South Carolina Syndromic Surveillance (SS)

HL7 version 2.5.1

Implementation Guide

Version 3.0

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.

Contents

I. Key Terms and Acronyms Defined

Term/Acronym	Definition
ADT	Admit Discharge Transfer message
CAH	Critical access hospital
CDC	Centers 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
EHR	Electronic health record
ELR	Electronic laboratory reporting
EP	Eligible professional (physician offices/group practices)
HCO	Healthcare organization
HL7	Health Level-7
MQF	Message quality framework
MU	Meaningful Use
NIST	National Institute of Standards and Technology
NPI	National Provider Identifier
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
SC DARTS	South Carolina Disease Alerting, Reporting, and Tracking System
SFTP	Secure File Transfer Protocol
SS	Syndromic Surveillance

II. 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 Public Health Information Network (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 according to national standards.

Process Outline:

This section is meant to provide a general overview of DHEC's protocol for the implementation of SS data messaging from an HCO. Additional information about each of the following steps is contained in this document.

1. Preliminary Communication – HCO acquires key documents.

2. Registration – HCO completes and submits registration of intent.

3. Message Building – HCO builds SS messages using test data.

4. HCO Testing/Validation – HCO tests and validates messages until 0 errors achieved.

5. DHEC Testing/Validation – DHEC reviews messages and confirms validation reports.

6. PHINMS Setup – DHEC works with HCO to establish and configure PHINMS mechanism.

7. Batch Testing/Validation – HCO sends live data via PHINMS and completes validation reports. DHEC reviews batch messages for compliance of structural and technical standards.

8. Programmatic Validation – DHEC program area(s) review messages for content.

9. Ongoing Submission – HCO signs data usage agreement with DHEC before moving into production.

III. 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 participating HCOs,

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

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 and maintain contact information to DHEC for those individuals,
- Notify DHEC when there are changes to staff or EHR systems, and
- Develop messages that are compliant with HL7 2.5.1 and DHEC standards.

IV. Reporting Requirements

Eligibility:

SC DHEC accepts syndromic surveillance messages which contain the following:

1. Eligible hospital emergency department data
2. Eligible hospital admissions data
3. Urgent care center data (includes data from EPs working in urgent care centers)

For Meaningful Use:

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

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

Non-Meaningful Use:

Organizations seeking to establish syndromic surveillance messaging but who are not seeking MU attestation must contact DHEC at muhelpdesk@dhec.sc.gov.

Types of SS Messages:

The following HL7 ADT message types have been identified for syndromic surveillance[1]:

1. ADT^A01 – Admit/Visit Notification
   A patient is undergoing the admission process which assigns the patient to a bed for inpatient care. This signals the beginning of a patient's stay in a healthcare facility.

2. ADT^04 – Register a Patient
   A patient has arrived or checked in. This includes one-time and recurring patients.

3. ADT^08 – 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.

4. ADT^03 – Discharge/End Visit
   A patient's encounter in a healthcare facility has ended and the status is changed to discharged.

HL7 Message Type Requirements by Care Setting:

	ADT Message Trigger Types			
Patient Care Setting	**A01**	**A04**	**A08**	**A03**
Eligible hospitals providing inpatient care	R	R	R	R
Eligible hospitals providing emergency are ONLY	C	R	R	R
EPs in urgent care centers	C	R	R	C

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

V. Syndromic Surveillance Implementation Process

1. Preliminary Communication

HCO visits the Syndromic Surveillance webpage from DHEC's EHR Incentive Program website to obtain key documentation (see **Appendix B: Resources**).

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

These documents include:
- SC Syndromic Surveillance Registration
- SC Syndromic Surveillance Implementation Guide
- CDC's PHIN Messaging Guides for Syndromic Surveillance

2. Registration

HCO will download the SC Syndromic Surveillance Registration form which corresponds to their facility type.

HCO will complete all fields of the registration form and email to muhelpdesk@dhec.sc.gov to initiate the implementation process.

DHEC will notify HCO when registration has been received and may request edits as needed until all fields are complete and appear correct.

DHEC may provide documentation of receipt of registration upon request of the HCO.

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

3. Message Building

HCO builds SS message using test data.

DHEC accepts SS messages formatted according to the CDC's PHIN Messaging Guides for Syndromic Surveillance. DHEC also provides tables which define DHEC-specific constraints for SS messages (see **Appendix A: Key Guidance for Message Structuring**).

DHEC recommends that HCOs develop message initially using the CDC PHIN Guides and then reference DHEC-specific constraint tables.

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

4. HCO Testing/Validation

HCO validates test messages using the following tools:
- NIST Syndromic Surveillance Validation Tool
- CDC's MQF

Each validation tool serves a unique purpose. The NIST tool is used to provide feedback on message structure while the MQF tool provides feedback on message vocabulary. DHEC requires that SS messages be validated using both tools.

Additional information regarding the NIST and MQF tools, including troubleshooting information, can be found on their respective websites (see **Appendix B: Resources**).

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

When a 0 error validation report has been achieved, HCO emails the report along with a .txt file of the corresponding test message to muhelpdesk@dhec.sc.gov.

DHEC may provide documentation of message testing and validation upon request of the HCO.

5. DHEC Testing/Validation

Once a 0 error validation report and .txt file of the corresponding test message has been received, DHEC will revalidate the message for structure and vocabulary using the following tools:
- NIST Syndromic Surveillance Validation Tool, and
- CDC's MQF

DHEC will notify the HCO of any remaining errors identified, if necessary. If errors are identified, HCO will resume testing and validating until a 0 error report has been achieved.

DHEC may provide documentation of message testing and validation upon request of the HCO.

6. PHINMS Setup

Once DHEC confirms 0 errors in test messages, DHEC will send PHINMS implementation package to HCO.

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

HCO reports successful implementation of sender PHINMS capability to DHEC.

7. Batch Testing/Validation

HCO will send batch messages containing live patient data via PHINMS connection AND will send corresponding validation reports (including vocabulary validation reports) to muhelpdesk@dhec.sc.gov using the following tools:
- NIST Syndromic Surveillance Validation Tool, and
- CDC's MQF

File transfer process:

- File is to contain **all records** for the previous 24 hour period. If the facility is unable to meet this data requirement due to system constraints or other non-modifiable reasons, notify DHEC Meaningful Use at muhelpdesk@dhec.sc.gov prior to submitting the first batch message via PHINMS.
- File to be generated and delivered to DHEC via secure PHINMS transfer daily (24 hours) by 6:00 a.m. EST.
- File naming convention is SHxxxYYYYMMDD.HL7 where "xxx" is a 3 character filename assigned by DHEC which identifies the sending facility and where "YYYYMMDD" is the year, month and day that the file was generated. [e.g. SHABC20160125.HL7] Do not include additional characters or punctuation.

HCO should submit and validate at least one message of each ADT type containing all data fields for that ADT type (see **Reporting Requirements**) in order to complete this step.

DHEC will review and revalidate batch message contents to ensure they meet reporting guidelines, and will report any identified issues to HCO for resolution.

NOTE: Any reports containing live patient data must be sent via encrypted email.

DHEC may provide documentation of message testing and validation upon request of the HCO.

8. **Programmatic Validation**

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

DHEC may provide documentation of message testing and validation upon request of the HCO.

9. **Ongoing Submission**

HCO signs the data use agreement. DHEC and HCO work together to implement ongoing electronic submission of SS data from the provider to SC DARTS.

Production messages must be transmitted via PHINMS as a batch by 6:00 a.m. EST daily.

For the duration of its SS messaging interface with SC DARTS, the HCO will continue to ensure that messages are structurally and qualitatively sound, and will notify DHEC of any EHR or staff changes which may impact the connection.

DHEC may provide documentation of ongoing submission upon request of the HCO.

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Appendix A: Key Guidance for Message Structuring

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 2.5.1 guides and the CDC PHIN guides to develop the SC SS Implementation Guide (see **Resources**).

DHEC is not currently using HL7 Acknowledgements.

Senders must establish or obtain OIDs as necessary per the recommendation contained in the latest version of the HL7 Implementation Guidance for OIDs (see **Appendix B: Resources**). HL7 members may download this document from the member website. Non-HL7 members may purchase the document from the online HL7 store.

Definitions of Usage Codes

Code	Definition
R	Required, must always be populated
RE	Required, but may be empty if no data available. If sender has data, then R.
O	Optional, no specified conformance rules.
C	Conditional, when conditionality is met ("true"), then R. When conditionality is not met ("false"), then X.
CE	Conditionally empty, when conditionality is met ("true"), then RE. When conditionality is not met ("false"), then X.
X	Not supported, sender must not populate.

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

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 time, and may repeat unlimited number of times.

Messaging Infrastructure:

NOTE: For basic HL7 terms, message element attribute definitions, and data type definitions as they appear in the tables below, reference the CDC PHIN Messaging Guide Release 2.0 Tables 3-1, 3.3, and 3.4.1, respectively.

Message Structure

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

Segment	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..*]

HL7 Batch File Structure

The HL7 Batch Protocol can be used to allow for periodic reporting. One batch of messages per file is supported. In the CDC PHIN Messaging Guide Release 2.0, reference Table 3.7.1.

Segment	Name	Description	Usage	Cardinality
FHS	File Header Segment	Information explaining how to parse and process the file, including identification of file delimiters, sender, receiver, etc.	R	[1…1]
BHS*	Batch Header Segment	Trigger event information for receiving application.	R	[1…1]
BTS	Batch Trailer Segment	Defines the end of a batch.	R	[1…1]
FTS	File Trailer Segment	Defines the end of a file.	R	[1…1]

*DHEC Batch Receiving Application Values: SCDOH^2.16.840.1.114222.4.3.2.2.1.175.1^ISO
*DHEC Batch Receiving Facility Values: SC^2.16.840.1.114222.4.1.3680^ISO

Message Header Segment (MSH)

For all ADT message types, the below fields are constrained to the following values. In the CDC PHIN Messaging 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 Messaging 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 Messaging 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	XPN	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]	

Field Name	Seq	DT	Length	Sender Usage	Receiver Usage	Cardinality	Values/Value Set
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]	PHIN-VADS Name Type
Date/Time of Birth	7	TS	26	X	X	[0..1]	
Street Address	11.1	SAD	184	X	X	[0..1]	
Other Designation	11.2	ST	120	X	X	[0..1]	
City	11.3	ST	50	RE	RE	[0..1]	
State or Province	11.4	ST	50	RE	O	[0..1]	
Country	11.6	ID	3	RE	RE	[0..1]	
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 Messaging 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]	PHIN-VAD Patient Class
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]	PHIN-VAD Discharge Disposition
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]	Shall be expressed with a minimum precision of the nearest minute as YYYYMMDDHHMM[SS[.S[S]]]

Diagnosis Segment (DG1)

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

Field Name	Seq.	DT	Length	Sender Usage	Receiver Usage	Cardinality	Values/Value Set
Diagnosis Code	3	CE	478	R	R	[1..1]	ICD-9 and ICD-10 accepted. If DG1 segment is provided, then DG1-3 must be valued.
Diagnosis Type	6	IS	2	R	R	[1..1]	Shall be A, F or W (Admitting, Final or Working). If the DG1 segment is provided, DG1-6 must be valued.

Observation/Result Segment (OBX)

For all ADT message types, the below fields are constrained to the following values. In the CDC PHIN Messaging 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 Observation	14	TS	26	RE	RE	[0..1]	

Appendix B: Resources

Centers for Disease Control and Prevention (CDC) and PHIN:

- CDC Meaningful Use Introduction:
  http://www.cdc.gov/EHRmeaningfuluse/introduction.html

- CDC Message Quality Framework (MQF) Validation Tool:
  https://phinmqf.cdc.gov/

- PHINMS Overview
  http://www.cdc.gov/phin/tools/PHINms/index.html

- PHIN Messaging Guide for Syndromic Surveillance: Emergency Department, Urgent Care, Inpatient and Ambulatory Care Settings, Release 2.0 (April 2015):
  http://www.cdc.gov/nssp/documents/guides/syndrsurvmessagguide2_messagingguide_phn.pdf

- 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-VADS:
  http://phinvads.cdc.gov/vads/SearchVocab.action

- PHIN-VADS Syndromic Surveillance Value Sets:
  http://phinvads.cdc.gov/vads/ViewView.action?name=Syndromic%20Surveillance

Centers for Medicare & Medicaid Services (CMS):

- CMS EHR Incentive Programs:
  https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html

- CMS Eligible Professional EHR Incentive Program Objectives and Measures for 2015 Objective 10 of 10 (October 6, 2015):
  https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/2015EP_10PublicHealthObjective.pdf

- NPI Registry:
  https://npiregistry.cms.hhs.gov/

SC Department of Health and Environmental Control (DHEC):

- DHEC Electronic Health Record Incentive Program (Meaningful Use):
  http://www.scdhec.gov/Health/FHPF/MeaningfulUse/

- Syndromic Surveillance:
  http://www.scdhec.gov/Health/FHPF/MeaningfulUse/SyndromicSurveillance/

Health Level-7 (HL7):

- HL7 Store:
  https://www.hl7.org/store/index.cfm?ref=nav

National Institute of Standards and Technology (NIST):

- NIST Syndromic Surveillance Validation Tool:
  http://hl7v2-ss-testing.nist.gov/mu-syndromic/

- NIST's Google Groups for Developers (Support and Troubleshooting):
  https://groups.google.com/forum/#!forum/hl7v2-syndromic-testing