



# Community Health Surveillance Project: Technical Specifications

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The goal of the project is to collect ADT records that are based on ED registrations. The following data types and related segments are meant as a guide and can be adjusted to accommodate a facility's processes.

**REGISTRATION** (typically A04) - the patient has arrived or checked in as a one-time, or recurring outpatient, and is not assigned to a bed. For these records, the following fields are requested:

## ***MSH***

Field separator [Seq#1] (e.g., "|")  
Encoding characters [Seq#2] (e.g., "^~\&")  
Sending facility [Seq#4] (e.g., "STATE\_XMC")  
HL7 message date and time [Seq#7]  
Trigger event code [Seq#9]  
Message control ID [Seq#10] (for ack purpose)  
Processing mode [Seq#11]  
HL7 version [Seq#12]

## ***PID***

Patient number [Seq#3]  
Patient DOB [Seq#7]  
Patient gender [Seq#8]  
Patient race [Seq#10] (*optional*)  
Patient home zip code [Seq#11-5] (e.g., "^^^12345")  
Patient country code [Seq#11-6] (*optional*)  
Patient ethnic group [Seq#22] (*optional*)  
Patient death date and time [Seq#29] (*optional*)  
Patient death indicator [Seq#30] (e.g. Yes/No) (*optional*)

## ***PVI***

Patient class [Seq#2] (E for emergency department, I for inpatient, O for outpatient)  
Visit number [Seq#19]  
Admitted date and time [Seq#44]

## ***PV2***

Chief complaint [Seq#3-2] (free text) [Note: some hospitals use DG1-4 or DG1-3.2 for chief complaint)

## ***DGI***

ICD-9 code [Seq#3] (*optional*)  
Diagnosis description [Seq#4] (*optional if chief complaint is in another segment*)

**REGISTRATION (CONTINUED)**

*INI (this segment is optional)*

Insurance plan ID (Seq#2)

Insurance company ID (Seq#3)

Insurance company name (Seq#4)

Insurance company address (Seq#5)

Employer's zip code [Seq#44]

*NKI (this segment is optional)*

Employer's zip code [Seq#4]

*OBX (Used to collect initial temperature) (this segment is optional)*

Set ID [Seq#1]

Value type [Seq#2] (Set to NM for "numeric" for initial temperature)

Observation identifier [Seq#3-2] (Set to "body temperature")

Observation value [Seq#5]

Units [Seq#6]

Date and time of observation [Seq#14]

**UPDATE** (typically A08) - any patient information has changed but no other trigger event has occurred.  
For these records, the following fields are requested:

***MSH***

Field separator [Seq#1] (e.g., "|")  
Encoding characters [Seq#2] (e.g., "^~\&")  
Sending facility [Seq#4] (e.g., "STATE\_XMC")  
HL7 message date and time [Seq#7]  
Trigger event code [Seq#9]  
Message control ID [Seq#10] (for ack purpose)  
Processing mode [Seq#11]  
HL7 version [Seq#12]

***PID***

Patient number [Seq#3]  
Patient DOB [Seq#7]  
Patient gender [Seq#8]  
Patient race [Seq#10] (*optional*)  
Patient home zip code [Seq#11-5] (e.g., "^^^12345")  
Patient country code [Seq#11-6] (*optional*)  
Patient ethnic group [Seq#22] (*optional*)  
Patient death date and time [Seq#29] (*optional*)  
Patient death indicator [Seq#30] (e.g. Yes/No) (*optional*)

***PVI***

Patient class [Seq#2] (E for emergency department, I for inpatient, O for outpatient)  
Visit number [Seq#19]  
Admitted date and time [Seq#44]

***PV2***

Chief complaint [Seq#3-2] (free text) [Note: some hospitals use DG1-4 or DG1-3.2 for chief complaint]

***DGI***

ICD-9 code [Seq#3] (*optional*)  
Diagnosis description [Seq#4] (*optional if chief complaint is in another segment*)

***INI*** (*this segment is optional*)

Insurance plan ID (Seq#2)  
Insurance company ID (Seq#3)  
Insurance company name (Seq#4)  
Insurance company address (Seq#5)  
Employer's zip code [Seq#44]

***NKI*** (*this segment is optional*)

Employer's zip code [Seq#4]

**UPDATE (CONTINUED)**

***OBX (Used to collect initial temperature) (this segment is optional)***

Set ID [Seq#1]

Value type [Seq#2] (Set to NM for “numeric” for initial temperature)

Observation identifier [Seq#3-2] (Set to “body temperature”)

Observation value [Seq#5]

Units [Seq#6]

Date and time of observation [Seq#14]

**ADMISSION** (typically A01 or A06) - a patient undergoes the admission process and is assigned to a bed. For these records, the following fields are requested:

***MSH***

Field separator [Seq#1] (e.g., "|")  
Encoding characters [Seq#2] (e.g., "^~\&")  
Sending facility [Seq#4] (e.g., "STATE\_XMC")  
HL7 message date and time [Seq#7]  
Trigger event code [Seq#9]  
Message control ID [Seq#10] (for ack purpose)  
Processing mode [Seq#11]  
HL7 version [Seq#12]

***PID***

Patient number [Seq#3]  
Patient DOB [Seq#7]  
Patient gender [Seq#8]  
Patient race [Seq#10] (*optional*)  
Patient home zip code [Seq#11-5] (e.g., "^^^12345")  
Patient country code [Seq#11-6] (*optional*)  
Patient ethnic group [Seq#22] (*optional*)  
Patient death date and time [Seq#29] (*optional*)  
Patient death indicator [Seq#30] (e.g. Yes/No) (*optional*)

***PVI***

Patient class [Seq#2] (E for emergency department, I for inpatient, O for outpatient)  
Visit number [Seq#19]  
Admitted date and time [Seq#44] (including time zone)

***PV2***

Chief complaint [Seq#3-2] (free text) [Note: some hospitals use DG1-4 or DG1-3.2 for chief complaint)

***DGI***

ICD-9 code [Seq#3] (*optional*)  
Diagnosis description [Seq#4] (*optional if chief complaint is in another segment*)

***INI***(*this segment is optional*)

Insurance plan ID (Seq#2)  
Insurance company ID (Seq#3)  
Insurance company name (Seq#4)  
Insurance company address (Seq#5)  
Employer's zip code [Seq#44]

***NKI*** (*this segment is optional*)

Employer's zip code [Seq#4]

**ADMISSION (CONTINUED)**

***OBX (Used to collect initial temperature) (this segment is optional)***

Set ID [Seq#1]

Value type [Seq#2] (Set to NM for “numeric” for initial temperature)

Observation identifier [Seq#3-2] (Set to “body temperature”)

Observation value [Seq#5]

Units [Seq#6]

Date and time of observation [Seq#14]

**TRANSFER** (typically A02) - a patient changes his or her assigned physical location. For these records, the following fields are requested:

***MSH***

Field separator [Seq#1] (e.g., "|")  
Encoding characters [Seq#2] (e.g., "^~\&")  
Sending facility [Seq#4] (e.g., "STATE\_XMC")  
HL7 message date and time [Seq#7]  
Trigger event code [Seq#9]  
Message control ID [Seq#10] (for ack purpose)  
Processing mode [Seq#11]  
HL7 version [Seq#12]

***PID***

Patient number [Seq#3]  
Patient DOB [Seq#7]  
Patient gender [Seq#8]  
Patient race [Seq#10] (*optional*)  
Patient home zip code [Seq#11-5] (e.g., "^^^12345")  
Patient country code [Seq#11-6] (*optional*)  
Patient ethnic group [Seq#22] (*optional*)  
Patient death date and time [Seq#29] (*optional*)  
Patient death indicator [Seq#30] (e.g. Yes/No) (*optional*)

***PVI***

Patient class [Seq#2] (E for emergency department, I for inpatient, O for outpatient)  
Assigned patient location [Seq#3] (*optional*)  
Prior patient location [Seq#6] (*optional*)  
Visit number [Seq#19]  
Discharge disposition [Seq#36]  
Discharged to location [Seq#37] (*optional*)  
Admitted date and time [Seq#44]  
Discharge date and time [Seq#45]

**DISCHARGE** (typically A03) - a patient's stay in a healthcare facility is ended and their status has changed to discharged. Additionally, a discharge date has been recorded. For these records, the following fields are requested:

***MSH***

Field separator [Seq#1] (e.g., "|")  
Encoding characters [Seq#2] (e.g., "^~\&")  
Sending facility [Seq#4] (i.e., "STATE\_XMC")  
HL7 message date and time [Seq#7]  
Trigger event code [Seq#9]  
Message control ID [Seq#10] (for ack purpose)  
Processing mode [Seq#11]  
HL7 version [Seq#12]

***PID***

Patient number [Seq#3]  
Patient DOB [Seq#7]  
Patient gender [Seq#8]  
Patient race [Seq#10] (*optional*)  
Patient home zip code [Seq#11-5] (e.g., "^^^12345")  
Patient country code [Seq#11-6] (*optional*)  
Patient ethnic group [Seq#22] (*optional*)  
Patient death date and time [Seq#29] (*optional*)  
Patient death indicator [Seq#30] (e.g. Yes/No) (*optional*)

***PVI***

Patient class [Seq#2] (E for emergency department, I for inpatient, O for outpatient)  
Assigned patient location [Seq#3] (*optional*)  
Visit number [Seq#19]  
Discharge disposition [Seq#36]  
Discharged to location [Seq#37] (*optional*)  
Admitted date and time [Seq#44]  
Discharge date and time [Seq#45]

***DGI***

ICD-9 code [Seq#3] (*optional*)  
Diagnosis description [Seq#4] (*optional*)

***INI***(*this segment is optional*)

Insurance plan ID (Seq#2)  
Insurance company ID (Seq#3)  
Insurance company name (Seq#4)  
Insurance company address (Seq#5)  
Employer's zip code [Seq#44]



**DISCHARGE (CONTINUED)**

*NKI (this segment is optional)*

Employer's zip code [Seq#4]

# HL7 Formatted ADT Data

## Start-of-message Character(s)

The start-of-message character is the character at the beginning of a HL7 message. The standard start-of-message character is <VT> (\x0B in hexadecimal value).

## End-of-message Character(s)

After receiving an HL7 message, the HMS listener will send an HL7 acknowledgement (ACK) message back to your message router. The end-of-message character in the ACK message will be the same end-of-message character used in the HL7 message transmitted from your message router. Figure 1 shows a sample HL7 ADT message that uses <FS> character (\x1C) as the end-of-message character. The commonly used end-of-message characters are <FS><CR> (\x1C and \x0D).

The next HL7 message should be transmitted AFTER your message router receives our ACK message as demonstrated in Figure 2. Thus your message router can assure that the message transmitted to Health Monitoring Systems has been received.

## End-of-Segment Character

Each HL7 data segment must be ended with character <CR> (\x0D).

```
MSH1|^~\&||PA_UPMC(hosp)||HMS|200003171458||ADT^A04|20000317145841029270(message control ID)2|P|2.3|<CR>3
PID|||||^017(age)|M||^12345^^^|<CR>
PV1|E|||||200109130045(admit time)||<CR>
PV2|^ABDOMINAL PAIN(chief complaint)|<CR>
DG1||I9|789.09|ABDOMINAL PAIN-SITE NEC(diagnosis desc.)|<CR>
NK1||||^12345^^|EMP|<CR>
IN1|||||^12345<CR>
<FS>4
```

Figure 1. Sample HL7 message to Health Monitoring Systems

```
MSH|^~\&|COMMON||MEDIPAC||200003171458||ACK|20000317145841029270||2.3|<CR>
MSA|AA|20000317145841029270<CR>
<FS>
```

Figure 2. Sample acknowledgement HL7 message to the message router

<sup>1</sup> Red color represents necessary data field.  
<sup>2</sup> Green color represents explanation of the field.  
<sup>3</sup> <CR> represents CR (\x0D) in the ASCII character set.  
<sup>4</sup> <FS> represents FS (\x1C) in the ASCII character set.

## Non-HL7 Formatted ADT Data

For the hospitals that do not have HL7 infrastructure or are not familiar with HL7 message protocol, the HMS software can also process your data in non-HL7 format. For example, HMS can process data files that use delimiters like bar or comma (*eg*, csv files) or use fixed column position. The basic elements that HMS collects are *hospital ID, patient class, patient admitted date and time, free-text chief complaint, home zip code, work zip code (if available), age or date of birth, gender, visit number (if available)*.

Figure 3 shows some sample bar-delimited records.

Non-HL7 formatted data is usually transmitted in batch mode through ftp or secure ftp (sftp) channel. Please contact the HMS group for further ftp server information.

File name convention for batch-mode data files will follow the format: <state\_id>\_<health system ID>\_<date and time the file was created>.txt. For example, the file name for the records in

Figure 3 is pa\_hosp1\_200401311100.txt.

HOSP-1 E 200401310849 ABNORMAL LABS 15217  19230515 F 8456212
HOSP-1 E 200401310949 SOB 15241 15213 19600114 M 8456216

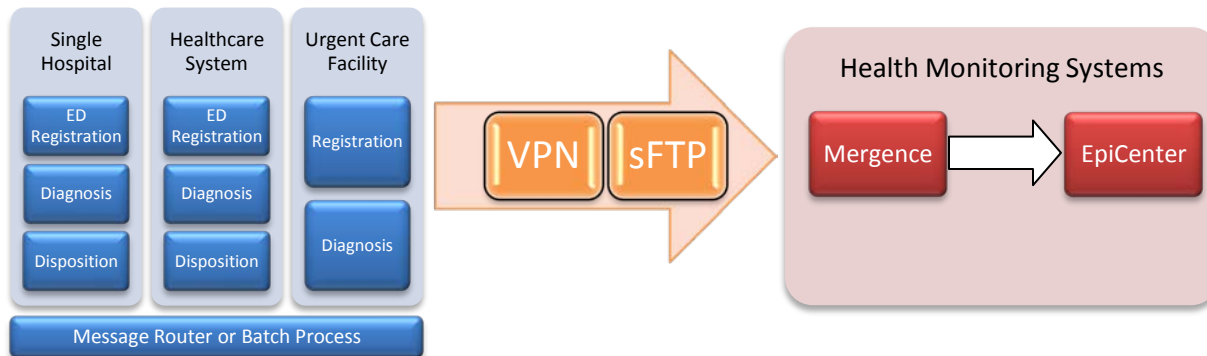
**Figure 3. Sample bar-delimited records.**

## Historic Data

Upon completion of the data connection, we request that a facility send at least 90 days worth of historic data (either across the HL7 interface or via flat file to one of our engineers) to be entered into the system. It is not mandatory to send this historical data, but if it is available, adding it to the system will help quickly establish baselines for the analysis methods to use. This will allow the health department to start using the data immediately.

## Network Connection

Facilities sending through an HL7 interface will send to 10.100.10.13 and port 12002 for test and port 12001 for production.



**Figure 4. HMS data communication diagram.**

*To transmit data in real-time via a VPN tunnel please complete the VPN request form. You will be asked for the following:*

1. Contact information for the interface and network engineers
2. Hardware make/model of VPN device
3. Tunnel Endpoint IP address
4. IP address (global or intranet) of the interface engine (message router)
5. Test Host IP address (if using one other than that of the message router)
6. Message control characters
7. IKE and IPsec settings
8. Pre-Shared key (will be exchanged over the phone)

*To transmit data via a batch process, an HMS network engineer will work with you to establish a sFTP feed.*

## Production System Maintenance and Contact Information

For support, please call (412) 231-2020, ext. 1