

*South Carolina
Syndromic Surveillance (SS)
HL7 version 2.5.1
Implementation Guide*

Version 2.0

***NOTE:** This implementation guide is intended to help healthcare organizations structure information for use in South Carolina but should not be considered the definitive implementation guide. The CDC Public Health Information Network (PHIN) Messaging Guides and the HL7 2.5.1 Implementation Guides documents should be used to structure messages.*

**** South Carolina Department of Health and Environmental Control reserves the right to change its requirements and/or update the contents of this implementation guide at any time.***

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APPENDIX A: HL7 2.5.1 MU ELR and SS Flow Chart	Error! Bookmark not defined.

Key Terms and Acronyms Defined

Term/Acronym	Definition
CAH	Critical Access Hospital
CDC	Center for Disease Control and Prevention
CMS	Centers for Medicare and Medicaid Services
DADE	Division of Acute Disease Epidemiology
DHEC	South Carolina Department of Health and Environmental Control
EH	Eligible hospital
EHR	Electronic Health Record
ELR	Electronic Laboratory Reporting
EP	Eligible professional (physician offices/group practices)
HCO	Healthcare Organization
HL7	Health Level 7
IG	Implementation Guide
MQF	Message Quality Framework
MU	Meaningful Use
NIST	National Institute of Standards and Technology
NPI	National Provider Identifier
O	Optional segment(s) and field(s)
OID	Object Identifiers
ONC	Office of the National Coordinator for Health Information Technology
PHIN	Public Health Information Network
PHINMS	Public Health Information Network Messaging System
PHIN-VADS	Public Health Information Network Vocabulary Access and Distribution System
R	Required segment(s) and field(s)
RE	Required, but can be empty
SC DARTS	SC Disease Alerting, Reporting, and Tracking System
SFTP	Secure File Transfer Protocol
SS	Syndromic Surveillance

Process Overview

Purpose:

To implement electronic submission of syndromic surveillance (SS) data from a healthcare organization (HCO) to the South Carolina Department of Health and Environmental Control's (DHEC) syndromic surveillance system known as SC Disease Alerting, Reporting, and Tracking System (SC DARTS) in alignment with the appropriate CDC PHIN Messaging Guide and the technical requirements for Meaningful Use (MU) attestation.

Note: This implementation guide is intended to help HCOs build messages for use in South Carolina but should not be considered the definitive implementation guide. The CDC PHIN Messaging Guide for Syndromic Surveillance and pertinent HL7 version 2.5.1 implementation guides should be used to structure messages.

Process Steps:

1. HCO acquires key documents.
2. HCO completes registration of intent (available on website) and emails it to muhelpdesk@dhec.sc.gov.
3. HCO builds syndromic surveillance messages using **TEST DATA**.
4. HCO validates message and emails validation reports to DHEC.
5. DHEC reviews messages and confirms validation reports. If DHEC identifies errors (structural or vocabulary), the HCO is notified by email.
6. After DHEC approves single messages, DHEC sends PHINMS package to HCO, and works with the HCO to configure transport mechanism until successful.
7. HCO transmits **VALIDATED** batch of messages from sender's electronic health record (EHR) system via PHINMS

If attesting to Stage 1: DHEC confirms message receiving and sends confirmation letter if requested.

8. DHEC validates message contents. If DHEC identifies errors (structural or vocabulary), the HCO is notified by email.
9. DHEC program area(s) review messages.
10. HCO signs data usage agreement with DHEC.

Key Guidance

1. This implementation guide is intended to help HCOs structure information for use in South Carolina but should not be considered the definitive implementation guide. DHEC uses the HL7 guides and the CDC PHIN guides to develop the SC SS Implementation Guide.
2. For detailed information on HL7 data types, obtain the following HL7 document (see resources section for website URL):
 - Health Level Seven (HL7) Standard Electronic Laboratory Reporting to Public Health- Release 1, Feb 2010

3. Definitions of Usage Codes

Code	Definition
R	Required, must always be populated.
RE	Required, but may be empty. If sender has data, it must be sent.
O	Optional, no specified conformance rules.
C	Conditional, when conditionality predicate evaluates to “true”, considered the same as ‘R’. When condition evaluates to “false”, senders must not populate the field.
CE	Conditionality Empty, when conditionality predicate evaluates to “true”, considered the same as ‘RE’. When condition evaluates to “false”, senders must not populate the field.
X	Not supported, Sender must not populate.

All fields labeled “RE” and “CE” are to be considered “R” for the purposes of this testing.

4. Cardinality Dictionary

Cardinality	Definition
[0..1]	Segment may be omitted and can have, at most, one occurrence.
[1..1]	Segment must have exactly one occurrence.
[0..*]	Segment may be omitted or repeat an unlimited number of times.
[1..*]	Segment must appear at least one, and may repeat unlimited number of times.

5. DHEC is not currently using HL7 Acknowledgements.
6. Senders must establish or obtain Unique Object Identifiers (OIDs) as necessary per the recommendations contained in the latest version of “HL7 Implementation Guidance for OIDs.” HL7 members may download this document from the member website. Non-HL7 members may purchase the document from the on-line HL7 store.
7. It is highly recommended that the HCO validate its messages using the NIST Syndromic Surveillance Validation Tool and/or CDC PHIN Message Quality Framework (MQF) Message Validation Tool (link is provided in “Resources” section).

Resources

- Centers for Medicare & Medicaid Services (CMS) EHR Incentive Programs Overview: http://www.cms.gov/EHRIncentivePrograms/30_Meaningful_Use.asp#TopOfPage
- CMS Attestation Requirements for syndromic surveillance objective:

Stage 1: http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/10_Syndromic_Surveillance_Data_Submission.pdf

Stage 2: http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/Stage2_HospitalCore_15_SyndromicSurveillanceDataSubmission.pdf
- CDC Meaningful Use Introduction: <http://www.cdc.gov/EHRmeaningfuluse/introduction.html>
- CDC PHIN Message Quality Framework (MQF) Validation Tool: <https://phinmqf.cdc.gov/>
- NIST Syndromic Surveillance Validation Tool: <http://hl7v2-ss-testing.nist.gov/mu-syndromic/>
- NIST's Google groups for developers (HL7v2 Syndromic Testing): <https://groups.google.com/forum/#!forum/hl7v2-syndromic-testing>
- PHIN-MS Overview: <http://www.cdc.gov/phin/tools/PHINms/index.html>
Note: DHEC will provide the PHINMS installation package.
- Secure, Reliable Messaging Comparisons between PHINMS, SFTP, and SSH: http://www.cdc.gov/phin/tools/phinms/documents/secure-reliable-messaging-comparisons-between-phinms-sftp-and-ssh_v1.0_04-15-08.pdf
- PHIN- Vocabulary Access and Distribution System (PHIN-VADS): <http://phinvads.cdc.gov/vads/>
- PHINVADS Value Sets: <http://phinvads.cdc.gov/vads/ViewView.action?name=Syndromic%20Surveillance>
- HL7 Store: <https://www.hl7.org/store/index.cfm?ref=nav>
- NPI registry: <https://npiregistry.cms.hhs.gov/>

- PHIN Messaging Guides for Syndromic Surveillance:
<http://www.cdc.gov/phn/resources/PHINguides.html>

PHIN GUIDE	Transaction	Standard(s) Used
PHIN Messaging Guide for Syndromic Surveillance: Emergency Department and Urgent Care Data, Release 1 (October 2011) 	Biosurveillance (Suggested for use with EHR Certification 2011 ed.)	HL7 2.5.1 (Version 2.3.1 Compatible)
PHIN Messaging Guide for Syndromic Surveillance: Emergency Department and Urgent Care Data, Release 1.1 (August 2012) 	Biosurveillance (ONC Certification Criteria for EHR Technology, 2014 Ed.)	HL7 2.5.1 (Version 2.3.1 Compatible) Meaningful Use Stage 2 (October 2013 start)
PHIN Messaging Guide for Syndromic Surveillance: Emergency Department and Urgent Care Data, Addendum Release 1.1 (August 2012) 	Biosurveillance (ONC Certification Criteria for EHR Technology, 2014 Ed.)	HL7 2.5.1 (Version 2.3.1 Compatible) Meaningful Use Stage 2 (October 2013 start)
PHIN Messaging Guide for Syndromic Surveillance: Emergency Department and Urgent Care Data, Release 1.1 (August 2012), Testing Clarification Release 1.2 (February 2013) 	Biosurveillance (ONC Certification Criteria for EHR Technology, 2014 Ed.)	HL7 2.5.1 (Version 2.3.1 Compatible) Meaningful Use Stage 2 (October 2013 start)
PHIN Messaging Guide For Syndromic Surveillance: Emergency Department, Urgent Care, And Inpatient Settings, Release 1.9 (April 2013) 	Biosurveillance (Currently not referenced for EHR certification)	HL7 2.5.1 (Version 2.3.1 Compatible) This guide is suggested for future Meaningful Use Stages.
PHIN Messaging Guide for Syndromic Surveillance: Emergency Department, Urgent Care, Inpatient and Ambulatory Care Settings, Release 2.0 (April 2015)  *Erratum to the PHIN Messaging Guide for Syndromic Surveillance: Emergency Department, Urgent	Biosurveillance	HL7 2.5.1

<p>Care, Inpatient and Ambulatory Care Settings ADT Messages A01, A03, A04, and A08 Optional ORU^R01 Message Notation for Laboratory Data HL7 Version 2.5.1 (Version 2.3.1 Compatible) Release 2.0 April 21, 2015 </p>		
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Reporting Requirements

SC DHEC accepts syndromic surveillance messages from the following organizations:

1. Hospitals' emergency department
2. Hospitals' admission data
3. Urgent Care Centers including from Eligible Providers

For Meaningful Use

DHEC supports eligible hospitals and eligible professionals in urgent care centers seeking to send syndromic surveillance messages to meet the MU requirements. The messages will need to adhere to the HL7 2.5.1 requirements outlined in the CDC PHIN Guides and in this implementation guide.

For eligible professionals not in urgent care centers, please contact DHEC staff to obtain necessary documentation at muhelpdesk@dhec.sc.gov.

Non-Meaningful Use

Organizations not seeking MU attestation need to contact DHEC at muhelpdesk@dhec.sc.gov.

Types of Messages To Send DHEC¹

1. HL7 ADT Message Types

The following HL7 ADT Messages have been identified for syndromic surveillance.

- ADT^A01 Admit / Visit Notification
A patient is undergoing the admission process which assigns the patient to a bed for inpatient care. It signals the beginning of a patient's stay in a healthcare facility.
- ADT^A04 Register a Patient
A patient has arrived or checked in. This includes one-time and recurring patients.

¹ CDC PHIN Messaging Guide for Syndromic Surveillance: Emergency Department, Urgent, Ambulatory Care and Inpatient Settings, Release 2.0 (September, 2014)

- **ADT^A08 Update Patient Information**
Patient information has changed or new information has become available, but no other trigger event has occurred. These A08 update messages shall be sent at the time the new or changed information becomes available, whether before or after discharge. The information they contain shall be cumulative, presenting all previously sent information that remains correct and adding the new or changed information.
- **ADT^A03 Discharge / End Visit**
A patient’s encounter in a healthcare facility has ended and the status is changed to discharged.

2. HL7 Message Type Requirements by Care Setting

Patient Care Setting	ADT			
	Message Trigger Types			
	A04	A08	A03	A01
Eligible hospitals providing inpatient care	R	R	R	R
Eligible hospitals providing emergency care ONLY	R	R	R	C
Eligible professionals (urgent ambulatory care)	R	R	C	C

R = Required C = Required only if used during normal flow of business

Roles and Responsibilities

Responsibilities of DHEC

DHEC is committed to facilitating testing, validation, and transition to production of SS messages.

DHEC is expected to fulfill the following responsibilities:

- Provide DHEC staff contact information to the participating HCOs.
- Provide SS implementation guidelines and specifications to participating HCOs.
- Collaborate with HCO personnel to develop and implement SS messages
- Collaborate with the HCO personnel to assist in the installation of the national standard for messaging, evaluate the data transfer and monitor the transfer process.

Responsibilities of Reporting HCOs

HCOs must submit a completed registration of intent to DHEC and are expected to fulfill the following responsibilities:

- Obtain the CDC PHIN guide
- Identify individuals to implement SS messages and provide contact information to DHEC for those individuals.
- Develop messages that are compliant with HL7 2.5.1 and DHEC standards.
- Notify DHEC when there are changes to staff or electronic health record systems.

Instructions

1. HCO acquires key documents.

HCO reviews the MU website and acquires the following key documents.

Use the resources section for relevant websites.

The documents needed include:

1. CDC PHIN Messaging Guides for Syndromic Surveillance
2. SC SS Implementation Guide
3. SC SS MU Registration of Intent

2. HCO completes registration of intent.

The SC SS MU registration can be downloaded from the DHEC MU website.

HCO must register with DHEC its intent to initiate ongoing submission of SS messages.

Federal guidance from CMS requires this registration occur within 60 days of the start of the EHR reporting period.

HCO completes registration and emails it to muhelpdesk@dhec.sc.gov.

3. HCO builds SS messages.

DHEC accepts SS messages formatted according to the CDC's "PHIN Messaging Guides for Syndromic Surveillance: Emergency Department, Urgent Care and Inpatient Settings."

The HCO should consider all fields labeled "RE" and "CE" to be "R" for the purposes of this testing.

The following tables define the **constraints** for DHEC syndromic surveillance messages.

RECOMMENDATION: Develop message initially using the CDC PHIN Guides and then reference below tables for DHEC-specific constraints.

DHEC recommends that the last, required field be populated and should NOT be followed by any trailing pipes.

4. Messaging Infrastructure

Message Structure

For all ADT message types, the below fields **are not supported**.
In the CDC PHIN Guide Release 2.0, reference Tables 3.5.4, 3.6.9, and 3.6.7.

SEG	NAME	DESCRIPTION	USAGE	CARDINALITY
{{PR1}}	Procedures	Information relative to various types of procedures performed	X	[0..*]
{{IN1}}	Insurance	Information about insurance policy coverage information	X	[0..*]

Message Header Segment (MSH)

For all ADT message types, the below fields are constrained to the following values.
In the CDC PHIN Guide Release 2.0, reference Table 3.6.1.

Field Name	Seq.	DT	Length	Sender Usage	Receiver Usage	Cardinality	Values/Value Set
Sending Facility	4	HD	227	R	R	[1..1]	NPI Required
Receiving Application	5	HD	227	R	R	[0..1]	0361
Receiving Facility	6	HD	227	R	R	[0..1]	0362

Event Type Segment (EVN)

For all ADT message types, the below field is constrained to the following value.
In the CDC PHIN Guide Release 2.0, reference Table 3.6.2.

Field Name	Seq.	DT	Length	Sender Usage	Receiver Usage	Cardinality	Values/Value Set
Event Facility	7	HD	241	R	R	[1..1]	NPI Required

Patient Identification Segment (PID)

For all ADT message types, the below fields are constrained to the following values.
In the CDC PHIN Guide Release 2.0, reference Tables 3.6.3 and 4.2.

Field Name	Seq.	DT	Length	Sender Usage	Receiver Usage	Cardinality	Values/Value Set
ID Number	3.1	ST	15	R	R	[1..1]	Sender must submit patient medical record number
Assigning Authority	3.4	HD	227	RE	RE	[0..1]	0363
Assigning Facility	3.6	HD	227	RE	RE	[0..1]	
Patient Name	5	XP N	294	R	R	[1..*]	~^S when name of patient is known or ~^U when name of patient is not known
Family Name	5.1	FN	194	X	X	[0..1]	
Given Name	5.2	ST	30	X	X	[0..1]	
Second Given Name or Initials	5.3	ST	30	X	X	[0..1]	
Suffix	5.4	ST	20	X	X	[0..1]	
Prefix	5.5	ST	20	X	X	[0..1]	
Name Type Code	5.7	ID	1	R	R	[1..1]	PHVS NameType Syndromic Surveillance (OID: 2.16.840.1.114222.4.11.6056)
Date/Time of Birth	7	TS	26	X	X	[0..1]	
Street Address	11.1	SA D	184	X	X	[0..1]	
Other Designation	11.2	ST	120	X	X	[0..1]	
City	11.3	ST	50	X	X	[0..1]	
State or Province	11.4	ST	50	X	X	[0..1]	PHVS State FIPS 5-2 (OID: 2.16.840.1.114222.4.11.830)
Country	11.6	ID	3	X	X	[0..1]	PHVS Country ISO 3166-1

							(OID: 2.16.840.1.114222.4. 11.828)
Address Type	11.7	ID	3	X	X	[0..1]	
Other Geographic Designation	11.8	ST	50	X	X	[0..1]	

Patient Visit Segment (PV1)

In the CDC PHIN Guide Release 2.0, reference Tables 3.6.4 and 4.2

Carefully review the usage definitions for each ADT message type.

Field Name	Seq.	DT	Length	Sender Usage	Receiver Usage	Cardinality	Values/Value Set
Patient Class	2	IS	1	R	R	[0..1]	PHVS_PatientClass_SyndromicSurveillance (OID: 2.16.840.1.114222.4.11.3 404)
Discharge Disposition	36	IS	3	ADT 01: X ADT 04: X ADT 08: RE ADT 03: R	ADT 01: X ADT 04: X ADT 08: RE ADT 03: R	[0..1]	PHVS_DischargeDisposition HL7 2x (OID: 2.16.840.1.114222.4.11.9 15)
Discharge Date/Time	45	TS	26	ADT 01: X ADT 04: X ADT 08:RE ADT 03:R	ADT 01:X ADT 04:X ADT 08: RE ADT 03: R	[0..1]	PV1-45 (Discharge Date/Time) SHALL be expressed with a minimum precision of the nearest minute and be represented in the following format: 'YYYYMMDDHHMM[SS[.S[S[S[S[S]]]]]] [+/-ZZZZ]'

Diagnosis (DG 1) Segment

For all ADT message types, the below fields are constrained to the following values.
In the CDC PHIN Guide 2.0, reference Tables 3.6.6 and 4.2

Field Name	Seq	DT	Length	Sender Usage	Receiver Usage	Cardinality	Comments
Diagnosis Code	3	CE	478	R	R	[1..1]	ICD-9 and ICD-10 accepted. If DG1 Segment is provided, then DG1-3 (Diagnosis) is required to be valued.
Diagnosis Type	6	IS	2	R	R	[1..1]	If the DG1 Segment is provided, DG1-6 (Diagnosis type) is required to be valued. DG1-6 SHALL be either A, F or W (Admitting, Final or Working)

Observation/Result Segment (OBX)

For all ADT message types, the below fields are constrained to the following values.
In the CDC PHIN Guide Release 2.0, reference Tables 3.6.8 and 4.2..

Field Name	Seq.	DT	Length	Sender Usage	Receiver Usage	Cardinality	Values/Value Set
Date/Time of the Observation	14	TS	26	RE	RE	[0..1]	

5. HCO validates messages and emails validation reports to DHEC.

HCO performs structural and vocabulary validation on the messages.

Messages that are not pre-validated will not be tested at DHEC.

HCO validates message using:

- NIST Syndromic Surveillance Validation Tool **AND/OR**
- CDC's Message Quality Framework (MQF)

DHEC uses both tools to validate messages and manually reviews each message.

Each validation tool has its own strengths. The NIST tool provides good feedback on message structure while the CDC's MQF tool provides good feedback on message vocabulary.

Both the PHIN MQF and the NIST website have links to User Manuals and FAQs and Support Desk for questions and other helpful links.

A good resource for troubleshooting errors is the NIST's Google groups for developers (HL7v2 Syndromic Testing): <https://groups.google.com/forum/#!forum/hl7v2-syndromic-testing>

HCO emails validation reports with errors to reflect progress to muhelpdesk@dhec.sc.gov.

With a zero-error validation report, the HCO needs to email the report with a .txt file of the message using TEST DATA.

6. DHEC reviews messages and confirms validation reports.

DHEC will validate the messages for structure and vocabulary.

DHEC will notify HCOs regarding time frame for reviewing the test messages.

If DHEC identifies errors (structural or vocabulary), the HCO is notified by email.

7. DHEC sends PHINMS package to HCO.

After DHEC approves messages in prior steps, DHEC sends PHINMS implementation package to HCO.

HCO reports successful implementation of sender PHINMS capability to DHEC.

DHEC works with HCO until PHINMS transmission capability between sender and DHEC meets requirements.

8. HCO transmits VALIDATED batch of messages

IF ATTESTING TO STAGE 1: After receiving test message, DHEC will provide documentation of receiving a test message and will send a confirmation letter if requested.

HCO notifies DHEC when file is sent.

For HCOs attesting to MU Stage 2: Continue with the process.

The HCO is required to VALIDATE the messages before sending to DHEC.

Validation reports need to be emailed to DHEC at muhelpdesk@dhec.sc.gov. As necessary and appropriate, please use encrypted emails to send validation reports.

In order for DHEC to complete this phase of its testing, it must receive enough syndromic surveillance messages to validate all data fields for all message types (ADT^A01, ADT^A03, ADT^A04 and ADT^A08).

DHEC will notify HCO when to stop sending validation reports.

File transfer process:

- File to be generated daily, containing **10 of previous days data** (12:00 a.m. to 11:59 p.m. of previous day)
- File should be generated and delivered to DHEC via a secure transfer by 6:00 a.m. each day.
- File naming convention should be the following:
SHxxxYYYYMMDD.HL7 – where ‘xxx’ is a 3-character filename assigned by DHEC that identifies the sender and YYYYMMDD is the year, month and day that the file was generated [e.g. SHMUS20140115.HL7]

9. DHEC validates message contents.

DHEC validates that the contents of the messages meets requirements.

As issues are identified, DHEC reports them to the HCO for resolution.

DHEC will review the submitted validation tool results in addition to re-validating the same message files.

Each clean revalidation by DHEC will move the facility closer to production status.

If any message fails the re-validation process the facility will be notified that they need to address their errors.

10. DHEC program area review messages.

Once both the HCO and SC DHEC IT are reasonably sure that there are no more technical errors being generated, the messages are sent to the Division of Acute Disease Epidemiology (DADE) to confirm messages are meaningful and useful.

11. HCO signs data usage agreement with DHEC

After the HCO signs the data use agreement, DHEC and the HCO work together to implement ongoing electronic submission of syndromic surveillance data from the provider to the SC DARTS system.

Messages must be transmitted as a batch once each day by 6:00 a.m. EST.

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