Quick Guide to

Data Upload to eHealth for

Encounter Records

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1 Purpose

This document is intended for Information Technology personnel involved in the development of programmes to upload data from their Electronic Medical Record (EMR) system to the electronic Health Record Sharing System (eHRSS). This document describes the technical interface requirements for implementing Encounter records upload based on HL7-HK Standards. Readers who prefer more in-depth study of the HL7-HK standards may refer to the HL7-HK website https://hl7.org.hk for further details.

2 Pre-requisites for Data Upload to eHRSS

eHealth Healthcare Provider (HCP) can only upload its client's / patient's clinical data to eHealth if:

- The client has joined eHealth as a Healthcare Recipient (HCR); and
- The client has given a sharing consent to the HCP and the sharing consent is still effective.

3 Types of Data Upload

3.1 Data materialization (DM) (First data upload for an HCR)

- When an HCR gives sharing consent to an HCP, eHRSS will send a PMI 'Give sharing consent' event (ADT^A28) to the HCP's registered EMR system;
- Upon receiving this event, the EMR system should upload all available clinical data related to the HCR to eHRSS, either immediately or with the next scheduled upload;
- Data should be the point in time image, thus will only involve 'Insert' transactions to eHRSS. Update and Delete transactions to eHRSS will be rejected for DM upload;
- DM upload is packaged by individual data domain for multiple HCR; and
- **DM mode** is denoted in the interface by a fixed value **BL-M** in *HL7 OBX.4* (details of HL7 message will be described in later section).

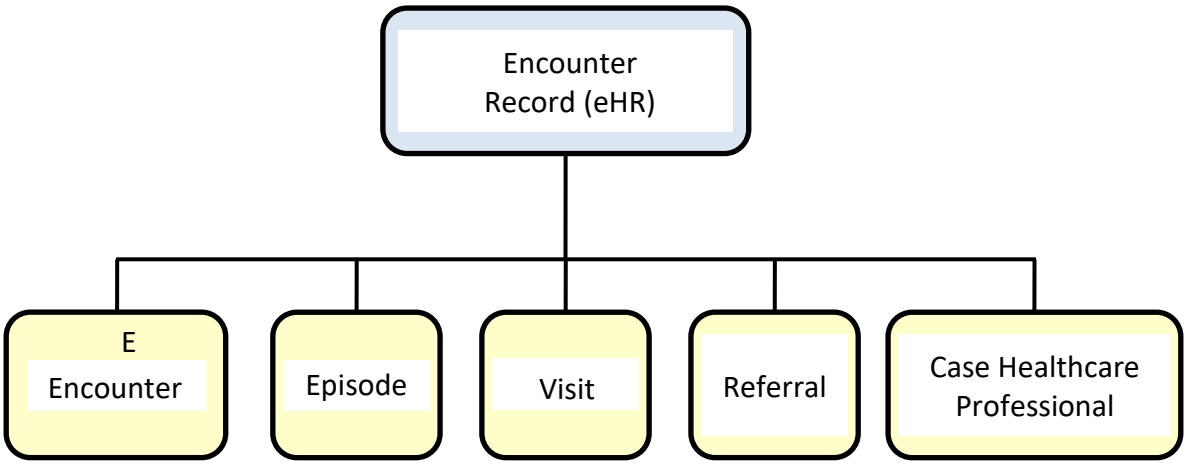
3.2 Incremental Load (INC) (Sub-sequent data upload)

- All subsequent record creations (insert), updates and deletes of all the consented HCRs should be uploaded to eHRSS at regular intervals via the INC data packages;
- **INC** upload is packaged by individual data domain for multiple HCRs; and
- **INC mode** is denoted in the interface by a fixed value **BL** in *HL7 OBX.4*.

4 Character set and encoding

UTF-8 encoding is used for eHR Clinical data exchange.

5 Data Components for the Encounter Domain



Encounter

A healthcare appointment and/or attendance, either in the form of face-to-face or electronic contact between a person and the healthcare practitioner who will assess, evaluate and treat the person.

Episode

An episode composes of one or more outpatient encounter(s) or an inpatient stay related to the care of a specific health condition or illness of the person. Episode-based encounter records will have Episode Start Data and End Date, which, for inpatients would indicate the start and end of the inpatient stay, while for outpatients would usually contain multiple visits of the client for a specific condition.

Visit

A visit is an outpatient attendance (an encounter) on a specified date (Visit Date). Episode-based encounters may contain multiple visits within a single episode as defined by the Episode Start Date and End Date. For non-episode-based encounters, visits are standalone attendance with a Visit Date and no Episode Start and End Date.

Referral Source

It includes information about the source of a referral, such as Referral number, Refer-from institution identifier, etc.

Case Healthcare Professional

It includes the information of the healthcare professional who is in charge of the episode of care.

6 Examples of Encounter Scenarios

The following examples are used to illustrate different Encounter scenarios but may not be the same as your organisation's current practices:

Encounter Type	Scenario Examples	Episode-based	Visit-based	Specialty	Data File section
Inpatient	Delivery of baby	Yes	No	Obstetrics & Gynaecology	
Outpatient	General Outpatient / Private Clinics e.g. Common cold	No	Yes		8.1
Outpatient	Specialist Outpatient Clinic e.g. Consultation for eye problem	No	Yes	Ophthalmology	8.1
	Physiotherapy service (Package of 10 treatments)	Yes	Yes	Physiotherapy	8.1
Other	Radiology Centre e.g. Breast Cancer Screening	No	Yes	Radiology	

7 Data Upload Channels

HCP can upload data to eHealth via one of the following channels:

- Construct data package in HL7-HK Bulk Load Formats and upload via Secure File Transfer Protocol (SFTP); or
- Install the Local EMR Adaptor Adaptation Module (LAAM) and pass the relevant data to LAAM for upload via the Simple Object Access Protocol (SOAP) messages.

7.1 Bulk Load SFTP Channel

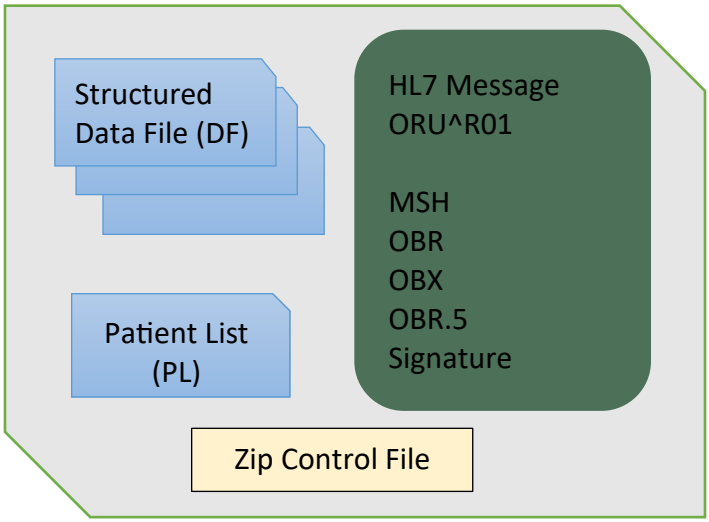
7.1.1 HL7-HK Bulk Load Standards

HCP has to batch the relevant records in flat file formats (HL7-HK Bulk Load Standards) and package the data files for upload via the specified SFTP protocol (Section 10)

7.1.2 Bulk Load Package Composition

HL7 message 'ORU^R01' is used for eHealth Encounters records exchange. The following files, together with the HL7 XML Message, have to be zipped as one package before upload. The formats of each of the following components will be described in sections 8 and 9 below.

1. Structured Data File (DF)
2. Healthcare Recipient List (PL)
3. Signed HL7 XML Message File
4. Zip Control File



7.2 Local EMR Adaptor Adaptation Module (LAAM) Channel

HCPs may choose to install LAAM and its related software in their data processing servers and transfer their EMRs transaction data to LAAM via SOAP messages (Section 11). LAAM will then process the data for upload to eHealth according to pre-determined schedules. HCPs who adopt LAAM for data upload are still required to study Sections 8 and 9 for the corresponding data definitions and restrictions.

8 Structured Data File (DF) For Outpatient Encounters

The Structured Data File (DF) for Outpatient Encounters contains HCRs' outpatient appointment and attendance records. In Data Materialisation (DM) mode, an HCR's appointments and attendance records in the local EMR system are packaged and uploaded by 'Insert' transactions. In Incremental Load (INC) mode, all newly created, amended and cancelled appointments and attendance records for different HCRs since the last data upload should be packaged and uploaded to eHealth by 'Insert', 'Update' and 'Delete' transactions. Note that the 'Insert', 'Update' and 'Delete' operations are in relation to eHRSS and not necessarily an exact reflection in the local EMR system, i.e. use 'Insert' if the record has never been uploaded to eHRSS, while 'Update' and 'Delete' transactions can only be used if the concerned record has already been uploaded to eHRSS. In the same upload batch, only one transaction type of the concerned record should be included and only the latest snapshot of the record is uploaded.

Notes:

The following conventions are used for the specifications described in this document:

M/O column:	*Indicates if the data field is Mandatory (M) or Optional (O). M* or O* denotes conditional Mandatory or Optional, please refer to Remarks for rules.*
{Applicability}:	*M/O requirements are applicable to all outpatient settings except if denoted with the following:* *{E} : applicable to Episode-based outpatient appointment/attendance only* *{V}: applicable to Visit-based outpatient appointment/attendance only* *{Ap} : applicable to Outpatient Appointment only* *{At} : applicable to Outpatient Attendance only*
Constants:	***Bolded** values are constants or fixed values.*
E.g.:	*Example values for illustration.*
[…]:	*Data variables*
"…":	*Data values.*
NA:	*Data Field in concern is not used. A field delimiter "|" is still required to be placed to preserve the correct field sequence. A white space is not required for the empty field.*

8.1 Encounter Data File (DF) Schema

The table below listed the data fields and corresponding definitions and expected values for each Outpatient Encounter DF record.

Seq	Data Field	Definition	Field Length	Remarks	M/O
1	eHR number	A unique HCR identifier assigned by eHRSS	numeric(12)	Fixed length: e.g. 773024585457	M
2	Record key	A unique identifier for an encounter record within the HCP's EMR system	varchar(50)	e.g. RK31	M
3	Transaction datetime	Datetime when this transaction was created in the local EMR. It indicates the transaction sequence if multiple transactions of the same record are uploaded.	datetime (23)	Format: YYYY-MMDD hh:mm:ss.sss e.g. 2023-08-02 00:00:00.000	M
4	Transaction type	Insert/Update/Delete of an Encounter Record identified by the [Record Key]. The Insert / Update / Delete is in relation to whether the record has been uploaded to eHRSS before and does not necessarily represent the actual transactions in the HCP's EMR system.	char(1)	Permissible value: **I** : Insert **U** : Update **D** : Delete • Insert ("I"): Upload an Encounter record which has never been uploaded to eHealth before. • Update ("U"): Update an Encounter record which has been uploaded to eHRSS before and its data content was changed since the last upload of this record (identified by [Record Key]). • Delete ("D"): Delete an Encounter record which has been uploaded to eHRSS before and has since be cancelled or deleted (identified by [Record Key]). • DM mode only permits 'I' (Insert)	M
5	Last update datetime	The last update datetime of the HCP's EMR system	datetime(23)	Format: YYYY-MMDD hh:mm:ss.sss e.g. 2023-08-02 00:00:00.000	M

Seq	Data Field	Definition	Field Length	Remarks	M/O
6	Transaction profile type	Denotes the setting / type of event related to this record	varchar(10)	Fixed value for Outpatient (OP) Encounters: **APP-OP** : Visit-based OP Appointment **ADM-OP** : Visit-based OP Attendance **APP-OP-EP** : Episode- based OP Appointment **ADM-OP-EP** : Episode based OP Attendance	M
7	Episode number	A unique reference number assigned by the healthcare institution to an episode of care. An episode is composed of one or more encounter(s). The episode of care can be of inpatient or outpatient nature.	varchar(20)	NA for Visit-based OP appointment or attendance ([Transaction profile type] is "APP-OP" or "ADM-OP"). Mandatory for Episode-based OP appointment or attendance ([Transaction profile type] is "APP-OP-EP" or "ADM-OP-EP").	M* {E}
8	Attendance institution identifier	eHRSS assigned [Healthcare Institution Identifier] (HCI ID) of the healthcare institution where the HCR receives the service	numeric(10)	Fixed length: e.g. "9907819043"	O
9	Encounter healthcare provider identifier	eHR [Healthcare Provided Identifier] (HCP ID) of the Healthcare Provider uploading this record.	numeric(10)	Fixed length: e.g. "9907819043"	M
10	Encounter healthcare institution identifier	eHR HCI ID of the healthcare institution uploading this record	numeric(10)	Fixed length: e.g. "9907819043"	M
11	Encounter type	The type of setting where the HCR has an encounter, with the HCP	char(1)	Fixed value: **O**	M
12-13	Not used (Fields for backward compatibility v1.0.0)			Place 2 "**|**" (i.e. "**||**") to delimit the two unused fields to keep the correct field sequence	M
14	Appointment number	A unique reference number assigned by the HCP to an appointment (a scheduled encounter)	varchar(20)	NA for Attendances ([Transaction profile type] is "ADM-OP" or "ADM-OP-EP"). Mandatory for Appointments ([Transaction profile type] is "APP-OP" or "APP-OP-EP") HCP assigned value. e.g. 1	M* {Ap}

Seq	Data Field	Definition	Field Length	Remarks	M/O
15	Episode start datetime	The date and time when the episode of care is started. If it is a future date or time, it represents a scheduled episode.	datetime(23)	NA for Visit-based OP appointment or attendance ([Transaction profile type] is "APP-OP" or "ADM-OP"). Optional for Episode-based OP appointment or attendance ([Transaction profile type] is "APP-OP-EP" or "ADM-OP-EP"). Format: YYYY-MMDD hh:mm:ss.sss e.g. 2023-08-02 00:00:00.000	O* {E}
16	Not used for Outpatient records (Episode urgency)			Place a pipe line delimiter "**|**"to delimit the unused field to keep the correct field sequence	M
17	Episode start specialty	eHR Specialty Code of the specialty providing service to the HCR when the episode starts	varchar(10)	NA for Visit-based OP appointment or attendance ([Transaction profile type] is "APP-OP" or "ADM-OP"). Optional for Episode-based OP appointment or attendance ([Transaction profile type] is "APP-OP-EP" or "ADM-OP-EP"). Permissible values: eHR value from the eHR 'Specialty' code set in **Self Service Kit**	O* {E}
18	Episode start specialty remarks	Specialty information if [Episode start specialty] is "OTH"	varchar(255)	Optional for Episode-based OP appointment or attendance if [Episode start specialty] is "OTH", else NA	O* {E}
19-33	Fields not applicable for outpatient			Place 15 "**|**" to delimit the 15 unused fields to keep the correct field sequence	M
34	Visit number	A unique reference number assigned by the healthcare institution to a particular visit for healthcare service which the patient received / will receive	varchar(20)	Mandatory for Attendances ([Transaction profile type] is "ADM-OP" or "ADM-OP-EP") Optional for Appointments ([Transaction profile type] is "APP-OP" or "APP-OP-EP")	M*
35	Visit clinic identifier	eHRSS assigned [Healthcare Institution Identifier] HCI ID of the clinic where the HCR visited / will visit to receive service	numeric(10)	Fixed length: e.g. "9907819043" Mandatory if [Visit clinic long Name] is not blank	M*

Seq	Data Field	Definition	Field Length	Remarks	M/O
36	Visit clinic long name	Long name of the Healthcare institution registered in eHRSS corresponding to the clinic as identified by [Visit clinic identifier]	varchar(255)	Mandatory if [Visit clinic Identifier] is not blank Permissible Value: • [Healthcare institution displayed English long name]; or • [Healthcare institution displayed Chinese long name] as registered in the eHRSS HCP Index e.g. Clinic A	M*
37	Visit clinic local name	HCP's own description (Local description) of the clinic corresponding to the clinic as identified by [Visit clinic identifier]	varchar(255)	Mandatory if [Visit clinic Identifier] is not blank HCP assigned e.g. Clinic A	M*
38	Visit datetime (Appointment datetime)	The date and time of the visit. If it is a future date / time, it represents a healthcare service appointment	datatime(23)	Format: YYYY-MMDD hh:mm:ss.sss e.g. 2023-08-03 16:30:05.005	M
39	Visit urgency	Urgency of care for the visit	varchar(1)	Permissible values eHR value from the eHR 'Urgency' code set in **Self Service Kit** **Two** possible values for Outpatient Encounter **S** : Scheduled **W** : Walk-in	O
40	Visit specialty	eHR Specialty Code of the specialty providing service to the HCR for the visit	varchar(10)	Permissible value: eHR value from the eHR 'Specialty' code set in **Self Service Kit** e.g. "FM"	O
41	Visit specialty remarks	Specialty information if [Visit specialty] is "OTH"	varchar(255)	Optional if [Visit specialty] is "OTH", else NA	O*

Seq	Data Field	Definition	Field Length	Remarks	M/O
42	Visit attendance indicator	Indicates whether the visit has been attended	varchar(1)	eHR value from the eHR 'Attendance Indicator" code set in **Self Service Kit** Permissible values: **A :** Attended **C** : Cancelled **N** : Not attended Use Transaction type "**U**" to update this indicator to record attendance of a previously uploaded scheduled appointment	O
43-48	Not used (Fields for backward compatibility v1.0.0)			Place 6 "**|**" to delimit the 6 unused fields to keep the correct field sequence	M
49	Referral number	A unique number issued by the healthcare institution for each referral	varchar(20)		O
50	Refer-from institution identifier	eHR HCI ID of the healthcare institution where the patient is referred from	number(10)	Mandatory if [Refer from-institution long name] is not blank	M*
51	Refer-from institution long name	eHRSS long name of the healthcare institution where the patient is referred from. It should correspond to the [Refer from-institution identifier]	varchar(255)	Mandatory if [Refer from-institution identifier] is not blank Permissible Value: • [Healthcare institution displayed English long name]; or • [Healthcare institution displayed Chinese long name] as registered in eHRSS HCP Index	M*
52	Refer-from institution local name	Local description of the healthcare institution where the patient is referred from	varchar(255)	Mandatory if [Refer from-institution identifier] is not blank	M*
53	Refer-from healthcare professional English name	Full English name with prefix of the healthcare professional who referred the episode	varchar(100)		O
54	Refer-from healthcare professional Chinese name	Full Chinese name with suffix of the healthcare professional who referred the episode	varchar(10)	Maximum 10 Chinese characters	O

Seq	Data Field	Definition	Field Length	Remarks	M/O
55	Refer-from encounter number	A unique reference number assigned by the healthcare institution, e.g. episode number or visit number, to a particular episode / visit under which the referral was made	varchar(20)		O
56	Referral source code	The eHR code value representing the referral source for the current episode / visit	varchar(1)	eHR value from the eHR 'Referral source' code set in **Self Service Kit** Permissible values: **A :** Accident and emergency **I** : Inpatient **O** : Outpatient	O
57	Referral source description	Description of the corresponding [Referral source code].	varchar(255)	Mandatory if [Referral source code] is not blank Permissible value: Corresponding description of the [Referral source code] above from the eHR 'Referral source' code table	M*
58	Referral source local description	Local description of the referral source for the current episode / visit, defined by healthcare institution	varchar(255)		O
59	Referral specialty	The specialty from which the referral was initiated	varchar(10)	eHR value from the eHR 'Specialty' code set in **Self Service Kit**	O
60	Referral specialty remarks	Specialty information if [Referral specialty] is "OTH"	varchar(255)	Optional if [Referral specialty] is "OTH", else NA	O*
61-62	Not used (Fields for backward compatibility v1.0.0)			Place 2 "**|**" to delimit the 2 unused fields to keep the correct field sequence	M
63	Case healthcare professional English name	Full English name with prefix of the healthcare professional who was in-charge of the care	varchar(100)	e.g. Dr Lee Tai Man	O
64	Not used (Fields for backward compatibility v1.0.0)			Place a "**|**" to delimit the unused field to keep the correct field sequence	M
65	Case healthcare professional Chinese name	Full Chinese name with suffix of the healthcare professional who was in-charge of the care	varchar(10)	Maximum 10 Chinese characters e.g. 李大文醫生	O

Seq	Data Field	Definition	Field Length	Remarks	M/O
67	Record creation datetime	Datetime when the record was created in source system of HCP	datetime(23)	e.g. 2023-08-02 15:30:05.005	O
68	Record creation institution identifier	eHR HCI ID of the Healthcare Institution which created this record	numeric(10)	Fixed length: e.g. “1234567890	O
69	Record creation institution name	Name of healthcare institution who created the record	varchar(255)	e.g. Clinic A	O
70	Record last update datetime	Datetime when the record was last updated in source system of HCP	datetime(23)	e.g. 2023-08-02 16:30:05.005	O
71	Record update institution identifier	eHR HCI ID of the healthcare institution who updated the record	numeric(10)	Fixed length: e.g. “1234567890”	O
72	Record update institution name	Name of healthcare institution who updated the record	varchar(255)	e.g. Clinic A	O

8.2 Generation of an Encounter Data File (DF)

1. Each record must be on a new line. **\CR** is used as record terminator.
2. Pipe line “**|**” is used as field delimiter. If the data field is not applicable, or there is no data value for an optional field, the pipe line must still be inserted to delimit the empty field so that the correct field sequence is preserved. White space is NOT required for an empty field.
3. If a data value contains pipe line, the pipe line must be replaced by **\F** before upload.

The resultant Encounter DF will be in the following format:

<eHR Number>**|**<Record Key>**|**<Transaction Datetime>**|**<Transaction Type>**|**field 1**|**field 2**|** …**|**field n**\CR**
<eHR Number>**|**<Record Key>**|**<Transaction Datetime>**|**<Transaction Type>**|**field 1**|**field 2**|** …**|**field n**\CR**

e.g.

```
280620114506|ENCTR_MOCK_DEV_005|2023-09-01 09:00:00.000|I|2023-09-01 09:00:00.000|APP-OP|||9907819043|9907819043|O|||1|||||||||||||||||||1|9907819043|Clinic A|Clinic A|2023-10-20 10:00:00.000||FM|FM remark|N|||||||||||||||||||||||||||||\CR\
165913031309|ENCTR_MOCK_DEV_006|2023-09-01 09:00:00.000|I|2023-09-01 09:00:00.000|APP-OP|||9907819043|9907819043|O|||1|||||||||||||||||||1|9907819043|Clinic A|Clinic A|2023-10-20 10:15:00.000||ENT|ENT remark|N|||||||||||||||||||||||||||||\CR\
```

8.3 Encounter Data File (DF) Trailer Format

1. A trailer is required at the bottom of each Data File, i.e., as the last record in the Structured Data File, in the following format:

   EOF.*[#Total Number of Records]*.*[File Name of Data File]*

2. Dot "." is used as the field delimiter. Hence the field value must not contain dot "."
3. The line of trailer is not counted in the [Total number of Records].
4. [File name of Data File] follows the format as specified in Section 8.4 below.

The table below listed the definition and expected values of the Trailer components:

Seq	Data Field	Definition	Field Length	Remarks	M/O
1	End of File indicator	File trailer indicator	char(3)	Fixed Value: **EOF**	M
2	Total number of Records	Total number of Encounter records in this Data File excluding the trailer	numeric(10)	Variable length: 0-9999999999	M
3	File name of Data File	File name of this Data File	vachar(83)	Refer to DF File Naming convention	M

e.g. DF with an Outpatient Appointment Encounter Record and trailer

```
773024585457|RK12|2023-08-02 00:00:00.000|I|2023-08-02 00:00:00.000|APP-OP||9907819043|9907819043|9907819043|O|||2|||||||||||||||||||Clinic A|Clinic A|2023-08-02 00:00:00.000||PAE||N|||||||||||||||||||||||||2023-08-02 00:00:00.000|9907819043|ZZZ VERIFICATION HOSPITAL|2023-08-02 00:00:00.000|9907819043|ZZZ VERIFICATION HOSPITAL\CR\
EOF.1.9907819043.4212607095.ENCTR.DF.1.20230802033003
```

8.4 Encounter Data File (DF) Naming Convention

Format

Each Encounter DF must be named in the following convention:

*[HCP ID].[Sending Location Code].**ENCTR.DF**.[Sequence ID].[Generation Date]*

e.g. 9907819043.BranchA.**ENCTR.DF**.1.20230802033003

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][-_].

File Name Conventions and Components

The table below listed the file name components and their respective definitions:

Seq	File name Component	Definition	Maximum Length	Remarks	M/O
1	HCP ID	A unique identifier assigned to an eHealth Healthcare Provider by eHRSS	char(10)	e.g. 8088450656	M
2	Sending Location Code	A code agreed between eHRSS and the HCP which indicates the location where the data is sending from.	varchar(20)	Use [HCP ID] if sending location cannot be provided. Format: Any combination of the following alphanumeric characters: [A-Z][0-9][-_] e.g. BranchA	M
3	Record Type	A standardised code to identify the data domain	char(5)	Fixed value: **ENCTR**	M
4	File Type	Data File	char(2)	Fixed value: **DF**	M
5	Sequence ID	Sequence of the file generated on the same generation date	numeric(3)	Variable Length: Numeric 1-999	M
6	Generation Date	File generation date	char(14)	Format: YYYYMMDDhhmmss	M

9 Healthcare Recipient List (PL) Interface File

A Healthcare Recipient List (PL) must accompany every Structured Data File (DF) upload. For the Encounter DF upload, the PL includes one record each for all the HCRs whose Encounter data are included in the current upload.

The PL file contains identification information of the HCRs included in the DF which eHRSS will verify and ensure that an active sharing consent exists. If there are any mismatched personal data or missing sharing consents or missing HCR data for an Encounter record, the corresponding PL and DF record(s) will be rejected. Error messages will be sent to tte HCP's eHR Inbox for follow up by the HCP.

9.1 HCR List (PL) Schema

The table below listed the data fields and corresponding definitions and expected values of each PL record.

Seq	Data Field	Definition	Field Length	Remarks	M/O
1	eHR number	A unique HCR identifier assigned by eHRSS	numeric(12)	Fixed Length: e.g.1: 201000000001, e.g.2: 773024585457	M
2	Sex	Gender of the HCR	char(1)	Permissible values: **M :** Male **F :** Female **U :**(Unknown Sex) e.g.1:. M; e.g.2: F	M
3	Date of birth (DOB)	The HCR's date of birth as indicated on the HCR's identity document	datetime(23)	• Birth time is not required; • If no exact birth month and day on HCR's ID, set birth day and month to 1 January, e.g. YYYY-**01-01** • If no exact birth day, set birth day to 01, e.g. YYYY-MM-**01** Format: YYYY-MM-DD **00:00:00.000** e.g.1: 1920-01-01 00:00:00.000 e.g.2: 1979-08-06 00:00: 00.000	M

Seq	Data Field	Definition	Field Length	Remarks	M/O
4	HKIC number	• Hong Kong Identity Card (HKIC) number; or • Registration Number on Hong Kong Birth Certificate (post-1981); or • Consular Corps Identity Card number issued by HKSAR Immigration Department • include check digit	varchar(12)	• Mandatory if [Type of Identity Document] is HKIC (ID); Birth Certificate (BC) or Consular Corps ID Card (CD); else NA • Check Digit must be included as the last character (without brackets) Format: AANNNNNNNNC or ANNNNNNNNC e.g.1: A1234563	M*
5	Type of identity document	The type of identity document the HCR used for eHealth registration or identity update.	Varchar(6)	eHR value from the eHR 'Type of identity document' code set in **Self-service kit** e.g.1: ID; e.g.2: OC	M
6	Identity document number	The document number of the HCR's identity document	varchar(30)	Mandatory if HKIC number is blank e.g.1: A1234563 e.g.2: VERIFICATIONDATA|53	M*
7	English surname	HCR's surname in English	varchar (40)	Mandatory if [English full name] is blank; else Optional Format: All Uppercase letters e.g.1: CHAN e.g.2: PARTICIPANT53	M*
8	English given name	HCR's given name in English	varchar (40)	Mandatory if [English full name] is blank; else Optional Format: All Uppercase letters e.g.1: TAI MAN e.g.2: KIWIFRUIT	M*
9	English full name	HCR's full name in English	varchar(100)	• Mandatory if either [English surname] or [English given name] is blank; • Optional if both [English surname] and [English given name] are not blank Format: All uppercase letters, [Surname]+[,]+ 1 white space +[Given Name] e.g.1: CHAN, TAI MAN	M*

9.2 Generation of an HCR List (PL) File

1. Each record must be on a new line. **\CR** is used as record terminator.
2. Pipe line "**|**" is used as field delimiter. If the data field is not applicable, or there is no data value for an optional field, the pipe line must still be inserted to delimit the empty field so that the correct field sequence is preserved. White space is NOT required for an empty field.
3. If a data value contains pipe line, the pipe line must be replaced by **\F** before upload.

The resultant PL record will be in the following format:

<eHR Number>**|**<Sex>**|**<Date of Birth>**|**<HKIC Number>**|**<Type of Identity Document>**|**<Identity Document Number>**|**<English Surname>**|**<English Given Name>**|**<English Full Name>**\CR**
<eHR Number>**|**<Sex>**|**<Date of Birth>**|**<HKIC Number>**|**<Type of Identity Document>**|**<Identity Document Number>**|**<English Surname>**|**<English Given Name>**|**<English Full Name>**\CR**

e.g.

201000000001|M|1920-01-01 00:00:00.000|A1234563|ID|A1234563|CHAN|TAI MAN|CHAN, TAI MAN\CR\
773024585457|F|1979-08-06 00:00:00.000||OP|VERIFICATIONDATA\F\53|PARTICIPANT53|KIWIFRUIT|\CR\

9.3 PL File Trailer Format

1. A trailer is required at the bottom of each PL file, i.e. as the last record of the PL file:

   EOF.*[#Total Number of HCRs]*.*[File Name of HCR List]*

2. Dot "**.**" is used as the field delimiter. Hence the field value must not contain dot "."
3. The line of trailer is not counted in the [Total number of HCRs].
4. [File name of HCR List] follows the format as specified in Section 9.4

The table below listed the definition and expected values of the Trailer components:

Seq	Data Field	Definition	Field Length	Remarks	M/O
1	End of File indicator	File trailer indicator	char(3)	Fixed Value : **EOF**	M
2	Total number of HCRs	Total number of HCRs records in this PL file excluding the trailer	numeric(10)	Variable length: 0-9999999999	M

Seq	Data Field	Definition	Field Length	Remarks	M/O
3	File name	File name of this PL file	vachar(83)	Please refer to Section 9.4 for PL File Naming Convention	M

e.g. PL file with trailer:

```
201000000001|M|2009-01-01 00:00:00.000|A1234563|ID|A1234563|CHAN|TAI MAN|CHAN, TAI MAN\CR\
773024585457|F|1979-08-06 00:00:00.000||OP|VERIFICATIONDATA\F\53|PARTICIPANT53|KIWIFRUIT|\CR\
EOF.2.9907819043.BranchA.ENCTR.PL.1.20230802033001
```

9.4 PL File Naming Convention (for Encounter Data Upload)

Format

Each PL file for Encounter data upload must be named in the following convention:

[HCP ID].[Sending Location Code]. ***ENCTR.PL.****[Sequence ID]. [Generation Date]*

e.g. 9907819043.BranchA.**ENCTR.PL**.1.20230802033003

File Name Conventions and Components

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][-_].

The table below listed the file name components and their respective definitions:

Seq	File name Component	Definition	Length	Remarks	M/O
1	HCP ID	A unique identifier assigned to an eHealth Healthcare Provider by eHRSS	char(10)	e.g. 8088450656	M
2	Sending Location Code	A code agreed between eHRSS and the HCP which indicates the location where the data is sending from.	varchar(20)	Format: Any combination of the following alphanumeric characters: [A-Z][0-9][-_] e.g. BranchA	M

Seq	File name Component	Definition	Length	Remarks	M/O
3	Record Type	A standardised code to identify the data domain	char(5)	Fixed value: **ENCTR**	M
4	File Type	HCR List	char(2)	Fixed value: **PL**	M
5	Sequence ID	Sequence of the file generated on the same generation date	numeric(3)	Variable length: 1-999	M
6	Generation Date	File generation date	char(14)	Format: YYYYMMDDhhmmss	M

10 Packaging the data upload files

After the DF(s) and PL files are generated, they have to be packaged with the Encounter HL7 message and zipped with password before upload to eHRSS. The steps involved are listed below:

- Generate HL7 message for Encounter records (ORU^R01)
- Sign the HL7 message with XML digital signature
- Zip DFs, PL and signed HL7 message with zip password
- Generate a Zip Batch Control File
- Connect to eHRSS via SFTP and upload the zipped batch files

Details of each step are elaborated in the following sections.

10.1 Generate HL7 Message for Encounter Records

10.1.1 HL7 ORU^R01 message

The HL7 version 2.5 ORU (Unsolicited Observation Message) Event R01 message in XML format is used for eHealth Encounter records upload. The ORU^R01 message contains 3 mandatory segments:

- MSH – Message Header Segment
- OBR – Observation Request Segment
- OBX – Observation/Result Segment

10.1.2 ORU^R01 message template for Encounter data upload

The ORU^R01 XML message format for eHR clinical data upload is standardised with fixed structure and specific values for most data items. In the following template, data variables that have to be generated with each specific upload are quoted in square brackets and highlighted in *[Red]*. The definitions and expected values of these variables will be described in later section. All other parts including XML Tags and data values should not be altered without confirmation with the eHRSS project teams.

A sample Encounter HL7 message XML file is included in the eHealth Data Upload **Self Service Kit**. Developers may use it as a template for incorporation with their data uploads after modification.

For in-depth and detail HL7 message mapping, please refer to the technical specifications published on the HL7 (HK) website.

```
<!-- Begin HL7 message -->

<?xml version="1.0" encoding="UTF-8"?>
<ORU_R01 xsi:schemaLocation="urn:hl7-org:v2xml ORU_R01.xsd"
xmlns="urn:hl7-org:v2xml" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance">
  <MSH>
      <MSH.1>|</MSH.1>
      <MSH.2>^~\&amp;</MSH.2>
      <MSH.3>
            <HD.1>[HCP system name and version]</HD.1>
      </MSH.3>
      <MSH.4>
            <HD.1>[HCP ID]</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>[Message generation datetime]</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>[Message Control ID]</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.21><EI.1>[Message Profile Identity]</EI.1></MSH.21>
  </MSH>
  <ORU_R01.PATIENT_RESULT>
      <ORU_R01.ORDER_OBSERVATION>
            <OBR>
                  <OBR.4>
                        <CE.1>ENCTR</CE.1>
                  </OBR.4>
            </OBR>
            <ORU_R01.OBSERVATION>
                  <OBX>
                        <OBX.2>RP</OBX.2>
                        <OBX.3>
                              <CE.1>ENCTR</CE.1>
                        </OBX.3>
                        <OBX.4>[Bulk Load Type]</OBX.4>
                        <OBX.5>
                              <RP.1>
                              [DF filename]:[DF checksum]
                              </RP.1>
                        </OBX.5>
                        <OBX.5>
                              <RP.1>
                              [PL filename]:[PL file checksum]
                              </RP.1>
                        </OBX.5>
                        <OBX.11>F</OBX.11>
                  </OBX>
            </ORU_R01.OBSERVATION>
      </ORU_R01.ORDER_OBSERVATION>
  </ORU_R01.PATIENT_RESULT>

<!-- Begin XML Digital Signature and Key Info -->

<Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
<SignedInfo>
  <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-
c14n#WithComments"/>
  <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"/>
      <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-
c14n#WithComments"/>
    </Transforms>
    <DigestMethod Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/>
    <DigestValue>[Message's Digest Value]</DigestValue>
  </Reference>
```

```
</SignedInfo>
   <SignatureValue>[Signature Value]</SignatureValue>
<KeyInfo>
  <X509Data>
    <X509Certificate>[Certificate]</X509Certificate>
    <X509IssuerSerial>
      <X509IssuerName>[X509 Issuer Name]</X509IssuerName>
      <X509SerialNumber>[X509 Serial Number]</X509SerialNumber>
    </X509IssuerSerial>
  </X509Data>
</KeyInfo>
</Signature>

<!-- End XML Digital Signature and Key Info -->

</ORU_R01>

<!-- End HL7 Message -->
```

10.1.3 Encounter HL7 Message data variables

The table below described the data variables in the eHR Encounter HL7 message which have to be generated for each data upload (those highlighted in [Red] in Section 10.1.2 HL7 ORU^R01 template). Fixed valued and un-used HL7 message items are not listed below. Readers may refer to the HL7 (HK) website for the full HL7 message specifications if required.

Tag	Max Length	HL7 Data Type	Data Variables	Remarks	M/O
<MSH.3> <HD.1>	227	HD	HCP's system name and version number	EMR system name and version for data exchange e.g. CMS 3.0	M
<MSH.4> <HD.1>	227	HD	Healthcare provider identifier assigned by eHRSS	Fixed length (10)	M
#<MSH.7> <TS.1>	26	TS DTM	Message generation datetime	Format YYYYMMDDhhmmss	M
#<MSH.10>	20	ST	Message Control ID	Unique message identifier assigned by HCP's data upload application. Values can be in any combination of alphanumeric characters i.e. [A-Z][0-9][-_] HCP assigned value. e.g. 20110701230000	M

Tag	Max Length	HL7 Data Type	Data Variables	Remarks	M/O
<MSH.21>	21	EI	Message Profile Identity	eHR dataset version *(Current version "eHRSS-1.5.0")*	M
<OBX.4>	20	ST	Bulk Load Type	Permissible values: **BL**: INC Bulk load **BL-M**: DM Bulk load	M
<OBX.5> <RP.1>	99999	Varies	[DF File Name]:[Checksum]	"**:**" is used to delimit the two variables	M
			DF File Name	File name of the Data File according to the specified naming convention	
			Checksum	Use SHA256 checksum algorithm for file checksum value. Refer to Section 1 of the Appendix on example of how to generate a file checksum. For SHA standards, 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)	M
<OBX.5> <RP.1>	99999	Varies	[PF File Name]:[Checksum]	"**:**" is used to delimit the two variables	M
			PF File Name	File name of the HCR List (PL) File according to the specified naming convention	M
			Checksum	Use SHA256 checksum algorithm for file checksum value. (See note under above Checksum for SHA standards)	M

10.1.4 HL7 message file naming convention

The file carrying the HL7 message must be named in the following conventions:

[HCP ID].[Sending Location Code]. ***ENCTR.HL7****.[Message Control ID]*

e.g.

8088450656.BranchA.**ENCTR.HL7**.20230802033003

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

10.2 Generate XML Digital Signature

10.2.1 XML digital signature

An XML digital signature is required to digitally sign the whole HL7 document to ensure integrity and authenticity of the message exchange. Refer to Section 2 of the Appendix on example of how to generate XML digital signature.

10.2.2 XML signature requirements

Signing Authority:	eHR Trusted CA e.g. HongKong Post CA (https://www.hongkongpost.gov.hk/product/ecert/type/server/index.html)
Certificate Type:	X.509(Encipherment)
Key Length:	2048-bit RSA key

10.3 Zip all files with password

Zip the signed HL7 message, PL and DFs into a standard zip format file (ZIP Batch File) with zip password. The zip encryption algorithm is AES-256.

10.3.1 File size limit

If total size of PL, DF and HL7 files exceeds 100MB, split into multi-parts zip with 100MB size limit.

10.3.2 Naming convention of the ZIP batch file

- Naming convention for single ZIP batch file or the first multi-parts ZIP batch file:
  [HL7 File Name].zip

  e.g. 8088450656.CORP.ENCTR.HL7.20110701230000.**zip**

- Naming convention for multi-parts ZIP batch file:
  *[HL7 File Name].**z**[sequence id]*

  e.g.
  8088450656.CORP.ENCTR.HL7.20110701230000.zip
  8088450656.CORP.ENCTR.HL7.20110701230000.**z**01
  8088450656.CORP.ENCTR.HL7.201107f01230000.**z**02

10.4 Generate Zip batch control file

Generate one control file (ZIP Batch Control File) for each lot of ZIP Batch File(s) (single ZIP file or multi-part zip files).

10.4.1 Naming convention of the ZIP batch control file

Naming convention of the zip batch control file:

*[HL7 File Name].**zip**.**control***

e.g.

```
8088450656.BRANCHA.ENCTR.HL7.20110701230000.zip.control
```

10.4.2 Content the ZIP batch control file

- The ZIP Batch Control File should contain the complete name list of the batch's zip file(s).
- If the ZIP Batch is in multi-part zip files, the file name records should be in the correct sequence. The first file name is the single zip file name and the following files are followed by the sequence id starting from "01".
- Each file name record should be on a new line.
- The Last Line of the file should be the "EOF" string to indicate the end of file

- Single ZIP batch control file content:

e.g.

```
8088450656.BRANCHA.ENCTR.HL7.20110701230000.zip
EOF
```

- multi-parts ZIP batch control file content:

e.g.

```
8088450656.BRANCHA.ENCTR.HL7.20110701230000.zip
8088450656.BRANCHA.ENCTR.HL7.20110701230000.z01
8088450656.BRANCHA.ENCTR.HL7.201107f01230000.z02
EOF
```

10.5 Connect to eHRSS for data upload

10.5.1 Generate key pair for SFTP connection

1. HCP is required to generate an RSA 2048-bit asymmetric key pair; and
2. Submit the public key to eHRSS registry.
   Refer to Section 3 of the Appendix on example of how to generate key pair.

10.5.2 Submit the public key to eHRSS

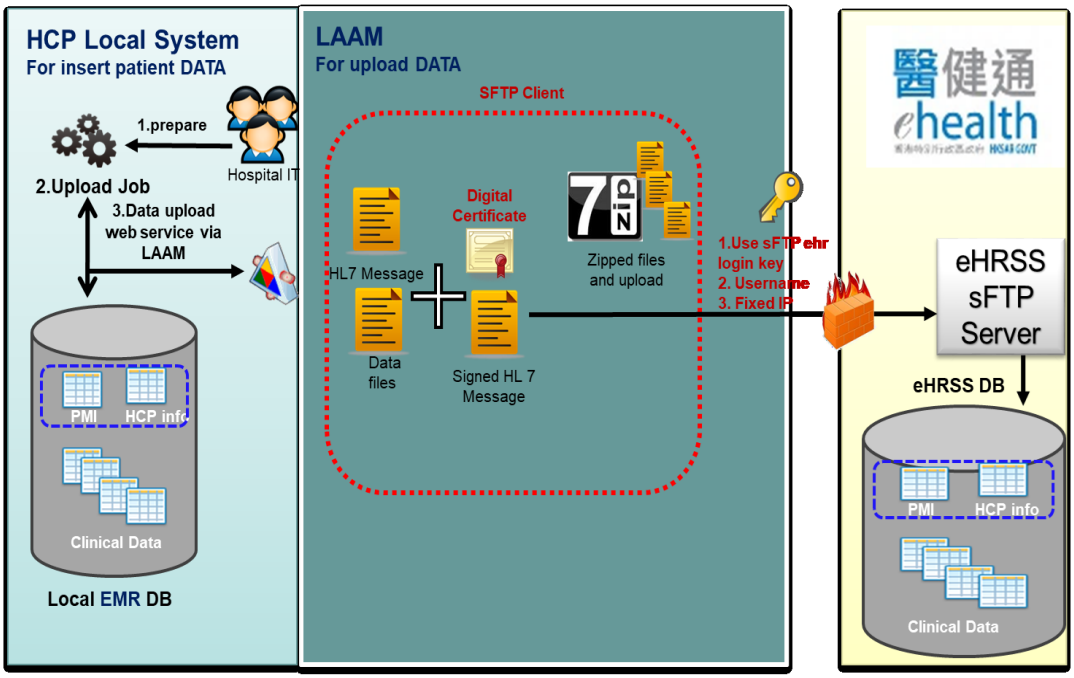
- Submit the public key to eHRSS registry.
- Obtain the SFTP server's public key from eHR
- Before upload, the HCP EMR system has to test the connection to eHRSS SFTP server with its private key and the public key from the SFTP server.

10.5.3 Files Upload Sequence

Upload the ZIP Batch File(s), following by the ZIP Batch Control File.

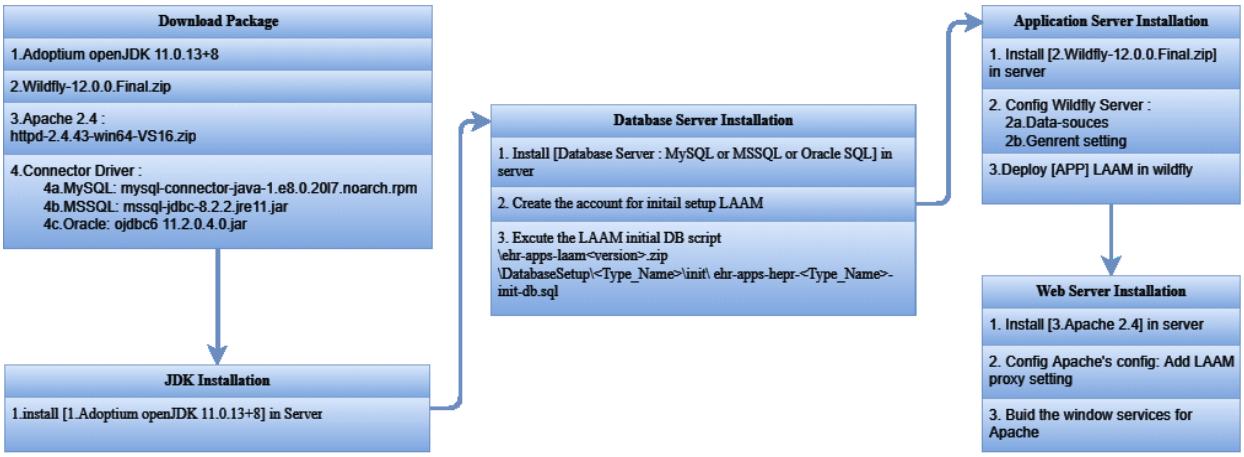
11 Local eMR Adaptor Adaptation Module (LAAM)

eHealth provides a free of charge packaging software LAAM to support EMR to upload data to eHRSS. It provides functions for PL and DF data files generation, HL7 message creation and signing, files zipping with passwords and data package upload to eHRSS via SFTP (Sections 8-10). EMR systems are only required to call the Simple Object Access Protocol (SOAP) interface provided by LAAM to submit their transaction data to LAAM for transformation to Bulk Load Standard (BLS) format for packaging and upload to eHRSS.



11.1 LAAM installation step by step

The following figure shows the software involved and the basic installation steps.



11.2 LAAM ENCTR Request Interface Hierarchy

The following table shows the Interface Hierarchy for Encounter SOAP Request. For the definition, data type, max length, remarks, and condition mandatory (M*), please refer to section 8.1 and 9.1.

Level	Namespace	Tag Name	Corresponding her data field	PL/DF [seq] or MSH	Schema Type	M/O	Repeatable
1	ws	uploadEnctrDataRequest	N/A	NA	Object	M	No
2	ws	hcpId	Healthcare Provider identifier	MSH.4	String	M	No
2	ws	batchType	Upload Mode Fixed value=**BL**	OBX.4	String	M	No
2	ws	complianceLevel	Data Compliance Level Fixed value=**3**	MSH.8	String	M	No
2	ws	generationDate	Message generation datetime	MSH.10	String	M	No
2	ws	enctrRecords	N/A	NA	Object	M	Yes (Max: 1000000)
3	urn	participant	N/A	NA	Object	M	No
4	urn	ehr_no	eHR number	PL[1] DF[1]	String	M	No
4	urn	hkid	HKIC number	PL[4]	String	M*	No
4	urn	doc_type	Type of identity document	PL[5]	String	M*	No
4	urn	doc_no	Identity document number	PL[6]	String	M*	No
4	urn	person_eng_surname	English surname	PL[7]	String	M*	No
4	urn	person_eng_given_name	English given name	PL[8]	String	M*	No
4	urn	person_eng_full_name	English full name	PL[9]	String	M*	No
4	urn	sex	Sex	PL[2]	String	M	No
4	urn	birth_date	Date of birth	PL[3]	String	M	No
3	urn	encounterDetail	NA	NA	Object	No	Yes (Max: 1000000)
4	urn	record_key	Record key	DF[2]	String	M	No
4	urn	transaction_dtm	Transaction datetime	DF[3]	String	M	No
4	urn	transaction_type	Transaction type	DF[4]	String	M	No
4	urn	last_update_dtm	Last update Datetime	DF[5]	String	M	No
4	urn	episode_no	Episode number	DF[7]	String	O	No
4	urn	attendance_inst_id	Attendance institution identifier	DF[8]	String	O	No
4	urn	record_creation_dtm	Record creation datetime	DF[67]	String	O	No
4	urn	record_creation_inst_id	Record creation institution identifier	DF[68]	String	O	No
4	urn	record_creation_inst_name	Record creation institution name	DF[69]	String	O	No

Level	Namespace	Tag Name	Corresponding her data field	PL/DF [seq] or MSH	Schema Type	M/O	Repeatable
4	urn	record_update_dtm	Record last update datetime	DF[70]	String	O	No
4	urn	record_update_inst_id	Record update institution identifier	DF[71]	String	O	No
4	urn	record_update_inst_name	Record update institution name	DF[72]	String	O	No
4	urn	transaction_profile_type	Transaction profile type	DF[6]	String	M	No
4	urn	healthcare_prov_id	Encounter healthcare provider identifier	DF[9]	String	M	No
4	urn	healthcare_inst_id	Encounter healthcare institution identifier	DF[10]	String	M	No
4	urn	encounter_type	Encounter type	DF[11]	String	M	No
4	urn	appointment_number	Appointment number	DF[14]	String	M	No
4	urn	episode_start_dtm	Episode start datetime	DF[15]	String	O	No
4	urn	episode_start_specialty	Episode start specialty	DF[17]	String	O	No
4	urn	episode_start_specialty_remark	Episode start specialty remarks	DF[18]	String	O	No
4	urn	visit_number	Visit number	DF[34]	String	O	No
4	urn	visit_clinic_id	Visit clinic identifier	DF[35]	String	O	No
4	urn	visit_clinic_name	visit_clinic_name	DF[36]	String	O	No
4	urn	visit_clinic_lt_name	Visit clinic local name	DF[37]	String	O	No
4	urn	visit_datetime	Visit datetime (Appointment datetime)	DF[38]	String	O	No
4	urn	visit_urgency	Visit urgency	DF[39]	String	O	No
4	urn	visit_specialty	Visit specialty	DF[40]	String	O	No
4	urn	visit_specialty_remark	Visit specialty remarks	DF[41]	String	O	No
4	urn	visit_attend_ind	Visit attendance indicator	DF[42]	String	O	No
4	urn	referral_no	Referral number	DF[49]	String	O	No
4	urn	refer_from_inst_id	Refer-from-institution identifier	DF[50]	String	O	No
4	urn	refer_from_inst_name	Refer-from-institution long name	DF[51]	String	O	No
4	urn	refer_from_inst_lt_name	Refer-from-institution local name	DF[52]	String	O	No
4	urn	refer_from_prof_eng_name	Refer-from-healthcare professional English name	DF[53]	String	O	No
4	urn	refer_from_prof_chi_name	Refer-from-healthcare professional Chinese name	DF[54]	String	O	No
4	urn	refer_from_encounter_no	Refer-from-encounter number	DF[55]	String	O	No
4	urn	referral_source_cd	Referral source code	DF[56]	String	O	No
4	urn	referral_source_desc	Referral source description	DF[57]	String	O	No
4	urn	referral_source_lt_desc	Referral source local description	DF[58]	String	O	No
4	urn	referral_specialty	Referral specialty	DF[59]	String	O	No
4	urn	referral_specialty_remark	Referral specialty remarks	DF[60]	String	O	No
4	urn	case_prof_eng_name	Case healthcare professional	DF[63]	String	O	No

Level	Namespace	Tag Name	Corresponding her data field	PL/DF [seq] or MSH	Schema Type	M/O	Repeatable
			English name				
4	urn	case_prof_chi_name	Case healthcare professional Chinese name	DF[65]	String	O	No

11.3 Sample for LAAM Encounter request (Visit-based Outpatient)

The sample below describes the data variables in the LAAM SOAP request that have to be provided (those highlighted in [Red]).

Encounter domain request object

```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ws="http://ehr.gov.hk/hepr/ws" xmlns:urn="urn:hl7-org:v3">
  <wsse:Security soapenv:mustUnderstand="1"
    xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
    xmlns:wsu="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd">
    <wsse:UsernameToken wsu:Id="UsernameToken">
      <wsse:Username>admin</wsse:Username>
      <wsse:Password
       Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-
1.0#PasswordText">
       password</wsse:Password>
    </wsse:UsernameToken>
  </wsse:Security>
 </soapenv:Header>
 <soapenv:Body>
   <ws:uploadEnctrDataRequest>
     <ws:hcpId>[HCP ID]</ws:hcpId>
     <ws:batchType>[Upload mode]</ws:batchType>
     <ws:complianceLevel>3</ws:complianceLevel>
    <ws:generationDate>[File generation date]</ws:generationDate>
     <!--Zero or more repetitions:-->
     <ws:EnctrRecords>
       <urn:participant>
         <urn:ehr_no>[eHR number]</urn:ehr_no>
         <urn:hkid>[HKIC number]</urn:hkid>
         <urn:doc_type>[Type of identity document ]</urn:doc_type>
         <urn:doc_no>[Identity document number]</urn:doc_no>
         <urn:person_eng_surname>[English surname ] </urn:person_eng_surname>
         <urn:person_eng_given_name>[ English given name ] </urn:person_eng_given_name>
         <urn:person_eng_full_name>[English full name] </urn:person_eng_full_name>
         <urn:sex>[sex]</urn:sex>
         <urn:birth_date>[Date of birth]</urn:birth_date>
       </urn:participant>
       <urn:encounterDetail>
         <!--Zero or more repetitions:-->
         <urn:appointment>
           <urn:record_key>[record key]</urn:record_key>
           <urn:transaction_dtm>[Transaction datetime]</urn:transaction_dtm>
           <urn:transaction_type>[Transaction Type]</urn:transaction_type>
           <urn:last_update_dtm>[Last update datetime]</urn:last_update_dtm>
           <urn:transaction_profile_type>[Transaction profile type]</urn:transaction_profile_type>
```

```
            <urn:attendance_inst_id>[Attendance institution identifier]</urn:attendance_inst_id>
            <urn:healthcare_prov_id>[Encounter healthcare provider identifier]</urn:healthcare_prov_id>
            <urn:healthcare_inst_id>[Encounter healthcare institution identifier]</urn:healthcare_inst_id>
            <urn:encounter_type>[Encounter type]</urn:encounter_type>
            <urn:outpatient_no_episode_appointment_encounter_type>
              <urn:appointment_number>[Appointment number]</urn:appointment_number>
              <urn:visit_number>[Visit number]</urn:visit_number>
              <urn:visit_clinic_id>[Visit clinic identifier]</urn:visit_clinic_id>
              <urn:visit_clinic_name>[Visit clinic long name]</urn:visit_clinic_name>
              <urn:visit_clinic_lt_name>[Visit clinic local name]/urn:visit_clinic_lt_name>
              <urn:visit_datetime>[Visit datetime]</urn:visit_datetime>
              <urn:visit_urgency>[Visit urgency]</urn:visit_urgency>
              <urn:visit_specialty>[Visit specialty]</urn:visit_specialty>
              <urn:visit_specialty_remark>[Visit specialty remarks]</urn:visit_specialty_remark>
              <urn:visit_attend_ind>[Visit attendance indicator]</urn:visit_attend_ind>
              <urn:referral_no>[Referral number]</urn:referral_no>
              <urn:refer_from_inst_id>[Refer-from-institution identifier]</urn:refer_from_inst_id>
              <urn:refer_from_inst_name>[Refer-from-institution long name]</urn:refer_from_inst_name>
              <urn:refer_from_inst_lt_name>[Refer-from-institution local name]</urn:refer_from_inst_lt_name>
              <urn:refer_from_prof_eng_name>[Refer-from-healthcare professional English
name]<urn:refer_from_prof_eng_name>
              <urn:refer_from_prof_chi_name>[Refer-from-healthcare professional Chinese
name]</urn:refer_from_prof_chi_name>
              <urn:refer_from_encounter_no>[Refer-from-encounter number]</urn:refer_from_encounter_no>
              <urn:referral_source_cd>[Referral source code]</urn:referral_source_cd>
              <urn:referral_source_desc>[Referral source description]</urn:referral_source_desc>
              <urn:referral_source_lt_desc>[Referral source local description]</urn:referral_source_lt_desc>
              <urn:referral_specialty>[Referral specialty]</urn:referral_specialty>
              <urn:referral_specialty_remark>[Referral specialty remarks]</urn:referral_specialty_remark>
              <urn:case_incharge_prof_eng_name>[Case healthcare professional English
name]</urn:case_incharge_prof_eng_name>
              <urn:case_incharge_prof_chi_name>[Case healthcare professional Chinese name]
</urn:case_incharge_prof_chi_name>
            </urn:outpatient_no_episode_appointment_encounter_type>
            <urn:record_creation_dtm>[Record creation datetime]</urn:record_creation_dtm>
            <urn:record_creation_inst_id>[Record creation institution identifier]</urn:record_creation_inst_id>
            <urn:record_creation_inst_name>[Record creation institution
name ]</urn:record_creation_inst_name>
            <urn:record_update_dtm>[Record last update datetime]</urn:record_update_dtm>
            <urn:record_update_inst_id>[Record update institution identifier]</urn:record_update_inst_id>
            <urn:record_update_inst_name>[Record update institution name]</urn:record_update_inst_name>
          </urn:appointment>
        </urn:encounterDetail>
      </ws:EnctrRecords>
    </ws:uploadEnctrDataRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

A sample Encounter LAAM SOAP request sample is included in the eHealth Data Upload **Self Service Kit**. Developers may use it as a template for incorporation with their data uploads after modification.

For in-depth and detail HL7 message mapping, please refer to the technical specifications published on the HL7 (HK) website.

Appendix

1 How to generate [File Checksum]

Select the programming language for the implementation. For example, Python or Java. Ensure that the chosen language has built-in support for SHA-256. The following is a sample JAVA code to generate file checksum using SHA256.

Sample code to import Java libraries for SHA“256

Replace "path/t”/your/file.txt" with the actual path to your file. This code uses the MessageDigest class to create a SHA-256 digest and then converts the digest into a hexadecimal string.

```java
import java.io.FileInputStream;
import java.security.MessageDigest;

public class SHA256ChecksumGenerator {
    public static void main(String[] args) {
        String filePath = "path/to/your/file.txt";
        try {
            byte[] checksum = generateChecksum(filePath);
            System.out.println("SHA-256 Checksum: " + bytesToHex(checksum));
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
    private static byte[] generateChecksum(String filePath) throws Exception {
        MessageDigest digest = MessageDigest.getInstance("SHA-256");
        try (FileInputStream fis = new FileInputStream(filePath)) {
            byte[] buffer = new byte[8192];
            int bytesRead;
            while ((bytesRead = fis.read(buffer)) != -1) {
                digest.update(buffer, 0, bytesRead);
            }
        }
        return digest.digest();
    }
    private static String bytesToHex(byte[] bytes) {
        StringBuilder result = new StringBuilder();
        for (byte b : bytes) {
            result.append(String.format("%02x", b));
        }
        return result.toString();
```

2 How to generate [XML Digital Signature]

XML signatures are standardized through the XML Signature Syntax and Processing (XMLDSig) specification. The XMLDSig specification defines the syntax and processing rules for creating and representing digital signatures on XML content. It provides a standardized way to sign and verify the integrity and authenticity of XML documents, ensuring interoperability across different systems and applications.

- Generate a pair of Keys called Private Key and Pubic Key.
  e.g. Install OpenSSL

  Use the following command to generate a private key and saves it to a file named "private_key.pem":

  ```
  openssl genpkey -algorithm RSA -out private_key.pem
  ```

  Use the following command to generate a public key by extracting the public key from the private key and saves it to a file named "public_key.pem":

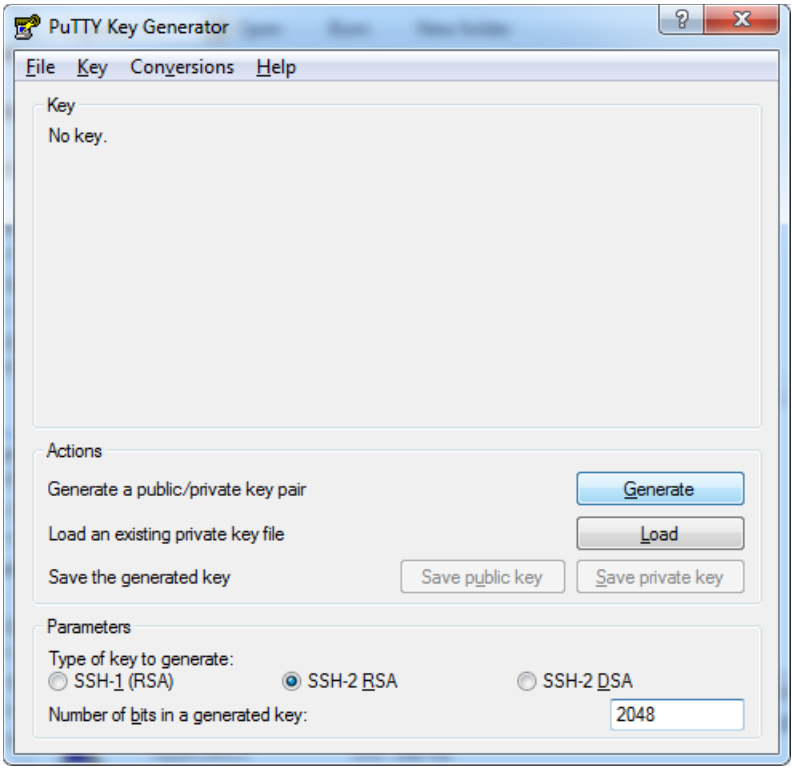
  ```
  openssl rsa -pubout -in private_key.pem -out public_key.pem
  ```

  - Sign the original XML document using both Private and Public key by Java API and generate another document that has a XML Digital Signature. HCP can use libraries or tools that support XML digital signature' (such as Java's javax.xml.crypto package or libraries in other programming languages) to sign XML documents. The following is one of the reference website :
    https://www.oracle.com/technical-resources/articles/java/dig-signature-api.html

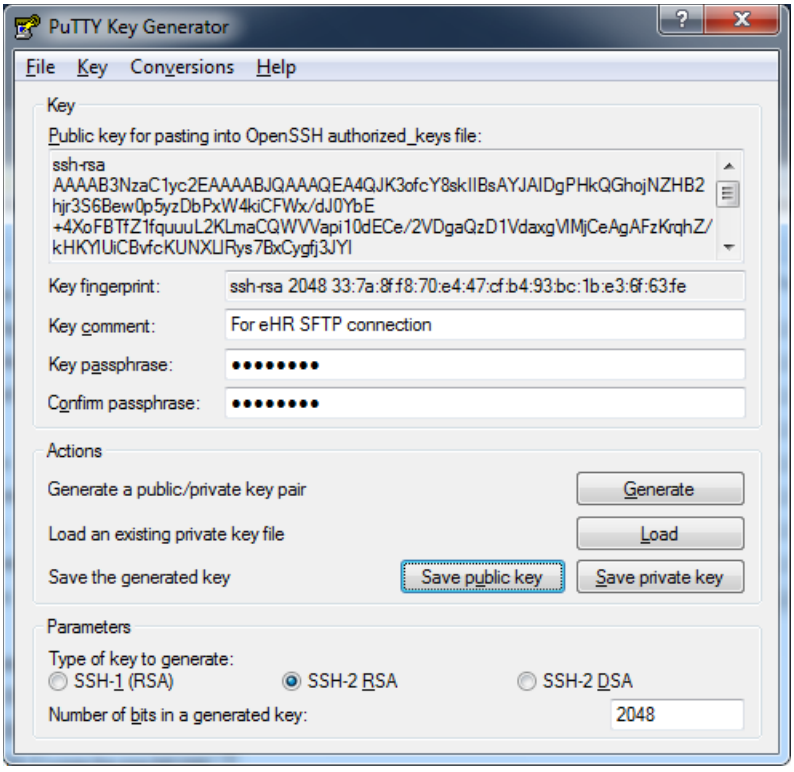
3 How to generate [Key Pair for SFTP connection]

The asymmetric keys can be generated by a variety of tools available on the market.
The following shows an example and steps:

- Program puttygen.exe can be downloaded from the official PuTTY download site (PuTTY: A Free Telnet/SSH Client).
- Execute the program to bring out below screen, entering parameters as:
  - Type of key to generate: SSH-2 RSA
  - Number of bits in a generated key: 2048



- Click Generate and follow the instructions to generate a new public/private key pair.



- Type in necessary information such as Key Comment and passphrase if applicable.
- Save the public key and private key respectively into separate text files.

e.g. public key file: <*HCP Name*>_public_key.pub:

```
---- BEGIN SSH2 PUBLIC KEY ----
Comment: "Generated by Hospital Authority"
AAAAB3NzaC1yc2EAAAABJQAAAQEA4QJK3ofcY8skIIBsAYJAIDgPHkQGhojNZHB2
hjr3S6Bew0p5yzDbPxW4kiCFWx/dJ0YbE+4XoFBTfZ1fquuuL2KLmaCQWVVapi10
dECe/2VDgaQzD1VdaxgVlMjCeAgAFzKrqhZ/kHKYlUiCBvfcKUNXLlRys7BxCygf
j3JYI+RsWqsJRQdLG9rPvzXBaXx0SkNgIT9sjlc05O00xtHeyWF7p4+TXMaZtoe+
tYloSdfY7i73z7sLMpYElJY/Xc17zPYjqL0EpaKY1VNaqSnEZkNTduDZyIv7kNsJ
wufWYZu1ljmjp+IgsD+yeU0quElDjgihM8qENh7J4AA1c+ncnw==
---- END SSH2 PUBLIC KEY ----
```

e.g. private key file: <*HCP Name*>_private_key.ppk

```
PuTTY-User-Key-File-2: ssh-rsa
Encryption: aes256-cbc
Comment: Generated by Hospital Authority
Public-Lines: 6
AAAAB3NzaC1yc2EAAAABJQAAAQEA4QJK3ofcY8skIIBsAYJAIDgPHkQGhojNZHB2
hjr3S6Bew0p5yzDbPxW4kiCFWx/dJ0YbE+4XoFBTfZ1fquuuL2KLmaCQWVVapi10
dECe/2VDgaQzD1VdaxgVlMjCeAgAFzKrqhZ/kHKYlUiCBvfcKUNXLlRys7BxCygf
j3JYI+RsWqsJRQdLG9rPvzXBaXx0SkNgIT9sjlc05O00xtHeyWF7p4+TXMaZtoe+
tYloSdfY7i73z7sLMpYElJY/Xc17zPYjqL0EpaKY1VNaqSnEZkNTduDZyIv7kNsJ
wufWYZu1ljmjp+IgsD+yeU0quElDjgihM8qENh7J4AA1c+ncnw==
Private-Lines: 14
dorl6RZ0nzeijSxt61F1mvBWtMQWBMMDUKmKRU7XjE3sUDvr2p9w08CQZ5z4B7vJ
HCYcNG2c1Ub361seEM9DCdVGNeg80Qc4PBsRZPTnd2UwRljEz6Ltmry+1mkh6mbL
ZRXAWH8vPDH7iYCK6NBohdCSJM1YQ33ijNfSToh/2wwGK/LtmfxFEXSvktj3W2Ob
7VJPRMVchSeWSL+xacs7/cV7jNNz80GW8v8+0/1uPMeWi5/5BkpfvpmiMqDj/KxM
qGZyP3wFzVH0aK4pO5rTLhvw14a/enbjONpVV0ZKMmiIVyQU4T+v7UtdSI5RcdTn
J6Z2De3dwzFfOq+ef6vzMwrvk9C9aCCmaj+N672TuA7EU5Tc0jMIwmI8x4/OlVsG
Leu1m+5YdNTYR9zgkPJQ4naa2SqSRY2E9uz6B5xnwlKsRwcEYxQperMBz0BweCDD
QE63FGoIwJNHqvTF3y6hgWG0fxRTyykiW5BIggDR/zr+IRfhErletll8Twb6K2JZ
smVZI6ujCGyjFlI2w2ritykkHhPf9yi7jn8KXIqDpnQo1Q/8l+B3Ni/R1yfKZCHG
JBpjZCVN4vpKK+dhwX220R4Or09AE5AuS160IUY/k1FMVuWHHXTcYJCorsUOa3hI
ihS/9C4uPp3cwKB56BfZMoycjNus6m66DG03F07Od8+kiCt7pEljP8asp2QX3AuJ
bfimrHdcMNZaa14JKe9PgVWoLC4gI1tjROePru3CfhfAF1kTHHLTSDYRR+faXHy0
mAYbQC4+9aaqjDK69I/co5FRLPsuRJoWat1/42lA64y59aNm2n2hhBp2vyuiMDg5
b7bHeNetCpa85BpC4Psuvq26PoYcXEnj/yVQregPVv7NtuTfj0hVVtTAGRgOM/IQ
Private-MAC: ced363a94c85e863b7b668c03e0db72dddd34b6d
```

4 Document /Website Reference

- BLS Technical Interface Specification for Encounter Record for details of data definitions in **Self Service Kit**
- Communication Protocol Specification for Connection to eHRSS in **Self Service Kit**
- LAAM Interface Specification SOAP in **Self Service Kit**
- XML Signature Generation Sample Code
    - https://www.oracle.com/technical-resources/articles/java/dig-signature-api.html
- Full set Code table in **Self Service Kit**