BLS Technical Interface Specification For eHR Problem (Simplified version) Record

Version 1.3.1

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DOCUMENT SUMMARY

Document Item	Current Value
Document Title	BLS Technical Interface Specification for eHR Problem (Simplified version) Record
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Document Description	The document describes the interface specification for bulk upload standards of Problem (Simplified version) records for Hong Kong Special Administrative Region eHR. The document should be read in conjunction with other related documents suggested by the eHR Information Standards Office.
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AMENDMENT HISTORY

Version No.	Summary of Changes	Date
1.0.0	Original version	30 Jun 2012
1.1.0	Enhanced according to the dataset as of Feb 2013 defined by eHR Information Standards Office	07 Mar 2013
1.2.0	• Added remarks in section 7.1 Types of File Upload Mode • Added section 8.3 XML Predefined Entities, update section reference in section 8 from 8.3.3 to 8.4.3 • Updated the validation rule of ' Last Update Datetime' from 'Optional' to 'Mandatory' • Add remarks in data field 'Transaction type' • Update the template of cover page and descriptions in footer • Update the contents in section 'Intellectual Property Rights Notice' • Aligned the terms used in eHR Sharing System (eHRSS) Bill: o Participant -> eHR Healthcare Recipient o Enroll -> Register o Re-join -> Re-register	19 Jun 2014
1.3.0	• Requested in Content Meeting in Jan 2015, The Diagnosis Comment is extended from 255 to 2000 • Diagnosis status local description for Level 2 records – change from NA to O for Insert and Update Scenerio	30 Aug 2015
1.3.1	• Sep 2016 Release	15 Sep 2016

1 PURPOSE

1.1 OBJECTIVE

This document describes the technical interface requirements for implementing Health Level Seven (HL7) version 2.5 standards messaging for transferring Problem (Simplified version) record in bulk upload standards from trusted healthcare providers to eHR system.

There are TWO data exchange standards for uploading clinical records to eHR system:

- HL7-HK Message Standards
- HL7-HK Localised Bulk Load Standards

HL7-HK Localised Bulk Load Standards will be described in detail in this document. For the HL7-HK Message Standards, please refer to 'Technical Interface Specification for eHR Record'.

1.2 INTENDED READERS

This document is intended for all parties involving the interface development of eHR in Hong Kong.

2 SCOPE

This reference defines the interface format, interface name for different upload mode and the message of the HL7 version 2.5 messaging. Specifically, this document contains:

- Data File Naming Convention
- Data File Content with delimiter
- Data definition and mapping

The recognised terminology sets applied in Problem Sharable Dataset include:

- Hong Kong Clinical Terminology Table (HKCTT)
- Systematized Nomenclature of Medicine - Clinical Terms (SNOMED CT)
- International Statistical Classification of Diseases and Related Health Problems Tenth Revision (ICD10-2001)
- International Statistical Classification of Diseases and Related Health Problems Tenth Revision (ICD10-2010)
- ICD-10 Mental and Behavioural Disorders: Clinical descriptions and diagnostic guidelines (ICD10-MBD)
- International Classification for Primary Care, Second edition (ICPC-2)

This document is referring to the health data defined in the eHR sharable dataset domain Problem mentioned in **eHR Content Standards Guidebook** in eHR Office website. It provides interpretation and guidance to which HL7 trigger event and data elements are required for interfacing to eHR system.

For details of scenarios, please refer to Data Requirement Specification for Problem (Simplified version).

3 REFERENCES

- Data Interface Requirement Document
  - Data Requirement Specification for eHR Problem (Simplified version) Record
  - Communication Protocol Specification

- eHR Information Standards Document
  - eHR Content Standards Guidebook
  - eHR Data Interoperability Standards
  - eHR Contents
  - eHR Codex

4 DEFINITIONS AND CONVENTIONS

4.1 ABBREVIATION

Term	Description
CDR	Clinical Data Repository
eHR	eHealth Record
EMR	Electronic Medical Record
HCP	Healthcare Provider
HL7	Health Level Seven
ORU	HL7 message type of "Unsolicited Observation Message"
PROB	Problem
HCR	eHR Healthcare Recipient

4.2 NOTATION

Value	Description
#	HL7 Mandatory Field
✓	Required HL7 Segment
"quoted"	Fixed value
N/A	Not Applicable
S0 - S99	Scenario numbering
RP/#	Repeatable Indicator [Y:Yes N: No] of HL7 element
TBL#	HL7 Table Reference Number
[ ]	Optional
YYYY	Year
MM	Month
DD	Day
hh	Hour (24-Hour)
mm	Minute
ss	Second
.sss	Millisecond

5 ASSUMPTIONS

- HCP is responsible for ensuring the integrity, accuracy and completeness of structure data when sending it to eHR.

- It is recommended that HCP should send the updated clinical record to eHR as soon as possible when there are any changes or new records of the eHR Healthcare Recipient (HCR).

- To ensure the integrity of the Problem record, the complete set of structured data should be sent for any amendment.

6 DELIVERY REQUIREMENTS

- HL7 version 2.5 message standards in XML format and data files (HCR list file and structured data file) will be implemented for delivering Problem event messages defined by eHR.

- The sharable dataset domain Problem supports eHR Data Compliance Level 2 and 3. Before sending clinical record to eHR, HCP has to register which data compliance levels she can comply to.

- A complete set of updated Problem data with an unique record key of the record is expected to be uploaded to eHR. eHR will use the HCP unique record key for subsequence data amendments in eHR repository.

- HCP must make sure the data submitted to eHR is complied with the data compliance levels she declared in the message. The detail definition of the Data Compliance Level is stated in eHR Content Standards Guidebook posted in eHR Office website.

7 DATA UPLOAD REQUIREMENTS

7.1 TYPES OF FILE UPLOAD MODE

There are two types of file upload mode: incremental mode and materialisation mode:

1. **Incremental mode** is the format for HCP to upload sharable data in ONE batch.
2. **Materialisation mode** is the format for HCP to upload a HCR's specific sharable dataset that exists in EMR, e.g new registered HCR and re-registered HCR.

The following table shows the files required for different upload mode and its schedule:

	HCR List File	**Data File**	**Schedule**
Incremental Mode	Required	Required	Within agreed period
Materialisation Mode	Required	Required	Within agreed period

Remarks:
For Materialisation Mode, 'Update' and 'Delete' transaction types are not accepted. If 'Update' or 'Delete' transaction type is uploaded using materialisation mode, the record will be rejected by eHR.

7.2 SHARABLE DATASET CODE

Sharable dataset code is a standardised short term to distinguish the sharable dataset. Please refer to the Interoperability Guide for details in eHR Office website.

For Problem Record, the sharable dataset code is "**PROB**".

7.3 COMPLIANCE LEVEL

eHR partner's applications must be certified for three levels of inter-operability: data inter-operability, security compliance and system inter-operability. Data inter-operability will focus on the EMR system's capability to send and receive messages in the defined standard.

A partner's systems will be certified as a compliance level, according to the message structure, format, content and coding validity for the type of message. Only the certified types of interfaces of partner's systems are permitted for on-going information exchange with the eHR Core.

The general definition of data compliance level is explained in Content Guidebook in eHR Office website.

7.4 MESSAGE COMPONENTS

There are three main data file types used to carry the clinical information of 'Problem' domain:

File Type	Usage
HL7 Message (ORU^R01)	It serves as delivery list which records the list of file names of 'HCR list' and 'Structure Data File'.
HCR list	It contains the identity of those HCRs whose clinical data records are updated and already included in the 'Structure Data File'.
Structure Data File	It contains the eHR required data fields defined in the 'Data Requirement Specification for Problem (Simplified version)'. The data mapping format must follow the requirements described in this document.

The details of the above file types will be further explained in subsequent sections.

8 HL7 MESSAGE

HL7 message 'ORU^R01' will be applied in exchanging of eHR clinical records. In the segment of OBX of 'ORU^R01', OBX.4 in HL7 message is used to indicate the file upload mode, whether it is in incremental and materialisation.

- The major components are used to carry the bulk clinical information when exchanging data in HL7 v2.5 standard. The components are:

  - HL7 version 2.5 ORU – Unsolicited Observation Message (Event R01):

  ORU^R01 event includes 3 mandatory segments

  - MSH – Message Header Segment
  - OBR – Observation Request Segment
  - OBX – Observation related to OBRs

  - The file upload mode will be assigned to the fourth field of OBX. For the <OBX.4> tag, the fields can either be "BL" and "BL-M", which represents whether it is in incremental or materialisation. For the data mapping of OBX in HL7 message, please refer to *Section 8.4.3 - OBX - Observation/Result Segment*.

  - The batch file name will be assigned to the <OBX.5> tag. The detail will be described in following section.

  - XML digital signature:

  In order to ensure the integrity, reputation and authenticity of the message exchange, a XML digital signature is required to digitally sign the whole HL7 document. The eHR system will not accept messages that are not digitally signed.

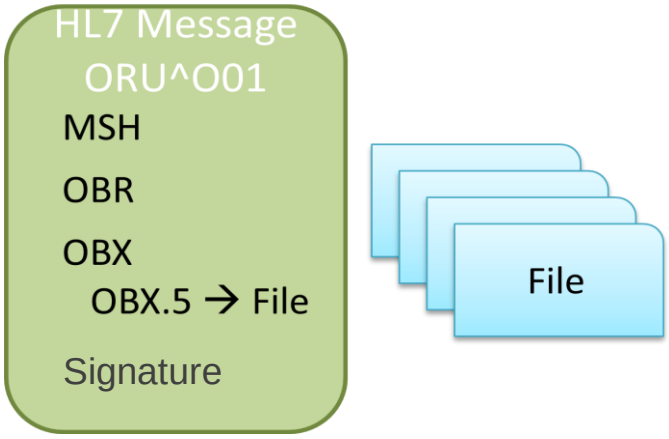

Figure 1 describes the overview structure of BLS in HL7 standards. (Please refer to HL7 official website for HL7 standards details.)

8.1 FILE NAME

The naming convention of the file which is carrying the HL7 message is specified as below:

Format

With Sending Location Code,

<HCP ID>.<Sending Location code>.<Record Type>.HL7.<Message Control ID>

Example

e.g. 8088450656.BRANCHA.PROB.HL7.20110701230000

Naming Convention

1. The file name should be in capital letters.
2. The value of each file name component should not contain dot "."
3. Message Control ID refers to the value MSH.10.
4. If the ***<Sending Location code>*** cannot be provided, its value can be set as same as ***<HCP ID>***.
5. The value of the ***<Sending Location code>*** can be in any combination of alphanumeric characters i.e. [A-Z][0-9][-_]

8.2 CHARACTER SET AND ENCODING

A Unicode Transformation Format (UTF) is an algorithmic mapping from every Unicode code point to a unique byte sequence. Among the several UTF scheme, UTF-8 is the most common Unicode encoding used and it has become the main storage encoding on most Unix-like operating systems since it is a relatively easy replacement of traditional extended ASCII character sets.

Therefore, UTF-8 will be used in eHR Clinical Data Sharing data exchange. HCP is required to ensure the file that sent to eHR should use UTF-8 encoding.

8.3 XML PREDEFINED ENTITIES

Extensible Markup Language (XML) is adopted in eHR Clinical Data Sharing data exchange using HL7 messages. The XML specification defines five "predefined entities" representing special characters, and requires that all XML processors honor them. To render the character, the format `&name;` must be used. For example, `&` renders as the character `&`. The table below lists the 5 predefined entities in XML:

Name	Character	Entity Reference	Description
gt	>	>	Greater than
lt	<	<	Less than
amp	&	&	Ampersand
apos	‘	'	Apostrophe
quot	“	"	Quotation mark

The prefix of namespace in XML in HL7 message is not expected.

8.4 DATA MAPPING

8.4.1 MSH - MESSAGE HEADER SEGMENT

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
#<MSH.1>	1	ST			Field Separator	"|"	• Fixed value
#<MSH.2>	4	ST			Encoding Characters	"^~\&"	• Fixed value
<MSH.3> <HD.1>	227	HD		0361	Sending Application Namespace ID	System Version	HCP's system name and version for data exchange
<MSH.4> <HD.1>	227	HD		0362	Sending Facility Namespace ID	Healthcare Provider Identifier	A unique identifier assigned by eHR Healthcare Provider Index to each healthcare institution for participation in eHR Sharing System
<MSH.5> <HD.1>	227	HD		0361	Receiving Application Namespace ID	"EIF"	• Fixed value
<MSH.6> <HD.1>	227	HD		0362	Receiving Facility Namespace ID	"eHR"	• Fixed value
#<MSH.7> <TS.1>	26	TS DTM			Date/Time Of Message Time	Message generation datetime	In format: YYYYMMDDhhmmss
<MSH.8>	40	ST			Security	Data Compliance Level e.g. 1	Possible value: **1**: Level 1 **2**: Level 2 **3**: Level 3

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
#<MSH.9> <MSG.1> <MSG.2> <MSG.3>	15	MSG			Message Type Message Type Trigger Event Message Structure	 “ORU” “R01” “ORU_R01”	 • Fixed value • Fixed value • Fixed value
#<MSH.10>	20	ST			Message Control ID	Unique message identifier in sending application	Values can be in any combination of alphanumeric characters i.e. [A-Z][0-9][-_]
#<MSH.11> <PT.1>	3	PT			Processing ID Processing ID	 “P”	 • Fixed value • **P**: Production
#<MSH.12> <VID.1>	60	VID			Version ID Version ID	 “2.5”	 Fixed value
<MSH.13>	15	NM			Sequence Number	NOT USE	
<MSH.14>	180	ST			Continuation Pointer	NOT USE	
<MSH.15>	2	ID		0155	Accept Acknowledgment Type	“NE”	• Fixed value • **NE**: Never
<MSH.16>	2	ID		0155	Application Acknowledgment Type	NOT USE	
<MSH.17>	3	ID		0399	Country Code	NOT USE	
<MSH.18>	16	ID	Y	0211	Character Set	NOT USE	

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
<MSH.19>	250	CE			Principal Language Of Message	NOT USE	
<MSH.20>	20	ID		0356	Alternate Character Set Handling Scheme	NOT USE	
<MSH.21>	427	EI	Y		Message Profile Identity	NOT USE	

8.4.2 OBR - OBSERVATION REQUEST SEGMENT

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
<OBR.1>	4	SI			Set ID – OBR	NOT USE	
<OBR.2>	22	EI			Placer Order Number	NOT USE	
<OBR.3>	22	EI			Filler Order Number	NOT USE	
#<OBR.4> <CE.1>	250	CE			Universal Service Identifier	"PROB"	• Fixed value
<OBR.5>	2	ID			Priority – OBR	NOT USE	
<OBR.6>	26	TS			Requested Date/Time	NOT USE	
<OBR.7>	26	TS			Observation Date/Time #	NOT USE	
<OBR.8>	26	TS			Observation End Date/Time #	NOT USE	
<OBR.9>	20	CQ			Collection Volume *	NOT USE	

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
<OBR.10>	250	XCN	Y		Collector Identifier *	NOT USE	
<OBR.11>	1	ID		0065	Specimen Action Code *	NOT USE	
<OBR.12>	250	CE			Danger Code	NOT USE	
<OBR.13>	300	ST			Relevant Clinical Information	NOT USE	
<OBR.14>	26	TS			Specimen Received Date/Time *	NOT USE	
<OBR.15>	300	SPS			Specimen Source	NOT USE	
<OBR.16>	250	XCN	Y		Ordering Provider	NOT USE	
<OBR.17>	250	XTN	Y/2		Order Callback Phone	NOT USE	
<OBR.18>	60	ST			Placer Field 1	NOT USE	
<OBR.19>	60	ST			Placer Field 2	NOT USE	
<OBR.20>	60	ST			Filler Field 1 +	NOT USE	
<OBR.21>	60	ST			Filler Field 2 +	NOT USE	
<OBR.22>	26	TS			Results Rpt/Status Chng –	NOT USE	
<OBR.23>	40	MOC			Charge to Practice +	NOT USE	
<OBR.24>	10	ID		0074	Diagnostic Serv Sect ID	NOT USE	

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
<OBR.25>	1	ID		0123	Result Status +	NOT USE	
<OBR.26>	400	PRL			Parent Result +	NOT USE	
<OBR.27>	200	TQ	Y		Quantity/Timing	NOT USE	
<OBR.28>	250	XCN	Y		Result Copies To	NOT USE	
<OBR.29>	200	EIP			Parent	NOT USE	
<OBR.30>	20	ID		0124	Transportation Mode	NOT USE	
<OBR.31>	250	CE	Y		Reason for Study	NOT USE	
<OBR.32>	200	NDL			Principal Result Interpreter +	NOT USE	
<OBR.33>	200	NDL	Y		Assistant Result Interpreter +	NOT USE	
<OBR.34>	200	NDL	Y		Technician +	NOT USE	
<OBR.35>	200	NDL	Y		Transcriptionist +	NOT USE	
<OBR.36>	26	TS			Scheduled Date/Time +	NOT USE	
<OBR.37>	4	NM			Number of Sample Containers *	NOT USE	
<OBR.38>	250	CE	Y		Transport Logistics of Collected Sample *	NOT USE	
<OBR.39>	250	CE	Y		Collector's Comment *	NOT USE	

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
<OBR.40>	250	CE			Transport Arrangement Responsibility	NOT USE	
<OBR.41>	30	ID		0224	Transport Arranged	NOT USE	
<OBR.42>	1	ID		0225	Escort Required	NOT USE	
<OBR.43>	250	CE	Y		Planned Patient Transport Comment	NOT USE	
<OBR.44>	250	CE		0088	Procedure Code	NOT USE	
<OBR.45>	250	CE	Y	0340	Procedure Code Modifier	NOT USE	
<OBR.46>	250	CE	Y	0411	Placer Supplemental Service Information	NOT USE	
<OBR.47>	250	CE	Y	0411	Filler Supplemental Service Information	NOT USE	
<OBR.48>	250	CWE		0476	Medically Necessary Duplicate Procedure Reason	NOT USE	
<OBR.49>	2	IS		0507	Result Handling	NOT USE	

8.4.3 OBX - OBSERVATION/RESULT SEGMENT

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
<OBX.1>	4	SI			Set ID – OBX	NOT USE	
<OBX.2>	2	ID		0125	Value Type	"RP"	• Fixed value • **RP**: Reference Pointer
#<OBX.3> <CE.1>	250	CE			Observation Identifier Identifier	"PROB"	• Fixed value
<OBX.4>	20	ST			Observation Sub-Id	e.g. BL	Possible value of data upload format: **BL**: Bulk load; **BL-M**: Bulk load for materialisation *Remarks:* ***Materialisation*** - HCP upload a HCR's specific sharable dataset that exists in EMR.

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
<OBX.5> <RP.1>	99999	Varies	Y		Observation Value Data	Filename of the batch file:checksum (Please refer to Section 12 – File Name Samples for examples of filename)	Colon ":" is used as field delimiter. Filename of two types of files will be included: - HCR list file - Structured data file For filename of the batch file, please see the file format in the related section. Repeat OBX.5 if more than one batch file. For data file checksum value, the checksum algorithm will use SHA-256. For SHA standard document, please refer to "Secure Hash Standard (SHS) of Federal Information Processing Standards Publication" provided by Information Technology Laboratory of National Institute of Standards and Technology in Gaithersburg (MD 20899-8900)
<OBX.6>	250	CE			Units	NOT USE	
<OBX.7>	60	ST			References Range	NOT USE	
<OBX.8>	5	IS	Y	0078	Abnormal Flags	NOT USE	
<OBX.9>	5	NM			Probability	NOT USE	
<OBX .10>	2	ID	Y	0080	Nature of Abnormal Test	NOT USE	

Tag	Len	HL7 Data Type	RP/#	TBL#	Element Name	Fields	Remarks
#<OBX. 11>	1	ID		0085	Observation Result Status	"F"	• Fixed value • F: Final Result
<OBX .12>	26	TS			Effective Date of Reference Range	NOT USE	
<OBX .13>	20	ST			User Defined Access Checks	NOT USE	
<OBX .14>	26	TS			Date/Time of the Observation	NOT USE	
<OBX .15>	250	CE			Producer's ID	NOT USE	
<OBX .16>	250	XCN	Y		Responsible Observer	NOT USE	
<OBX .17>	250	CE	Y		Observation Method	NOT USE	
<OBX .18>	22	EI	Y		Equipment Instance Identifier	NOT USE	
<OBX .19>	26	TS			Date/Time of the Analysis	NOT USE	

8.5 HL7 MESSAGE SAMPLE

The following HL7 sample in XML format shows materialisation case:

```
<?xml version="1.0" encoding="UTF-8"?>
<ORU_R01 xsi:schemaLocation="urn:hl7-org:v2xml ORU_R01.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="urn:hl7-
org:v2xml">
      <MSH>
            <MSH.1>|</MSH.1>
            <MSH.2>^~\&amp;</MSH.2>
            <MSH.3>
                  <HD.1>CMS 3.0</HD.1>
            </MSH.3>
            <MSH.4>
                  <HD.1>8088450656</HD.1>
            </MSH.4>
            <MSH.5>
                  <HD.1>EIF</HD.1>
            </MSH.5>
            <MSH.6>
                  <HD.1>eHR</HD.1>
            </MSH.6>
            <MSH.7>
                  <TS.1>20120301230001</TS.1>
            </MSH.7>
            <MSH.8>3</MSH.8>
            <MSH.9>
                  <MSG.1>ORU</MSG.1>
                  <MSG.2>R01</MSG.2>
                  <MSG.3>ORU_R01</MSG.3>
            </MSH.9>
            <MSH.10>20120301230001</MSH.10>
            <MSH.11>
                  <PT.1>P</PT.1>
            </MSH.11>
            <MSH.12>
                  <VID.1>2.5</VID.1>
            </MSH.12>
            <MSH.15>NE</MSH.15>
      </MSH>
      <ORU_R01.PATIENT_RESULT>
            <ORU_R01.ORDER_OBSERVATION>
                  <OBR>
                        <OBR.4>
                              <CE.1>PROB</CE.1>
                        </OBR.4>
                  </OBR>
                  <ORU_R01.OBSERVATION>
                        <OBX>
                              <OBX.2>RP</OBX.2>
                              <OBX.3>
                                    <CE.1>PROB</CE.1>
                              </OBX.3>
                              <OBX.4>BL-M</OBX.4>
                              <OBX.5>
                                    <RP.1>
      8088450656.BRANCHA.PROB.DF.1.20110702084530:332be2c46e1a0a632610e8bf63b
de57851374c583aaf84b3769d7eb2d67f8bcc2b0c356c4972aa49c444860c3e00104b50d24907
```



```
b86a6e3c6927e61bd3ecfc24
                                        </RP.1>
                                    </OBX.5>
                                    <OBX.5>
                                        <RP.1>
      8088450656.BRANCHA.PROB.PL.1.20110702084530:dba2a0463da72f264677ba6e83f
b8eecdce1454e17cea6ec5dcf41a11f1a94e28bbbabbb11e3441de0da7ea741cb175527fff415
58062c9f0691c7c463a186b6
                                        </RP.1>
                                    </OBX.5>
                                    <OBX.11>F</OBX.11>
                                </OBX>
                            </ORU_R01.OBSERVATION>
                        </ORU_R01.ORDER_OBSERVATION>
      </ORU_R01.PATIENT_RESULT>
</ORU_R01>
```


8.6 XML DIGITAL SIGNATURE ON HL7

XML digital signature is required the components of XML digital signature are listed below:

No.	XML Tag	XPath	Attribute	Element Name	Mandatory (M) / Optional(O)	Remarks
1	Signature	Signature		Signature	M	Sign the HL7 message *(Please refer to "XML Signature Syntax and Processing (Second Edition)" provided by W3C Recommendation 10 June 2008)*
			@xmlns		M	Fixed Value: "http://www.w3.org/2000/09/xmldsig#"
2	SignedInfo	Signature/SignedInfo		Signed Information	M	
2.1	CanonicalizationMethod	Signature/SignedInfo/ CanonicalizationMethod		Canonicalization Method	M	
			@Algorithm	Algorithm	M	Fixed Value: "http://www.w3.org/TR/2001/REC-xml-c14n-20010315"
2.2	SignatureMethod	Signature/SignedInfo/ SignatureMethod		Signature Method	M	
			@Algorithm	Algorithm	M	Fixed Value: "http://www.w3.org/2001/04/xmldsig-more#rsa-sha256"

No.	XML Tag	XPath	Attribute	Element Name	Mandatory (M) / Optional(O)	Remarks
2.3	Reference	Signature/SignedInfo/ Reference		Reference element for the whole HL7 document	M	
			@ URI	URI	M	Fixed Value: “” *(Empty String)*. Apply the signature to the whole HL7 document
2.3.1	Transforms	Signature/SignedInfo/ Reference/Transforms		Transforms	M	
2.3.1.1	Transform	Signature/SignedInfo/ Reference/Transforms/ Transform		Transform	M	
			@Algorithm	Algorithm	M	Fixed Value: “http://www.w3.org/2000/09/xmldsig#enveloped-signature”
2.3.2	DigestMethod	Signature/SignedInfo/ Reference/DigestMethod			M	
			@Algorithm	Algorithm	M	Fixed Value: “http://www.w3.org/2001/04/xmlenc#sha256”
2.3.3	DigestValue	Signature/SignedInfo/ Reference/DigestValue		Digest Value	M	Message’s Digest Value

No.	XML Tag	XPath	Attribute	Element Name	Mandatory (M) / Optional(O)	Remarks
3	SignatureValue	Signature/SignatureValue		Signature value	M	Canonicalize and then calculate the SignatureValue over SignedInfo based on algorithms specified in SignedInfo as specified in XML Signature [XMLDSIG]
4	KeyInfo	Signature/KeyInfo		Key Info	M	
4.1	X509Data	Signature/KeyInfo/ X509Data		X509 Data	M	
4.1.1	X509SubjectName	Signature/KeyInfo/ X509Data/ X509SubjectName		X509 Subject Name	M	Distinguished name (DN) that contains the information for both the owner or requestor of the certificate (called the Subject DN) and the CA that issues the certificate (called the Issuer DN)
4.1.2	X509Certificate	Signature/KeyInfo/ X509Data/ X509Certificate		Certificate	M	base64-encoded [X509v3] certificate *(Please refer to the content of X509Data in "XML Signature Syntax and Processing (Second Edition)" provided by W3C Recommendation 10 June 2008)*

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<ORU_R01 xmlns="..." xmlns:xsi="..." xsi:schemaLocation="...">
  <MSH>...</MSH>
  <ORU_R01.PATIENT_RESULT>
    <ORU_R01.ORDER_OBSERVATION>
      <OBR>...      </OBR>
      <ORU_R01.OBSERVATION>
        <OBX>... </OBX>
      </ORU_R01.OBSERVATION>
    </ORU_R01.ORDER_OBSERVATION>
  </ORU_R01.PATIENT_RESULT>
  <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
    <SignedInfo>
      <CanonicalizationMethod Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n-20010315"/>
      <SignatureMethod Algorithm="http://www.w3.org/2001/04/xmldsig-more#rsa-sha256"/>
      <Reference URI="">
        <Transforms>
          <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
        </Transforms>
        <DigestMethod Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/>
        <DigestValue>xxxxx</DigestValue>
      </Reference>
    </SignedInfo>
    <SignatureValue>xxxxxxxxxx</SignatureValue>
    <KeyInfo>
      <X509Data>
        <X509SubjectName>xxxxx</X509SubjectName>
        <X509Certificate>xxxxxxxxxx</X509Certificate>
      </X509Data>
    </KeyInfo>
  </Signature>
</ORU_R01>
```

XML Digital Signature

9 HEALTHCARE RECIPIENT LIST

When a HCP uploads the sharable data to eHR, it is assumed that a daily HCR identity list will be sent **for each sharable dataset** in advance. The HCR identity list consists of the identity of those HCRs who have clinical data records changes.

There are four major keys: Document ID with Document Type, English Name, Sex and Date of Problem of the HCR which are mandatory. They are used to refer to information that can be uniquely identified as an individual. Therefore, four major keys are needed to verify and match the eHR number which is assigned to HCR when one registered to eHR program during the data upload and verification processing.

A HCR list file is required which contains the four major keys and eHR number for every data batch upload. To standardise the HCR list, the file name, content and trailer should be strictly controlled. Besides, the size of the file should not exceed the maximum upload file size according to eHR Localised Bulk Load Standard Specification. The data file should be split into smaller files within the file size limit and Sequence ID could be used to specify each smaller file.

9.1 FILE NAME

The naming convention of the file which is carrying the HCR List is specified as below:

Format

With Sending Location Code,

<HCP ID>.<Sending location code>.<Record Type>.PL.<Sequence ID>.<Generation Date>

Example

e.g. 8088450656.BRANCHA.PROB.PL.1.20110702084530

Naming Convention

1. The file name should be in capital letters.
2. Generation date provided in the file name should be in YYYYMMDDhhmmss format (YYYY:year; MM:month; DD:day; hh:hour; mm:minute; ss:second).
3. The value of each file name component should not contain dot "."
4. If the ***<Sending Location code>*** cannot be provided, its value can be set as same as ***<HCP ID>***.
5. The value of the ***<Sending Location code>*** can be in any combination of alphanumeric characters i.e. [A-Z][0-9][-_]

The following table shows the components of file name and the respective definitions:

Sequence	Component	Definition	Maximum Length	Remarks
1	HCP ID	A unique identifier assigned by eHR Healthcare Provider Index to each healthcare institution for participation in eHR Sharing System	string(10)	Fixed length
2	Sending Location Code	A code to indicate the location where the data is sending from. The format should be agreed before the interface is on production.	string(20)	
3	Record Type	A standardised short term to distinguish the sharable dataset	string(20)	Fixed value: PROB
4	PL	HCR List	string(2)	Fixed value : PL
5	Sequence ID	Sequence of the file generated in the same generation date	string(3)	In format: 1-999
6	Generation Date	File generation date	string(14)	In format: YYYYMMDDhhmmss

9.2 FILE CONTENT

Format

```
<eHR Number>|<Sex>|<Birth Date>|<HKIC Number>|<Type of Identity
Document>|<Identity Document Number>|<English Surname>|<English Given
Name>|<English Full Name>\CR\
<eHR Number>|<Sex>|<Birth Date>|<HKIC Number>|<Type of Identity
Document>|<Identity Document Number>|<English Surname>|<English Given
Name>|<English Full Name>\CR\
EOF.<#Total Number of HCRs>.<File Name of HCR List>
```

Naming Convention

For file content,

1. Each record should be on a new line. \CR\ should be used as record terminator.
2. Pipe line "|" should be used as field delimiter. If data content contains pipe line, pipe line should be replaced by \F\ before sending to eHR.
3. A trailer is required at the bottom of each data file. The convention is explained in the next paragraph.

For file trailer,

1. A trailer is required at the bottom of each file.
2. Dot "." should be used as field delimiter.
3. Generation date provided in the file name should be in YYYYMMDDhhmmss format (YYYY:year; MM:month; DD:day; hh:hour; mm:minute; ss:second).

The following table shows the components of file content and trailer and the respective definitions:

Sequence	Data Field	Definition	Maximum Length	Remarks
File Content				
1	eHR number	A unique eHR healthcare recipient identifier assigned to each patient for each participation in the Hong Kong eHR	string(12)	Fixed length
2	Sex	[eHR value] of the "Sex" code table. It is used to identify the sex of the patient	string(1)	Refer to the code set of "Sex" in eHR Office website

Sequence	Data Field	Definition	Maximum Length	Remarks
3	Date of birth	The patient's date of birth	string(23)	In format: YYYY-MM-DD hh:mm:ss.sss Milliseconds should be in ".000" format e.g. 2010-01-31 00:00:00.000 (Birth time is not required.) Remarks: • If date is exact to 'Year' (e.g. 2010), the unknown month and day is suggested to be set as '01-01' E.g. 2010-**01-01** 0:00:00.000 • If date is exact to 'Month'(e.g. 2010-12), the unknown day is suggested to be set as '01' E.g. 2010-12-**01** 0:00:00.000
4	HKIC number	The Hong Kong Identity Card number or the Registration Number printed on Hong Kong Birth Certificate (post-1981) issued by HKSAR Immigration Department, include the check digit	string(12)	
5	Type of identity document	[eHR value] of the "Type of identity document" code table. It is the type of patient's identity / travel document presented during registration / enrolment / update of the patient's identity / demographic data	string(6)	Refer to the code set of "Type of identity document" in eHR Office website
6	Identity document number	The document number of the [Type of identity document - patient]	string(30)	

Sequence	Data Field	Definition	Maximum Length	Remarks
7	English surname	Patient's surname in English	string(40)	Surname should be in uppercase letters. Optional if [English full name] is not blank Mandatory if [English full name] is blank
8	English given name	Patient's given name in English	string(40)	Given name should be in uppercase letters. Optional if [English full name] is not blank Mandatory if [English full name] is blank
9	English full name	Patient's full name in English	string(100)	Full name should be in uppercase letters. In format of : [Surname]+[,]+ 1 white space +[Given Name] e.g. CHAN, TAI MAN Optional if [English surname] and [English given name] are not blank Mandatory if [English surname] and [English given name] are blank ** If patient has either English surname or given name stored in local EMR system, full name should be filled.*
File Trailer				
1	EOF	File trailer indicator	string(3)	Fixed length
2	Total Number of HCRs	Total number of records in this batch being processed excluding the trailer	string(10)	Numeric value: 0-9999999999
3	File Name of HCR List	File name of HCR list	string(83)	Please refer to Section 9.1 - File Name for naming convention of HCR list file name.

Example

The following is a sample file of HCR list:

```
201000000001|M|2009-01-01|A1234563|ID|A1234563|CHAN|TAI MAN|CHAN, TAI
MAN\CR\
201000000002|F|2001-01-01|A7654321|OC|10234567890|LEE|HO|LEE, HO\CR\
EOF.2.8088450656.BRANCHA.PROB.PL.1.20110702084530
```


10 STRUCTURED DATA FILE

Data loading will use a standardised file naming convention, data content and the trailer. With the standardised format, it takes less time and is easier to interpret the data.

For details of the implementation requirements for transferring clinical records, please refer the 'Communication Protocol Specification'.

10.1 FILE NAME

The naming convention of the file which is carrying the Structured Data File is specified as below:

Format

With Sending Location Code,

<HCP ID>.<Sending Location code>.<Record Type>.DF.<Sequence ID>.<Generation Date>

Example

e.g. 8088450656.BRANCHA.PROB.DF.1.20110702084530

Naming Convention

1. The file name should be in capital letters.
2. Generation date provided in the file name should be in YYYYMMDDhhmmss format (YYYY:year; MM:month; DD:day; hh:hour; mm:minute; ss:second).
3. The value of each file name component should not contain dot "."
4. If the ***<Sending Location code>*** cannot be provided, its value can be set as same as ***<HCP ID>***.
5. The value of the ***<Sending Location code>*** can be in any combination of alphanumeric characters i.e. [A-Z][0-9][-_]

The following table shows the components of file name and the respective definitions:

Sequence	Component	Definition	Maximum Length	Remarks
1	HCP ID	A unique identifier assigned by eHR Healthcare Provider Index to each healthcare institution for participation in eHR Sharing System	string(10)	Fixed length
2	Sending Location Code	A code to indicate the location where the data is sending from. The format should be agreed before the interface is on production.	string(20)	
3	Record Type	A standardised short term to distinguish the sharable dataset	string(20)	Fixed value : PROB
4	DF	Data File	string(2)	Fixed value : DF
5	Sequence ID	Sequence of the file generated in the same generation date	string(3)	In format: 1-999
6	Generation Date	File generation date	string(14)	In format: YYYYMMDDhhmmss

10.2 FILE CONTENT

Format

```
<eHR Number>|<Transaction Datetime>|<Transaction Type>|< Last Update
Datetime>|<Record Key>|field 1|field 2|field 3|…|field n\CR\
<eHR Number>|<Transaction Datetime>|<Transaction Type>|< Last Update
Datetime>|<Record Key>|field 1|field 2|field 3|…|field n\CR\
EOF.<#Total Number of Records>.<File Name of Data File>
```

Naming Convention

For file content,

1. Each record should be on a new line. \CR\ should be used as record terminator.
2. Pipe line "|" should be used as field delimiter. If data content contains pipe line, pipe line should be replaced by \F\ before sending to eHR.
3. A trailer is required at the bottom of each data file. The convention is explained in the next paragraph.

For file trailer,

1. A trailer is required at the bottom of each file.
2. Dot "." should be used as field delimiter.
3. Generation date provided in the file name should be in YYYYMMDDhhmmss format (YYYY:year; MM:month; DD:day; hh:hour; mm:minute; ss:second).

Data Component

The following table shows the components of file content and trailer and the cardinality for each compliance level of each data file. In general, there are THREE data compliance levels. Data compliance level 1 is NOT applicable for Problem record.

No.	Data Field	Definition	Maximum Length	Notes	Mandatory (M)/ Optional (O)/ Not Applicable (N/A – Data field should not be submitted)					
					Level 2			Level 3		
					S1	S2	S3	S1	S2	S3
1	eHR Number	A unique eHR healthcare recipient identifier assigned to each patient for each participation in the Hong Kong eHR	string(12)	Fixed length	M					
2	Record key	A unique identifier for each Problem record within HCP	string(50)		M					
3	Transaction datetime	The datetime indicates the transaction sequence	string(23)	In format: YYYY-MM-DD hh:mm:ss.sss e.g. 2010-01-31 16:30:05.005	M					
4	Transaction type	Insert/Update/Delete	string(1)	I : Insert operation U : Update operation D : Delete operation *Remarks:* *'U' and 'D' are not accepted in materialisation mode.*	M					

No.	Data Field	Definition	Maximum Length	Notes	Mandatory (M)/ Optional (O)/ Not Applicable (N/A – Data field should not be submitted)					
					Level 2			Level 3		
					S1	S2	S3	S1	S2	S3
5	Last update datetime	The last update datetime for HCP system	string(23)	In format: YYYY-MM-DD hh:mm:ss.sss e.g. 2010-01-31 16:30:05.005	M					
6	Episode Number	A unique reference number assigned by the healthcare institution to an episode of care. The episode of care can be of inpatient or outpatient nature	string(20)		O					
7	Attendance Institution Identifier	A unique identifier assigned by eHR Healthcare Provider Index to each healthcare institution for participant attendance	string(10)	Fixed length	O					
8	Diagnosis reference date	Date when the diagnosis was created. For eHR, if this date is not available, the last update date of the diagnosis should be used when submitting data to the eHR	string(23)	In format: YYYY-MM-DD hh:mm:ss.sss e.g. 2010-01-31 16:30:05.005	M		N/A	M		N/A
9	Diagnosis status code	[eHR value] of the "Diagnosis status" code table which is used to identify the status of a reported diagnosis	string(1)	Refer to the code set of “Diagnosis status” in eHR Office website	N/A			O		N/A

No.	Data Field	Definition	Maximum Length	Notes	Mandatory (M)/ Optional (O)/ Not Applicable (N/A – Data field should not be submitted)					
					Level 2			Level 3		
					S1	S2	S3	S1	S2	S3
10	Diagnosis status description	[eHR description] of the "Diagnosis status" code table which is used to identify the status of a reported diagnosis. The [Diagnosis status description] should be the corresponding description of the selected [Diagnosis status code]	string(255)	Refer to the code set of "Diagnosis status" in eHR Office website	N/A			M if [Diagnosis status code] is given N/A if [Diagnosis status code] is blank		N/A
11	Diagnosis status local description	Local description of the diagnosis status	string(255)		O		N/A	M if [Diagnosis status code] is given N/A if [Diagnosis status code] is blank		N/A
12	Reason for cancellation of diagnosis	The stated reason for cancelling the diagnosis	string(1000)		N/A			O if [Diagnosis Status Code] is "C" N/A if [Diagnosis Status Code] is not "C"		N/A

No.	Data Field	Definition	Maximum Length	Notes	Mandatory (M)/ Optional (O)/ Not Applicable (N/A – Data field should not be submitted)					
					Level 2			Level 3		
					S1	S2	S3	S1	S2	S3
13	Diagnosis - recognised terminology name	Recognised terminology / classification set for the diagnosis	string(20)	Refer to the code set of "Recognised Terminology Name - Problem" in eHR Office website • HKCTT • SNOMED CT • ICD10-2001 • ICD10-2010 • ICD10-MBD • ICPC2	N/A			M		N/A
14	Diagnosis identifier - recognised terminology	Unique identifier of the reported diagnosis in the recognised terminology	string(20)		N/A			M		N/A
15	Diagnosis description - recognised terminology	The description of the reported diagnosis in the recognised terminology. It should be the corresponding description of the selected [Diagnosis identifier - recognised terminology].	string(1000)	For HKCTT, use "eHR Description" For SNOMED CT, use "Preferred Name" For ICD10-2001, ICD10-2010 and ICD10-MBD, use "FULL Name" For ICPC2, use "Description"	N/A			M		N/A

No.	Data Field	Definition	Maximum Length	Notes	Mandatory (M)/ Optional (O)/ Not Applicable (N/A – Data field should not be submitted)					
					Level 2			Level 3		
					S1	S2	S3	S1	S2	S3
16	Diagnosis local code	Local code created by the healthcare provider for the reported diagnosis	string(20)		O		N/A	O		N/A
17	Diagnosis local description	Local description created by the healthcare provider for the reported diagnosis	string(1000)		M		N/A	M		N/A
18	Diagnosis Comment	Comment made on the reported diagnosis	string(2000)		O		N/A	O		N/A
19	Record creation datetime	Datetime when the record was created in source system of HCP	string(23)	In format: YYYY-MM-DD hh:mm:ss.sss e.g. 2010-01-31 16:30:05.005	O		N/A	O		N/A
20	Record creation institution identifier	A unique identifier assigned by eHR Healthcare Provider Index to each healthcare institution who created the record	string(10)	Fixed length	O		N/A	O		N/A
21	Record creation institution name	Name of the institute who created the record	string(255)		O		N/A	O		N/A

No.	Data Field	Definition	Maximum Length	Notes	Mandatory (M)/ Optional (O)/ Not Applicable (N/A – Data field should not be submitted)					
					Level 2			Level 3		
					S1	S2	S3	S1	S2	S3
22	Record last update datetime	Datetime when the record was last updated in source system of HCP	string(23)	In format: YYYY-MM-DD hh:mm:ss.sss e.g. 2010-01-31 16:30:05.005	O		N/A	O		N/A
23	Record update institution identifier	A unique identifier assigned by eHR Healthcare Provider Index to each healthcare institution who updated the record	string(10)	Fixed length	O		N/A	O		N/A
24	Record update institution name	Name of the institute who updated the record	string(255)		O		N/A	O		N/A
File Trailer										
1	EOF	File trailer indicator	string(3)	Fixed value	M					
2	Total number of records	Total number of records in this batch being processed excluding the trailer	string(10)	Numeric value: 0-9999999999	M					
3	File name of data file	File name of data file	string(83)	Please refer to Section 8.2 - File Name for naming convention of data file name.	M					

Example

The following example is according the data requirements of the scenarios in 'Data Compliance Level 3'.

Sample data file of S1 (New):

```
201000000001|PROBRECKEY0001|2011-07-01 08:00:00.000|U|2011-07-01
08:00:00.000|||2011-06-13 16:15:00.000|||||HKCTT|1234|Transient
ischaemic attack||Transient ischaemic attack - TIA||2011-07-01
08:00:00.000|1735455950|eHR Virtual Hospital|2011-07-01
08:00:00.000||\CR\
201000000002|PROBRECKEY0002|2011-07-01 09:00:00.000|U|2011-07-01
09:00:00.000|||2011-06-20 12:25:00.000|A|Active|A -
Active||HKCTT|1234|Transient ischaemic attack||Transient ischaemic
attack - TIA||2011-07-01 08:00:00.000|1735455950|eHR Virtual
Hospital|2011-07-01 09:00:00.000||\CR\
201000000001|PROBRECKEY0003|2011-07-01 09:00:00.000|U|2011-07-01
10:00:00.000|||2011-06-30 08:05:00.000|C|Cancelled|Wrong|Wrong
diagnosis as no evidence supported that patient has this
condition|HKCTT|1234|Transient ischaemic attack|332|Transient
ischaemic attack - TIA|affect left side of body|2011-07-01
08:00:00.000|1735455950|eHR Virtual Hospital|2011-07-01
10:00:00.000|1735455950|eHR Virtual Hospital\CR\
EOF.3.8088450656.BRANCHA.PROB.DF.1.20110702084530
```

Sample data file of S2 (Override):

```
201000000001|PROBRECKEY0001|2011-07-01 08:00:00.000|U|2011-07-02
08:00:00.000|||2011-06-13 16:15:00.000|||||HKCTT|1234|Transient
ischaemic attack||Transient ischaemic attack - TIA||2011-07-01
08:00:00.000|1735455950|eHR Virtual Hospital|2011-07-02
08:00:00.000|1735455950|eHR Virtual Hospital\CR\
201000000002|PROBRECKEY0002|2011-07-01 09:00:00.000|U|2011-07-02
09:00:00.000|||2011-06-20 12:25:00.000|A|Active|A -
Active||HKCTT|1234|Transient ischaemic attack||Transient ischaemic
attack - TIA||2011-07-01 08:00:00.000|1735455950|eHR Virtual
Hospital|2011-07-02 09:00:00.000|1735455950|eHR Virtual Hospital\CR\
201000000001|PROBRECKEY0003|2011-07-01 09:00:00.000|U|2011-07-02
09:00:00.000|||2011-06-30 08:05:00.000|C|Cancelled|Wrong|Wrong
diagnosis as no evidence supported that patient has this
condition|HKCTT|1234|Transient ischaemic attack|332|Transient
ischaemic attack - TIA|affect left side of body|2011-07-01
08:00:00.000|1735455950|eHR Virtual Hospital|2011-07-02
09:00:00.000|1735455950|eHR Virtual Hospital\CR\
EOF.3.8088450656.BRANCHA.PROB.DF.1.20110702084530
```


Sample data file of S3 (Delete):

```
201000000001|PROBRECKEY0001|2011-08-01 08:00:00.000|D|2011-08-01
08:00:00.000|||||||||||||||||||\CR\
201000000002|PROBRECKEY0002|2011-08-01 09:00:00.000|D|2011-08-01
09:00:00.000|||||||||||||||||||\CR\
201000000001|PROBRECKEY0003|2011-08-01 09:00:00.000|D|2011-08-01
09:00:00.000|||||||||||||||||||\CR\
EOF.3.8088450656.BRANCHA.PROB.DF.1.20110702084530
```

FILE NAME SAMPLES

The following provides some file name samples for different file upload modes:

Sample Values

Component	Sample Value	Full Form
HCP ID	8088450656	Hospital Authority
Sending Location Code	BRANCHA	Branch A of HCP
	BRANCHB	Branch B of HCP
	GATEWAY1	Gateway 1 system of HCP
	GATEWAY2	Gateway 2 system of HCP

The following table lists examples of HCR list file name and data file name, for each file upload mode:

	HCR List File	Data File
Incremental Mode	8088450656.BRANCHA.PROB.PL.1.20110702084530	8088450656.BRANCHA.PROB.DF.1.20110702084530
Materialisation Mode	8088450656.BRANCHA.PROB.PL.2.20110702084530	8088450656.BRANCHA.PROB.DF.2.20110702084530

