Graphnet Feed Spec – Pathology HL7 - Generic

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Version: 1.1

Created: February 2019

Updated: May 2019

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Name	Role	Date	Comments
Graphnet	Author	February 2019	
S Latif / B Keown	Reviewer	February 2019	

Amendment record

Issue status	Version	Date	Actioned by	Description
Final	1.0	06/02/2019	Qaez Anwar	Pathology content migrated from Acute HL7 Specification and placed in own separate document. Tile updated to Design Standards.
Update	1.1	01/05/2019	Qaez Anwar	Highway Diagram Updated. Included a new PID note

Table of contents

1 Purpose

The purpose of this document is to describe how CareCentric receives and displays Pathology data through HL7 v2.4 messages.

1.1 Document Scope and Limitations

Any internal implementation details, XML Schemas and specifications defined by Graphnet within this document are subject to change without further notice. CareCentric Highway Integration Engine is beyond the scope of this document and any reference to the actual internal components or workings of this product in any form (e.g. visual, written) are subject to change without notice.

1.2 General Information / Reference Documents

The Graphnet interface specification is guided by the requirements of the following specifications and standards:

ANSI/HL7 V2.4-2000 (This is a revision of ANSI/HL7 V2.3.1-1999)

This document requires that the reader has a good understanding of HL7 messages, rules and format. Further information can be acquired from the following website: http://www.hl7.org.uk/version2group/HL72UK.asp

1.3 Definitions

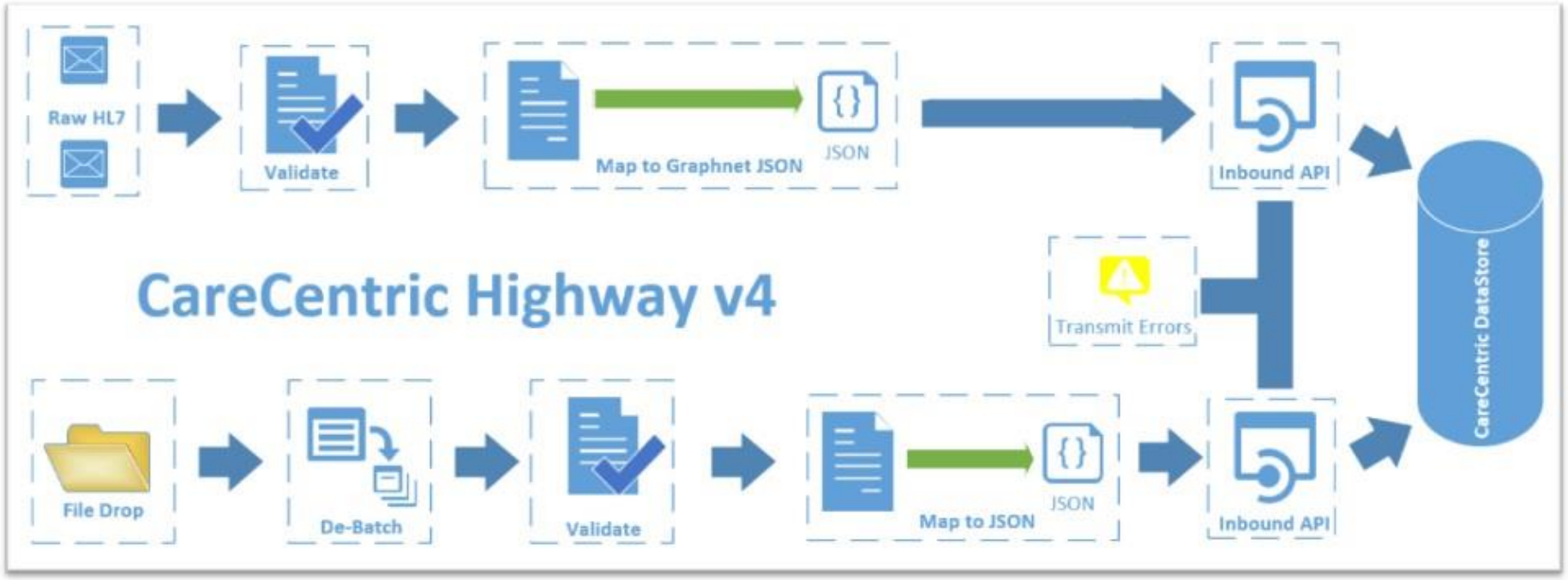
Term/Abbreviation	Description
ACK	Acknowledgement
EHR	Electronic Health Record
HL7	Health Level Seven
MLLP	Minimum Lower Layer Protocol
Tenancy	Used to manage and differentiate demographics between organisations, CareCentric links this data together.
NAK	Negative Acknowledgement

2 CareCentric Highway Integration Engine

CareCentric Highway v4 is a cloud-based service where processing takes place in the Microsoft Azure platform. The service can also be deployed locally on premise. Data is sent to Highway using secure protocols HTTPS/FTPS. Azure meets a set of international and industry-specific compliance standards such as ISO/IEC 27001/27002:2013, HIPAA and FedRAMP.

The following diagram illustrates the concept for receiving data into CareCentric using the Highway Integration Engine to extract and integrate data from a wide range of health and social care IT solutions.

Note - This is not indicative of all physical environments and is provided as a conceptual guide only.



2.1 Transport/Network Security

Real Time HL7 messages are encrypted at socket level using TLS 1.2. Any messages other than HL7 will be encrypted when the files are sent to the Highway v4 server.
The configuration of the network including firewalls, IP addresses and re-routing of data are the responsibility of the sending party (Trust).

2.2 Error Handling

Highway v4 incorporates synchronous ACK/NACK Reponses when HL7 messages are received. If any issues occur during processing, they are logged (as per diagram above) and can be configured to be sent out as Email Notifications.

3 Message Format

3.1 Pathology Results

The following HL7 messages are accepted by CareCentric Highway to display Results information for a patient:

HL7 Message Type	Event/Description
ORU^R01	Results message

4 HL7 Message Details

4.1 Message Details - Key

[ ] - Segment is optional.
{ } - Segment can be repeated.

4.2 Results Feed (ORU^R01)

Pathology results are accepted by Graphnet as Message Type ORU^R01. The expected structure of the message is as follows:

ORU^R01 Message Structure

Segments	Description	Comments
MSH	Message Header	
PID	Patient Identifiable Data	Only used for patient matching
[{ NTE }]	Notes and Comments	
ORC	Common Order	Order (ORC) to Request (OBR) Ratio 1(ORC):many(OBR)
{	Repeating OBR Section	OBR Repeating Section (Start)
OBR	Observation Request	Request (OBR) to Test (OBX) Ratio 1(OBR):many(OBX)
[{ NTE }]	Notes and Comments	Optional Section which can repeat
{	Repeating OBX Section	OBX Repeating Section (Start)
OBX	Observation / Result	
[{ NTE }]	Notes and Comments	Optional Section which can repeat
}		OBX Repeating Section (End)
}		OBR Repeating Section (End)

Results are accepted as HL7 message type ORU^R01 then subdivided into pathology result types. This is be done by Utilising OBR:4.4 to determine the result type.

OBR:4.4 Value	Result Type
PATH	Pathology

4.3 Results Display Format

To determine the display format, either report or battery, the value of OBX:2.1 is used.

OBX:2.1 Value	Display format
TX	Report
FT	Report
Any other value	Battery

4.4 Patient Matching Rules

Patients will be matched based on the Patient Number as defined in PID.3.1 (PID.3.1 is a field within the message). The Tenancy ID is used to accurately match related to a specific tenancy, distinct from any other tenancy.

The following fields are used by this transaction type for patient and activity matching purposes:

Segment	Field	Description	Comments
PID	3.1	PatientIDList/PatientID	
PID	3.5	Patient Identifier Type	Used to determine whether the number is NHS type or other (see section 4.2)
OBR	3.1 4.1	SpecimenID Test Code	OBR:3 and OBR:4.1 are used to uniquely identify the result, that is, the specific OBR and its associated OBX and NTE segments

5 Segment Details

5.1 MSH – Message Header

Seq	Field Name	Opt	Occurs	Comments
1	Field Separator	R	1	
2	Encoding Characters	R	1	
3	Sending Application	R	1	Used to generate document properties
4	Sending Facility	R	1	Used to generate document properties
5	Receiving Application	R	1	
6	Receiving Facility	R	1	
7	Date/Time of Message	R	1	
9.1	Message Type / Message Type	R	1	
9.2	Message Type / Trigger Event	R	1	Used to generate document properties
10.1	Message Control Id	R	1	Used to generate document properties
11	Processing Id	R	1	
12	VersionId	R	1	
18	Character Set	O	1	

5.2 PID

Note: This Pathology feed does not perform any demographic updates, PID is used for the purpose of Patient Matching.

Seq	Field Name	Opt	Occurs	Comments
3.1	PatientIdentifierList\PatientID	R	1-n	Used to retrieve NHS number and/or Other number type (to be used with identifier type)
3.4	PatientIdentifierList\PatientID	O	1-n	
3.5	PatientIdentifierList\PatientID	R	1-n	Used to identify number type NHS Number = NHS or NH Hospital Number = PI or HOSP Master Record Number = MRN Other number types can be specified
5.1	Surname	R	1-n	
5.2	Forename	R	1-n	
5.3	Middle Name(s)	O	1-n	
5.4	Suffix	O	1-n	
5.5	Prefix	R	1-n	e.g. Master ,Mr, Mrs
5.7	Name Type Code	O	1-n	e.g. L – Legal Name
7	Date of Birth	R	1	As YYYYMMDDHHMM
8	Administrative Sex	R	1	Code values accepted: F- Female M-Male O or U-Unknown

5.3 ORC - Common Order

Seq	Field Name	Opt	Occurs	Comments
1	Order Control	R	1	
13.1	Enterer's Location	O	1	Shown on screen D11, D12

5.4 OBR - Observation Request

Seq	Field Name	Opt	Occurs	Comments
1	Set ID	R	1	
3	Filler Order Number	R	1	ID of the order OBR:3 and OBR:4.1 are used to uniquely identify the result in this OBR and it's OBX and NTE segments
4.1	Test Code	R	1	OBR:3 and OBR:4.1 are used to uniquely identify the result in this OBR and it's OBX and NTE segments
4.2	Test Description	R	1	Shown on screen D1
4.4	Alternate Identifier	R	1	Must be set to "PATH" – used to show this is a pathology result
6	Collected Date / Time	O	1	Shown on screen D4, D5
7	Observation Date / Time	R	1	Shown on screen D2
14.1	SpecimenReceivedDate	O	1	Shown on screen D7, D8
15.1	SpecimenTypeCode	O	1	Shown on screen D9
16.2	Ordering Provider Surname	O	1	Shown on screen D10
16.3	Ordering Provider Given Name	O	1	Shown on screen D10
16.4	Ordering Provider Middle Name	O	1	Shown on screen D10

25.1	Report Status	O	1	Shown on screen D16
31.1	CodeDescription	O	1	Shown on screen D3
32.1	ReportedByDescription	R	1	Shown on screen D17

5.5 OBX- Observation / Result

Seq	Field Name	Opt	Occurs	Comments
1	Set Id	R	1	
2.1	ValueType	O	1	Used to identify if the result should be displayed as Battery or Report. Expected Values are listed below. FT (Formatted Text) Dictates 'Report' display format TX (Text Data) dictates 'Report' display format ST (String Data) dictates 'Battery' display format NM (Numeric) dictates 'Battery' display format SN (Structured Numeric) dictates 'Battery' display format CE (Coded Entry) dictates 'Battery' display format
3.1	Item Code	R	1	
3.2	Item Description	R	1	Shown on screen D23
5.1	Result Value	R	1	Shown on screen D19
6.1	Unit	O	1	Shown on screen D20 Units of measurement
7.1	ResultRange	O	1	Shown on screen D21 e.g. minimum 10 maximum 50 sent as 10 – 50 where Graphnet splits this into two segments using '-' as a delimiter
8.1	AbnormalFlag	O	1	Shown on screen D22 i.e. Result out of range

5.6 NTE- Notes and Comments

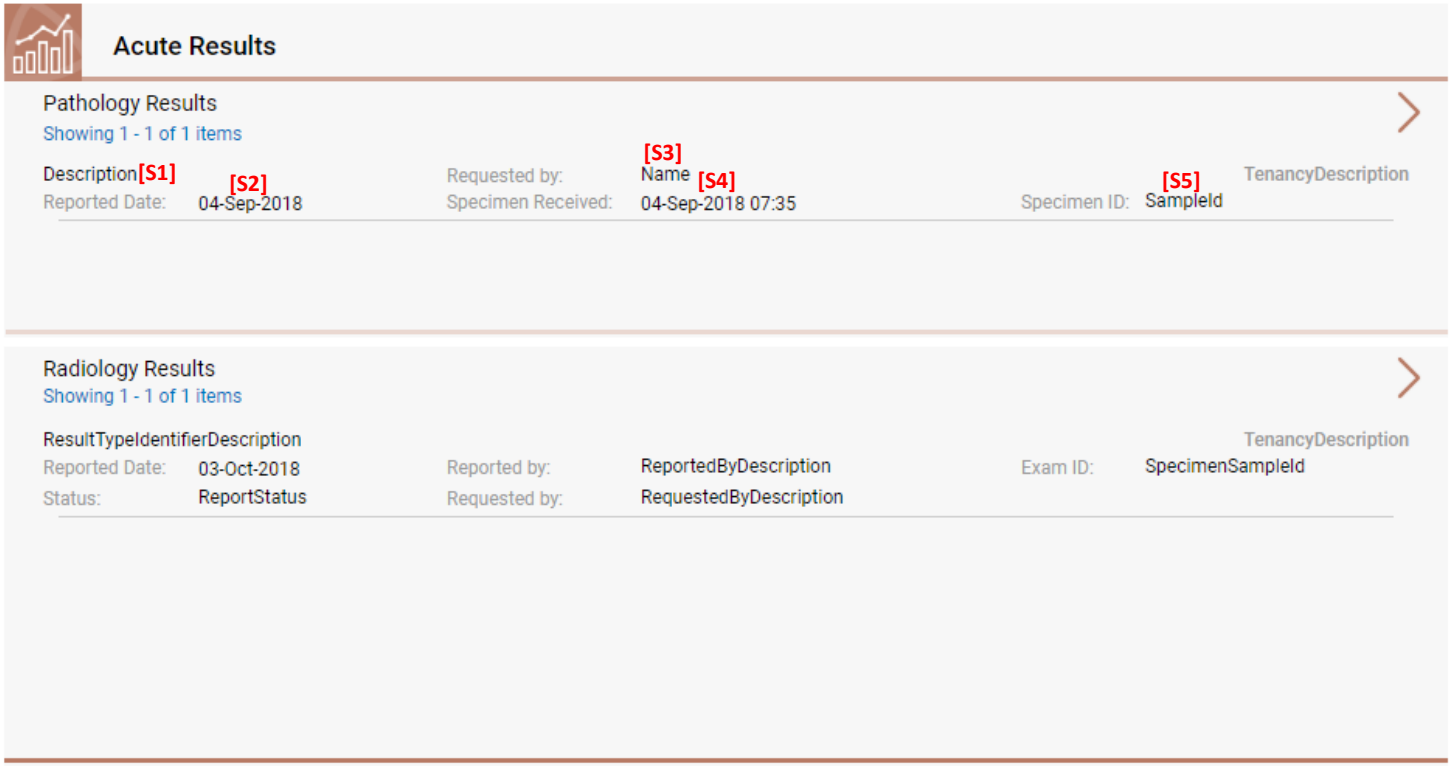
Seq	Field Name	Opt	Occurs	Comments
3.1	Comments	R	1	Shown on screen D13, D18, D24

6 CareCentric Pathology Documents

6.1 Pathology Results (ORU^R01)

HL7 Message Type: ORU^R01
OBR-4.4 Starts with “PATH” for Pathology.

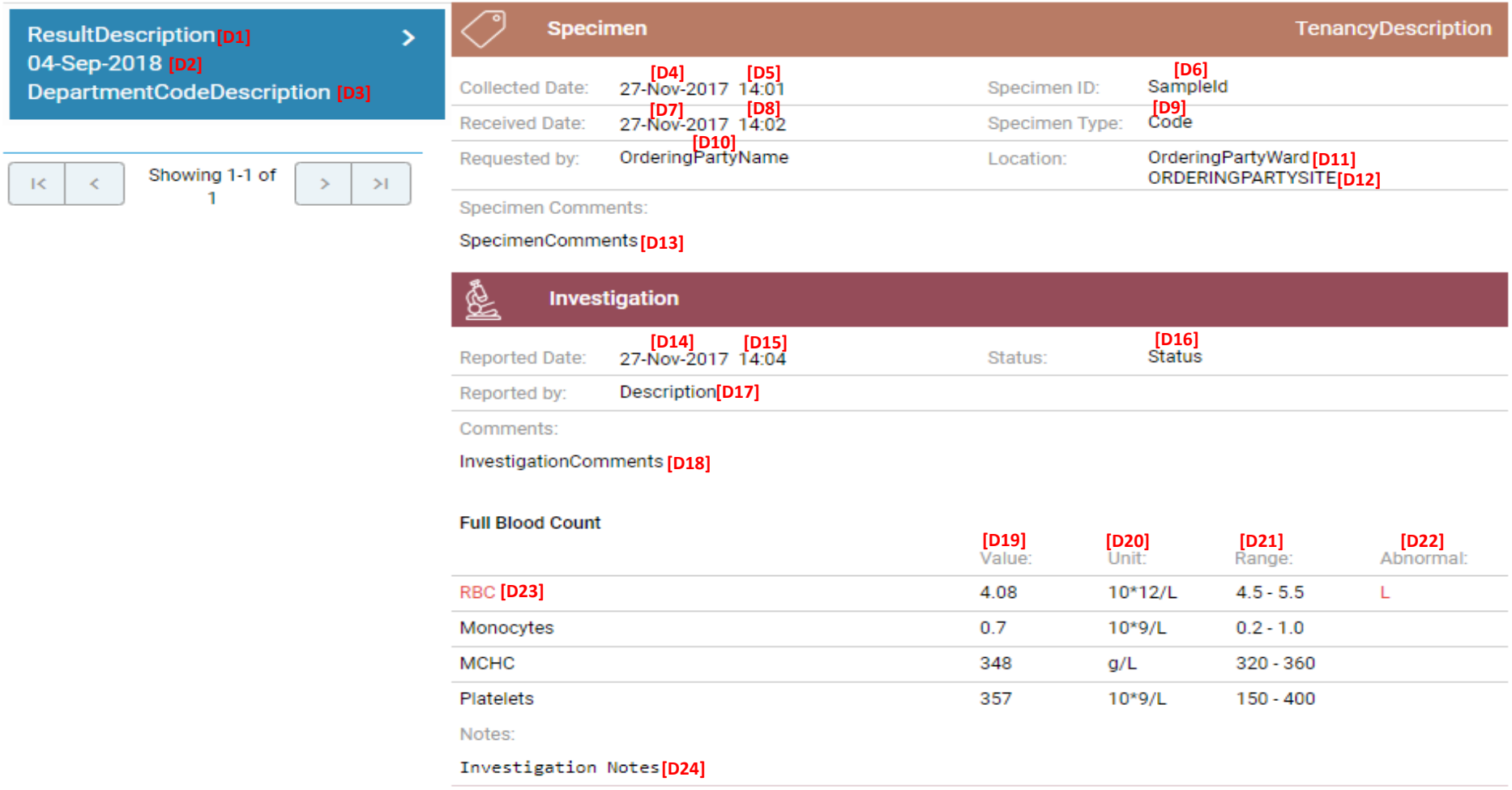
6.1.1 Summary View (cc0098)



6.1.2 Summary View Mapping Reference

Reference	Description	HL7 Message Location	Label	Notes
S1	Type of Result Document	OBR 4.2	-	
S2	Reported date and time	OBR 7.1	Reported Date	
S3	Ordering provider first name / Ordering provider middle name / Ordering provider surname	OBR 16.3 / OBR 16.4 / OBR 16.2	Requested By	Ordering Provider names will be concatenated.
S4	Received date and time	OBR 14.1	Specimen Received	
S5	Specimen ID	OBR 3.1	Specimen ID	

6.1.3 Detail View (cc0097)



6.1.4 Detail View Mapping Reference

Reference	Description	HL7 Message Location	Label
D1	Test Name	OBR 4.2	-
D2	Reported Date	OBR 7.1	-
D3	Provider Discipline	OBR 31.1	-
D4, D5	Collected Date and Time	OBR 6.1	Collected Date
D6	Specimen ID	OBR 3.1	Specimen ID
D7, D8	Received Date and Time	OBR 14.1	Received Date
D9	Specimen Type	OBR 15.1	Specimen Type
D10	Ordering provider first name / Ordering provider middle name / Ordering provider Surname	OBR 16.3 / OBR 16.4 / OBR 16.2	Requested By
D11, D12	Enterers Location	ORC 13.1	Location
D13	Specimen Comments	NTE 3.1 (with preceding PID)	Specimen Comments
D14, D15	Reported Date and TIme	OBR 7.1	Reported Date
D16	Report Status	OBR 25.1	Status
D17	Reporter	OBR 32.1	Reported by
D18	Investigation Comments	NTE 3.1 (with preceding OBR)	Comments
D19	Observation Value	OBX 5.1	Value
D20	Test Units	OBX 6.1	Unit

D21	Reference range Range Minimum Value + Range Maximum Value	OBX 7.1	Range
D22	Abnormal Flag	OBX 8.1	Abnormal
D23	Item Description	OBX 3.2	-
D24	Investigation Notes	NTE 3.1(with preceding OBX)	Notes

7 Mapping Considerations

7.1 CareCentric Document Version Control

Version control is required for all messages

7.2 CareCentric Business Rules

The following business rules will be used when processing the data for creating, updating and deleting records.

Pathology Result Documents	
Create	New records based on the key **Specimen ID element (OBR:3.1) & Test Code (OBR:4.1)** must be detected and added. The identifier will be retained in the *UniqueID* column of the Graphnet record table
Update	Existing records based on the key **Specimen ID element (OBR:3.1) & Test Code (OBR:4.1)** must be detected and the inbound record will be made a newer version of the existing record. The date from OBR.7 will be used for ordering the versions.
Delete	Documents will not be permanently deleted. Deletions will hide documents from the patient record (soft delete).

8 Frequently Asked Questions

- Q. Will the results be grouped by Specimen ID if they are sent back as separate items?
  - Currently the results are not collated by Specimen ID.

- Q. Why isn't the display order done on the Collected Date and Time (clinically significant date)?
  - The feed sorts by the Reported Date as this generic feed is designed to receive data from all well known Pathology Systems and the Reported Date is the only mandatory field which these systems can always supply.

- Q. Why doesn't the text make full use of the width of the display in the results?
  - In order to enable textural results to be displayed in a clinically safe way the system uses a mono-spaced font and prevents the display from wrapping the text automatically. This is to preserve any formatting associated with the text to ensure that it displays as intended. There will be occasions where text is sent through that could have been displayed in a more condensed format but in order to maintain a clinically safe display the text will be displayed as it has been received within the message. This will also mean the user will occasionally see a scroll bar when the preserved formatting causes the text to exceed the width of the display area. This is particularly relevant where textural tables are included as part of the result.

- Q. There are empty fields being displayed in the tile.
  - The pathology tile within CareCentric is designed to accept feeds from multiple pathology systems and as such there might be a field that a particular pathology system does not or cannot send. In this case the field will display but no data will be shown. If this is problematic Graphnet can set the tile to display 'data not provided' as a default text.

- Q. Why are some of the component names displayed in red?
  - When a value is received that is out of range, the abnormal flag and the component name are displayed in red to highlight this abnormality in the persons results. At this time we are unable to indicate out of range results in the left-hand menu but this is a roadmap item for future development.

- Q. How are results displayed if when there are many OBXs in a result?
    - The Hub Tile is designed to take the value provided in this field and then display that row in one of two ways, if the value is TX or FT is uses one set of display fields and hides the other, if the value is not FT or TX then it hides those field and displays the other set. It does this on a row by row basis so we can have alternating display formats if that is what is required by the message. This way we can have the textural results shown correctly (report style) and the tabular results displayed correctly (battery style).