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HL7 Implementation Guide for CDA R2:

Emergency Medical Services Patient Care Report (PCR)

(US Realm)

Ballot for Draft Standard for Trial Use

May, 2011

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## About this document

This document is intended to guide software developers in generating CDA-compliant XML run reports, also known as patient care reports, from EMS agency crews to emergency departments and other transport destinations. It consists of a set of constraints on the HL7 CDA R2 model.

CDA, or Clinical Document Architecture, is a standard for information representation. It is based on the HL7 Reference Information Model, but it constrains that model to a specific set of patterns. This document adds further constraints, so that it specifies not just a generic clinical document, but a Run Report—a record of an Emergency Medical Services encounter with a patient designed to provide critical information to a hospital Emergency Department.

Further information about CDA is available at HL7.org.

This guide constrains the National EMS Information System data set (NEMSIS) to the HL7 CDA R2 document format. NEMSIS is maintained by the NEMSIS Technical Assistance Center, a US organization funded by the National Highway Transportation Safety Administration, the Centers for Disease Control, the Health Resources and Services Administration, the University of Utah, and the University of North Carolina.

## Audience

The audience for this document is software developers and development organizations who wish to produce or receive emergency medical services patient care reports.

## Approach

This guide is a set of constraints on the Health Level 7 (HL7) Clinical Document Architecture, release 2. That specification is itself a set of constraints on the HL7 Reference Information Model (RIM).

In order to translate the NEMSIS specification, that specification was first converted into an analysis-level class diagram in the Emergency Medical Services Domain Analysis Model (EMS DAM), initially balloted in May of 2010 and undergoing final revisions for the release in May 2011. The analysis model was then constrained to the RIM in a Domain Information Model (DIM), balloted in January, 2011.

This guide is the first implementable specification developed based on the EMS DIM.

This initial iteration will support what is commonly termed “level one” CDA, i.e., a document with structured header information containing an unstructured document of some form (whether pdf, image, or other recognized format). In addition, this iteration will support “level two,” in which human-readable text information is provided for identified sections. A sender of a document, however, must choose whether to send the “level one” encapsulated document or the “level two” set of sections.

The next iteration will model the sections to “level three,” in which the sections also include detailed, structured information representing the section text. This structured information follows standard patterns in such a way that receiving applications will be able to parse out specific semantically identified elements for storage in medical records, application of business rules, or other computable services.

Because this iteration will map structured, computable, and automatically generated information into the specification at “level three,” and because this information may be used to generate the text to be presented at “level two,” we do not expect many implementers to populate the level two conformance profile at this time.

Harmonization with ED and DEEDS involved confirmation of extant LOINC codes for common elements

## Change process

We expect this standard to change as we model the sections in a subsequent release

Issues should be reported to (NEMSIS, CIC, SD, Ockham)

## How to use this document

Software developers may adopt the attached java classes in order to generate xml documents that conform to the schema. They will need to write information from their systems to the appropriate classes, and they will need to understand the constraints in order to do so correctly. Some of the constraints in this document are programmatic, but many are not. Schematron may be necessary for enforcing these constraints.

Alternatively, developers may choose to code their own document generation classes. They should conform to the constraints in three layers:

* In the CDA specification
  + At HL7.org
* In any templates specified in this document
  + Using the Object Identifier (OID) to confirm the template definition at cdatools.org or other template repository
* In this document

Note that other information in addition to that specified may be sent. For maximum interoperability, additional fields should conform to the CDA model and specification.

### Coded Values

Coded values are constrained to value sets. Value sets may be enumerated or defined by reference. This specification uses both kinds. Enumerated (“extensional”) sets are included in Appendix A; those defined by reference (“intensional”) are listed in Appendix B. Both types are in the process of being added to the HL7 vocabulary repository; this will aid in the use of HL7 tools for validation. They will also be available on the NEMSIS web site (nemsis.org) and they will be available via web service from the CDC (phinvads.cdc.gov).

Vocabularies are identified by object identifiers (OIDs), and can be identified in their respective sources by those OIDs.

### Information Scope

This guide is intended to support the transfer of patient care reports from EMS crews to emergency departments (ED). Because the NEMSIS data set contains over 500 data elements, and because ED physicians require concision in patient care reports (to the extent possible without omitting pertinent information), this guide

A – use IHE as template for PCR, published first; just reuse sections for nemsis dataset

B – publish the nemsis one first; then build the PCR, adding IHE

There is a pre-existing Integrating the Health Enterprise (IHE) profile for Emergency Transfer of Care (ETC). . . . . .

Subsequent iterations to detail the elements in R3 and their associated vocabularies . . . .

The NEMSIS data set includes a great deal of information designed to support run reports, billing, quality analysis, agency profiling and accreditation, and other uses. Of the over 500 elements in the NEMSIS data set, only [80] are included in this specification.

This concision is based on ED physicians’ reports that information must be verified in the ED anyway, so anything beyond the minimum adds little value. A larger concern is that the run reports are often not available: we hope that this specification will be a small step toward solving that problem.

The run report includes the following elements:

Insert table

### Conventions

This document follows the conventions of the *Healthcare Associate Infection* (HAI) implementation guide. Relevant conventions are reiterated here.

>shall

>constraints are exhaustive: brackets indicate source; no brackets mean this template

## Implementation Constraints

Items in this specification that are mandated by the CDA specification are indicated by the [CDA] annotation.

### Levels of Conformance

To indicate conformance to Level 1 (which also asserts compliance withall general or non-level-specific constraints), ClinicalDocument/templateId elements MAY be present with the value shown below. [GHC CONF-HP-3]

<templateId root='2.16.840.1.113883.10.20.10'/> <!-- conforms to Level 1 guidance -->

To indicate conformance to Level 2 features (which also asserts compliance with Level 1 requirements and asserts the presence of section codes), ClinicalDocument/templateId elements MAY be present with the value shown below. [GHC CONF-HP-4]

<templateId root='2.16.840.1.113883.10.20.20'/> <!-- conforms to Level 2 guidance -->

To indicate conformance to Level 3 features (which also asserts compliance with Level 2 requirements and the use of CDA entries in some sections), ClinicalDocument/templateId elements MAY be present with the value shown below. [GHC CONF-HP-5]

<templateId root='2.16.840.1.113883.10.20.30'/> <!-- conforms to Level 3 guidance -->

### Header

We adopt the General Header Constraints in order to maximize interoperability. Items in this specification that are mandated by this template are indicated by the [GHC] annotation.

* CONF-1: The header SHALL conform to the General Header Constraints template 2.16.840.1.113883.10.20.3

Within the header, there are relationships to the following:

* Patient (record target): NEMSIS Patient section
* Author: includes both the software system that generates the report and \_\_\_\_\_\_
  + Who generated EOther.08
  + Signer EOther.17-18
* Authenticator: \_\_\_\_\_\_\_
  + Who generated EOther.08
  + Signer EOther.17-18
* Participant
  + Who generated EOther.08
  + Signer EOther.17-18
* Custodian: the organization that takes responsibility for maintaining the document; in this case, the EMS agency
* Service Event: the EMS dispatch for the patient
* Encompassing Encounter: usually a longer-term entity than the Service Event (designed to model a hospital stay during which there may be many Service Events). In our case, logically coextensive with the Service Event, but used to represent the EMS unit (as a healthcare facility).

#### 6.1.1 Clinical Document

In a CDA document, the top-level element, also called the document element, is ClinicalDocument, in the urn:hl7-org:v3 namespace.

The examples in this specification assume that this is the default namespace, and accordingly show all elements without a namespace prefix. This IG does not require use of any specific namespace prefix.

Header constraints are expressed in relation to the document element.

No header elements have traceabilty to pre-existing NEMSIS elements

The templateId refers to this EMS Patient Care Report specification:

* CONF-2: A ClinicalDocument/templateId element SHALL be present representing conformance to the generic constraints of this guide (templateId 2.16.840.1.113883.17.3.10.1).
  + CDA HD: not found
  + NEMSIS: no corresponding element

The typeId refers to the base CDA schema:

* CONF-3: A ClinicalDocument/typeId element SHALL be present having @root = "2.16.840.1.113883.1.3" and @extension = "POCD\_HD000040" [CDA]
  + CDA HD: line 1
  + NEMSIS: no corresponding element

The classCode and moodCode are static for all CDA documents.

* CONF-4: A ClinicalDocument/classCode element SHALL be present where the value is “DOCCLIN” [CDA]
  + CDA HD: line 2
  + NEMSIS: no corresponding element

* CONF-5: A ClinicalDocument/moodCode element SHALL be present where the value is “EVN” [CDA]
  + CDA HD: line 3
  + NEMSIS: no corresponding element

The id element uniquely identifies the document. Because a revised document must have a unique id, but the same “setId” as the original, we recommend the following practice: the setId is a unique identifier for a new document, and version id is always set to “1”. The id element is then the setId concatenated with the version id, separated with a period (“.”). Example: report 12345 would have setId “12345”, versioned “1”, and id “12345.1”.

* CONF-6: A ClinicalDocument/setId element SHALL be present
  + CDA HD: line 10
  + NEMSIS: ERecord.01
* CONF-7: A ClinicalDocument/versionId element SHALL be present, and SHALL have value “1” unless there is a ClinicalDocument/relatedDocument/ParentDocument of typeCode “RPLC”
  + CDA HD: line 11
  + NEMSIS: no corresponding element
* CONF-8: A ClinicalDocument/id element SHALL be present and SHALL have value equivalent to ClinicalDocument/setId & “.” & ClinicalDocument/versionId
  + CDA HD: line 4
  + NEMSIS: no corresponding element

The code element identifies the document type as an EMS Patient Care Report. This code is currently under submission to LOINC.

* CONF-9: A ClinicalDocument/code element SHALL be present where the value of @code is “EMSPCR” EMS Patient Care Report 2.16.840.1.113883.6.1 LOINC STATIC.
  + CDA HD: line 5
  + NEMSIS: no corresponding element

The title element identifies the document as a Patient Care report. The preferred title is “EMS Patient Care Report.”

* CONF-10: A ClinicalDocument/title element SHALL be present. [CDA]
  + CDA HD: line 6
  + NEMSIS: no corresponding element

The effective time is for the document, not the encounter.

* CONF-11: A ClinicalDocument/effectiveTime element SHALL be present representing the time of document creation. [CDA]
  + CDA HD: line 7
  + NEMSIS: no corresponding element

Confidentiality defaults to “N,” normal.

* CONF-12: A ClinicalDocument/confidentialityCode element SHALL be present where the value of @codeSystem is 2.16.840.1.113883.5.25 (HL7 confidentiality). [CDA]
  + CDA HD: line 8
  + NEMSIS: no corresponding element

Language code represents the language in which the report is written.

* CONF-13: A ClinicalDocument/languageCode element SHALL be present where the value of @system is 2.16.840.1.113883.1.11.11526 (HL7 HumanLanguage).
  + CDA HD: line 9
  + NEMSIS: no corresponding element
* CONF-14: A ClinicalDocument/languageCode element SHOULD have @code value of “en-US”.
  + CDA HD: line 9
  + NEMSIS: no corresponding element

#### 6.1.2 Patient

The patient is represented in CDA as the subject of the Record Target class.

* CONF-15: A ClinicalDocument/recordTarget element SHALL be present. [CDA]
  + CDA HD: line 13
  + NEMSIS: no corresponding element
* CONF-16: A ClinicalDocument/recordTarget/typeCode element SHALL be present having value “RCT”. [CDA]
  + CDA HD: line 14
  + NEMSIS: no corresponding element
* CONF-17: A ClinicalDocument/recordTarget/contextControlCode element SHALL be present having value “OP”. [CDA]
  + CDA HD: line 15
  + NEMSIS: no corresponding element
* CONF-18: A ClinicalDocument/recordTarget/patientRol/classCode element SHALL be present having value “PAT”. [CDA]
  + CDA HD: line 17
  + NEMSIS: no corresponding element

The NEMSIS patient id is the social security number. This is expedient for emergency dispatch, but this specification does not require that type of ID. For patient transfers, the patient ID, scoped by an id @root element of the facility, would be appropriate.

* CONF-19: A ClinicalDocument/recordTarget/PatientRole/id element SHALL be present. [CDA]
  + CDA HD: line 13
  + NEMSIS: EPatient.12
* CONF-20: A ClinicalDocument/recordTarget/PatientRole/addr element SHALL be present. [GHC]
  + CDA HD: line 19
  + NEMSIS:
    - EPatient.05 Street address: @ADXP = “SAL”
    - EPatient.06 City: @ADXP = “CTY”
    - EPatient.07 County: @ADXP = “CPA”
    - EPatient.08 State: @ADXP = “STA”
    - EPatient.09 Postal code: @ADXP = “ZIP”
    - EPatient.10 Country: @ADXP = “CNT”
* CONF-21: A ClinicalDocument/recordTarget/PatientRole/telecom element SHALL be present. [GHC]
  + CDA HD: line 20
  + NEMSIS: EPatient.18
* CONF-22: A ClinicalDocument/recordTarget/PatientRole/Patient/classCode element SHALL be present having value “PSN”. [CDA]
  + CDA HD: line 22
  + NEMSIS: no corresponding element
* CONF-23: A ClinicalDocument/recordTarget/PatientRole/Patient/determinerCode element SHALL be present having value “INSTANCE”. [CDA]
  + CDA HD: line 23
  + NEMSIS: no corresponding element
* CONF-24: A ClinicalDocument/recordTarget/PatientRole/Patient/name element SHALL be present. [GHC]
  + CDA HD: line 25
  + NEMSIS:
    - EPatient.02 Last: @ENXP=”FAM”
    - EPatient.03 First: @ENXP=”GIV”
    - EPatient.04 Middle: @ENXP=”GIV”
* CONF-25: A ClinicalDocument/recordTarget/PatientRole/Patient/ administrativeGenderCode element SHALL be present. [GHC]
  + CDA HD: line 26
  + NEMSIS: EPatient.13
* CONF-25: A ClinicalDocument/recordTarget/PatientRole/Patient/administrativeGenderCode element SHOULD be drawn from 2.16.840.1.113883.1.11.1 (HL7 AdministrativeGenderCode).
  + CDA HD: line 26
  + NEMSIS: EPatient.13
* CONF-26: A ClinicalDocument/recordTarget/PatientRole/Patient/birthTime element SHALL be present. The patient/birthTime element SHALL be precise at least to the year, and SHOULD be precise at least to the day, and MAY omit time zone. If unknown, it SHALL be represented using a flavor of null. [GHC, CONF-HP-32]
  + CDA HD: line 27
  + NEMSIS: EPatient.17

NEMSIS collects race and ethnicity in the one-question format (see guidance at <http://www.whitehouse.gov/omb/fedreg_1997standards>), but the HL7 RIM and, therefore, the CDA schema contain separate elements. It is necessary to populate both CDA fields based on the values selected for the NEMSIS question.

* CONF-27: A ClinicalDocument/recordTarget/PatientRole/Patient/raceCode element MAY be present. If present it SHALL drawn from 2.16.840.1.113883.1.11.14914 (HL7 raceCode).
  + CDA HD: line 30
  + NEMSIS: EPatient.14
* CONF-28: A ClinicalDocument/recordTarget/PatientRole/Patient/ethnicGroupCode element MAY be present. If present it SHALL drawn from 2.16.840.1.113883.1.11.15836 (HL7 ethnicity).
  + CDA HD: line 31
  + NEMSIS: EPatient.14

#### 6.1.3 Author

The EMS Patient Care Report is not a hand-written document, but, like the Continuity of Care document, an export of information from an automated system. As a result, the set of authors includes the software used to generate the report. And others.

* CONF-29: A ClinicalDocument/author element SHALL be present, having typeCode = “AUT” and contextControlCode=”OP”. [CDA]
  + CDA HD: line 71, 72, 74
  + NEMSIS: no corresponding element
* CONF-30: A ClinicalDocument/author/AssignedAuthor element SHALL be present having classCode”ASSIGNED”.
  + CDA HD: line 77
  + NEMSIS: no corresponding element
* CONF-31: An . . . author/AssignedAuthor/AuthoringDevice/manufacturerModelName element SHALL be present.
  + CDA HD: line 88
  + NEMSIS: ERecord.02

The NEMSIS specification records both software name and version. These are concatenated in the CDA EMS Patient Care Report.

* CONF-32: An . . . author/AssignedAuthor/AuthoringDevice/softwareName element SHALL be present.
  + CDA HD: line 88
  + NEMSIS: ERecord.03 & ERecord.04 (version), concatenated with a space
* CONF-33: One or more . . . author/AssignedAuthor/Person elements MAY be present.
  + CDA HD: line 83
  + NEMSIS: TBD

ClinicalDocument/Author/AssignedAuthor/telecom; DProfessional.09

ClinicalDocument/Author/AssignedAuthor/addr/CTY; DProfessional.05-9

[GHC]

#### 6.1.4 Custodian

* CONF-XX: A ClinicalDocument/custodian/typeCode element SHALL be present, having value “CST”.
  + CDA HD: line 120
  + NEMSIS: no corresponding element
* CONF-XX: A ClinicalDocument/custodian/AssignedCustodian/classCode element SHALL be present, having value “ASSIGNED”.
  + CDA HD: line 122
  + NEMSIS: no corresponding element
* CONF-XX: A . . . AssignedCustodian/representedCustodianOrganization/classCode element SHALL be present, having value “ORG”.
  + CDA HD: line 124
  + NEMSIS: no corresponding element
* CONF-XX: A . . . AssignedCustodian/representedCustodianOrganization/determinerCode element SHALL be present, having value “INSTANCE”.
  + CDA HD: line 125
  + NEMSIS: no corresponding element
* CONF-XX: A . . . AssignedCustodian/representedCustodianOrganization/id element SHALL be present, having value “ORG”. [CDA]
  + CDA HD: line 126
  + NEMSIS: EResponse.01
* CONF-XX: A . . . AssignedCustodian/representedCustodianOrganization/name element SHALL be present. [GHC CONF-HP-9]
  + CDA HD: line 127
  + NEMSIS: EResponse.02
* CONF-XX: A . . . AssignedCustodian/representedCustodianOrganization/addr element SHALL be present. [GHC CONF-HP-9]
  + CDA HD: line 127
  + NEMSIS:
    - DContact.05 Street address: @ADXP = “SAL”
    - DContact.06 City: @ADXP = “CTY”
    - DContact.07 County: @ADXP = “CPA”
    - DContact.08 State: @ADXP = “STA”
    - DContact.09 Postal code: @ADXP = “ZIP”
    - DContact.10 Country: @ADXP = “CNT”

#### 6.1.5 Legal Authenticator

#### 6.1.6 Authenticator

#### 6.1.7 Participant

#### 6.1.8 Service Event

The Service Event is the EMS service provided to the patient.

* CONF-XX: A ClinicalDocument/documentationof element SHALL be present, having value “DOC”.
  + CDA HD: line 172
  + NEMSIS: no corresponding element
* CONF-XX: A ClinicalDocument/documentationof/ServiceEvent/classCode element SHALL be present, having value “ACT”.
  + CDA HD: line 174
  + NEMSIS: no corresponding element
* CONF-XX: A ClinicalDocument/documentationof/ServiceEvent/moodCode element SHALL be present, having value “EVN”.
  + CDA HD: line 175
  + NEMSIS: no corresponding element
* CONF-XX: A ClinicalDocument/documentationof/ServiceEvent/id element SHALL be present, representing the incident number assigned by the 911 Dispatch System.
  + CDA HD: line 176
  + NEMSIS: EResponse.03
* CONF-XX: A ClinicalDocument/documentationof/ServiceEvent/code element SHALL be present, having value drawn from EMSTEMPVS\_010.
  + CDA HD: line 174
  + NEMSIS: EResponse.05

Performers are the EMS crew members. The values in the specified value set are PRF (performer) and SPRF (secondary performer).

* CONF-XX: For each performer, a . . . /performer/typeCode element SHALL be present, having value drawn from 2.16.840.1.113883.1.11.19601 (HL7 x\_ServiceEventPerformer).
  + CDA HD: line 180
  + NEMSIS: no corresponding element
* CONF-XX: For each performer, a . . . /performer/functionCode element SHALL be present, having value drawn from EMSTEMPVS\_022.
  + CDA HD: line 181
  + NEMSIS: ECrew.03
* CONF-XX: For each performer, a . . . /performer/assignedEntity/id element SHALL be present.
  + CDA HD: line 183/101
  + NEMSIS: ECrew.01
* CONF-XX: For each performer, a . . . /performer/assignedEntity/code element SHALL be present.
  + CDA HD: line 183/102
  + NEMSIS: ECrew.02
* CONF-XX: For each performer, a . . . /performer/assignedEntity/person/name element SHALL be present. [GHC 16 CONF-HP-6]
  + CDA HD: line 183/found in diagram not HD
  + NEMSIS:
    - DProfessional.01 Last: @ENXP=”FAM”
    - DProfessional.02 First: @ENXP=”GIV”
    - DProfessional.03 Middle: @ENXP=”GIV”
* CONF-XX: For each performer, a . . . /performer/assignedentity/addr element SHALL be present. [GHC 17 CONF-HP-7]
  + CDA HD: line 183/103
  + NEMSIS:
    - DProfessional.04 Street address: @ADXP = “SAL”
    - DProfessional.05 City: @ADXP = “CTY”
    - DProfessional.06 State: @ADXP = “STA”
    - DProfessional.07 Postal code: @ADXP = “ZIP”
    - DProfessional.08 Country: @ADXP = “CNT”
* CONF-XX: For each performer, a . . . /performer/assignedentity/telecom element SHALL be present. [GHC 17 CONF-HP-7]
  + CDA HD: line 183/104
  + NEMSIS: DProfessional.09

#### 6.1.9 Related Document

If an EMS Patient Care report is updated, it is sent as a “replacement” document, and it refers back to the original. The EMS Patient Care Report has no anticipated need for the “append” or “transform”.

* CONF-XX: If a document version is greater than 1 (i.e., it replaces a previous document), a ClinicalDocument/relatedDocument element SHALL be present with typecode = “RPLC”. [CDA]
  + CDA HD: line 185
  + NEMSIS: no corresponding element
* CONF-XX: For a replacement document , a . . . /relatedDocument/ParentDocument/classCode element SHALL be present with value = “DOCCLIN”. [CDA]
  + CDA HD: line 187
  + NEMSIS: no corresponding element
* CONF-XX: For a replacement document , a . . . /relatedDocument/ParentDocument/moodCode element SHALL be present with value = “EVN”. [CDA]
  + CDA HD: line 188
  + NEMSIS: no corresponding element
* CONF-XX: For a replacement document , a . . . /relatedDocument/ParentDocument/id element SHALL be present. [CDA]
  + CDA HD: line 189
  + NEMSIS: the id of the previous document (ERecord.01 of the previous document + the version number of that original document)

#### 6.1.9 Encompassing Encounter

The encompassing encounter is used to relate the ambulance or truck (the facility) to the service.

* CONF-XX: A ClinicalDocument/componentOf element SHALL be present, having value = “COMP”.
  + CDA HD: line 203
  + NEMSIS: no corresponding element
* CONF-XX: A ClinicalDocument/componentOf/EncompassingEncounter element SHALL be present, having classCode=”ENC” and moodCode=”EVN”. [CDA]
  + CDA HD: line 205-206
  + NEMSIS: no corresponding element
* CONF-XX: A ClinicalDocument/componentOf/EncompassingEncounter/effectiveTime element SHALL be present. [CDA]
  + CDA HD: line 209
  + NEMSIS: Etimes.03 (The date the responding unit was notified by dispatch)
* CONF-XX: A . . . /EncompassingEncounter/Location/HealthCareFacility/classCode element SHALL be present having value = “SDLOC”.
  + CDA HD: line 221
  + NEMSIS: no corresponding element
* CONF-XX: A . . . /EncompassingEncounter/Location/HealthCareFacility/id element SHALL be present.
  + CDA HD: line 222
  + NEMSIS: EResponse.04
* CONF-XX: A . . . /EncompassingEncounter/Location/HealthCareFacility/code element SHALL be present with a value drawn from EMSTEMPVS\_012.
  + CDA HD: line 223
  + NEMSIS: EResponse.07

### Sections

## Appendix A: Value Sets

EMSTEMPVS\_010 EResponse.05

EMSTEMPVS\_022 ECrew.03

EMSTEMPVS\_012 EResponse.07

## Appendix B: NEMSIS Element Scope

A