Merge Information				

LANTIS ESI limits the data being updated for this event code to the following:

- PID:3 (Patient ID – Internal) – Used to update IDT:pat_ida or IDT:pat_idb
- PID:18 (Patient Account Number) – Used to update one of IDT:pat_ida – IDT:pat_idf

4.5.3.19 Event Code: A40 - Merge Patient - Patient Identifier List

An A40 event is used to signal a merge of records for a patient that was incorrectly filed under two different identifiers. The MRG segment contains the non-surviving information. Only PID-3-patient identifier list is updated as a result of the merge. For LANTIS purposes this event will be treated like an A34.

ADT^A40	ADT Message	Rep#		ACK^A40	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
MRG	Merge Information				

LANTIS ESI limits the data being updated for this event code to the following:

♦ PID:3 (Patient ID – Internal) – Used to update IDT:pat_ida or IDT:pat_idb

4.5.4 Finance (BAR and DFT) Messages

The Finance Transaction Set provides for transmitting new or updated information about patients including demographics, charges and insurance information. Each triggering event supported by the Gateway Patient Import Message product is listed below, along with the applicable form of the message exchange.

4.5.4.1 Event Code: P01 - Finance: Add and Update Patient Accounts

BAR^P01	BAR Message	Rep#	ACK^P01	General Acknowledgment
MSH	Message Header		MSH	Message Header
EVN	Event Type		MSA	Message Acknowledgment
PID	Patient Identification		[ERR]	Error
[PV1]	Patient Visit			
[{ DG1 }]	Diagnosis Information	4		
[{ GT1 }]	Guarantor	1		
[{ NK1 }]	Next of Kin /Associated Parties	2		
[{ IN1 }]	Insurance	5		

LANTIS ESI inserts or updates (configurable, see section 5.1.1.2) patient demographic for A01, A04, A05, A08 and A28 events. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- NK1 – Related Parties (relative and emergency contact)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.) see section 0 for more details.

See the mapping for each HL7 segment for more details.

The LANTIS database accepts up to four admitting diagnosis.

4.5.4.2 Event Code: P02 - Finance: Purge Patient Accounts

Generally the elimination of all billing/accounts receivable records is an internal function controlled by the financial system; however, there is an occasional need to correct an account, or a series of accounts, that may require sending a notice of account deletion from another sub-system and processed by the financial system.

BAR^P02	ADT Message	Rep#		ACK^P02	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
{ PID	Patient Identification			[ERR]	Error
[PV1] }	Patient Visit				

Upon receipt of this message for a patient, the ID in LANTIS corresponding to the PATIENT ACCT NUMBER in the PID segment will be erased to prevent charges from being captured with an invalid account number.

LANTIS ESI limits the data being updated for this event code to the following:

- PID:18 (Patient Account Number) – Used to clear the contents of one of IDT:pat_ida – IDT:pat_idf

4.5.4.3 Event Code: P03 - Finance: Post detail financial transactions - Inbound

Event Code P03. The Detail Financial Transaction is used to describe a financial transaction imported into LANTIS for billing purposes. In addition, ESI can be configured to optionally add or update patient demographics and payer information. Note that the transaction code (FT1:SEQ7) must be specified in terms of hospital codes in order for the messages to be successfully imported.

DFT^P03	DFT Message	Rep#		ACK^P03	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
[PV1]	Patient Visit				
{ FT1 }	Financial Transaction	10			
[{ DG1 }]	Diagnosis Information	4			
[{ GT1 }]	Guarantor	1			
[{ IN1 }]	Insurance	5			

LANTIS ESI optionally inserts or updates (configurable, see section 5.1.1.4) patient demographic for the P03 events. It also inserts financial transactions. The information to be inserted or updated includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.) see section 0 for more details.
  FT1 – Charges associated with a patient (hospital code, CPT code, quantity, ICD code, … etc.)

See the mapping for each HL7 segment for more details.

See section 5.1.1.4 for information regarding HL7 Charge Inbound configuration settings.

4.5.4.4 Event Code: P03 - Finance: Post detail financial transactions - Outbound

Event code P03. The Detail Financial Transaction is used to describe a financial transaction exported from LANTIS to a file for use by an external billing system.

DFT^P03	DFT Message	Rep#
MSH	Message Header	
EVN	Event Type	
PID	Patient Identification	
[PV1]	Patient Visit	
{ FT1 }	Financial Transaction	1
[{ DG1 }]	Diagnosis Information	4
[{ GT1 }]	Guarantor	1
[{ IN1 }]	Insurance	5

LANTIS ESI exports financial transactions (charges). It also optionally exports patient demographics. The information to be exported includes:

- PID – Patient Demographics (name, address, phone, … etc.)
- PV1 – Patient Visit Information (patient class, location, admit date/time, links to physicians, … etc.)
- DG1 – Diagnosis Code
- GT1 – Guarantor (name, address, phone, employer information … etc.)
- IN1 – Links to patient's insurance companies (name, policy number, contact, … etc.)
- FT1 – Charges associated with a patient (hospital code, CPT code, quantity, ICD code, … etc.)

See the mapping for each HL7 segment for more details.

4.5.5 Observation Reporting Messages

The observation reporting set provides for transmission of unsolicited observations reports for patients registered in the LANTIS system. Each trigger event supported by the Lab Results Inbound and Document Inbound interfaces is listed below, along with the applicable form of the message.

4.5.5.1 Event Code R01 - Unsolicited Transmission of an Observation

The R01 event code is supported by both the ESI:Doc Inbound interface and the ESI:Lab Results Inbound interface. The mapping of information between the HL7 segments and the LANTIS database differ for each of these interfaces. The business validation rules also differ.

For lab results to be imported, the entire message must be valid and contain at least one OBX segment per OBR segment. Multiple OBR segments are supported.

The Doc Inbound interface supports a single document per message. For ORU^R01 the ORC segment is repeating according to the HL7 2.3 standard. But support within the interface is limited to a single instance of this segment. If multiple documents are sent, only the first one will be processed.

ORU^R01	ORU Message	Rep#		ACK	General Acknowledgment
MSH	Message Header			MSH	Message Header
{				MSA	Message Acknowledgment
[				[ERR]	Error
PID	Patient Identification				
[PD1]	Additional Demographics				
[{NK1}] *	Next of Kin / AssociatedParties				
[{NTE}] *	Notes and Comments				
[					
PV1 *	Patient Visit				
[PV2] *	Patient Visit – Additional Info				
]					
{					
[ORC] *	Order common				
OBR	Observation Report ID				
[{NTE}]	Notes and Comments	No limit			
[CTD] *	Contact Data				
{					

ORU^R01	ORU Message	Rep#		ACK	General Acknowledgment
[{OBX}]	Observation / Result				
{NTE}]	Notes and Comments	No limit			
}					
[{FT1}] *	Financial Transaction				
{[CT1]} *	Clinical Trial Identification				
}					
}					
[DSC]	Continuation Pointer				

NOTE: The HL7 segments with an asterisk * are not part of the standard mapping between the HL7 message and the LANTIS database. The DSC segment is only used by the ESI:Doc Inbound interface.

4.5.5.2 Event Codes R02, R04 - Query for Results of Observation

Event Codes R02, R04.

QRY^R02, ORF^R04	ORU / ORF Message	Rep#		ACK^R02,R04	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
MSA	Message Acknowledgment			[ERR]	Error
QRD	Query Definition				
[PID]	Patient Identification				
OBR	Observation Report ID				
[{ NTE }]	Notes and Comments	5			
{					
[{ OBX }]	Observation / Result	200			
[{ NTE }]	Notes and Comments	5			
}					

4.5.6 Document Management Messages

The medical document management set provides for transmission of new or updated documents or information about their status(es). We will process these messages for patients registered in the LANTIS system. Each trigger event supported by the ESI:Doc Inbound interfaces is listed below, along with the applicable form of the message.

4.5.6.1 Event Code T02 – Original Document Notification and Content

The T02 event code is supported by the ESI:Doc Inbound interface.

ORU^R01	ORU Message	Rep#		ACK	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN				MSA	Message Acknowledgment
PID	Patient Identification			[ERR]	Error
PV1	Patient Visit				
TXA	Document Notification				
{OBX}					

4.5.7 Lab Order Messages

The lab order set provides for lab order transmission for patients registered in the LANTIS system.

4.5.7.1 Event Code O01 – General Order Message

The function of this message is to initiate the transmission of order information. This includes placing new orders, canceling existing orders, discontinuation, holding, etc. ORM messages can also originate with a placer, filler, or an interested third party.

The trigger event for this message is any change to an order. Such changes include submission of new orders, cancellations and updates.

ORM^O01	ORM Message	Rep#		ORR^O02	General Acknowledgment
MSH	Message Header			MSH	Message Header
PID	Patient Identification			MSA	Message Acknowledgment
[PV1]	Patient Visit			[ERR]	Error
[{IN1}]	Insurance	4		[{NTE}]	Notes and Comments (forPatient ID)
[GT1]	Guarantor	1		[	
				PID	Patient Identification
{				[{NTE}]	
ORC	Common Order			{	
OBR	Order Detail SegmentOBR, etc.			ORC	Common Order
[{DG1}]	Diagnosis	1		OBR	Order Detail Segment OBR,etc.
}				}	
				]	

The DG1 segment will not be created if there is no diagnosis associated with the lab order.

4.5.8 Pharmacy Order Messages

The Pharmacy order set provides for pharmacy order transmission for patients registered in the LANTIS system. Each trigger event supported by the ESI:Pharmacy Order Export product is listed below, along with the applicable form of the message.

4.5.8.1 Event Code O01 – General Order Message

The function of this message is to initiate the transmission of order information. This includes placing new orders, canceling existing orders, discontinuation, holding, etc.

The trigger event for this message is any new pharmacy order or any change to an approved order. Such changes include cancellations and updates.

ORM^O01	ORM Message	Rep#		ORR^O02	General Acknowledgment
MSH	Message Header			MSH	Message Header
PID	Patient Identification			MSA	Message Acknowledgment
[PV1]	Patient Visit			[ERR]	Error
[{IN1}]	Insurance	4		[{NTE}]	Notes and Comments (forPatient ID)
[GT1]	Guarantor	1		[	
[{AL1}]	Allergy Information	N		PID	Patient Identification
{				[{NTE}]	
ORC	Common Order			{	
RXO	Pharmacy/Treatment Order	1		ORC	Common Order
[RXR]	Pharmacy/treatment route	0-1		RXO	Order Detail Segment RXO,etc.
[{RXC}]	Pharmacy/treatmentcomponent segment	N		}	
[{DG1}]	Diagnosis	1		]	
[OBX]	Observation	1			
}					

The PV1, IN1, and GT1 segments are conditional on interface configuration and on whether or not there is insurance and/or guarantor information defined for the patient.
The AL1 segment is conditional on interface configuration and on whether or not the patient has allergies.
The RXR segment is conditional on a route being present the order.
The RXC segment is conditional on order components in the order. If the order is defined as a solution with additives, there will be an RXC segment in the message for each additive.

The DG1 segment is conditional on interface configuration and on whether or not there is a diagnosis associated with the pharmacy order.
The OBX segment for BSA (Body Surface Area) is conditional on interface configuration and on whether or not any of the components in the order have a BSA.

4.5.9 Locally Defined Messages

HL7 specifies that all messages that begin with “Z” be locally defined. LANTIS ESI has two locally defined messages.

4.5.9.1 Event Code: Z01 - Physician Add/Update/Delete

The LANTIS system must be able to recognize valid doctor names/IDs when classifying attending, referring, consulting or admitting physicians. A local message exists in order to add, update and remove valid physicians in the system.

ZPA^Z01	ADT Message	Rep#		ACK^Z01	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
ZPH	Physician Identification			[ERR]	Error

LANTIS ESI inserts / updates (configurable, see section 5.1.1.2) or deletes Staff or External physicians. The information to be inserted or updated includes:

- ZPH – Staff or External Physician Identification information (name, license, upin, address, phone, … etc.) See the mapping for each HL7 segment for more details.

4.5.9.2 Event Code: Z02 - Insurance Add/Update/Delete

The LANTIS system must be able to recognize valid insurance company names/IDs when processing patient information. In order to receive and remove valid insurance providers in the system, a local message exists.

ZIN^Z02	ADT Message	Rep#		ACK^Z02	General Acknowledgment
MSH	Message Header			MSH	Message Header
EVN	Event Type			MSA	Message Acknowledgment
ZIL	Insurance Local			[ERR]	Error

LANTIS ESI inserts / updates (configurable, see section 5.1.1.2) or deletes Payers (Insurance Companies).

The information to be inserted or updated includes:

- ZIL – Insurance Identification information (Company name, ID, Plan ID, address, contact, phone, … etc.) See the mapping for each HL7 segment for more details.

5. USER CONFIGURABLE SWITCHES

Some data fields exist that are site specific and must be coordinated between Siemens Medical Systems and the parties responsible for maintaining the external systems. All coordination between LANTIS ESI and an external system will occur through use of the data table scheme. Site-specific tables must be defined for items such as patient class, physician IDs, Insurance Company IDs, etc. (i.e., all data types CN and ID). Site-defined tables are noted as such in Appendix A on page 145.

Detailed descriptions of the various configuration items may be found in the LANTIS user manuals.

5.1 CONFIGURABLE OPTIONS

LANTIS ESI is end-user configurable regarding the following import and export options.

5.1.1 Import Options

- Null Character Value.
- HL7 Production Value.
- Receiving Application Name.
- Receiving Facility Name.
- Send Acknowledgment. [1] (TRUE/FALSE).
- LANTIS to HL7 Patient ID mapping. [2]

You can configure data items coordinated through the HL7 data tables to be accepted with or without validation on a per table basis on imports.

The segment terminator (last character of every segment) defaults to ASCII CR (Hex 0D) in ESI. The segment terminator is end-user configurable.. If DOS ASCII files are used for message exchange, ASCII CR LF (Hex 0D 0A) is recommended to maintain compatibility with standard text editors.

[1] The Send Acknowledgement flag is used to determine whether the external system is expecting a general acknowledgment (ACK) message. ACKs are routinely written to the transaction log file.

[2] The LANTIS to HL7 Patient ID mapping includes assignment of LANTIS IDs to HL7 IDs (Example: LANTIS Pat_IDA is almost always assigned to HL7 Internal ID for use as a coordinating medical record number), check digit scheme configuration and whether the mapping extends to inpatients, outpatients or both for a particular ID.

5.1.1.1 Query Configuration

Future versions of ESI will be configurable as to whether the HIS is screening messages for destination or the query and send scheme is being used. This item will not be supported until LANTIS patient registration supports query initiation; however, the current version of ESI does respond to query acknowledgments.

5.1.1.2 Admit, Update and Secondary Search Configuration

LANTIS ESI is configurable as to whether the following features are enabled:

- Admit transactions are treated as updates if they are received when a matching record is already in the system. This applies to add of patients, insurance companies and physicians.
- Update transactions are treated as admits if received prior to an admit occurring. This applies to updating patients, insurance companies and physicians.
- Search for a patient with matching last name and social security number if a failure to match using Internal ID occurs for admit, update, register, or add/update patient accounts messages occurs.

5.1.1.3 Process Delete Patient Messages

If checked, the Delete Patient (event code A23) messages will be processed to attempt to delete patient records.

5.1.1.4 Charge Inbound Configuration

LANTIS ESI provides the additional configuration options specific to the processing of P03 (Post Financial Transactions) inbound messages.

- Add Patient: If set, patient demographics will be added to the database if the patient does not already exist. Patient will be added according to the processing rules for an A01 (Admit a Patient) event code.
- Update Patient: If set, existing patients will be updated in the database according to the processing rules for an A08 (Update Patient Information) event code.

Note: *If either of the above options is set, the IN1 segments included in the message will be analyzed. If an ESI coordinating ID exists for the IN1 record, a relationship will be established between the patient and the payer. If an ESI coordinating ID does not exist for the IN1 record, a new payer record will be created, an ESI_ID will be created with the value from IN1:2, and a relationship will be established between the patient and the payer.*

5.1.1.5 ADT Inbound Configuration

The “ADT Inbound” tab is visible when the Interface Type is set to ADT Inbound. When “Use Department Mapping” is checked, ADT messages are evaluated to determine if the patient location in PV1:3 matches a department entry in the ESI Mapping table. If a department match is found, the patient ADT data is updated to assign that department as the patient home department. If there is no department match, the ADT update message can be configured to be discarded, to be assigned to a default department, or to be updated to the system as an unregistered patient.

If the “Discard Unknown” checkbox is checked, the non-matching transactions will be discarded and not updated to the database.

If “Use Department Mapping” is checked and “Discard Unknown” is not checked, the “Department Mapping Settings” group box is enabled on the ADT Inbound tab. Two mutually exclusive settings are provided: “Assign Default Department” and “Unregistered Patient”. The following special processing based on these settings will occur when an HL7 message being processed fails on department mapping:

- **Assign Default Department** - Default for new interfaces

  When set the Department identified in the “Department” dropdown will be used as the home department for the non-department-mapped HL7 message being processed.

- **Unregistered Patient**

  When “Unregistered Patient” is set this non-department-mapped message will be processed differently based on whether this message is for an existing patient in LANTIS.

  - New Patient:

    (1) The patient data will be updated and the patient clinical status will be set to Unregistered.

  - Existing Patient with a Patient Status = Unregistered:

  (1) The patient data will be updated to the unregistered patient and the clinical status will remain unchanged.

  - Existing Registered Patient:

    (1) The patient data not specific to a department will be updated but patient IDs IDA – IDF will not be updated.>

    (2) No PV1 data will be processed.

    (3) No DG1 data will be processed.

5.1.1.6 Charge Outbound Configuration

LANTIS ESI provides the additional configuration options specific to the processing of P03 (Post Financial Transactions) outbound messages.

- Within the “Billing” tab in DEPARTMENT SETUP, there is a setting entitled “Require Charges to be reviewed before Exporting”. When this checkbox is checked, only those charges that have been reviewed can be exported.

5.1.2 Export Options

- Null Character Value.
- HL7 Version.
- HL7 Production Value.
- HL7 Encoding Characters.
- Receiving Application Name.
- Receiving Facility Name.
- Sending Application Name.
- Sending Facility Name.
- LANTIS to HL7 Patient ID mapping.[2]
- Use Department Code, Cost Center Code or Department Abbreviation[3] (FT1 Segment DEPARTMENT CODE).
- Use Hospital Charge Code or CPT Code[4] (FT1 Segment TRANSACTION CODE).
- Use Batch Headers/Footers (TRUE/FALSE).
- Use File Headers/Footers (TRUE/FALSE).
- Export Credits (TRUE/FALSE).
- Use PV1, Use DG1, Use GT1, Use IN1 (TRUE/FALSE)

HL7 Data items exported through ESI can be configured as unused or required. If a data item is required and not present, the export will not occur. If a data item is unused, then regardless of whether it is present, it will not be included in the export.

ESI can maintain multiple export destination configurations and be coordinated for use with the LANTIS Billing Module to control rights to the export of technical and professional components of charges. Example 1: Hospital receives technical charges, LANTIS Billing Module receives professional charges. Example 2: Hospital receives technical charges, Professional Billing Service receives professional charges.

[2] The LANTIS to HL7 Patient ID mapping includes assignment of LANTIS IDs to HL7 IDs (Example: LANTIS Pat_IDA is almost always assigned to HL7 Internal ID for use as a coordinating medical record number), check digit scheme configuration and whether the mapping extends to inpatients, outpatients or both for a particular ID.

[3] It is end-user configurable whether a department code, cost center code or department abbreviation appears in the FT1 segment DEPARTMENT CODE field.

[4] It is end-user configurable whether a Charge’s Hospital Charge Code or CPT Code appears in the FT1 segment TRANSACTION CODE field.

5.2 HALT TIME/DURATION

ESI is configurable as to what time and duration the ESI program is not allowed to run. This allows data backups to proceed during specified time periods. A message displays during the halt time stating that the program has been disabled.

6. LOG FILES

6.1 TRANSACTION LOG FILES

For each inbound interface, a file called <interfacename>.Lxx, in which “xx” is today’s date, is used to keep a record of all the transactions occurring within a 24-hour period. The log file contents can be filtered and viewed from the ESI Manager, Log File button. The log file contains details of the processing of inbound messages including:

- **Message Content** - The original message content received.
- **Error Details** – Details regarding any errors encountered while processing the message. The information is this section will vary based on the error, but enough information will be provided to allow the user to identify the type of error and the data associated with the error. The general format for the error data is to include a description of the error followed by the relevant data. **NOTE**: Additional information is written to the log file when errors are encountered importing lab results or charges. Any lab result or charge not imported will be documented in the log file. This will enable users to more easily identify and resolve these errors.
- **Warning Details** – Details regarding any warnings encountered while processing the message. The information is this section will vary based on the error, but enough information will be provided to allow the user to identify the type of warning and the data associated with the warning.
- **Message Acknowledgment** - The content of the HL7 acknowledgement message.
- **Patient Information** – Patient identification information from the HL7 message content.

Transaction messages received and ignored or discarded will be listed in the transaction log file.

LANTIS ESI keeps the thirty-one most recent transaction log files (one month's worth). The files are stored as <interfacename>.L1 through <interfacename>.L31. Following completion of a 31-day cycle, the <interfacename>.Lxx file is overwritten.

The <interfacename>.Lxx files utilize the DOS environmental variable ESI to identify the directory.

6.2 TCP/IP LOG FILES

For TCP/IP interfaces, two additional log files are created.

- CESI.LOG: Contains general information that applies to the TCP/IP communication protocol.
- <interfacename>.TCP: Contains more detailed information to help diagnosis error. The original message content is also included if the ‘Save Message Content’ is checked in the Interface definition.

7. ERRORS

7.1 ERROR HANDLING

LANTIS ESI does not allow transaction messages in which it has detected errors to be input into the LANTIS system. Duplicate transaction messages (ex: two admit messages for a patient) and messages for invalid patients (ex: transfer or purge a nonexistent patient) are not allowed. Physician and Insurance codes transmitted from external systems must match valid ID numbers in the LANTIS system.

When errors occur, the transaction message is not accepted as input by LANTIS ESI. The error is recorded in the LANTIS ESI Transaction Log File.

The LANTIS ESI has a list of Anomaly Codes (Returned in ERR Segment as fourth component of ERROR CODE AND LOCATION) that are used as rules when processing messages. The table below lists the anomaly code, whether the anomaly response is end-user configurable (error, warning, none) and the default values for each code. All error codes that are not end-user configurable are considered fatal error conditions.

ANOMALY CODE	DESCRIPTION	END-USER CONFIGURABLE	DEFAULT
01	Invalid Patient	No	Error
02	Invalid Physician	Yes	None
03	Invalid Insurance	Yes	None
04	Missing Required Data Field/Component	Yes	None
05	Invalid Data Repetition	Yes	None
06	Missing Required Data Segment	No	Error
07	Invalid Event Type	Yes	Error
08	Duplicate Message	No	Error
09	Invalid Data Field/Component	Yes	None
10	Invalid Data Field Length	Yes	None
11	Invalid Segment	No	None
12	File Error	No	Error
13	Application Error	No	Error
14	Invalid Time Stamp	Yes	None
15	Invalid Application	Yes	None
16	Invalid Facility	Yes	None
17	Unexpected Segment	Yes	None
30	Entry Not Found	No	Error
33	Record Not Available	No	Error
35	Record Not Found	No	Error
37	File Not Open	No	Error
40	Creates Duplicate key	No	Error
43	Record is Already Hold	No	Error

For end user configurable anomalies:

- “Error” stops processing when the error is encountered. However, some data may have already been completely processed resulting in the form of additions or updates to the database.
- “Warn” warns the user that an error has occurred, but continues processing the message.
- “None” ignores the error when it occurs and continues processing the message.

7.2 ERROR LOGGING

The <interfacename>.Lxx file is also used to keep a record of all the errors that occur between LANTIS ESI and the external system. The file contains all errors that occur within a 24-hour period.

Errors are not logged for any ADT messages received which were ignored/discarded. Errors are only logged for those messages that resulted in an error when an attempt was made to process the data. Any ADT messages received and ignored/discarded will be listed in the transaction log file.

For each Error, the ERR segment appears as part of the ACK message. Note that the ERR segment is an optional segment in the ACK messages. The ACK message Acknowledgment segment should have the MSA ACKNOWLEDGMENT CODE equal to either AR (Application Reject) or AE (Application Error) whenever an ERR segment is present.

8. APPENDIX A. TABLES

The table ID number references column six (TABLE) from the HL7 segment definitions in this document. The tables represent data which may be standardized across institutions, but for which no applicable official standard exists. For these a set of suggested values is listed below. See section 4.4, Tables on page 120 for detailed information concerning the use of HL7 data tables. For more information on maintaining these tables refer to the ESI Data Mapping Guide.

[1] Indicates that this version of LANTIS ESI does not support the use of this table.

[2] Indicates that this table is user defined. Listed table values are examples only.

Note: *The tables detailed in this appendix do not include the entire set of HL7 defined tables.*

TABLE ID: 0001 SEX[2]

VALUE	DESCRIPTION
F	Female
M	Male
O	Other
U	Unknown

TABLE ID: 0002 MARITAL STATUS[2]

VALUE	DESCRIPTION
A	Separated
D	Divorced
M	Married
S	Single
W	Widowed

TABLE ID: 0003 EVENT TYPE CODE

VALUE	DESCRIPTION
A01	Admit a patient
A02	Transfer a patient
A03	Discharge a patient
A04	Register a patient
A05	Pre-Admit a Patient
A06	Transfer outpatient to inpatient
A07	Transfer inpatient to outpatient
A08	Update patient information
A17	Swap a Patient
A18	Merge patient information
A19	Patient Query
A23	Delete a Patient
A28	Add Person or Patient Information
A30	Merge Person Information
A31	Update Person Information
A34	Merge Patient Information - Patient ID Only
A35	Merge Patient Information - Account Number Only
A36	Merge Patient Information - Patient ID and Account Number
A40	Merge Patient – Patient Identifier List
P01	Add/Update patient account
P02	Purge patient account
P03	Post detail financial transaction
Z01	Local Physician Add/Update/Delete
Z02	Local Insurance Add/Update/Delete
R01	Unsolicited Transmission of an observation message
R02	Query for Results of Observation
R03	Query for Results of Observation

TABLE ID: 0004 PATIENT CLASS[2]

VALUE	DESCRIPTION
I	Inpatient
O	Outpatient

Note:
For mapping within LANTIS, the “Label” field must be “In” for Inpatient and “Out” for Outpatient.

TABLE ID: 0005 ETHNIC GROUP2

VALUE	DESCRIPTION
A	Asian
B	Black
C	Caucasian
H	Hispanic
N	Native American
O	Other
P	Pacific Islander
U	Unknown

TABLE ID: 0006 RELIGION[2]

VALUE	DESCRIPTION
A	Atheist
B	Baptist
C	Catholic
N	Christian Scientist
E	Episcopalian
H	Hindu
J	Jewish
D	LDS (Mormon)
L	Lutheran
M	Methodist
S	Moslem
O	Other
P	Protestant
U	Unknown
Z	Nazarene

TABLE ID: 0007 ADMISSION TYPE1 TABLE ID: 0008 ACKNOWLEDGMENT CODE

VALUE	DESCRIPTION
AA	Application Accept
AE	Application Error
AR	Application Reject

TABLE ID: 0009 AMBULATORY STATUS[1]

TABLE ID: 0010 PHYSICIAN ID

LANTIS ESI substitutes this table for physician ID's that are entered elsewhere in the LANTIS system for ATTENDING, ADMITTING, REFERRING and CONSULTING DOCTORS.

TABLE ID: 0018 PATIENT TYPE[1]

TABLE ID: 0019 ANESTHESIA CODE[1]

TABLE ID: 0021 BAD DEBT AGENCY CODE[1]

TABLE ID: 0022 BILLING STATUS[1]

TABLE ID: 0023 ADMIT SOURCE[1]

TABLE ID: 0032 CHARGE / PRICE INDICATOR. [1]

TABLE ID: 0042 COMPANY PLAN CODE[1]

TABLE ID: 0044 CONTRACT CODE

TABLE ID: 0045 COURTESY CODE1

TABLE ID: 0046 CREDIT RATING[1]

TABLE ID: 0048 WHAT SUBJECT FILTER[1]

TABLE ID: 0051 DIAGNOSIS CODE[2]

TABLE ID: 0052 DIAGNOSIS TYPE[2]

TABLE ID: 0053 DIAGNOSIS CODING METHOD

VALUE	DESCRIPTION
I9	ICD9

TABLE ID: 0055 DRG CODE[1]

TABLE ID: 0056 DRG GROUPER REVIEW CODE[1]

TABLE ID: 0059 CONSENT CODE[1]

TABLE ID: 0061 CHECK DIGIT SCHEME[1]

TABLE ID: 0062 EVENT REASON

VALUE	DESCRIPTION
01	Patient Request
02	Physician Order
03	Census Management

TABLE ID: 0063 RELATIONSHIP[2]

This table is used by Next of Kin Relationship, Insured's Relation to Patient, and Guarantor Relationship.

VALUE	DESCRIPTION
BR	Brother
DA	Daughter
FA	Father
MO	Mother
OT	Other
SE	Self
SI	Sister
SN	Son
SP	Spouse
HU	Husband
WI	Wife
CH	Child
IN	In-law
FR	Friend

TABLE ID: 0064 FINANCIAL CLASS[1]

TABLE ID: 0066 EMPLOYMENT STATUS[1]

TABLE ID: 0068 GUARANTOR TYPE[1]

TABLE ID: 0069 HOSPITAL SERVICE[1]

TABLE ID: 0072 INSURANCE PLAN ID

LANTIS ESI substitutes this table for insurance plan IDs which are entered elsewhere in the LANTIS system.

TABLE ID: 0073 INTEREST RATE CODE[1]

TABLE ID: 0076 MESSAGE TYPE

VALUE	DESCRIPTION
ACK	General acknowledgment message
ADT	ADT message
BAR	Add/Change billing account
DFT	Detail financial transaction
ORF	Query for results of observation
QRY	Query, original mode

TABLE ID: 0079 LOCATION[2]

TABLE ID: 0083 OUTLIER TYPE[1] TABLE ID: 0086 INS. PLAN TYPE[1]

TABLE ID: 0087 PRE-ADMIT TESTING[1]

TABLE ID: 0088 PROCEDURE CODE[2]

TABLE ID: 0089 PROCEDURE CODING METHOD[2]

TABLE ID: 0090 PROCEDURE TYPE[2] TABLE ID: 0091 QUERY PRIORITY[1]

TABLE ID: 0092 RE-ADMISSION INDICATOR[2]

TABLE ID: 0099 VIP INDICATOR[1]

TABLE ID: 0102 DELAYED ACKNOWLEDGMENT TYPE[2]

TABLE ID: 0103 PROCESSING ID

VALUE	DESCRIPTION
D	Debugging
P	Production
T	Training

TABLE ID: 0104 VERSION CONTROL TABLE[1]

TABLE ID: 0106 QUERY FORMAT CODE

VALUE	DESCRIPTION
R	Response in record-oriented format

TABLE ID: 0107 DEFERRED RESPONSE TYPE1

TABLE ID: 0108 QUERY RESULTS LEVEL1

TABLE ID: 0110 TRANSFER TO BAD DEBT CODE[1]

TABLE ID: 0111 DELETE ACCOUNT CODE[1]

TABLE ID: 0112 DISCHARGED TO DISPOSITION[1]

TABLE ID: 0113 DISCHARGED TO LOCATION[1]

TABLE ID: 0114 DIET TYPE[1]

TABLE ID: 0115 SERVICING FACILITY[1]

TABLE ID: 0116 BED STATUS[1]

TABLE ID: 0117 ACCOUNT STATUS

TABLE ID: 0118 MAJOR DIAGNOSTIC CATEGORY[1]

TABLE ID: 0126 QUANTITY LIMITED REQUEST[1]

9. APPENDIX B. EXAMPLES

9.1 HL7 (VARIABLE POSITION, VARIABLE LENGTH) EXAMPLES

9.1.1 Admit a Patient - Trigger Event A01:

Note:
All patient-related information is fictitious.

```
MSH|^~\&|STAN||RADONC||200201251123||ADT|MSG00001|P|2.3|<cr>
EVN|A01|199410251123||<cr>
PID|||PATID1234^5^M11||PATIENT^SAMPLE^A^JR^MR.||19310615|M||C|

   1066 N YOUR STREET^HOMETOWN^CA^99999-1234|SC|(555)555-5555|

   (555)555-5555CX555||M||PATID12345001|5174389| 999999^CA|<cr>

NK1|PATIENT^OTHER^K|WIFE|<cr>
PV1|1|I|^100^A||||004xyz^JONES^SIDNEY^J.|||RAD||||ADM|A0|<cr>
```

Patient Mr. Sample A. Patient Jr. was admitted on January 25, 2002 at 11:23AM by Doctor Sidney J. Jones (#004xyz) at Radiation Oncology (RAD). He was assigned to room 100, bed A.

The message was sent from system STAN to system RADONC on the same date as the admission but took place three minutes after the admit.

9.1.2 Add and Update Patient Accounts - Trigger Event P01:

```
MSH|^~\&|RADONC||PATB||||BAR|MSG00010|P|2.3|<cr>
EVN|P01|200201250800<cr>

PID|||125976|PUBLIC^JOHN^Q||19471007|M||C|

   8339 WAGON RD^ANYWHERE^CA^91111^""|SC|

   (555)555-5555|||||125976011<cr>

DG1|001|I9|155.0|MAL NEO LIVER, PRIMARY|20020125|DG<cr>
GT1|001|PUBLIC^JOHN^Q|8339 WAGON RD^ ANYWHERE ^CA^91111^""|

||||||123454321<cr> NK1|1|PUBLIC^WILLIAM^F|FATHER|522 MAIN
ST^NOWHERE^ID^84321^""|

(208)746-1283<CR>

IN1|1|PRU001|A357|BCCA|||||132987<cr>
```

A patient is registered and notification is sent to the Patient Billing system (PATB). The patient's name is John Q. Public, a Male Caucasian, born on October 7, 1947, living at 8839 Wagon Rd, Anywhere, CA.

Mr. Public's patient number is 125976 and his billing number is 125976011. Mr. Public has provided his father's name and address as next of kin. Mr. Public is insured under plan ID A357 with an insurance company known to both systems as BCCA. The coordinating Plan ID for the insurance company is PRU001.

The Diagnosis segment contains the admitting diagnosis information that the patient was diagnosed on January 25, as having a malignancy of the Hepatobiliary System or Pancreas (ICD9 code 155.0).

10. APPENDIX C. HL7 TO LANTIS DATA ITEM CROSS REFERENCE

Purpose:

This appendix contains technical information pertaining to the External System Interface (ESI). The information compiled here was obtained from the HL7 technical reference as well as the Siemens LANTIS Database. Only information pertinent to the mapping of data items between LANTIS and HL7 is contained in this appendix.

10.1 CONVENTIONS

SEQ Sequence number.

LEN Length.

TYPE HL7 Data Type (See the ESI Interface Requirements or HL7 Standard for elaboration).

R/O Required/Optional.

REP Data Item May Repeat.

TBL HL7 Table Number.

NAME HL7 data item name.

An Asterisk (*) appears next to HL7 data items and tables that are not currently used. If an HL7 data item is unused, it is implied that the associated table is also unused. “Mappable” describes a configurable HL7 to LANTIS data items assignment. For example, HL7 Patient ID - External can be assigned to PAT: PAT_IDB through PAT: PAT_IDF.

HL7 to LANTIS data item relationships are generally more complex than they appear here. For example, a physician ID called ADM:ATTENDING_MD_IDmaps to the HL7 attending physician ID, data type XCN. In order for the data to be filled in per HL7 standards, the ADM:ATTENDING_MD_IDvalue is used to find a matching record in STAFF.DAT using STF:STAFF_ID as a key. Once that value is found, a matching record in EXT_ID.DAT must be found using EID:INTERNAL_ID as a key. The physician's name (STF:LAST_NAME, STF:FIRST_NAME) can then be attached to their coordinating external ID, EID:EXT_ID and placed into an HL7 segment. Given these complex relationships, this document shall remain a resource for development only.

10.2 DG1 – DIAGNOSIS SEGMENT

The DG1 segment contains patient diagnosis information of various types, for example, admitting, primary, etc. The DG1 segment is used to send multiple diagnoses. LANTIS ESI can send and receive up to four DG1 segments. For the Lab Orders Outbound interface, Interface Manager will send at most one DG1 segment relating to the specific order being exported.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	4	SI	R	N		Set ID - Diagnosis		“1”, “2”, “3”, “4”	Set ID is used to determine mapping to corresponding diagnosis field in database.
2	2	ID	R	N	0053	Diagnosis Coding Method	Not Used	“I9”	None – Value is hardcoded.
3	60	CE	O	N	0051	Diagnosis Code	med:Topography	med:Topography or orc:tpg_id (for Lab Orders Outbound)	eChart | Diagnoses and Interventions Pushbutton – Diagnosis Column - Diagnosis or Form – Observation Orders Field – Diagnosis
4	40	ST	O	N		Diagnosis Description	Not Used	tpg:description	File | Libraries | Topography Codes Pushbutton – Change Fields - Description
5	26	TS	O	N		Diagnosis Date / Time*			
6	2	ID	R	N	0052	Diagnosis / Drg Type*	Not Used	No Mapping Available	
7	60	CE	O	N	0118	Major Diagnostic Category*			
8	4	IS	O	N	0055	Diagnostic Related Group*			
9	2	ID	O	N		Drg Approval Indicator*			
10	2	IS	O	N	0056	Drg Grouper Review Code*			

11	60	CE	O	N	0083	Outlier Type*			
12	3	NM	O	N		Outlier Days*			
13	12	NM	O	N		Outlier Cost*			
14	4	ST	O	N		Grouper Version And Type*			
15	2	NM	O	N		Diagnosis Priority*			
16	60	XCN	O	Y		Diagnosis Clinician*			
17	3	IS	O	N	0228	Diagnosis Classification*			
18	1	ID	O	N	0136	Confidential Indicator*			
19	26	TS	O	N		Attestation Date/Time*			

DG1 Field Notes

* This field is not used by LANTIS ESI.

1. “Set ID”: A number to uniquely identify the individual diagnosis, used to accept a single admitting diagnosis from an external system.

3. “Diagnosis code”: The ICD9 diagnosis code assigned.

   - For import the code must match an entry in the Topography table to be accepted. Table 0051 can be used for mapping purposes. For each valid diagnosis code LANTIS accepts through the interface, a unique diagnosis record will be created in the Medical table. The initial record state will indicate that the record was imported via an interface (State = “Imported”). If a matching Medical record exists already, LANTIS will not create a new record for that same diagnosis. If at least 1 valid diagnosis is passed in via the interface LANTIS will remove any existing Medical records with State = “Imported” if there is not a matching DG1 record. Prioritization, MED.Sequence is based on order of DG1 records. For matching on Oncology (194.0 – 239.9) diagnoses LANTIS only considers the base (everything prior to the period, “.”) of the code. For non-Oncology codes LANTIS compares the complete code.

   - For export of charges, LANTIS will only export diagnoses for records that have been affirmed (State = Affirmed) and are current (Inactive_Date = 0). LANTIS will export them in order based on MED.Sequence.

10.3 FT1 -FINANCIAL TRANSACTION SEGMENT

The FT1 segment contains the detail data necessary to post charges, payments, adjustments, etc. to patient accounting records.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	4	SI	O	N		Set ID – Financial Transaction		"1"	
2	12	ST	O	N		Transaction ID*			
3	10	ST	O	N		Transaction Batch ID*			
4	26	TS	R	N		Transaction Date	chg:proc_date chg:proc_time	chg:proc_date chg:proc_time NOTE: chg:proc_time is exported for HL7 2.3 only.	Code Mgmt | Code Capture Tab – General Fields – To Date, Time
5	26	TS	O	N		Transaction Posting Date*			
6	8	IS	R	N	0017	Transaction Type	"Credit" or "Charge"	"Credit" or "Charge" (Configurable through mapping.)	Code Mgmt | Code Capture Tab – General Fields – Based on Days/Qty
7	80	CE	R	N	0096	Transaction Code	chg:hsp_code	chg:hsp_code or cpt:cpt_code	Code Mgmt | Code Capture Fields – Code
8	40	ST	O	N		Transaction Description		cpt:description	Code Mgmt | Code Capture
									Fields – Text next to Code
									Dropdown
9	40	ST	O	N		Transaction Description – Alt	chg:notes	chg:notes	Code Mgmt | Code Capture Tab - General
									Fields – Comment
10	6	NM	O	N		Transaction Quantity	chg:days_units	chg:days_units	Code Mgmt | Code Capture
							(This is a required field.)		Tab – General
									Fields – Days/Qty

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
11	12	CP	O	N		Transaction Amount – Extended		chg:days_units * FT1:12 (Transaction Amount – Unit)	
12	12	CP	O	N		Transaction Amount – Unit		cpt:prof_ charge or cpt:tech_charge or cpt:tech_charge + cpt:prof_charge	File | Libraries | Procedures and Supplies… Pushbutton – Change Tab – Capture Schedule Fields – Pro Forma Prof Charge, Pro Forma Tech Charge
13	60	CE	O	N	0049	Department Code	chg:Inst_ID (This is a required field.)	cpt:rsp_center or chx:dept_id or	File | Libraries | Procedures and Supplies…
								cfg:Inst_Abrv	Pushbutton – Change Tab – Capture Schedule Fields – Cost Center
									or
									Code Mgmt | Code Capture Fields – Dept
14	60	CE	O	N	0072	Insurance Plan ID		chg:auth_num	
15	12	CP	O	N		Insurance Amount*			
16	12	PL	O	N	0079	Patient Location	chg:rend_fac_id	chg:rend_fac_id	Code Mgmt | Code Capture
									Tab – General
									Fields – Facility
17	1	IS	O	N	0024	Fee Schedule*			
18	2	IS	O	N	0018	Patient Type	chg:in_out	chg:in_out	Code Mgmt | Code Capture
									Tab – General
									Fields – Inpatient checkbox

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
19	60	CE	O	N	0051	Diagnosis Code	chg:icd_code1, chg:icd_code2, chg:icd_code3, chg:icd_code4	chg:icd_code1, chg:icd_code2, chg:icd_code3, chg:icd_code4	Code Mgmt | Code Capture Tab – General Fields – Diagnosis Group Box1, 2, 3, 4
20	120	XCN	O	N	0084	Performed By Code	chg:staff_id	chg:staff_id	Code Mgmt | Code Capture
									Tab – General
									Fields – MD
21	120	XCN	O	N		Ordered By Code*			
22	12	CP	O	N		Unit Cost		cpt:cost	File | Libraries | Procedures and Supplies… Pushbutton – Change Tab – Capture Schedule Fields – Pro Forma Cost
23	75	EI	O	N		Filler Order Number*			
24	120	XCN	O	N		Entered By Code	chg:edit_id		Database only.
25	80	CE	O	N	0088	Procedure Code	chg:modifier1 chg:modifier2	cpt:cpt_code chg:modifier1	Code Mgmt | Code Capture Fields – Code,
							chg:modifier3	chg:modifier2	Modifier 1, 2 and 3
							chg:modifier4	chg:modifier3	
								chg:modifier4	
26	80	CE	O	Y		Procedure Code Modifiers	chg:modifier1	chg:modifier1	Code Mgmt | Code Capture
							chg:modifier2	chg:modifier2	Fields – Modifier 1, 2 and 3
							chg:modifier3	chg:modifier3	
							chg:modifier4	chg:modifier4	

FT1 Field Notes

* This field is not used by LANTIS ESI.

6. “Transaction Type”:

- ♦ Import: Used to determine whether to set Transaction Quantity (FT1:10) as positive or negative when importing data. If this value, or its mapped value, is not “Charge” or “Credit” then the charge is invalid and will not be imported.
- ♦ Export: Code that identifies the type of transaction; i.e., charge, credit, payment, etc. Refer to user-defined table 0017 - transaction type.
- ♦ Default value is Charge for outbound charge records.

2 “Transaction Code”: cpt:code can be provided as an alternative to chg:hsp_code. This is controlled through an option switch.

1 “Transaction Amount - Unit”: The value depends on both the billable filter (Tech, Prof, Both) selected during export and the billable status of the charge, CPT:BILLABLE.

13. “Department Code”

- ♦ chg:Inst_ID is set by matching the department abbreviation in FT1:13 to CFG:Inst_Abrv.
- ♦ cpt:rsp_center or chx:dept_id or chg:Inst_Abrv are controlled through user selection.

2 “Insurance Plan ID”: Only the second component is filled in.

26. “Procedure Code Modifiers”: FT1:26 overrides FT1:25 for importing modifiers.

Charge Modifiers may appear in FT1:25 in the format "77761^^^m1m2m3m4^^MODIFIER" in which:

- ♦ 77761 = CPT Code (Cpt:cpt_code)
- ♦ m1 = Modifier 1 (Chg:modifier1)
- ♦ m2 = Modifier 2 (Chg:modifier2)
- ♦ m3 = Modifier 3 (Chg:modifier3)
- ♦ m4 = Modifier 4 (Chg:modifier4)
- ♦ MODIFIER = Alternate ID Code

10.4 GT1 – GUARANTOR SEGMENT

The GT1 segment contains guarantor (for example, the person or the organization with financial responsibility for payment of a patient account) data for patient and insurance billing applications. LANTIS ESI can send and receive only one GT1 segment.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	20	SI	R	N		Set ID - Guarantor	No mapping available	"1"	None
2	58	CX	O	Y		Guarantor Number*			
3	48	XPN	R	Y		Guarantor Name	pp:bil_fname, pp:bil_lname, pp:bil_mdl_init **or** pat:last_name,	pp:bil_fname, pp:bil_lname, pp:bil_mdl_init **or** pat:last_name,	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – Last, First, MI
							pat:first_name,	pat:first_name,	**or**
							pat:middle_name	pat:middle_name	File | Demographics
									Tab – Name/IDs/Personal
									Fields – Last, First, MI
4	48	XPN	O	Y		Guarantor Spouse Name*			
5	106	XAD	O	Y		Guarantor Address	pp:bil_adr1, pp:bil_adr2, pp:bil_city, pp:bil_state, pp:bil_postal, pp:bil_country **or** adm:pat_adr1, adm:pat_adr2, adm:pat_city, adm:pat_state, adm:postal, adm:country	pp:bil_adr1, pp:bil_adr2, pp:bil_city, pp:bil_state, pp:bil_postal **or** adm:pat_adr1, adm:pat_adr2, adm:pat_city, adm:pat_state, adm:postal,	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – 1, 2, City, State,Postal, Country **or** File | Demographics Tab – Home/Work Group Box – Patient's Home Address/Phone Fields – 1, 2, City, State,Postal, Country

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
6	40	XTN	O	N		Guarantor Ph. Num.- Home Format: Uses only component 1 of XTN.	pp:bil_home_phone,	pp:bil_home_phone, pp:bil_home_phone_ex **or** adm:pat_home_phone, adm:pat_home_phone_ex	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – Phone **or**
									File | Insurance
									Change pushbutton
									Tab – Employment Group Box – Home Address/Phone Fields – Phone
7	40	XTN	O	N		Guarantor Ph.Num-Business Format: Uses only component 1 of XTN.	pp:bil_work_phone, pp:bil_work_phone_ex **or** adm:pat_work_phone	pp:bil_work_phone, pp:bil_work_phone_ex **or** adm:pat_work_phone, adm:pat_work_phone_ex	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – Work, Ext
									or
									File | Demographics
									Tab – Home/Work
									Group – Patient's Work Address/Phone
									Fields – Phone, Ext
8	26	TS	O	N		Guarantor Date Of Birth	pp:bil_birth_dt	pp:bil_birth_dt **or** pat:birth_date	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – Date of Birth
									or

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
									File | Demographics Tab – Name/IDs/Personal Group – Personal Fields – Birth Date
9	10	IS	O	N	0001	Guarantor Sex	pp:bil_gender	pp:bil_gender **or** adm:gender	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – Gender
									or
									File | Demographics Tab – Name/IDs/Personal Group – Personal Fields – Gender
10	2	IS	O	N	0068	Guarantor Type*			
11	2	IS	O	N	0063	Guarantor Relationship	pp:bil_relate	pp:bil_relate	File | Insurance
									Change pushbutton
									Tab – Responsible Billing Party
									Fields – Patient's Relationship to Policyholder
12	9	ST	O	N		Guarantor Social Security	pp:bil_ssn	pp:bil_ssn **or** pat:ss_number	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – SSN
									or
									File | Demographics Tab – Name/IDs/Personal Group – Personal Fields – SSN

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
13	8	DT	O	N		Guarantor Date - Begin	pp:effective_date	pp:effective_date	File | Insurance Change pushbutton Tab – General
									Fields – Effective Date
14	8	DT	O	N		Guarantor Date - End	pp:expiration date	pp:expiration date	File | Insurance Change pushbutton Tab – General
									Fields – Expiration Date
15	2	NM	O	N		Guarantor Priority	pp:priority	pp:priority	File | Insurance
									Change pushbutton
									Tab – General
									Fields – Billing Priority
16	130	XPN	O	Y		Guarantor Employer Name	pp:bil_employer	pp:bil_employer	Insurance
								or adm:pat_employer	Employment Tab **or**
									File | Demographics
									Tab – Home/Work
									Group – Patient's Home Address/Phone
									Fields – Employer
17	106	XAD	O	Y		Guarantor Employer Address	pp:emp_adr1, pp:emp_adr2, pp:emp_city, pp:emp_state,	pp:emp_adr1, pp:emp_adr2, pp:emp_city, pp:emp_state,	File | Insurance Change pushbutton Tab – Employment Fields – 1, 2, City, State,

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
							pp:emp_postal	pp:emp_postal **or** adm:emp_adr1, adm:emp_adr2, adm:emp_city, adm:emp_state, adm:emp_postal	Postal **or** File | Demographics Tab – Home/Work Group – Patient's Home Address/Phone Fields – 1, 2, City, State,Postal
18	40	XTN	O	Y		Guarantor Employ Phone # Format: Uses only component 1 of XTN.	pp:emp_phone	pp:emp_phone, pp:emp_phone_ex **or**	File | Insurance Change pushbutton Tab – Employment
								adm:emp_phone,	Fields – Phone
								adm:emp_phone_ex	**or**
									File | Demographics
									Tab – Home/Work
									Group – Patient's Home Address/Phone
									Fields - Phone
19	20	CX	O	Y		Guarantor Employee ID Num*			
20	2	IS	O	N	0066	Guarantor Employment Status*			
21	130	XON	O	Y		Guarantor Organization Name*			
22	1	ID	O	N	0136	Guarantor Billing Hold Flag*			
23	80	CE	O	N		Guarantor Credit Rating Code*			
24	26	TS	O	N		Guarantor Death Date And			
						Time*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
25	1	ID	O	N	0136	Guarantor Death Flag*			
26	80	CE	O		0218	Guarantor Charge AdjustmentCode*			
27	10	CP	O			Guarantor's Household Annual Income*			
28	3	NM	O			Guarantor's Household Size*			
29	20	CX	O	Y		Guarantor's Employer ID Number*			
30	1	IS	O		0002	Guarantor's Marital Status Code*			
31	8	DT	O			Guarantor Effective Hire Date*			
32	8	DT	O			Employment Stop Date*			
33	2	IS	O		0223	Living Dependency*			
34	2	IS	O		0009	Ambulatory Status*			
35	4	IS	O		0171	Citizenship*			
36	60	CE	O		0296	Primary Language*			
37	2	IS	O		0220	Living Arrangement*			
38	80	CE	O		0215	Publicity Indicator*			
39	1	ID	O		0136	Protection Indicator*			
40	2	IS	O		0231	Student Indicator*			
41	3	IS	O		0006	Religion*			
42	48	XPN	O			Mother's Maiden Name*			
43	80	CE	O		0212	Nationality*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
44	3	IS	O		0189	Ethnic Group*			
45	48	XPN	O	Y		Contact Person's Name*			
46	40	XTN	O	Y		Contact Person's Telephone Number*			
47	80	CE	O		0222	Contact Reason*			
48	2	IS	O		0063	Contact Relationship*			
49	20	ST	O			Job Title*			
50	20	JCC	O		0327/ 0328	Job Code/Class*			
51	130	XON	O	Y		Guarantor Employer's Organization Name*			
52	2	IS	O		0310	Handicap*			
53	2	IS	O		0311	Job Status*			
54	50	FC	O		0064	Guarantor's Financial Class*			
55	1	IS	O		0005	Guarantor Race*			

GT1 Field Notes

* This field is not used by LANTIS ESI.

1. "Set ID – guarantor": A number that uniquely identifies the transaction. LANTIS ESI imports only one GT1 segment per message. Subsequent GT1 segments will be ignored.

11. "Guarantor relationship": Identifies the relationship between the guarantor and the patient (i.e. Parent, Child, etc.). See user-defined table 0063.

15. "Guarantor priority": A code used to determine the order in which the guarantors will be responsible for the patient's bill.

Note:
For GT1 fields 3, 5, 6, 7, 8, 9, 11, 12, 17, 18 the outbound database mapping is based on GT1:11 (Guarantor Relationship). When the relationship is "Self", the database mapping looks to the Admin (ADM) and Patient (PAT) tables. When the relationship is not "Self", the database mapping looks to the Pat_Pay (PP) table.

10.5 IN1 – INSURANCE SEGMENT

The IN1 segment contains insurance policy coverage information necessary to produce properly pro-rated and patient and insurance bills. LANTIS ESI can send and receive up to five IN1 segments.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	20	SI	R	N		Set ID - Insurance	No mapping available	“1”, “2”, “3”, “4”, “5”	None
2	20	IS	R	N	0072 *	Insurance Plan ID	eid:id_code	eid:id_code	File | Directories | Payer Directory… Change pushbutton Edit IDs pushbutton Column – Identification (in which Type = ‘ESI’).
3	59	CX	R	Y		Insurance Company ID NOTE: This field is optional for our use even though HL7 shows it as mandatory.	pay:miscid NOTE: Only applies to Event Code P03.	pay:miscid	File | Directories | Payer Directory… Change pushbutton Tab – General Field – Ext ID
4	45	ST	O	Y		Insurance Company Name	pay:payer_name NOTE: Only applies to Event Code P03.	pay:payer_name	File | Directories | Payer Directory… Change pushbutton Tab – General Field – Name
5	106	XAD	O	Y		Insurance Company Address	pay:adr1, pay:adr2, pay:city, pay:state, pay:postal NOTE: Only applies to Event Code P03.	pay:adr1, pay:adr2, pay:city, pay:state, pay:postal	File | Directories | Payer Directory… Change pushbutton Tab – Contact Address/Phone Fields – 1, 2, City, State, Postal
6	48	XPN	O	N		Insurance Co.Contact Pers	pay:contact NOTE: Only applies to Event Code P03.		File | Directories | Payer Directory… Change pushbutton Tab – Contact Address/Phone Field – Contact
7	40	XTN	O	Y		Insurance Co Phone Number Format: Uses only component 1 of XTN.	pay:pri_phone NOTE: Only applies to Event Code P03.	pay:pri_phone, pay:pri_phone_ex	File | Directories | Payer Directory… Change pushbutton Tab – Contact Address/Phone Field – Primary

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
8	12	ST	O	N		Group Number	pp:group_no	pp:group_no	File | Insurance
									Change pushbutton
									Tab – General
									Fields – Group
9	35	ST	O	Y		Group Name*			
10	12	ST	O	Y		Insured's Group Emp. ID*			
11	45	ST	O	Y		Insured's Group Emp.Name*			
12	8	DT	O	N		Plan Effective Date	pp:effective_date	pp:effective_date	File | Insurance Change pushbutton Tab – General
									Fields – Effective Date
13	8	DT	O	N		Plan Expiration Date	pp:expiration_date	pp:expiration_date	File | Insurance Change pushbutton Tab – General
									Fields – Expiration Date
14	55	CM	O	N		Authorization Information*			
15	3	IS	O	N	0086	Plan Type*			
16	48	XPN	O	N		Name Of Insured	pp:bil_lname, pp:bil_fname, pp:bil_mdl_init	pp:bil_lname, pp:bil_fname, pp:bil_mdl_init **or** pat:last_name,	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – Last, First, MI
								pat:first_name,	**or**
								pat:middle_name	File | Demographics
									Tab – Name/IDs/Personal

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
									Fields – Last, First, MI
17	10	IS	O	N	0063	Insured's Relationship To Pat	pp:bil_relate	pp:bil_relate	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – Patient's Relationship to Policyholder
18	26	TS	O	N		Insured's Date Of Birth	pp:bil_birth_dt	pp:bil_birth_dt **or** pat:birth_date	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – Date of Birth
									or
									File | Demographics
									Tab – Name/IDs/Personal
									Fields – Birth Date
19	106	XAD	O	N		Insured's Address	pp:bil_adr1, pp:bil_adr2, pp:bil_city, pp:bil_postal, pp:bil_country	pp:bil_adr1, pp:bil_adr2, pp:bil_city, pp:bil_postal, pp:bil_country **or** adm:pat_adr1,	File | Insurance Change pushbutton Tab – Responsible Billing Party Fields – 1, 2, City, State,Postal, County **or**
								adm:pat_adr2,	File | Demographics
								adm:pat_city,	Tab – Home/Work
								adm:pat_state, adm:pat_postal, adm:pat_country	Group Box – Patient's Home Address/Phone Fields – 1, 2, City, State, Postal
20	2	IS	O	N		Assignment Of Benefits*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
21	2	IS	O	N		Coordination Of Benefits*			
22	2	ST	O	N		Coord Of Ben. Priority	pp:priority	pp:priority	File | Insurance Change pushbutton Tab – General
									Fields – Billing Priority
23	2	ID	O	N		Notice Of Admission Code		pay:auth_req	File | Directories | Payer Directory…
									Change pushbutton
									Tab – General
									Field – Prior Authorization Required checkbox
24	8	DT	O	N		Notice Of Admission Date*			
25	2	ID	O	N	0094	Rpt Of Eligibility Code*			
26	8	DT	O	N		Rpt Of Eligibility Date*			
27	2	IS	O	N	0093	Release Information Code*			
28	15	ST	O	N		Pre-Admit Cert.Code (Pac)	pp:pr_auth_no	pp:pr_auth_no	File | Insurance Change pushbutton Tab – General
									Fields – Primary Authorization
29	26	TS	O	N		Verification Date	pp:Verified_Date	pp:Verified_Date	File | Insurance
									Change pushbutton
									Tab – General
									Fields – Verified On

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
30	60	XCN	O	N		Verification By	pp:Verified_Staff_ID	pp:Verified_Staff_ID	File | Insurance Change pushbutton Tab – General Fields – Verified By
31	2	IS	O	N	0098	Type Of Agreement Code*			
32	2	IS	O	N	0022	Billing Status*			
33	4	NM	O	N		Lifetime Reserve Days*			
34	4	NM	O	N		Delay Before L. R. Day*			
35	8	IS	O	N	0042	Company Plan Code*			
36	15	ST	O	N		Policy Number	pp:policy_no	pp:policy_no	File | Insurance Change pushbutton Tab – General Fields – Policy Number
37	12	CP	O	N		Policy Deductible*			
38	12	CP	O	N		Policy Limit -Amount*			
39	4	NM	O	N		Policy Limit - Days*			
40	12	CP	O	N		Room Rate - Semi-Private*			
41	12	CP	O	N		Room Rate - Private*			
42	60	CE	O	N	0066	Insured's Employment Status*			
43	1	IS	O	N	0001	Insured's Sex*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
44	106	XAD	O	N		Insured's Employer Address		pp:emp_adr1, pp:emp_adr2, pp:emp_city, pp:emp_state, pp:emp_postal **or** adm:emp_adr1, adm:emp_adr2, adm:emp_city, adm:emp_state, adm:emp_postal	File | Insurance Change pushbutton Tab – Employment Fields – 1, 2, City, State, Postal **or** File | Demographics Tab – Home/Work Group Box – Patient's WorkAddress/Phone Fields – 1, 2, City, State, Postal
45	2	ST	O	N		Verification Status*			
46	8	IS	O	N	0072	Prior Insurance Plan ID*			
47	2	IS	O	N	0309	Coverage Type*			
48	2	IS	O	N	0310	Handicap*			
49	12	CX	O	N		Insured's ID Number*			

IN1 Field Notes

* This field is not used by LANTIS ESI.

1 “Set ID - insurance”: Each account can have multiple insurance segments. The set number serves to uniquely identify each one.

2 “Insurance plan ID”: The code that uniquely identifies the insurance plan. User-defined table 0072 is unused in LANTIS.

3 “Insurance Company ID”: This field is optionally imported for the Charge Inbound interface only (Event Code P03).

4 “Insurance Company Name”: This field is optionally imported for the Charge Inbound interface only (Event Code P03).

5 “Insurance Company Address”: This field is optionally imported for the Charge Inbound interface only (Event Code P03).

6 “Insurance Company Contact Person”: This field is optionally imported for the Charge Inbound interface only (Event Code P03).

7 “Insurance Company Phone Number”: This field is optionally imported for the Charge Inbound interface only (Event Code P03).

Eligibility Verified Date & User will be supported by both the import and export process. If the Verified Date is present in an imported record, the Eligibility Status within the patient payer record will be set to “Verified”; otherwise it will be set to “Unknown”.

NOTE 1: For IN1 fields IN1:16 (Name of Insured), IN1:18 (Insured’s Date of Birth), IN1:19 (Insured’s Address) and IN1:44 (Insured’s Employer Address) the outbound database mapping is based on IN1:17 (Insured’s Relationship to Patient). When the relationship is “Self”, the database mapping looks to the Admin (ADM) and Patient (PAT) tables. When the relationship is not “Self”, the database mapping looks to the Pat_Pay (PP) table.

NOTE 2: To eliminate a single plan, a null value must be sent in IN1:3 and IN1:4. (IN1|1|ESI-ID1|””|””|)

NOTE 3: To eliminate all plans, a null value must be sent in IN1:2 and IN1:3. (IN1|””|””|””)

IN1 Processing Details

Prioritization of IN1 records is based first on IN1:22 (Coordination of Benefits Priority) and then on physical order of the IN1 records within the HL7 message. Except for the processing of HL7 event code P03 messages, the Insurance Company must exist in the LANTIS system prior to receipt of a Patient Accounting message. This can be accomplished either through the use of locally defined message Insurance Add/Update/Delete (Z02) or by manual data entry.

Data within the IN1 records will be added / updated to conform to the rules used to manually enter data in LANTIS as follows:

- Instead of importing (adding) records to the system in “snap-shot” mode, LANTIS attempts to update existing insurance records to match the snap-shot coming in by setting the effective/expiration dates as available in the imported data.
- Regardless of whether aCOUNT is installed or not, LANTIS brings the imported information in as the current information to the best it’s ability. If conflicts exist, the incoming data comes in as the current information and all existing records that conflict with that new record will have their respective “Conflict” flag set.
- A conflict will be considered to have occurred if any record being imported could not be manually added to the system through the UI. ♦ If a “DELETE” message is received, look for a match with an existing record. If found check whether that record was used. If so, set the “Void” flag. If not and the current date falls within the effective date range, delete the record. ♦ If a “DELETE ALL” message is received, look for all records which do not have the “Void” or “Conflict” flag set. For each record found that WAS used, set the “Void” flag; otherwise if it was NOT used and the current date falls within the effective date range, delete the record.

10.6 NK1 – NEXT OF KIN SEGMENT

The NK1 segment contains information about the patient's other related parties. LANTIS ESI accepts up to two NK1 segment within transaction messages. The first is accepted as the relative information. The second will be accepted as emergency contact. The remainder will be ignored.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	4	SI	R	N		Set ID - Next Of Kin	See field note 1 below:	1", "2"	
2	48	XPN	O	Y		Next Of Kin Name			File | Demographics
						• for Set_ID = 1	adm:kin_fname, adm;kin_lname	adm:kin_fname, adm;kin_lname	Tab – Relative Fields – Last Name, First
						• for Set_ID = 2	adm:emg_fname,	adm:emg_fname,	Tab – Emergency
							adm:emg_lname	adm:emg_lname	Fields – Last Name, First
3	60	CE	O	N	0063	Next Of Kin Relationship			File | Demographics
						• for Set_ID = 1	adm:kin_relate	adm:kin_relate	Tab – Relative Fields – Relationship
						• for Set_ID = 2	adm:emg_relate	adm:emg_relate	Tab – Emergency
									Fields – Relationship
4	106	XAD	O	N		Next Of Kin – Address			File | Demographics
						• for Set_ID = 1	adm:kin_adr1, adm:kin_adr2, adm:kin_city, adm:kin_state, adm:kin_postal, adm:kin_country	adm:kin_adr1, adm:kin_adr2, adm:kin_city, adm:kin_state, adm:kin_postal, adm:kin_country	Tab – Relative Fields – 1, 2, City, State,Postal, Country
						• for Set_ID = 2	adm:emg_adr1, adm:emg_adr2, adm:emg_city,	adm:emg_adr1, adm:emg_adr2, adm:emg_city,	Tab – Emergency Fields – 1, 2, City, State,Postal, Country
							adm:emg_state	adm:emg_state	
							adm:emg_postal	adm:emg_postal	

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
							adm:kin_country	adm:kin_country	
5	40	XTN	O	Y		Next Of Kin – Phone Number Format: Uses only component 1 of XTN.			File | Demographics
						• for Set_ID = 1	adm:kin_home_phone,	adm:kin_home_phone,	Tab – Relative
							adm:kin_phone_ex	adm:kin_phone_ex	Group Box – Relative's Home Address/Phone
									Fields – Phone
						• for Set_ID = 2	adm:emg_home_phone,	adm:emg_home_phone,	Tab – Emergency
							adm:emg_phone_ex	adm:emg_phone_ex	Fields – Phone
6	40	XTN	O	Y		Business Phone Number Format: Uses only component 1 of XTN.			File | Demographics
						• for Set_ID = 1	adm:kin_work_phone	adm:kin_work_phone	Tab – Relative
							adm:kin_work_phone_ex	adm:kin_work_phone_ex	Group Box – Relative's Home Address/Phone
									Fields – Work, Ext
						• for Set_ID = 2	adm:emg_work_phone, adm:emg_work_phone_	adm:emg_work_phone, adm:emg_work_phone_e	Tab – Emergency Fields – Work, Ext
							ex	x	
7	60	CE	O	N	0131	Contact Role*			
8	8	DT	O	N		Start Date*			
9	8	DT	O	N		End Date*			
10	60	ST	O	N		Next Of Kin/Associated Parties Job Title*			
11	20	CM	O	N		Next Of Kin/Associated			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
						PartiesEmployee Name*			
12	20	CX	O	N		Next Of Kin/Associated PartiesEmployee Number*			
13	60	XON	O	Y	0327 /0328	Organization Name*			
14	2	IS	O	N	0002	Marital Status*			
15	1	IS	O	N	0001	Sex*			
16	26	TS	O	N		Date/Time of Birth*			
17	2	IS	O	Y	0223	Living Dependency*			
18	2	IS	O	Y	0009	Ambulatory Status*			
19	4	IS	O	Y	0171	Citizenship*			
20	60	CE	O	N	0296	Primary Language*			
21	2	IS	O	N	0220	Living Arrangement*			
22	1	IS	O	N	0215	Publicity Indicator*			
23	1	ID	O	N	0136	Protection Indicator*			
24	2	IS	O	N	0221	Student Indicator*			
25	3	IS	O	N	0006	Religion*			
26	48	XPN	O	N		Mother’s Maiden Name*			
27	80	CE	O	N	0212	Nationality*			
28	48	IS	O	N	0189	Ethnic Group*			
29	40	CE	O	Y	0222	Contact Reason*			
30	106	XPN	O	Y		Contact Person’s Name*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
31	32	XTN	O	Y		Contact Person's Telephone Number*			
32	2	XAD	O	Y		Contact Person's Address*			
33	1	CX	O	Y		Associated Party's Identifiers			
34	2	IS	O	N	0311	Job Status*			
35	1	IS	O	N	0005	Race*			
36	2	IS	O	N	0295	Handicap*			
37	16	ST	O	N		Contact Person Social Security Number*			

NK1 Field Notes

* This field is not used by LANTIS ESI.

1. "Set ID - next of kin": This field uniquely identifies the NK1 records for the purpose of adding, changing, or deleting records. If supported by a particular message, LANTIS ESI accepts up to two NK1 segment within transaction messages. The first is accepted as the relative information. The second will be accepted as emergency contact. The remainder will be ignored.

10.7 NTE – NOTE SEGMENT

The NTE segment is a common format for sending notes and comments.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
1	4	SI	O	N		Set ID - Nte		
2	8	ID	O	N	0105	Source Of Comment*		
3		ST	O	Y		Comment	nte:notes or document	Patient Notes

NTE Field Notes

* This field is not used by LANTIS ESI.

Multiple supported HL7 event codes use the NTE segment. For ESI:Lab Results Inbound, the data in NTE.3 is used to construct a Notes record in the database. For ESI:Doc Inbound, the data in NTE.3 is used to construct a document.

10.8 OBR -OBSERVATION REQUEST SEGMENT (FOR INBOUND INTERFACES)

In the reporting of clinical data, the OBR serves as the report header. It identifies the observation set represented by the following atomic observations. It includes the relevant ordering information when that applies. It contains many of the attributes that usually apply to all of the included observations. LANTIS maintains a "Status" field in OBR and its initial value is set to "Unreviewed".

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
1	4	ST	R	N		Set ID - Observation Request	No mapping available	
2	75	EI	O	N		Placer Order Number*		
3	15	EI	O	N		Filler Order Number	obr:filler_order	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Filler Order
4	200	CE	R	N		Universal Service ID*	obr:panel_name	
5	2	ID	O	N		Priority*		
6	26	TS	O	N		Request Date/Time*		
7	26	TS	O	N		Observation Date/Time	obr:obs_date, obr:obs_time	eChart | Laboratory Fields – Date, Time
8	26	TS	O	N		Observation End Date/Time	obr:obs_end_date, obr:obs_end_time	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Obs End At
9	20	CQ	O	N		Collection Volume	obr:collect_vol, obr:collect_units	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Collect Volume

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
10	60	XCN	O	Y		Collector Identifier	obr:collector	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Collector
11	1	ID	O	N	0065	Specimen Action Code	obr:spec_action	eChart | Laboratory Add pushbutton
								Info pushbutton Tab – Observation Field – Specimen Action
12	60	CE	O	N		Danger Code	obr:danger_code	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Danger Code
13	300	CM	O	N		Relevant Clinical Information*		
14	26	TS	O	N		Specimen Received Date/Time	obr:rcvd_date, obr:rcvd_time	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Received At
15	300	CM	O	N	0070	Specimen Source	obr:spec_source	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Specimen Source
16	80	XCN	O	Y		Ordering Provider	obr:ord_provider	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Order Provider
17	40	XTN	O	Y/2		Order Callback Phone Number*		
18	60	ST	O	N		Placer Field 1*		
19	60	ST	O	N		Placer Field 2*		

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
20	60	ST	O	N		Filler Field 1 +*		
21	60	ST	O	N		Filler Field 2 +*		
22	26	TS	O	N		Results Rpt/Status Change - Date/Time	obr:results_date. obr:results_time	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation Field – Results At
23	40	CM	O	N		Charge To Practice +*		
24	10	ID	O	N		Diagnostic Serv Sect ID*		
25	1	ID	O	N		Result Status +	obr:results_sts	eChart | Laboratory Add pushbutton Info pushbutton Tab – Observation
								Field – Results Status
26	200	CM	O	N		Parent Result +*		
27	200	TQ	O	Y		Quantity/Timing*		
28	150	XCN	O	Y/5		Result Copies To	obr:results_cc1, obr:results_cc2, obr:results_cc3, obr:results_cc4, obr:results_cc5	Only in database
29	150	CM	O	N		Parent Number *		
30	20	ID	O	N	0124	Transportation Mode	obr:transport	eChart | Laboratory Add pushbutton
								Info pushbutton
								Tab – Observation
								Field – Transportation

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
31	300	CE	O	Y		Reason For Study	obr:reason	Only in database
32	200	CM	O	N		Principal Result Interpreter +	obr:results_pi	eChart | Laboratory Add pushbutton
								Info pushbutton
								Tab – Results
								Field – Principal Interpreter
33	200	CM	O	Y		Assistant Result Interpreter +*		
34	200	CM	O	Y		Technician +*		
35	200	CM	O	Y		Transcriptionist +*		
36	26	TS	O	N		Scheduled Date/Time +	obr:sch_date, obr:sch_time	Only in database
37	4	NM	O	N		Number Of Sample Containers*		
38	60	CE	O	Y		Transport Logistics Of Collected*		
39	200	CE	O	Y		Collector's Comment*		
40	60	CE	O	N		Transport Arrangement Responsibility*		
41	30	ID	O	N	0224	Transport Arranged*		
42	1	ID	O	N	0225	Escort Required*		
43	200	CE	O	Y		Planned Patient Transport Comment*		

OBR Field Notes

* This field is not used by LANTIS ESI.

3 "Filler Order Number": The permanent identifier for and order and its associated observations.

4 “Universal Service ID”: The text in OBR.4.2 is mapped to the “Panel Name” field in LANTIS.

7 “Observation Date/Time” : The clinically relevant date and time of the observation.

8 “Observation End Date/Time” : The end date and time of a study or timed specimen collection.

9 “Collection Volume” : For laboratory tests, the collection volume is the volume of a specimen in the form <quantity (NM)> ^ <units (CE) >. The default unit is ML. Specifically the units should be expressed in the ISO standard abbreviations (ISO-2955, 1977). The units value is mapped to Table 10000 (Unit of Measure) in ObsDef

10 “Collection Identifier”: When a specimen is required for a study, this field identifies the person, department, or facility that collected the specimen. Either name or ID code, or both, may be present.

11 “Specimen Action Code”: The action to be taken with respect to the specimens that accompany or precede this order. Refer to table 0065 – Specimen Action Code for values.

12 “Danger Code”: Refer to table 10001.

14 “Specimen Received Date/Time”: For observations requiring a specimen, the specimen received date/time is the actual login time at the diagnostic service.

15 “Specimen Source”: The site where the specimen should be obtained or where the service should be performed in the form: <specimen source name or *code (CE)*> ^ *<additives (TX)>* ^ *<freetext (TX)>* ^ *<body site (CE)>* ^ *<site modifier (CE)>* ^ *<collection method modifier code (CE)>*.

16 “Ordering Provider”: The provider who ordered the test. Either the ID code or the name, or both, may be present in the form: *<ID number (ST)>* ^ *<family name (ST)>* ^ *<given name (ST)>* ^ *<middle initial or name (ST)>* ^ *<suffix (e.g., JR or III) (ST)>* ^ *<prefix (e.g., DR) (ST)>* ^ *<degree (e.g., MD) (ST)>* ^ *<source table (IS)>* ^ *<assigning authority (HD)>* ^ *<name type code(ID)>* ^ *<identifier check digit (ST)>* ^ *<code identifying the check digit scheme employed (ID*)> ^ *<identifier type code (IS)>* ^ *<assigning facility (HD)>*.

22 “Results Rpt/Status Charge – Date/Time”: The date/time when the results were reported or status changed.

23 “Results Rpt/Status Charge – Date/Time”: The date/time when the results were reported or status changed.

25. “Result Status”: This is a conditional field that is required whenever the OBR is contained in a report message. If the status is that of the entire order, use *ORC-15-order effective date/time* and *ORC-5-order status*. If the status pertains to the order detail segment, use *OBR-25-result status* and *OBR-22results report/status change - date/time*. If both are present, the OBR values override the ORC values. Refer to *HL7 table 0123 - Result status for valid entries*.

28. “Result copies to” : Identifies the people who are to receive copies of the results. Either the name or the ID may be present.

32 “Transportation Mode”: Identifies how to transport a patient, when applicable. Refer to HL7 table 0124 – Transportation mode for valid codes.

31. “Reason for Study” : The code or test in the form <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^ <alternate identifier (ST)> ^

<alternate text (ST)> ^ <name of alternate coding system (ST)>

32 “Principal Result Interpreter”: Identifies the physician or other clinician who interpreted to observation and is responsible for the report content.

36. “Scheduled Date/Time”: The date/time the filler scheduled an observation.

10.9 OBR -OBSERVATION REQUEST SEGMENT (FOR ESI:DOC INBOUND INTERFACES)

In the reporting of clinical data, the OBR serves as the report header. It identifies the observation set represented by the following atomic observations. It includes the relevant ordering information when that applies. It contains many of the attributes that usually apply to all of the included observations. For use in the ESI:Doc Inbound interface, we are only interested in a small subset of data from this segment.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
1	4	ST	R	N		Set ID - Observation Request	No mapping available	
2	75	EI	O	N		Placer Order Number*		
3	15	EI	O	N		Filler Order Number	eii.Filler_Order_Number	N/A
4	200	CE	R	N		Universal Service ID	obj.doc_type	eChart | Documents… Column – Document Type
5	2	ID	O	N		Priority*		
6	26	TS	O	N		Request Date/Time*		
7	26	TS	O	N		Observation Date/Time	obj.encounter_date	eChart | Documents… Column - Encounter
8	26	TS	O	N		Observation End Date/Time *		
9	20	CQ	O	N		Collection Volume *		
10	60	XCN	O	Y		Collector Identifier *		
11	1	ID	O	N	0065	Specimen Action Code *		
12	60	CE	O	N		Danger Code *		
13	300	CM	O	N		Relevant Clinical Information*		
14	26	TS	O	N		Specimen Received Date/Time *		
15	300	CM	O	N	0070	Specimen Source *		
16	80	XCN	O	Y		Ordering Provider	obj.dict_id or obj.sanct_id	eChart | Documents… Column – By (After column “Encounter” for obj.dict_id. After column “Approved” for obj.sanct_id.)

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
17	40	XTN	O	Y/2		Order Callback Phone Number*		
18	60	ST	O	N		Placer Field 1*		
19	60	ST	O	N		Placer Field 2*		
20	60	ST	O	N		Filler Field 1 +*		
21	60	ST	O	N		Filler Field 2 +*		
22	26	TS	O	N		Results Rpt/Status Change - Date/Time *		
23	40	CM	O	N		Charge To Practice +*		
24	10	ID	O	N		Diagnostic Serv Sect ID*		
25	1	ID	O	N		Result Status	No mapping to database. Must = “F” or message will be rejected.	None
26	200	CM	O	N		Parent Result +*		
27	200	TQ	O	Y		Quantity/Timing*		
28	150	XCN	O	Y/5		Result Copies To *		
29	150	CM	O	N		Parent Number *		
30	20	ID	O	N	0124	Transportation Mode *		
31	300	CE	O	Y		Reason For Study *		
32	200	CM	O	N		Principal Result Interpreter	obj.dict_id or obj.sanct_id	eChart | Documents… Column – By (After column “Encounter” for obj.dict_id. After column “Approved” for obj.sanct_id.)
33	200	CM	O	Y		Assistant Result Interpreter *		
34	200	CM	O	Y		Technician *		

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
35	200	CM	O	Y		Transcriptionist	obj.trans_id	eChart | Documents… Column – By (after column Transcribed)
36	26	TS	O	N		Scheduled Date/Time *		
37	4	NM	O	N		Number Of Sample Containers*		
38	60	CE	O	Y		Transport Logistics Of Collected*		
39	200	CE	O	Y		Collector's Comment*		
40	60	CE	O	N		Transport Arrangement Responsibility*		
41	30	ID	O	N	0224	Transport Arranged*		
42	1	ID	O	N	0225	Escort Required*		
43	200	CE	O	Y		Planned Patient Transport Comment*		

OBR Field Notes

* This field is not used by LANTIS ESI.

3. "Filler Order Number": The permanent identifier for and order and its associated observations.
Only one of OBR.16, OBR.32 or PV1.7 may be mapped to obj.dict_ID.
Only one of OBR.16, OBR.32 or PV1.7 may be mapped to obj.sanct_ID.
For fields 16, 32 and 35, both ID and Last Name are needed to find a matching Staff record in LANTIS. If no match is found, a new Staff record will be created.

10.10 OBR -OBSERVATION REQUEST SEGMENT (LAB ORDER OUTBOUND INTERFACE)

The Observation Request (OBR) segment is used to transmit information specific to an order for a diagnostic study or observation, physical exam, or assessment.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	4	ST	O	N		Set ID - Observation Request	“1”, “2”, “3”, etc.	None
2	75	EI	C	N		Placer Order Number	orc:orc_set_id	Form – Observation Orders
								Field – Order #
3	15	EI	C	N		Filler Order Number*		
4	200	CE	R	N		Universal Service ID	Mappable to one of the following: cpt:hsp_code, cpt:hsp_code2, cpt:hsp_code3, cpt:hsp_code4, cpt:hsp_code5, cpt:cpt_code Also included is cpt:short_description	File | Libraries | Procedures and Supplies… View dropdown – Lab Change hbutton Fields – Hospital Code, Hospital Code 2, Hospital Code 3, Hospital Code 4, Hospital Code 5, Cpt Code
5	2	ID	B	N	1000 3 (Orde r	Priority	orc:priority	Form – Observation Orders Field – Priority
					Priori			
					ty)			
6	26	TS	B	N		Request Date/Time	orc:start_date,	Form – Observation Orders
							orc:start_time	Fields – Start Date / Time
7	26	TS	C	N		Observation Date/Time *		
8	26	TS	O	N		Observation End Date/Time *		
9	20	CQ	O	N		Collection Volume *		
10	60	XCN	O	Y		Collector Identifier *		

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
11	1	ID	O	N	0065	Specimen Action Code *		
12	60	CE	O	N		Danger Code *		
13	300	CM	O	N		Relevant Clinical Information*		
14	26	TS	O	N		Specimen Received Date/Time *		
15	300	CM	O	N	0070	Specimen Source *		
16	80	XCN	O	Y		Ordering Provider	orc:ord_provider	Form – Observation Orders Fields – MD
17	40	XTN	O	Y/2		Order Callback Phone Number *		
18	60	ST	O	N		Placer Field 1*		
19	60	ST	O	N		Placer Field 2*		
20	60	ST	O	N		Filler Field 1 +*		
21	60	ST	O	N		Filler Field 2 +*		
22	26	TS	O	N		Results Rpt/Status Change - Date/Time *		
23	40	CM	O	N		Charge To Practice +*		
24	10	ID	O	N		Diagnostic Serv Sect ID*		
25	1	ID	O	N		Result Status +*		
26	200	CM	O	N		Parent Result +*		
27	200	TQ	O	Y		Quantity/Timing	orc:service_qty orc:start_date orc:start_time orc:end_date orc:end_time orc:priority Format: 1^^^20020112094500^20020112010450 0^S^^^^	Observation Orders form Fields – Start Date, Time, End Date, Time Priority NOTE: orc:service_qty is not displayed within LANTIS.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
28	150	XCN	O	Y/5		Result Copies To*		
29	150	CM	O	N		Parent Number*		
30	20	ID	O	N	0124	Transportation Mode	obr:transport	Observation Order form Field – Transport
31	300	CE	O	Y		Reason For Study *		
32	200	CM	O	N		Principal Result Interpreter +*		
33	200	CM	O	Y		Assistant Result Interpreter +*		
34	200	CM	O	Y		Technician +*		
35	200	CM	O	Y		Transcriptionist +*		
36	26	TS	O	N		Scheduled Date/Time +		
37	4	NM	O	N		Number Of Sample Containers*		
38	60	CE	O	Y		Transport Logistics Of Collected*		
39	200	CE	O	Y		Collector’s Comment*		
40	60	CE	O	N		Transport Arrangement Responsibility*		
41	30	ID	O	N	0224	Transport Arranged*		
42	1	ID	O	N	0225	Escort Required*		
43	250	CE	O	Y		Planned Patient Transport Comment*		

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
44	250	CE	O		0088	Procedure Code	Mappable to one of the following: cpt:hsp_code, cpt:hsp_code2, cpt:hsp_code3, cpt:hsp_code4, cpt:hsp_code5, cpt:cpt_code, Null Also included is cpt:short_description	File | Libraries | Procedures and Supplies… View dropdown – Lab Change pushbutton Fields – Hospital Code, Hospital Code 2, Hospital Code 3, Hospital Code 4, Hospital Code 5, Cpt Code
45	250	CE	O	Y	0	Procedure Code Modifier *		
46	250	CE	O	Y	0	Placer Supplemental Service Information *		
47	250	CE	O	Y	0411	Filler Supplemental Service Information *		

OBR Field Notes

* This field is not used by LANTIS ESI.

6. “Request Date/Time”: A time of 12am is a null. For outbound interfaces, the time is left out of the field if the time is 12:00 AM.

16. “Ordering Provider”: The provider who ordered the test. Either the ID code or the name, or both, may be present in the form: <ID number (ST)> ^ <family name (ST)> ^ <given name (ST)> ^ <middle initial or name (ST)> ^ <suffix (e.g., JR or III) (ST)> ^ <prefix (e.g., DR) (ST)> ^ <degree (e.g., MD) (ST)> ^ <source table (IS)> ^ <assigning authority (HD)> ^ <name type code(ID)> ^ <identifier check digit (ST)> ^ <code identifying the check digit scheme employed (ID)> ^ <identifier type code (IS)> ^ <assigning facility (HD)>.

30. “Transportation Mode”: Identifies how to transport a patient, when applicable. Refer to HL7 table 0124 – Transportation mode for valid codes.

27. “Quantity/Timing”: A time of 12am is a null. For outbound interfaces, the time is left out of the field if the time is 12:00 AM.

10.11 OBX -OBX -OBSERVATION / RESULT SEGMENT (Gateway Lab. Results Import RESULT INBOUND INTERFACE)

The OBX segment is used to transmit a single observation or observation fragment. It represents the smallest indivisible unit of a report.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
1	10	SI	O	N		Set ID – Observational Simple		
2	2	ID	R	N	0125	Value Type		
3	150	CE	R	N		Observation Identifier	obx:obd_id obd:code, obd:label, obd:desc, obd.units	eChart | Laboratory Fields – column entries
4	20	ST	C	N		Observation Sub-ID		
5	65535	ST	O	Y		Observation Value	obx:obs_string	eChart | Laboratory Fields – column entries (results)
6	60	CE	O	N		Units	obd:units	eChart | Laboratory Fields – column entries (1st column)
7	10	ST	O	N		References Range	obx:reference_range	eChart | Laboratory Fields – column entries (results)
8	5	ID	O	Y/5	0078	Abnormal Flags	obx:abnormal_flags	eChart | Laboratory Fields – column entries (results)
9	6	NM	O	N		Probability*		
10	2	ID	O	Y		Nature of Abnormal Test*		
11	1	ID	O	N	0085	Observe Result Status*		
12	20	TS	O	N		Date Last Obs Normal Values*		
13	26	ST	O	N		User Defined Access Checks*		
14	200	TS	O	N		Date/Time Of The Observation		

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
15	60	CE	O	N		Producer's ID*		
16	80	XCN	O	N		Responsible Observer*		
17	60	CE	O	Y		Observation Method*		

OBX Field Notes

* This field is not used by LANTIS ESI.

3. "Observation Identifier" is a code that maps to a procedure in LANTIS. This mapping must exist for the observation result to be added. See the ESI Data Mapping Guide for details. If a matching lab test is not found, a new lab test will be created. OBX.3.1 and OBX.3.2 are required fields for adding a lab test.

5 "Observation Value": The value observed by the observation producer. If within a single HL7 message multiple OBX records are present with the same Observation ID, the first the value in OBX.5 of the first OBX segment will be saved in OBX:Obs_String. For subsequent matching lab tests, the data in OBX.5 and accompanying NTE.3 data will be concatenated into one Notes record in LANTIS.

6 "Units": Units will be used along with Observation Identifier for matching purposes. Both fields must match for success.

8. "Abnormal flags": We will import the text in OBX.8. This field indicates the normalcy status of the result. LANTIS only supports display of one abnormal flag per result. LANTIS currently supports "special display" for the following values:

HL7 Flag	Field Color / Symbol			Description
L	Yellow	/	L	Below low normal
H	Yellow	/	H	Above high normal
LL	Red	/	LL	Below lower panic limits
HH	Red	/	HH	Above upper panic limits
<	Black	/	<	Below absolute low-off instrument scale
>	Black	/	>	Above absolute high-off instrument scale

10.12 OBX -OBSERVATION / RESULT SEGMENT (ESI:DOC INBOUND INTERFACE)

The OBX segment is used to transmit a single observation or observation fragment. It represents the smallest indivisible unit of a report.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
1	10	SI	O	N		Set ID – Observational Simple		
2	2	ID	R	N	0125	Value Type	Used for filtering. See below	N/A
3	150	CE	R	N		Observation Identifier		
4	20	ST	C	N		Observation Sub-ID		
5	65535	ST	O	Y		Observation Value	Used for creating document.	N/A – contents go in document
6	60	CE	O	N		Units *		
7	10	ST	O	N		References Range *		
8	5	ID	O	Y/5	0078	Abnormal Flags *		
9	6	NM	O	N		Probability*		
10	2	ID	O	Y		Nature of Abnormal Test*		
11	1	ID	O	N	0085	Observe Result Status*		
12	20	TS	O	N		Date Last Obs Normal Values*		
13	26	ST	O	N		User Defined Access Checks*		
14	200	TS	O	N		Date/Time Of The Observation *		
15	60	CE	O	N		Producer's ID*		
16	80	XCN	O	N		Responsible Observer*		
17	60	CE	O	Y		Observation Method*		

OBX Field Notes

* This field is not used by LANTIS ESI.

2. “Value Type” identifies the type of data being transmitted. We will only import data where OBX.2 = TX, ST or FT. If no OBX segments exist with OBX.2 = TX, ST or FT, the message will be rejected.

5. “Observation Value”: For an ORU^R01 and an MDM^T02 message, the OBX + NTE segments are repeating. Within the OBX segment, OBX.5 can repeat infinitely. Within the NTE segment, NTE.3 can repeat infinitely. The Doc Inbound Interface can support one level of repeating information. The interface can be configured to expect a single OBX segment with OBX.5 repeating infinitely or it can be configured to expect multiple OBX segments each with a single value in OBX.5. It can not be configured to support multiple OBX segments each with a repeating OBX.5 field. The same restriction applies to the NTE segment. Note: MDM^T02 does not contain an NTE segment. The interface can be configured to support a single NTE with a repeating NTE.3 field or multiple NTE segments each with a single NTE.3 field but not both.

10.13 OBX -OBSERVATION / RESULT SEGMENT (PHARMACY OUTBOUND INTERFACE)

The OBX segment is used to transmit BSA (Body Surface Area) to a pharmacy system.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	10	SI	O	N		Set ID – Observational Simple	1	None
2	2	ID	R	N	0125	Value Type	NM	None
3	150	CE	R	N		Observation Identifier	BSA^Body Surface	None
4	20	ST	C	N		Observation Sub-ID*		
5	65535	ST	O	Y		Observation Value	rxo:bsa	eChart | Vital Signs Fields – column entries for bsa at the time the order was entered
6	60	CE	O	N		Units	m2^m2	None
7	10	ST	O	N		References Range*		
8	5	ID	O	Y/5	0078	Abnormal Flags*		
9	6	NM	O	N		Probability*		
10	2	ID	O	Y		Nature of Abnormal Test*		
11	1	ID	O	N	0085	Observe Result Status*		
12	20	TS	O	N		Date Last Obs Normal Values*		
13	26	ST	O	N		User Defined Access Checks*		
14	200	TS	O	N		Date/Time Of The Observation*		
15	60	CE	O	N		Producer's ID*		
16	80	XCN	O	N		Responsible Observer*		
17	60	CE	O	Y		Observation Method*		

OBX Field Notes

* This field is not used by LANTIS ESI.

10.14 PID -PATIENT IDENTIFICATION SEGMENT

The PID segment is used as the primary means of communicating patient identification information to / from LANTIS ESI. This segment contains permanent patient identifying and demographic information that, for the most part, is not likely to change frequently.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	4	SI	O	N		Set ID	Not Used	"1"	
2	16	CX	O	N		Patient ID - External	MAPPABLE	MAPPABLE	File | Demographics Tab – Name/IDs/Personal Fields – For import, any of the six fields in the ID group box except the first. For export, anyof the six fields.
3	16	CX	R	N		Patient ID - Internal	IDT:pat_ida **or** IDT:pat_idb	MAPPABLE	File | Demographics Tab – Name/IDs/Personal Fields – For import, either ofthe first two fields in the ID group box. For export, any ofthe six fields.
4	12	CX	O	N		Alternate Patient ID	MAPPABLE	MAPPABLE	File | Demographics Tab – Name/IDs/Personal Fields – For import, any of the six fields in the ID group box except the first. For export, anyof the six fields.
5	48	XPN	R	N		Patient Name	pat:last_name, pat:first_name, pat:middle_name, pat:salutation	pat:last_name, pat:first_name, pat:middle_name, pat:salutation	File | Demographics Tab – Name/IDs/Personal Fields – Salutation, Last, First, MI
6	48	XPN	O	N		Mother's Maiden Name*			
7	26	TS	O	N		Date/Time of Birth	pat:birth_date	pat:birth_date	File | Demographics
									Tab – Name/IDs/Personal
									Fields – Birth Date

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
8	10	IS	O	N	0001	Sex	adm:gender	adm:gender	File | Demographics
									Tab – Name/IDs/Personal
									Fields – Gender
9	48	XPN	O	Y		Patient Alias	pat:alias_name	pat:alias_name	File | Demographics
									Tab – Name/IDs/Personal
									Fields – Other
10	10	IS	O	N	0005	Ethnic Group	adm:race	adm:race	File | Demographics Tab – Name/IDs/Personal Fields – Race
11	106	XAD	O	N		Patient Address	adm:pat_adr1, adm:pat_adr2, adm:pat_city, adm:pat_state, adm:pat_postal, adm:pat_country	adm:pat_adr1, adm:pat_adr2, adm:pat_city, adm:pat_state, adm:pat_postal, adm:pat_country	File | Demographics Tab – Home/Work Fields – 1, 2, City, State, Postal,Country
12	4	IS	O	N	0289	County Code *	adm:pat_county	adm:pat_county	
13	40	XTN	O	Y		Phone Number - Home	adm:pat_home_phone	adm:pat_home_phone, adm:pat_home_phone_ex	File | Demographics Tab – Home/Work Fields – Phone (top)
14	40	XTN	O	Y		Phone Number Business	adm:pat_work_phone, adm:pat_work_phone_ex	adm:pat_work_phone, adm:pat_work_phone_ex	File | Demographics Tab – Home/Work Fields – Phone (bottom), Ext
15	60	CE	O	N		Language - Patient*			
16	10	IS	O	N	0002	Marital Status	adm:marital	adm:marital	File | Demographics
									Tab – Name/IDs/Personal
									Fields – Marital Status

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
17	10	IS	O	N	0006	Religion	adm:religion	adm:religion	File | Demographics
									Tab – Name/IDs/Personal
									Fields – Religion
18	20	CX	O	N	0061	Patient Acct Number	MAPPABLE	MAPPABLE	File | Demographics
									Tab – Name/IDs/Personal
									Fields – For import, any of the six fields in the ID group box except the first. For export, anyof the six fields.
19	16	ST	O	N		Social SecurityNumber	pat:ss_number	pat:ss_number	File | Demographics Tab – Name/IDs/Personal Fields – SSN
20	25	CM	O	N		Driver Lic Num - Patient*			
21	20	CX	O	N		Mother's Identifier*			
22	4	IS	O	N		Ethnic Group*			
23	60	ST	O	N		Birth Place	adm:birth_place		File | Demographics Tab – Name/IDs/Personal Fields – Birth Place
24	2	ID	O	N		Multiple Birth Indicator*			
25	2	NM	O	N		Birth Order*			
26	4	IS	O	Y		Citizenship*			
27	60	CE	O	N		Veterans MilitaryStatus*			
28	80	CE	O	N		Nationality*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
29	26	TS	O	N		Patient Death Date & Time	adm:expired		File | Demographics Tab – Admission Fields – Expired Date
30	1	ID	O	N		Patient Death Indicator*			

PID Field Notes

* This field is not used by LANTIS ESI.

Patients added via an interface are marked as active (Pat:Inactive = False).

MAPPABLE: LANTIS maintains six patient ID fields referred to as IDA, IDB, IDC, IDD, IDE and IDF. IDA must be unique. IDB is optionally unique based on department configuration. IDC – IDF are not unique. For both inbound and outbound interfaces, configuration is available to map these IDs to specific fields in HL7 segments PID and PV1. In addition to being mappable, LANTIS assigns effective date ranges to each set of IDs. For inbound interfaces LANTIS creates a new set of IDs when changes are detected. For the HL7 Charge Export interface LANTIS exports IDs from the set of IDs with an effective date range matching the charge date of service.

1. “Set ID”: For those messages that permit multiple datasets about different patients, the SET ID field is used to identify the repetitions. LANTIS ESI supports only one dataset per HL7 message and updates based on PID:3 (Patient ID – Internal), not PID:1 (Set ID).

3. “Patient ID - Internal”: Primary ID used by the facility to positively identify a patient when admitted, i.e., medical record number, billing number, etc. LANTIS automatically generates patient ID field IDA when the following conditions are true:

   ♦ ESI Configuration ID Mapping setting for IDA = “None” and IDB = “Internal”.
   ♦ Department Setup setting “Automatic Generation of Primary ID (IDA)” is checked.
   ♦ Department Setup setting “Require Unique Secondary ID (IDB)” is checked.

8. “Sex”: Valid entries are M -Male; F - Female, U -Unknown.

16. “Marital status”: Valid entries are M - Married; S - Single; D -Divorced; W - Widowed; A - Separated.

10.15 PV1 -PATIENT VISIT SEGMENT

The PV1 segment is used by ADT applications to communicate information on a visit specific basis.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	4	SI	O	N		Set ID - Patient Visit			
2	3	IS	R	N	0004	Patient Class	adm:in_out	adm:in_out	File | Demographics Tab – Admission Fields – Inpatient checkbox
3	12	PL	O	N		Assigned Patient Location	adm:nurse_unit, adm:room_num, adm:bed_num	adm:nurse_unit, adm:room_num, adm:bed_num	File | Demographics Tab – Admission Fields – Nurse Unit, Room, Bed
4	2	IS	O	N	0007	Admission Type*			
5	20	ST	O	N		Pre-Admit Number*			
6	12	PL	O	N	0079	Prior Patient Location*			
7	60	XCN	O	Y	0010*	Attending Doctor	adm:attending_md_id **or** adm:stf_md2_id **or** adm:stf_md3_id **or** adm:stf_md4_id **or** adm:stf_md5_id **or** adm:stf_md6_id **or** adm:stf_md7_id	adm:attending_md_id **or** adm:stf_md2_id **or** adm:stf_md3_id **or** adm:stf_md4_id **or** adm:stf_md5_id **or** adm:stf_md6_id **or** adm:stf_md7_id	File | Demographics Tab – Attending Fields – Attending Physician
8	60	XCN	O	Y	0010*	Referring Doctor	adm:ref_md_id	adm:ref_md_id	File | Demographics Tab – Referral Fields – Referring Physician
9	60	XCN	O	Y	0010*	Consulting Doctor	adm:ref_md2_id, adm:ref_md3_id, adm:pri_md_id, adm:ref_from_fac_id	adm:ref_md2_id, adm:ref_md3_id, adm:pri_md_id	File | Demographics Tab – Referral Fields – Other MD 1, Other MD 2, Primary Physician, ReferringFacility
10	3	ID	O	N	0069	Hospital Service*			
11	12	PL	O	N	0079	Temporary Location*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
12	2	IS	O	N	0087	Pre-Admit Test			
						Indicator*			
13	2	IS	O	N	0092	Re-Admission Indicator*			
14	3	IS	O	N	0023	Admit Source*			
15	2	IS	O	Y	0009	Ambulatory Status*			
16	2	IS	O	N	0099	VIP Indicator	adm:vip	Not Used	Database only
							“1” or “Y” – TRUE		
							else – FALSE		
17	60	XCN	O	Y	0010	Admitting Doctor	adm:adm_md_id	adm:adm_md_id	File | Demographics Tab – Admission Fields – Admitting Physician
18	2	IS	O	N	0018	Patient Type*			
19	4	CX	O	N		Visit Number	MAPPABLE	MAPPABLE NOTE: The patient IDs contain up to 20 characters. LANTIS exports the entire value, not just up to 4 characters.	File | Demographics Tab – Name/IDs/Personal Fields – For import, any of the six fields in the ID group box except the first. For export, anyof the six fields.
20	50	CM	O	Y 4	0064	Financial Class *			
21	2	IS	O	N	0032	Charge Price Indicator*			
22	2	IS	O	N	0045	Courtesy Code*			
23	2	IS	O	N	0046	Credit Rating*			
24	2	IS	O	Y	0044	Contract Code*			
25	8	DT	O	Y		Contract Effective Date*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
26	12	NM	O	Y		Contract Amount*			
27	3	NM	O	Y		Contract Period*			
28	2	IS	O	N	0073	Interest Code*			
29	1	IS	O	N	0110	Transfer To Bad Debt*			
30	8	DT	O	N		Transfer To Bad Debt Date*			
31	10	ST	O	N	0021	Bad Debt AgencyCode*			
32	12	NM	O	N		Bad Debt Transfer Amount*			
33	12	NM	O	N		Bad Debt Recovery Amount*			
34	1	IS	O	N	0111	Delete Account Indicator*			
35	8	DT	O	N		Delete Account Date*			
36	2	IS	O	N	0112	Discharge Disposition			
37	2	IS	O	N	0113	Discharged To Location*			
38	2	IS	O	N	0114	Diet Type*			
39	2	IS	O	N	0115	Servicing Facility		PRF:Preference_Str	File | Import/Export | HL7 Code Export…
									Change Button
									Tab – Msg Configuration Codes – Dept ID Code
40	1	IS	O	N	0116	Bed Status*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
41	2	IS	O	N	0117	Account Status	adm:accnt_sts	adm:accnt_sts	File | Demographics Tab – Billing Fields – Account Status
42	12	IS	O	N	0079	Pending Location*			
43	12	IS	O	N	0079	Prior Temporary Location*			
44	19	TS	O	N		Admit Date / Time	adm:adm_time, adm:adm_date	adm:adm_time, adm:adm_date	File | Demographics Tab – Admission Fields – Admit/Registration Date, Admit/Registration Time
45	19	TS	O	N		Discharge Date / Time	adm:discharge	adm:discharge	File | Demographics
									Tab – Admission
									Fields – Discharge Date
46	12	NM	O	N		Current Patient Balance*			
47	12	NM	O	N		Total Charges*			
48	12	NM	O	N		Total Adjustments*			
49	12	NM	O	N		Total Payments*			
50	20	CX	O	N		Alternate Visit ID	MAPPABLE	MAPPABLE (for Lab Orders Outbound only, not Charge Export)	File | Demographics Tab – Name/IDs/Personal Fields – any of the six fields in the ID group box except the first.
51	1	IS	O	N		Visit Indicator*			
52	60	XCN	O	Y		Other Healthcare Provider*			

PV1 Field Notes

* This field is not used by LANTIS ESI.

MAPPABLE: LANTIS maintains six patient ID fields that are referred to as IDA, IDB, IDC, IDD, IDE and IDF. IDA must be unique. IDB is optionally unique based on department configuration. IDC – IDF are not unique. For both inbound and outbound interfaces, configuration is available to map these IDs to specific fields in HL7 segments PID and PV1. In addition to being mappable, LANTIS assigns effective date ranges to each set of IDs. For inbound interfaces LANTIS creates a new set of IDs when changes are detected. For the HL7 Charge Export interface LANTIS exports IDs from the set of IDs with an effective date range matching the charge date of service.

39. The “Servicing Facility” field is configurable for outbound interfaces. The HL7 Charge Export interface exports the user-supplied value in the “Dept ID Code” field when the “Dept Code” field = Dept. This field is not exported when using the Lab Order Outbound interface.

10.16 QRD – QUERY SEGMENT

The QRD segment is used to define a query.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
1	19	TS	R	N		Query Date/Time		
2	1	ID	R	N	0106	Query Format Code	'R'	NA
3	1	ID	R	N	0091	Query Priority		
4	10	ST	R	N		Query ID		
5	1	ID	O	N	0107	Deferred Response Type		
6	19	TS	O	N		Deferred Response Date/Time		
7	5	CQ	R	N	0126	Quantity Limited Request		
8	20	ST	R	Y		Who Subject Filter	IDT:pat_ida	File | Demographics Tab – Name/IDs/Personal Fields – First field in the ID group box
9	3	ID	R	Y	0048	What Subject Filter		
10	20	ST	R	Y		What Department Data Code		
11	20	ST	O	Y		What Data Code Value Qual.		
12	1	ID	O	N	0108	Query Results Level		

QRD Field Notes

* This field is not used by LANTIS ESI.

2. “Query format code”: Refer to user-defined table 0106 for valid entries. “R” (Response is in record-oriented format) is the only value currently accepted.

8. “Who subject filter”; Identifies the subject, or who the inquiry is about. This field is used for patient lookup only.

10.17 TXA - TRANSCRIPTION DOCUMENT HEADER SEGMENT (ESI:DOC IMPORT INTERFACE)

The TXA segment is used to transmit information about a document to LANTIS ESI. The TXA segment contains information specific to a transcribed document but does not include the text of the document.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (inbound)	LANTIS Application Mapping
1	4	SI	O	N		Set ID – Observational Simple	No mapping available	None
2	30	ST	R	N	0270	Document Type	obj.doc_type	eChart | Documents… Column – Document Type
3	20	ST	O	N	0191	Document Content Presentation *		None
4	26	TS	O	N		Activity Date/Time	obj.enounter_date	eChart | Documents… Column – Encounter
5	250	XCN	C	Y		Primary Activity Provider Code/Name *		
6	26	TS	O	N		Origination Date/Time *		
7	26	TS	C	N		Transcription Date/Time	obj.trans_date	eChart | Documents… Column – Transcribed
8	26	TS	O	N		Edit Date/Time *		
9	250	XCN	O	Y		Originator Code/Name	obj.dict_id or obj.sanct_id	eChart | Documents… Column – By (After column “Encounter” for obj.dict_id. After column “Approved” for obj.sanct_id)
10	250	XCN	O	Y		Assigned Document Authenticator	obj.sanct_id	eChart | Documents… Column – By (After column “Approved” for obj.sanct_id)
11	250	XCN	C	Y		Transcriptionist Code/Name	Obj.trans_id	eChart | Documents… Column – By (after column Transcribed)
12	400	EI	R	N		Unique Document Number *		
13	400	EI	C	N		Parent Document Number *		

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (inbound)	LANTIS Application Mapping
14	22	EI	O	N		Placer Order Number *		
15	400	EI	O	N		Filler Order Number	eii.Filler_Order_Number	N/A
16	400	ST	O	N		Unique Document File Name *		
17	400	ST	R	N	0271	Document Completion Status *		
18	400	ST	O	N	0272	Document Confidentiality Status *		
19	400	ST	O	N	0273	Document Availability Status *		
20	400	ST	O	N	0275	Document Storage Status *		
21	30	ST	C	N		Document Change Reason *		
22	250	PTS	C	Y		Authentication Person, Time * Stamp *		
23	250	XCN	O	Y		Distributed Copies (Code and Name of Recipients) *		

TXA Field Notes

* This field is not used by LANTIS ESI.

15. “Filler Order Number”: The permanent identifier for an order and its associated document
    Only one of TXA.9 or PV1.7 may be mapped to obj.dict_ID.
    Only one of TXA.10 or PV1.7 may be mapped to obj.sanct_ID.

For fields 9, 10, and 11, both an ID and Last Name are needed to find a matching Staff record in LANTIS. If no match is found a new Staff record is created.

10.18 MRG – MERGE SEGMENT

The MRG segment provides information necessary to initiate the merging of patient data.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
1	20	CX	R	Y		Prior Patient ID	IDT:pat_ida **or** IDT:pat_idb	File | Demographics Tab – Name/IDs/Personal Fields – For import, either of the first two fields in the ID groupbox. For export, any of the six fields.
2	1	CX	O	Y		Prior Alternate Patient ID	MAPPABLE	File | Demographics
								Tab – Name/IDs/Personal
								Fields – For import, any of the six fields in the ID group boxexcept the first. For export, any of the six fields.
3	20	CX	O	N		Prior Patient Account Number	MAPPABLE	File | Demographics Tab – Name/IDs/Personal Fields – For import, any of the six fields in the ID group boxexcept the first. For export, any of the six fields.
4	16	CX	O	N		Prior Patient ID – External	MAPPABLE	File | Demographics
								Tab – Name/IDs/Personal
								Fields – For import, any of the six fields in the ID group boxexcept the first. For export, any of the six fields.
5	15	CX	O	N		Prior Visit Number	MAPPABLE	File | Demographics
								Tab – Name/IDs/Personal
								Fields – For import, any of the six fields in the ID group boxexcept the first. For export, any of the six fields.
6	20	CX	O	N		Prior Alternate Visit ID *		
7	48	XPN	O	N		Prior Patient Name *		

MRG Field Notes

* This field is not used by LANTIS ESI.

MAPPABLE: LANTIS maintains six patient ID fields, referred to as IDA, IDB, IDC, IDD, IDE and IDF. You can map these IDs to specific fields in the PID and PV1 HL7 segments. In addition to these fields being mappable, LANTIS assigns effective date ranges to each set of IDs. For inbound interfaces, LANTIS creates a new set of IDs when changes are detected.

10.19 ZIL -INSURANCE LOCAL SEGMENT

The ZIL segment contains the information required to add, update or delete payers. This segment is a local segment for use with message type ZIN event code Z02 only.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound Only)	LANTIS Application Mapping
1	2	ID	R	N		Insurance Action Code		
						[A/U/D]		
2	6	ST	R	N		Insurance Company ID NOTE: This field is optional for our use eventhough HL7 shows it asmandatory.	pay:misc_id	File | Directories | Payer Directory… Change pushbutton Tab – General Field – Ext ID
3	8	ID	R	N		Insurance Plan ID	eid:id_code	File | Directories | Payer Directory…
								Change pushbutton
								Edit IDs pushbutton
								Field – Identification column value when Typecolumn value = ‘ESI’
4	20	ST	O	N		Insurance ID Number	pay:other_id	File | Directories | Payer Directory… Change pushbutton Tab – General
								Field – ID No.
5	40	ST	R	N		Insurance CompanyName	pay:payer_name	Payer Information. General Tab. Name.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound Only)	LANTIS Application Mapping
6	106	AD	O	N		Insurance CompanyAddress	pay:adr1, pay:adr2, pay:city, pay:state, pay:postal, pay:country	File | Directories | Payer Directory… Change pushbutton Tab – Contact Address/Phone Fields – 1, 2, City, State, Postal, Country.
7	30	PN	O	N		Insurance CompanyContact Person	pay:contact	File | Directories | Payer Directory… Change pushbutton Tab – Contact Address/Phone Field – Contact
8	40	TN	O	Y 3		Insurance CompanyPhone Number	pay:pri_phone, pay:pri_phone_ex, pay:sec_phone, pay:sec_phone_ex, pay:fax	File | Directories | Payer Directory… Change pushbutton Tab – Contact Address/Phone Field – Primary, x, Secondary, x, Fax
9	10	ST	O	N		Accounting Type	pay:acc_type	File | Directories | Payer Directory…
								Change pushbutton
								Tab – Billing Field – Accounting Type
10	10	ST	O	N		Bill Type *		
11	1	ST	O	N		Authorization Required	pay:auth_req	File | Directories | Payer Directory… Change pushbutton Tab – General Field – Prior Authorization Required.

ZIL Field Notes

*	This field is not used by LANTIS ESI.
1	“Insurance action code”: The code used to identify the action to be performed by this message. Valid codes are: A (Add), U (Update), and D (Delete).
2	“Insurance Company ID”: The program or plan id of the insurance company.
3	“Insurance Plan ID”: This code serves to uniquely identify the insurance plan via the interface. This ID serves as the ESI Coordinating ID for this Payer and is also used to identify the payer within the INI segment (IN1:2).
4	“Insurance ID Number”: Another code that serves to uniquely identify the insurance company. Can be used for an ID assigned to the facility by the insurance company.
9	“Accounting type”: The accounting method used by the payer.
10	“Bill type”: The type of bill to send.
11	“Authorization required”: Based on the type of insurance, some coverages require an authorization number or code be obtained prior to all nonemergency admissions and within 48 hours of an emergency admission. Y - Authorization Required; N - No Authorization Required.

10.20 ZPH -PHYSICIAN IDENTIFICATION LOCAL SEGMENT

The ZPH segment contains the information required to add, update or delete Staff and External Physicians. This segment is a local segment for use with message type ZPA event code Z01 only.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
1	2	ID	R	N		Doctor Action Code	“A” or “U” or “D”	
						[A/U/D]		
2	2	ID	R	N		Staff / External [S/E]	“S” or “E”	
3	60	XCN	R	N	0010	Doctor		
					*			
						• External	eid:id_code,	File | Directories | External Directory…
							eid:ext_type = “ESI”, ext:last_name, ext:first_name	Change pushbutton Tab – Work Fields – Last Name, First Name, Mdl Initial
								Edit IDs pushbutton.
								Field – Identification (for eid:id_code)
						• Staff	eid:id_code,	File | Directories | Staff Directory…
							eid:ext_type = “ESI” stf:last_name, stf:first_name, stf:mdl_initial	Change pushbutton Tab – Work Fields – Last Name, First Name, Mdl Initial Edit IDs pushbutton.
								Field – Identification (for eid:id_code)
4	20	ID	O	N		Provider Number	eid:id_code eid:ext_type = “MEDICARE”	File | Directories | Staff Directory… **or** File | Directories | External Directory…
								Change pushbutton
								Edit IDs pushbutton.
								Field – Identification (for eid:id_code)

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
5	20	ID	O	N		Provider Number Other	eid:id_code eid:ext_type = “MEDICAID”	File | Directories | Staff Directory… **or** File | Directories | External Directory…
								Change pushbutton
								Edit IDs pushbutton.
								Field – Identification (for eid:id_code)
6	20	ID	O	N		License Number	eid:id_code, eid_ext_type = “ST LICENSE”	File | Directories | Staff Directory… **or** File | Directories | External Directory…
								Change pushbutton
								Edit IDs pushbutton.
								Field – Identification (for eid:id_code)
7	20	ID	O	N		Universal ID	eid:id_code, eid:ext_type = “UPIN”	File | Directories | Staff Directory… **or** File | Directories | External Directory…
								Change pushbutton
								Edit IDs pushbutton.
								Field – Identification (for eid:id_code)
8	9	ID	O	N		Tax ID Number	eid:id_code, eid:ext_type = “TAX ID”	File | Directories | Staff Directory… **or** File | Directories | External Directory…
								Change pushbutton
								Edit IDs pushbutton.
								Field – Identification (for eid:id_code)
9	106	XAD	O	N		Doctor Address		
						• External	ext:adr1, ext:adr2, ext:city, ext:state, ext:postal	File | Directories | External Directory… Change pushbutton Fields – 1, 2, City, State, Postal

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS Application Mapping
						• Staff	stf:adr1, stf:adr2, stf:city, stf:state, stf:postal	File | Directories | Staff Directory… Change pushbutton Fields – 1, 2, City, State, Postal
10	40	XTN	O	Y		Phone Number – Home		Format: Uses only component 1 of XTN.
						• External	ext:home_phone, ext:home_phone_ex	File | Directories | External Directory… Change pushbutton
								Fields – Home Phone, ext only in database
						• Staff	stf:home_phone, stf:home_phone_ex	File | Directories | Staff Directory… Change pushbutton
								Fields – Home Phone, ext only in database
11	40	XTN	O	Y 3		Phone Number – Business		Format: Uses only component 1 of XTN.
						• External	ext:work_phone, ext:work_ext, ext:pager_no, ext:fax_no	File | Directories | External Directory… Change pushbutton Fields – Work Phone, Ext, Pager, Fax
						• Staff	stf:work_phone, stf:work_ext, stf:pager_no, sft:fax	File | Directories | Staff Directory… Change pushbutton Fields – Work Phone, Ext, Pager, Fax

ZPH Field Notes

1 “Doctor action code”: The code used to identify the action to be performed by this message. Valid codes are: A (Add), U (Update), and D (Delete).

2 “Staff / ExternaL”: The code used to identify whether the physician is staff or external. Valid codes are S (Staff) and E (External).

3 “Doctor”: In the form physician id^name. Both physician ID and physician name must be present. NOTE: The “id” component (often referred to as the ESI Coordinating ID) is used to uniquely identify the physician. No secondary searching is performed to identify the physician.

10.21 AL1 – PATIENT ALLERGY INFORMATION SEGMENT

The AL1 segment contains patient allergy information of various types. Each AL1 segment describes a single patient allergy.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	4	SI	R			Set ID -AL1	1	
2	250	CE	O		0127	Allergen Type Code	AG, FA, DA, MC, NKDA alg:Allergy_Type->ProgID ->obd:Code odb:Code ->obd:Label	eCHART | Allergies and Alerts Field - Type
							Format: DA^Drug Allergy	
3	250	CE	R			Allergen Code/Mnemonic/Description	Code: alg:drg_id-> drg:drug_code or	eChart | Allergies and Alerts Field - Medication
							drg: drug_code2 or	
							drg: drug_code 3 or	
							drg:medid or	
							drg: gcnseqno	
							Description:	
							alg:drg_id->	
							drg:generic_name	
							Format: code^description	
4	250	CE	O		0128	Allergy Severity Code	SV, MI, MO	eCHART | Allergies and Alerts
							alg:severity	Field - Severity
							Format: SV^Severe	
5	15	ST	O	Y		Allergy Reaction Code	alg:reaction	eCHART | Allergies and Alerts Field - Reaction

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
6	8	DT	B			Identification Date	alg:ID_Date	eCHART | Allergies and Alerts | Change

AL1 Field Notes

* This field is not used by LANTIS ESI

1 “Allergen Type Code”: The value is mapped using Table 0127 (Allergy Type) in ObsDef. The key column in ObsDef is Prog_ID, not OBD_ID.

4 “Allergy Severity Code”: The value is mapped using Table 0128 (Allergy Severity) in ObsDef.

5 “Allergy Reaction Code”: The value is mapped using Table 100025 (Allergic Reaction) in ObsDef.

10.22 ORC – COMMON ORDER SEGMENT

The ORC segment is used to transmit fields that are common to all orders (all types of services that are requested such as lab orders and pharmacy orders). The ORC segment is required in the Order (ORM) message.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	2	ID	R		0119	Order Control	For new orders – “NW” For canceled, held, voided or replaced orders – “CA”	NA
2	22	EI	C			Placer Order Number	orc:orc_set_id	Form – Observation Orders or Pharmacy Orders Field – Order #
3	22	EI	C			Filler Order Number *		
4	22	EI	O			Placer Group Number *		
5	2	ID	O		0038	Order Status *		
6	1	ID	O		0121	Response Flag	“N”	NA
7	200	TQ	O			Quantity/Timing	orc:service_qty orc:repeat_pattern->obd_id -> obs:code orc:duration orc:duration_units->obd_id>obs:code orc:start_date orc:start_time orc:end_date orc:end_time orc:priority Format: 1^Q6H^X3D^20020112094500^20020120104500^S^^^^	Form – Observation Orders form or Pharmacy Orders Fields – Start Date, Time, End Date, Time Priority For repeat pattern, duration, and duration units, see Field Notes below. NOTE: orc:service_qty is not displayed within LANTIS.
8	200	CM	O			Parent *		
9	26	TS	O			Date/Time of Transaction	orc:edit_date orc:edit_time	Order history Fields- Audit date, time
10	120	XCN	O	Y		Entered By	orc:edit_id	Order history Fields- Audit user
11	120	XCN	O	Y		Verified By *		
12	120	XCN	O	Y		Ordering Provider	orc:ord_provider	Form – Observation Orders or Pharmacy Orders

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
								Field – MD
13	80	PL	O			Enterer's Location *		
14	40	XTN	O	Y/2		Call Back Phone Number *		
15	26	TS	O			Order Effective Date/Time	orc:edit_date orc:edit_time when Order Control = "CA"	Not displayed in LANTIS
							else	
							null	
16	200	CE	O			Order Control Code Reason	orc:control_reason	Form - Observation Orders or Pharmacy Orders Pushbutton – Change Record Status form Field – Control Reason
17	60	CE	O			Entering Organization	orc:inst_id	Form - Observation Orders or Pharmacy Orders Field – Department
18	60	CE	O			Entering Device *		
19	120	XCN	O	Y		Action By	orc:sanct_id	Form - Observation Orders or Pharmacy Orders Status pushbutton Record Status form
								Field – "By" in Current Status groupbox.
20	40	CE	O		0339	Advanced Beneficiary Notice Code *		
21	60	XON	O	Y		Ordering Facility Name *		
22	106	XAD	O	Y		Ordering Facility Address *		
23	48	XTN	O	Y		Ordering Facility Phone Number *		
24	106	XAD	O	Y		Ordering Provider Address *		

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
25	250	CWE	O	N		Order Status Modifier *		

ORC Field Notes

* This field is not used by LANTIS ESI.

7 "Quantity/Timing": This field determines the priority, quantity, frequency, and timing of an atomic service. A Start Date/Time or End Date/Time of 12am is a null. For outbound interfaces, the time is left out of the field if the time is 12:00 AM. See description of Duration and Frequency below.

10 "Entered By": This field contains the identity of the person who actually keyed the request into the application.

15 "Order Effective Date/Time": If the order has changed, this field will contain the date and time of the change. Otherwise, this field will be null.

16 "Order Control Code Reason": This field contains the explanation (in text form) of the reason for the order event.

17 "Entering Organization": This field identifies the organization that the enterer belonged to at the time he/she enters/maintains the order. The value placed in this field will contain the department abbreviation for the department associated with this order.

Duration and Frequency

The Wave Setup screen is used to set up the pharmacy schedule (duration and frequency) that shows up in ORC-7:2 and ORC-7:3. ORC-7:2 is the frequency, and ORC-7:3 is the duration.

If no Wave is entered, ORC-7:2 will be **Once** and ORC-7:3 will be **X1**. This will also be the case whenever "Patient Administrable" is not checked. If "Patient Administrable" is not checked, the order is broken down into a series of "once per day, one time" orders.

If an order has two schedule components such as TID (from Wave) and PRN (from a checkbox on the Order screen), the two schedule items are concatenated with a space separator in ORC-7:2, for example … |1^**TID PRN**^X3^20050620^20050624^^^^^^^|…

Important: If a schedule is to be entered for the order, the Patient Administrable check box must be checked BEFORE clicking the Wave button. Otherwise, certain options may be offered on the Wave setup screen that do not make sense and cannot be properly encoded in the HL7 message.

Duration

Enter in LANTIS Wave Setup		**Contents of ORC-7:3**
End after a certain number of times	n Times	Xn
End after a certain amount of time	n Minute(s) n Hour(s) n Day(s) n Week(s) n Month(s) n Year(s)	Mn Hn Dn Wn Ln Yn
End by a certain date	date	Dn

Frequency Options

Enter in LANTIS Wave Setup		**Contents of ORC-7:2**
Times per day	Once according to pattern	Once or Q1D, or other, as indicated by patterns below **
Times per day	BID	BID
Times per day	TID	TID
Times per day	QID	QID
Times per day,	n Times, Interval m Hours	*** This option is not available if Patient Administrable

Times:		is selected
Times per day, Every:	n Hours n Minutes	QnH QnM
Times per day, At:	AM PM Before Sleep Each Shift	QAM QPM QHS QSHIFT
Pattern, Daily	Every day	Q1D
Pattern, Daily	Every other day	Q2D
Pattern, Daily	Every n days	QnD
Pattern, Weekly	Every week	Q1W
Pattern, Weekly	Every n weeks	QnW
Pattern, Weekly	Every n weeks, on day m (1=Mon, 2=Tue, … 7=Sun)	QnJm
Pattern, Monthly	Every month	Q1L
Pattern, Monthly	Every n months	QnL
Pattern, Continuous		C
Pattern, As Needed		PRN

** If Duration is entered as “Stop after a certain number of times, 1 time” (X1) and Times per Day is “Once according to Pattern” and Pattern is “Daily, Every day”, then Frequency is Once, otherwise, frequency is Q1D, Q2D, or other pattern.
*** This option does not show up on the Wave Setup if you check “Patient Administrable” before you click on the Wave button. This option should not be used when setting pharmacy order schedules.

10.23 RXO – PHARMACY/TREATMENT ORDER SEGMENT

This is the “master” pharmacy/treatment order segment. It contains order data not specific to components or additives.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	250	CE	C			Requested Give Code	For Medication: Code: rxo:req_give_code -> drg:drug_code or drg:drug_code2 or drg:drug_code3 or drg:medid or drg: gcnseqno Description: rxo:req_give_code -> drg:generic_name For IV Solution: Code: rxo:req_give_code -> cpt:hsp_code or cpt:hsp_code2 or cpt: hsp_code3 or cpt: hsp_code4 or cpt: hsp_code5 or cpt:cpt_code Description: rxo:prs_id -> cpt: supply_short_desc Format: 63^Oncovin Inj	Code: Medication formulary form Fields- Drug Code or Drug Code2 or Drug Code3 or MEDID or GCNSeqNo Description: Pharmacy Order (RXO) Form Field – Medication
2	20	NM	C			Requested Give Amount - Minimum	rxo:req_give_min	Pharmacy Order (RXO) Form Field – Dose Basis
3	20	NM	O			Requested Give Amount – Maximum*		
4	250	CE	C			Requested Give Units	rxo:give_units -> obsdef:obd_id->	Pharmacy Order (RXO) Form Field – Dose Basis Units

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
							obs: code^code	
							Format: mL/kg^mL/kg	
5	250	CE	C			Requested Dosage Form*		
6	250	CE	O	Y		Provider's Pharmacy/TreatmentInstructions*		
7	250	CE	O	Y		Provider's		
						Administration		
						Instructions*		
8	200	CM	O			Deliver-To Location*		
9	1	ID	O		0161	Allow Substitutions	N, G, T rxo:allow_subs	Pharmacy Order (RXO) Form Field – Substitutions
10	250	CE	O			Requested DispenseCode*		
11	20	NM	O			Requested DispenseAmount	rxo:disp_amt	Pharmacy Order (RXO) Form Field – Calculated Dose
12	250	CE	O			Requested DispenseUnits	rxo:disp_units -> obsdef:obd_id->	Pharmacy Order (RXO) Form Field – Calculated Units
							obs: code^code	
							Format: mg^mg	
13	3	NM	O			Number Of Refills	rxo:refills	Pharmacy Order (RXO) Form Field – Refill
14	250	XCN	C	Y		Ordering Provider'sDEA Number	DEA Number if controlled substance if drg:dea_class =	Pharmacy Orders Form Field – MD
							controlled substance	
							orc:ord_provider	

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
15	250	XCN	C	Y		Pharmacist/Treatment Supplier's Verifier ID*		
16	1	ID	O		0136	Needs Human Review*		
17	20	ST	C			Requested Give Per	rxo:give_over	Pharmacy Order (RXO) Form
						(Time Unit)	Format: Dn or Hn or Mn where n is an integer	Field – Give Over
18	20	NM	O			Requested Give Strength*		
19	250	CE	O			Requested Give Strength Units*		
20	250	CE	O	Y		Indication	orc:condition, rxo:condition Format: ^As directed	Pharmacy Order (RXO) Form Field – Condition
21	6	ST	O			Requested Give Rate Amount	rxo:rate	Pharmacy Order (RXO) Form Field – Rate
22	250	CE	O			Requested Give Rate Units*		

RXO Field Notes

* This field is not used by LANTIS ESI.

10.24 RXR – PHARMACY/TREATMENT ROUTE SEGMENT

This segment is conditional on a route being specified with the order.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	250	CE	R		0162	Route	PharmOrd: Admin_route->	Pharmacy orders Form
							obs:label	Field - Route
2	250	CWE	O		0163	Administration Site*		
3	250	CE	O		0164	Administration Device*		
4	250	CWE	O		0165	Administration Method*		
5	250	CE	O			Routing Instruction*		
6	250	CWE	O		0495	Administration Site Modifier*		

RXR Field Notes

* This field is not used by LANTIS ESI.

10.25 RXC – PHARMACY/TREATMENT COMPONENT ORDER SEGMENT

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	1	ID	R		0166	RX Component Type	A	
2	250	CE	R			Component Code	Code: rxo:req_give_code -> drg:drug_code or drg:drug_code2 or drg:drug_code3 or drg:medid or drg:gcnseqno Description: rxo:req_give_code -> drg:generic_name where this is an additive to a base solution Format: 63^Oncovin Inj	Code: Medication formulary form Fields- Drug Code Drug Code2 Drug Code3 MEDID GCNSeqNo Description: Pharmacy Order (RXO) Form Field – Medication
3	20	NM	R			Component Amount	rxo:disp_amt	Pharmacy Order (RXO) Form Field- Calculated Dose
4	250	CE	R			Component Units	rxo:disp_units-> obsdef:obd_id obs:code^code Format: mg^mg	Pharmacy Order (RXO) Form Field- Calculated Units
5	20	NM	O			Component Strength*		
6	250	CE	O			Component Strength Units*		

RXC Field Notes

* This field is not used by LANTIS ESI.

10.26 MSH -MESSAGE HEADER SEGMENT (MAPPING FOR ESI MANAGER AND CHARGE EXPORT)

The MSH segment defines the intent, source, destination, and some specifics of the syntax of a message.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	1	ST	R	N		Field Separator	No mapping available	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Field Separator
2	4	ST	R	N		EncodingCharacters	No mapping available	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change pushbutton Tab – MSH Segment Fields – Component Separator, RepetitionChar, Sub Component
3	15	ST	O	N		SendingApplication	NA	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Sending Application
4	20	ST	O	N		Sending Facility	NA	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Sending Facility
5	15	ST	O	N		ReceivingApplication	PRF:Preference_Str	PRF:Preference_Str	For Import File | Import/Export | ESI Manager… ESI Cfg pushbutton Tab – Inbound Fields – Receiving Application For Export File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Receiving Application

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
6	30	ST	O	N		Receiving Facility	PRF:Preference_Str	PRF:Preference_Str	For Import File | Import/Export | ESI Manager… ESI Cfg pushbutton Tab – Inbound Fields – Receiving Facility
									For Export File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Receiving Facility
7	19	TS	O	N		Date / Time Of Message	No mapping available	System Time	
8	40	ST	O	N		Security*			
9	7	ID	R	N	0076	Message Type	No mapping available	“DFT”	NA
10	20	ST	R	N		MessageControl ID	No mapping available	PRF:Preference_Str	NA
11	1	ID	R	N	0103	Processing ID		PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Processing ID
12	8	NM	R	N	0104	Version ID	No mapping available	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – HL7 Version
13	15	NM	O	N		SequenceNumber*			
14	180	ST	O	N		Continuation Pointer*			
15	2	ID	O	N	0155	AcceptAcknowledgment Type*			

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
16	2	ID	O	N	0155	ApplicationAcknowledgment Type*			
17	2	ID	O	N		Country Code*			
18	6	ID	O	Y/3	0211	Character Set*			
19	60	CE	O	N		PrincipalLanguage Of Message*			

MSH Field Notes

* This field is not used by LANTIS ESI.

1 “Field separator”: This is the separator between the segment ID and the first real field, the Encoding characters. As such, it serves as the separator and defines the character to be used as a separator for the rest of the message. Recommended value is "|".

2 “Encoding characters”: The four characters are the component separator, the repetition separator, the escape character, and the sub-component separator. Recommended values are "^~\&". Configurable for outbound interfaces.

3 “Sending application”: This field is available for interface with lower level protocols.

4 “Sending facility”: Used to address one of several occurrences of the same application within the sending system. Aside from other consideration, the Medicare Provider ID might be used with an appropriate sub-identifier in the second subfield. Entirely site-defined.

5 “Receiving application”: This field is available for interface with lower level protocols.

6 “Receiving facility”: Used to identify the receiving application among multiple identical incarnations of the application running on behalf of different organizations. See comments regarding Sending facility.

7 “Date / time of message”: The date/time that the sending system created the message.

8 “Security”: The use of this field has not yet been specified. In the future this field will be used to implement security features.

9 “Message type”: Tells LANTIS ESI the contents of the message, and hence the data segments to recognize, and the application to which to route the message. Valid types are defined in subsequent sections of this document.

10 “Message control ID”: A number or other identifier that uniquely identifies the message. The LANTIS ESI will echo this ID back to the sending system in the Message Acknowledgment for inbound interfaces. This value will be generated for outbound interfaces.

11 “Processing ID”: Values are P-Production; T-Training; D-Debugging.

12 “Version ID”: Currently not supported for inbound interfaces. Configurable for outbound interfaces.

10.27 MSH -MESSAGE HEADER SEGMENT (MAPPING FOR INTERFACE MANAGER)

The MSH segment defines the intent, source, destination, and some specifics of the syntax of a message.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	Interface Manager Application Mapping
1	1	ST	R	N		Field Separator	edd:definition	Interface | Properties Tab – Message Configuration Fields – Field Separator
2	4	ST	R	N		EncodingCharacters	edd:definition	Interface | Properties Tab – Message Configuration Fields – Component Separator, Repetition Char, Escape Characterand Sub Component
3	15	ST	O	N		SendingApplication	edd:definition	Interface | Properties Tab – Message Configuration Fields – Sending Application
4	20	ST	O	N		Sending Facility	edd:definition	Interface | Properties Tab – Message Configuration Fields – Sending Facility
5	15	ST	O	N		ReceivingApplication	edd:definition	Interface | Properties Tab – Message Configuration Fields – Receiving Application
6	30	ST	O	N		Receiving Facility	edd:definition	Interface | Properties Tab – Message Configuration Fields – Receiving Facility
7	19	TS	O	N		Date / Time Of Message	System Time	
8	40	ST	O	N		Security*		
9	7	ID	R	N	0076	Message Type	“ORM”	NA
10	20	ST	R	N		Message Control ID	dst:message_control_id	Interface Status Tab – Detailed Processing Column – Message Control ID
11	1	ID	R	N	0103	Processing ID	edd:definition	Interface | Properties Tab – Message Configuration Fields – Processing ID

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	Interface Manager Application Mapping
12	8	NM	R	N	0104	Version ID	edd:definition	Interface | Properties Tab – Message Configuration Fields – HL7 Version
13	15	NM	O	N		Sequence Number*		
14	180	ST	O	N		Continuation Pointer*		
15	2	ID	O	N	0155	AcceptAcknowledgmentType*		
16	2	ID	O	N	0155	ApplicationAcknowledgmentType*		
17	2	ID	O	N		Country Code*		
18	6	ID	O	Y/3	0211	Character Set*		
19	60	CE	O	N		Principal Language Of Message*		

MSH Field Notes

* This field is not used by LANTIS ESI.

1 “Field separator”: This is the separator between the segment ID and the first real field, the Encoding characters. As such, it serves as the separator and defines the character to be used as a separator for the rest of the message. This field is configurable. Recommended value is "|".

2 “Encoding characters”: The four characters are the component separator, the repetition separator, the escape character, and the sub-component separator. This field is configurable. Recommended values are "^~\&".

3 “Sending application”: This field is available for interface with lower level protocols. This field is configurable.

4 “Sending facility”: Used to address one of several occurrences of the same application within the sending system. Aside from other consideration, the Medicare Provider ID might be used with an appropriate sub-identifier in the second subfield. This field is entirely site-defined and configurable.

5 “Receiving application”: This field is available for interface with lower level protocols. This field is configurable.

6 “Receiving facility”: Used to identify the receiving application among multiple identical incarnations of the application running on behalf of different organizations. This field is configurable.

7 “Date / time of message”: The date/time that the message was created.

1 “Message type”: Tells the receiving system the contents of the message, and hence the data segments to recognize, and the application to which to route the message. Valid types are defined in subsequent sections of this document.

2 “Message control ID”: A number or other identifier that uniquely identifies the message. This value will be generated for outbound interfaces.

3 “Processing ID”: Values are P-Production; T-Training; D-Debugging.

4 “Version ID”: This field is configurable.

10.28 EVN -EVENT TYPE SEGMENT

The EVN segment is used to communicate necessary trigger event information to receiving applications. Valid event types are contained in HL7 table 0003 - Event type.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Inbound)	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	3	ID	R	N	0003	Event Type Code	NA	NA	NA
2	19	TS	R	N		Date / Time of Event	NA	CHG:Proc_Date, CHG:Proc_Time (for event code P03)	Code Mgmt | Code Capture Tab – General Fields – To Date, Time
3	19	TS	O	N		Date / Time of PlannedAdmit			
4	3	ID	O	N	0062	Event Reason Code	NA	NA	NA
5	60	XCN	O	N	0188	Operator ID*			
6	26	TS	O	N		Event Occurred*			

EVN Field Notes

* This field is not used by LANTIS ESI.

1 “Event type code”: Codes correspond to the trigger events processed by LANTIS ESI. Refer to 2.1 for the event type codes LANTIS ESI supports.

2 “Date / time of event”: Most systems will default to the system date/time when the transaction was entered, but should also permit an override.

4. “Event reason code”: Values are 01 - patient request; 02 - physician order; 03 - census management.

10.29 MSA -MESSAGE ACKNOWLEDGMENT SEGMENT

The MSA segment contains information sent while acknowledging another message.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	2	ID	R	N	0008	Acknowledgment Code	"AA" **or** "AE" **or** "AR"	NA
2	20	ST	R	N		Message Control ID	MSH:10 (HL7 mapping. See below.)	NA
3	80	ST	O	N		Text Message	See below.	NA
4	15	NM	O	N		Expected Sequence Number*		
5	1	ID	O	N	0102	Delayed Acknowledgment Type*		

MSA Field Notes

* This field is not used by LANTIS ESI.

1 "Acknowledgment code": Values are AA - Application Accept; AR - Application Reject; AE - Application Error.

2 "Message control ID": This is the ID of the message sent by the sending system. It allows the sending system to associate this response with the message for which it is intended.

3 "Text message": An optional text field that further describes an error condition. This text may be printed in error logs or presented to an end user.

10.30 ERR -ERROR SEGMENT

The ERR segment is used to add error comments to acknowledgment messages.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	80	ID	R	Y		Error Code and Location	See below.	NA

MSA Field Notes

1. “Error code and location”: Used to identify an erroneous segment in another message and contains four components:

- ♦ Segment ID.
- ♦ SEQUENCE ID
- ♦ The field position.
- ♦ A code identifying the error.

For systems that do not use the LANTIS ESI encoding rules, the data item number will be used for the third component. Data Error Codes are discussed in Section 7, Errors on page 144.

10.31 BHS -BATCH HEADER SEGMENT

The BHS segment defines the start of a batch.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	1	ST	R	N		Batch Field Separator	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Field Separator
2	3	ST	R	N		Batch Encoding Characters	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change pushbutton Tab – MSH Segment Fields – Component Separator, RepetitionChar, Sub Component
3	15	ST	O	N		Batch Sending Application	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Sending Application
4	20	ST	O	N		Batch Sending Facility	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Sending Facility
5	15	ST	O	N		Batch Receiving Application	PRF:Preference_Str	PRF:Preference_Str
6	20	ST	O	N		Batch Receiving Facility	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Receiving Facility
7	19	TS	O	N		Batch Creation Date / Time	NA	NA
8	40	ST	O	N		Batch Security *		
9	20	ST	O	N		Batch Name/ID/Type	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – Batch Option Fields – BHS Name ID

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
10	80	ST	O	N		Batch Comment	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – Batch Option Fields – BHS Comment
11	20	ST	O	N		Batch Control ID	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – Batch Option Fields – BHS ID Start, End
12	20	ST	O	N		Reference Batch Control ID *		

BHS Field Notes

* This field is not used by LANTIS ESI.

1 – 6, 8.: These fields have the same definition as the corresponding field in the MSH segment.

7. “Batch creation date/time”: Date and time batch was created.

9 “Batch name/ID/type”: This field can be used by the application processing the batch. It can have extra components if needed. On exports, a free text field can be assigned.

10 “Batch comment”: A comment field that is not further defined. On exports, a free text field can be assigned.

11 “Batch control ID”: This field can be used to uniquely identify a particular Batch. It can be echoed in the Ref batch control ID field if an answering batch is needed. On exports a range of values can be assigned, if required. The entire range would be used before it was repeated.

10.32 BTS -BATCH TRAILER SEGMENT

The BTS segment defines the end of a batch.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	10	ST	O	N		Batch Message Count	See below.	NA
2	80	ST	O	N		Batch Comment	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – Batch Option Fields – BHS Comment
3	100	CM	O	N		Batch Totals	See below.	NA

BTS Field Notes

1 “Batch message count”: A count of the individual messages contained within the batch.

2 “Batch comment”: A comment field.

- “Batch totals”: As many types of totals as needed for the batch may be carried by this field as separate components. Three totals are exported:
- Total records exported.
- Total transaction quantity. Sum of CHG:Days_Units for each exported charge.
- Total dollars. Sum of CHG:Days_Units * X for each exported charge, where X =
  - ♦ CPT:Tech_Charge (for Tech charge only) or
  - ♦ CPT:Prof_Charge (for Prof charge only) or
  - ♦ CPT:Tech_Charge + CPT:Prof_Charge (for both Tech and Prof charge)

10.33 FHS -FILE HEADER SEGMENT

The FHS segment is used to head a file (group of batches). It is used in the HL7 Batch Protocol.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	1	ST	R	N		File Field Separator	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Field Separator
2	4	ST	R	N		File Encoding Characters	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change pushbutton Tab – MSH Segment Fields – Component Separator,Repetition Char, Sub Component
3	15	ST	O	N		File Sending Application	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Sending Application
4	20	ST	O	N		File Sending Facility	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Sending Facility
5	15	ST	O	N		File Receiving Application	PRF:Preference_Str	PRF:Preference_Str
6	20	ST	O	N		File Receiving Facility	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – MSH Segment Fields – Receiving Facility
7	19	TS	O	N		File Creation Date / Time	NA	NA
8	40	ST	O	N		File Security *		

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
9	20	ST	O	N		File Name/ID/Type	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – Batch Option Fields – FHS Name ID
10	80	ST	O	N		File Comment	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – Batch Option Fields – FHS Comment
11	20	ST	O	N		File Control ID	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – Batch Option Fields – FHS ID Start, End
12	20	ST	O	N		Reference File Control ID *		

FHS Field Notes

1 – 6, 8.: These fields have the same definition as the corresponding field in the MSH segment.

7 “Date/time of file creation”: This field has the same definition as the corresponding field in the MSH segment.

8 “File security”: This field has the same definition as the corresponding field in the MSH segment.

9 “File Name/ID/Type”: This should have the filename and file extension. On exports, either the filename and file extension will appear, or if required, a free text field can be assigned.

10 “File header comment”: A free text field. On exports, a free text field can be assigned.

11 “File control ID”: This field is used to identify a particular file uniquely. It can be echoed in the Reference file control ID field of the FTS segment. On exports, if required, a range of values can be assigned. The entire range would be used before it was repeated.

10.34 FTS -FILE TRAILER SEGMENT

The FTS segment defines the end of a file. It is used in the HL7 Batch Protocol.

SEQ	LEN	TYPE	R/O	REP	TBL	NAME	LANTIS DB Mapping (Outbound)	LANTIS Application Mapping
1	10	ST	O	N		File Batch Count	NA	NA
2	80	ST	O	N		File Trailer Comment	PRF:Preference_Str	File | Import/Export | HL7 Code Export… Change Button Tab – Batch Option Fields – FHS Comment

FTS Field Notes

1 “File batch count”: This field contains the number of batches contained in the file.

2 “File trailer comment”: A free text field.