CDAR2\_IG\_POLST\_R1\_STU\_2022SEP\_Vol1

Logo, company name

Description automatically generated

**HL7 CDA® R2 Implementation Guide: ePOLST: Portable Medical Orders About Resuscitation and Initial Treatment,**

**Release 1 (US Realm)**

**Standard for Trial Use**

**Volume 1 — Introductory Material**

**September 2022**

Publication of this standard for trial use (STU) has been approved by Health Level Seven International (HL7). This STU is not an accredited American National Standard. The feedback period on the use of this STU shall end 24 months from the date of publication. For information on submitting feedback see <http://www.hl7.org/permalink/?SpecificationFeedback> [Specification = “Portable Medical Orders (ePOLST) About Resuscitation and Initial Treatment (CDA), Version = 1.0.0]”.

Following this 24-month feedback period, this STU, revised as necessary, may be resubmitted for further feedback or submitted to a normative ballot in preparation for approval by ANSI as an American National Standard. Implementations of this STU shall be viable throughout any subsequent normative ballot process and for up to six months after publication of the relevant normative standard.

Copyright © 2022 Health Level Seven International ® ALL RIGHTS RESERVED. The reproduction of this material in any form is strictly forbidden without the written permission of the publisher. HL7 International and Health Level Seven are registered trademarks of Health Level Seven International. Reg. U.S. Pat & TM Off**.**

**IMPORTANT NOTES:**

HL7 licenses its standards and select IP free of charge. **If you did not acquire a free license from HL7 for this document,** you are not authorized to access or make any use of it. To obtain a free license, please visit http://www.HL7.org/implement/standards/index.cfm.

**If you are the individual that obtained the license for this HL7 Standard, specification or other freely licensed work (in each and every instance "Specified Material")**, the following describes the permitted uses of the Material.

**A. HL7 INDIVIDUAL, STUDENT AND HEALTH PROFESSIONAL MEMBERS,** who register and agree to the terms of HL7’s license, are authorized, without additional charge, to read, and to use Specified Material to develop and sell products and services that implement, but do not directly incorporate, the Specified Material in whole or in part without paying license fees to HL7.

INDIVIDUAL, STUDENT AND HEALTH PROFESSIONAL MEMBERS wishing to incorporate additional items of Special Material in whole or part, into products and services, or to enjoy additional authorizations granted to HL7 ORGANIZATIONAL MEMBERS as noted below, must become ORGANIZATIONAL MEMBERS of HL7.

**B. HL7 ORGANIZATION MEMBERS,** who register and agree to the terms of HL7's License, are authorized, without additional charge, on a perpetual (except as provided for in the full license terms governing the Material), non-exclusive and worldwide basis, the right to (a) download, copy (for internal purposes only) and share this Material with your employees and consultants for study purposes, and (b) utilize the Material for the purpose of developing, making, having made, using, marketing, importing, offering to sell or license, and selling or licensing, and to otherwise distribute, Compliant Products, in all cases subject to the conditions set forth in this Agreement and any relevant patent and other intellectual property rights of third parties (which may include members of HL7). No other license, sublicense, or other rights of any kind are granted under this Agreement.

**C. NON-MEMBERS,** who register and agree to the terms of HL7’s IP policy for Specified Material, are authorized, without additional charge, to read and use the Specified Material for evaluating whether to implement, or in implementing, the Specified Material, and to use Specified Material to develop and sell products and services that implement, but do not directly incorporate, the Specified Material in whole or in part.

NON-MEMBERS wishing to incorporate additional items of Specified Material in whole or part, into products and services, or to enjoy the additional authorizations granted to HL7 ORGANIZATIONAL MEMBERS, as noted above, must become ORGANIZATIONAL MEMBERS of HL7.

Please see http://www.HL7.org/legal/ippolicy.cfm for the full license terms governing the Material.

**Ownership.** Licensee agrees and acknowledges that **HL7 owns** all right, title, and interest, in and to the Trademark. Licensee shall **take no action contrary to, or inconsistent with**, the foregoing.

**Licensee agrees and acknowledges that HL7 may not own all right, title, and interest, in and to the Materials and that the Materials may contain and/or reference intellectual property owned by third parties (“Third Party IP”). Acceptance of these License Terms does not grant Licensee any rights with respect to Third Party IP. Licensee alone is responsible for identifying and obtaining any necessary licenses or authorizations to utilize Third Party IP in connection with the Materials or otherwise. Any actions, claims or suits brought by a third party resulting from a breach of any Third Party IP right by the Licensee remains the Licensee’s liability.**

Following is a non-exhaustive list of third-party terminologies that may require a separate license:

| **Terminology** | **Owner/Contact** |
| --- | --- |
| Current Procedures Terminology (CPT) code set | American Medical Association https://www.ama-assn.org/practice-management/cpt-licensing |
| SNOMED CT | SNOMED International http://www.snomed.org/snomed-ct/get-snomed-ct or info@ihtsdo.org |
| Logical Observation Identifiers Names & Codes (LOINC) | Regenstrief Institute |
| International Classification of Diseases (ICD) codes | World Health Organization (WHO) |
| NUCC Health Care Provider Taxonomy code set | American Medical Association. Please see www.nucc.org. AMA licensing contact: 312-464-5022 (AMA IP services) |

|  |  |  |  |
| --- | --- | --- | --- |
| Primary Editor: | Diana Wright Lantana Consulting Group [diana.wright@lantanagroup.com](mailto:diana.wright@lantanagroup.com) | Primary Editor: | Zabrina Gonzaga Lantana Consulting Group [zabrina.gonzaga@lantanagroup.com](mailto:zabrina.gonzaga@lantanagroup.com) |
| Co-Editor: | Amy Vandenbroucke, JD,  National POLST [amy@polst.org](mailto:amy@polst.org) | Co-Editor: | Larry Garber [lawrence.garber@reliantmedicalgroup.org](mailto:lawrence.garber@reliantmedicalgroup.org) |
| Co-Editor: | Rick Geimer Lantana Consulting Group [rick.geimer@lantanagroup.com](mailto:rick.geimer@lantanagroup.com) | Co-Editor: | Liora Alschuler Lantana Consulting Group [liora.alschuler@lantanagroup.com](mailto:liora.alschuler@lantanagroup.com) |
| Co-Editor: | Lisa Nelson MaxMD [lnelson@max.md](mailto:lnelson@max.md) | Technical Editor: | Kristin Schrock Lantana Consulting Group [kristin.schrock@lantanagroup.com](mailto:kristin.schrock@lantanagroup.com) |
| SDWG  Co-Chair: | Gaye Dolin M.S.N., R.N. Namaste Informatics [gdolin@namasteinformatics.com](mailto:gdolin@namasteinformatics.com) | SDWG  Co-Chair: | Benjamin Flessner Redox [benjamin@redoxengine.com](mailto:benjamin@redoxengine.com) |
| SDWG  Co-Chair: | Austin Kreisler Leidos Consultant [Austin.J.Kreisler@leidos.com](mailto:Austin.J.Kreisler@leidos.com) | SDWG  Co-Chair: | Sean McIlvenna Lantana Consulting Group [sean.mcilvenna@lantanagroup.com](mailto:sean.mcilvenna@lantanagroup.com) |
| SDWG  Co-Chair: | Russell Ott Deloitte Consulting LLP [rott@deloitte.com](mailto:rott@deloitte.com) | SDWG  Co-Chair: | Andrew Statler [astatler@kc.rr.com](mailto:astatler@kc.rr.com) |
| SDWG  Co-Chair: | Matt Szczepankiewicz  Epic [mszczepa@epic.com](mailto:mszczepa@epic.com) |  |  |
| **Stakeholder contributors:** Rachel Abbey, Chinonye Onwunli (OS/ONC); Gay Dolin (Namaste Informatics); Liz Umberfield (Indiana Univ.); Becky Learn (Indiana Health Information Exchange); Abby Dotson (Oregon Health & Science Univ.); Robert (Rim) Cothren (CA Assoc. HIEs); Andrea Pitkus (Univ. Wisconsin); Eric Chaney (NHTSA); Becky Gradl (Academy of Nutrition and Dietetics); Corey Spears (MITRE); Christian Witt, Dave Saylor, Jonathon Feit (Beyond Lucid); Brooke Miles (Cerner); Dan Wortmann, Daniel Rutz, Michael Brodsky (Epic); Remle Crowe (ESO); Kashif Khan, Kelly Clarke (Image Trend); Maria Moen (ADVault); Natasha Kreisle; Jay Ostby | | | |

Acknowledgments

This guide was developed and produced through the efforts of Health Level Seven (HL7) International and the Office of the National Coordinator for Health Information Technology (ONC) and National POLST. The editors appreciate the support and sponsorship of the HL7 Structured Documents Working Group (SDWG), the HL7 Orders and Observation Working Group, the HL7 Patient Empowerment Working Group, and all volunteers and staff associated with the creation of this document. This guide would not have been possible without the funding support of the ONC and the years of consensus-building work and content development by National POLST.

This material contains content from Systematized Nomenclature of Medicine, Clinical Terms (SNOMED CT®) (<http://www.ihtsdo.org/snomedct/>), of the International Health Terminology Standard Development Organisation (IHTSDO). This material contains content from the Logical Observation Identifiers Names and Codes (LOINC) organization (<http://loinc.org>). The LOINC table, LOINC codes, and LOINC panels and forms file are copyright © 1995-2021, Regenstrief Institute, Inc. and LOINC Committee, and available at no cost under the license at <https://loinc.org/kb/license/>.

Structure of This Guide

Two volumes comprise the complete *HL7 CDA® R2 Implementation Guide: ePOLST: Portable Medical Orders About Resuscitation and Initial Treatment, Release 1 - US Realm*. Volume 1 provides narrative introductory and background material pertinent to this implementation guide, including information on how to understand and use the templates in Volume 2. Volume 2 contains the normative Clinical Document Architecture (CDA) templates for this guide along with lists of all templates, code systems, value sets, and, when appropriate, changes from the previous version.

Table of Contents

[1 Introduction 9](#_Toc113889644)

[1.1 Purpose 9](#_Toc113889645)

[1.2 Audience 9](#_Toc113889646)

[1.3 Organization of the Guide 9](#_Toc113889647)

[1.3.1 Volume 1 Introductory Material 10](#_Toc113889648)

[1.3.2 Volume 2 CDA Templates and Supporting Material 10](#_Toc113889649)

[1.4 Contents of the Package 10](#_Toc113889650)

[2 Portable Medical Orders About Resuscitation and Initial Treatments 12](#_Toc113889651)

[2.1 Background 12](#_Toc113889652)

[2.2 Current Project Scope 13](#_Toc113889653)

[2.3 ePOLST Design Approach 13](#_Toc113889654)

[2.4 Relationship to Other Standards 14](#_Toc113889655)

[2.5 Best Practices for Implementation 14](#_Toc113889656)

[2.5.1 Understanding State-Specific Requirements 15](#_Toc113889657)

[2.5.2 Completing the National ePOLST Form 15](#_Toc113889658)

[2.5.3 Rendering the National ePOLST Form 16](#_Toc113889659)

[2.5.4 Roles on an ePOLST 16](#_Toc113889660)

[2.5.5 Electronic Signatures and Other Indications of "Validity" 17](#_Toc113889661)

[2.5.6 Exchange of Scans or PDF Versions of the National POLST Form 18](#_Toc113889662)

[2.5.7 Versioning 18](#_Toc113889663)

[2.5.8 Referencing a Related Document 19](#_Toc113889664)

[2.6 Recommendations for Further Work 19](#_Toc113889665)

[2.6.1 Testing “Signature on File” 19](#_Toc113889666)

[2.6.2 Supporting Query & Retrieval Functions 19](#_Toc113889667)

[2.6.3 Voiding ePOLST Forms 20](#_Toc113889668)

[2.6.4 Aligning with Fast Healthcare Interoperable Resources (FHIR) Work 21](#_Toc113889669)

[2.6.5 Testing CDA Document Types 21](#_Toc113889670)

[2.6.6 Testing Additional Codes 22](#_Toc113889671)

[2.6.7 Reviewing Related Documents 23](#_Toc113889672)

[3 CDA R2 Background 24](#_Toc113889673)

[3.1 Templated CDA 24](#_Toc113889674)

[3.2 Further Constraining Existing Templates 25](#_Toc113889675)

[3.3 Status of a Template Version 26](#_Toc113889676)

[4 Design Considerations 27](#_Toc113889677)

[4.1 Rendering Header Information for Human Presentation 27](#_Toc113889678)

[4.2 Unknown and No Known Information 27](#_Toc113889679)

[5 Using This Implementation Guide 32](#_Toc113889680)

[5.1 Conformance Conventions Used in This Guide 32](#_Toc113889681)

[5.1.1 Errata or Enhancements 32](#_Toc113889682)

[5.1.2 Templates and Conformance Statements 32](#_Toc113889683)

[5.1.3 Template Versioning 33](#_Toc113889684)

[5.1.4 Open and Closed Templates 34](#_Toc113889685)

[5.1.5 Conformance Verbs (Keywords) 34](#_Toc113889686)

[5.1.6 Cardinality 35](#_Toc113889687)

[5.1.7 Optional and Required with Cardinality 35](#_Toc113889688)

[5.1.8 Vocabulary Conformance 36](#_Toc113889689)

[5.1.9 Containment Relationships 38](#_Toc113889690)

[5.1.10 Data Types 38](#_Toc113889691)

[5.1.11 Succession Management 38](#_Toc113889692)

[5.1.12 Document-Level Templates “Properties” Heading 38](#_Toc113889693)

[5.2 XML Conventions Used in This Guide 38](#_Toc113889694)

[5.2.1 XPath Notation 38](#_Toc113889695)

[5.2.2 XML Examples and Sample Documents 39](#_Toc113889696)

[6 References & Resources 40](#_Toc113889697)

[Appendix A — Acronyms And Abbreviations 41](#_Toc113889698)

[Appendix B — National POLST Form 43](#_Toc113889699)

[Appendix C — POLST to ePOLST Mapping 45](#_Toc113889700)

[Appendix D — Extensions To CDA R2 50](#_Toc113889701)

[Appendix E — Mime Multipart/Related Messages 52](#_Toc113889702)

[***MIME Multipart/Related Messages*** 52](#_Toc113889703)

[***RFC-2557 MIME Encapsulation of Aggregate Documents, Such as HTML (MHTML)*** 52](#_Toc113889704)

[***Referencing Supporting Files in Multipart/Related Messages*** 52](#_Toc113889705)

[***Referencing Documents from Other Multiparts within the Same X12 Transactions*** 53](#_Toc113889706)

Table of Figures

[Figure 1: Pre-selected Code Example 15](#_Toc113889707)

[Figure 2: Section.text Example 22](#_Toc113889708)

[Figure 3: Entry Example 22](#_Toc113889709)

[Figure 4: Templated CDA 24](#_Toc113889710)

[Figure 5: Asserting Conformance to Two Templates 25](#_Toc113889711)

[Figure 6: nullFlavor Example 28](#_Toc113889712)

[Figure 7: Attribute Required (nullFlavor not allowed) 28](#_Toc113889713)

[Figure 8: Allowed nullFlavors When Element is Required (with XML examples) 29](#_Toc113889714)

[Figure 9: Unknown Medication Example 29](#_Toc113889715)

[Figure 10: Unknown Medication Use of Anticoagulant Drug Example 29](#_Toc113889716)

[Figure 11: No Known Medications Example 30](#_Toc113889717)

[Figure 12: Value Known, Code for Value Not Known 30](#_Toc113889718)

[Figure 13: Value Completely Unknown 30](#_Toc113889719)

[Figure 14: Value Known and Code in Required, Code System Not Known but Code from Another Code System is Known 31](#_Toc113889720)

[Figure 15: Constraints Format Example 33](#_Toc113889721)

[Figure 16: Constraints Format – only one allowed 35](#_Toc113889722)

[Figure 17: Constraints Format – only one like this allowed 35](#_Toc113889723)

[Figure 18: Binding to a Single Code 36](#_Toc113889724)

[Figure 19: XML Expression of a Single-code Binding 36](#_Toc113889725)

[Figure 20: Translation Code Example 37](#_Toc113889726)

[Figure 21: XML Document Example 39](#_Toc113889727)

[Figure 22: XPath Expression Example 39](#_Toc113889728)

[Figure 23: ClinicalDocument Example 39](#_Toc113889729)

[Figure 24: National POLST Form, page 1 43](#_Toc113889730)

[Figure 25: National POLST Form, page 2 44](#_Toc113889731)

Table of Tables

[Table 1: Contents of the Package 11](#_Toc113889732)

[Table 2: Example Value Set Table (Referral Types) 37](#_Toc113889733)

[Table 3: Mapping National POLST Form to CDA 45](#_Toc113889734)

# Introduction

Purpose

This implementation guide package describes constraints on the Clinical Document Architecture Release 2 (CDA R2) header and body elements for the ePOLST Medical Orders Document, which are derived from requirements set forth by the National POLST Form[[1]](#footnote-2) and by Health Level Seven (HL7) stakeholder work groups.

An ePOLST is an electronic document of a POLST, portable medical orders about resuscitation and initial treatment created by a legally authorized person (usually a clinician or care provider) in consultation with a patient or patient representative. It provides medical orders and guidance on resuscitation and initial treatments as well as goals of care and, possibly, additional orders or instructions and orders regarding artificial nutrition. The POLST decision-making process is for patients who are at risk for a life-threatening clinical event because they have a serious life-limiting medical condition, which may include advanced frailty.[[2]](#footnote-3) The author of the ePOLST Medical Orders Document may not necessarily be the same person as the legal authenticator. (For further explanation, see section [Roles on an ePOLST](#Roles).) Some states regulate the form, content, and approved authors and/or legal authenticators for these documents. Implementers must know the rules and regulations of the locations where this standard will be implemented.

This implementation guide is published as a Standard for Trial Use (STU), allowing users to comment during the trial period (see [Errata or Enhancements](#Errata_Enhancements)).

Audience

The audience for this implementation guide includes software developers, vendors, and implementers of electronic health records (EHRs), emergency medical services (EMS), and information systems for hospitals, hospice, home care, and long-term care settings; National POLST, state portable medical order programs; as well as registries, health information exchanges (HIEs), and accountable care organizations (ACOs). Business analysts and policy managers can also benefit from a basic understanding of the use of CDA templates across multiple local implementations and use cases.

Organization of the Guide

This implementation guide is organized into two volumes. Volume 1 contains primarily narrative text describing this implementation guide, whereas Volume 2 contains normative CDA R2 template definitions.

### Volume 1 Introductory Material

This document, Volume 1, provides information on this project, an overview of CDA, and guidance on how to understand and use the CDA templates provided in Volume 2.

* **Chapter 1**—Introduction
* **Chapter 2**—Portable Medical Orders for Resuscitation and Initial Treatments contains project information, best practices, and recommendations.
* **Chapter 3**—CDA R2 Background provides an introduction to the CDA R2 base standard’s “templated CDA” approach to implementation guide development and overarching principles that have been developed and applied across the CDA templates in this guide. Material in this section can be thought of as “heuristics”, as opposed to the formal and testable constraints found in Volume 2 of this guide.
* **Chapter 4**—Design Considerations describe overarching principles that have been developed and applied across the CDA templates in this guide.
* **Chapter 5**—Using This Implementation Guide describes the rules and formalisms used to constrain the CDA R2 standard. It describes the formal representation of CDA templates, the mechanism by which templates are bound to vocabulary, and additional information necessary to understand and correctly implement the normative content found in Volume 2 of this guide.
* **Chapter 6**—References & Resources lists documents and sources cited by this guide.
* **Appendices** include acronyms and abbreviations, CDA R2 extensions, and Multipurpose Internet Mail Extensions (MIME) multipart/related messages.

### Volume 2 CDA Templates and Supporting Material

Volume 2 includes CDA templates and prescribes their use for a specific document type, the ePOLST Portable Medical Orders. The main chapters are:

* **Chapter 1**—Document-Level Templates defines the document constraints that apply to the ePOLST Medical Orders Document.
* **Chapter 2**—Section-Level Templates defines the section templates in the ePOLST Medical Orders Document.
* **Chapter 3**—Entry-Level Templates defines the entry template in the ePOLST Medical Orders Document.
* **Chapter 4**—Participation and Other Templates defines templates for other fielded items (e.g., address, name) that cannot stand on their own without being nested in another template.
* **Chapters 5-9** provide tables of the template IDs, value sets, code systems used in the guide, and retired templates, as well as a detailed log of changes from the previous version.

Contents of the Package

The following files comprise the package.

Table 1: Contents of the Package

| Filename | Description | Standards Applicability |
| --- | --- | --- |
| CDAR2\_IG\_POLST\_R1\_STU\_2022SEP\_Vol1 \_Introductory\_Material | Implementation Guide Introductory and Background Material | Normative |
| CDAR2\_IG\_POLST\_R1\_STU\_2022SEP\_Vol2 \_Templates\_and\_Supporting\_Material | Implementation Guide Template Library and Supporting Material | Normative |

Additional Resources (not included in the package):

* Transform/Stylesheets:
  + <https://hl7.org/permalink/?CDAStyleSheet>
  + <https://github.com/lantanagroup/stylesheets>
* CDA SDTC schema: <https://github.com/HL7/cda-core-2.0/tree/master/schema/extensions/SDTC>
* GitHub repository for the project files: <https://github.com/HL7/CDA-portable-medical-orders>
  + Examples files (xml & html)
  + Input files
  + Validation files

(A Github account is required. See <https://github.com/signup> & <https://github.com/HL7/> for access information.)

# Portable Medical Orders About Resuscitation and Initial Treatments

Background

US states have the authority to adopt portable medical order forms for patients who are considered to be at risk for a life-threatening clinical event because they have a serious life-limiting medical condition, which may include advanced frailty. A national initiative to assist states in developing portable medical orders launched in 2004, and the National POLST organization emerged from that effort.[[3]](#footnote-4) Together, National POLST and state programs seek to improve patient care and greater patient control and direction over their medical treatment by creating policies, guidance, and education materials supporting appropriate and consistent use of the POLST process and form. National POLST is the non-profit organization coordinating the creation of and education about these standards and other materials.

A POLST portable medical order differs from an advance directive and from a Personal Advance Care Plan (PACP) in that a POLST form is a portable medical order created by a clinician in consultation with the patient and/or patient's family for patients who are seriously ill or frail. This portable medical order set is designed to promote coordinated care for patients by communicating their treatment preferences as they transition across care settings or travel to other states. While not solely for emergencies, a POLST is valuable in communicating to emergency personnel and other treating healthcare professionals whether the patient wants to elect or decline cardiopulmonary resuscitation (CPR), advanced respiratory interventions, and medically assisted nutrition, as well as additional preferences such as transfer to a hospital and intravenous antibiotics.

While both advance directives and POLST are advance care plans, they do not replace each other. An advance directive is a form in which an individual: (1) appoints a person or persons to make healthcare decisions for the individual if and when the individual loses the capacity to make healthcare decisions (typically called a “healthcare power of attorney” or “healthcare proxy”); and/or (2) provides guidance or instructions for making healthcare decisions, typically in end-of-life care situations (often called a “living will”). An advance directive is a direction from the patient, not a medical order.

In contrast, a POLST is a set of medical orders that applies to a limited population of patients and addresses a limited number of critical medical decisions. The form is used to communicate information that complements advance directives in that these medical orders remain in effect between encounters. They provide continuity of care assurance for patients between interactions with the healthcare system and beyond the scope of orders that are limited to a single organization.

All 50 states plus the District of Columbia (D.C.) have adopted or are in the process of adopting such forms. The portable medical orders forms vary across states, so National POLST convened a process among states to create a national consensus form, which was released in September 2019. That National POLST Form is primarily based on the endorsement standards used to evaluate state POLST programs, though most non-endorsed states have forms substantially similar to the endorsement standards and National POLST Form. The name and acronym of these forms vary. As of 2021, 15 acronyms and 19 names are used by the states for these types of portable medical order forms.[[4]](#footnote-5) All National POLST education uses the name "POLST" and "portable medical order" but no longer defines "POLST" as an acronym.[[5]](#footnote-6) This project has adopted that approach to the POLST name; it is not an acronym but a word that means a portable medical order about resuscitation and initial treatments.

An ePOLST CDA document serves three important functions outlined by National POLST[[6]](#footnote-7):

* **For patients, families and caregivers**, it is a medical order communicating their treatment preferences to providers when they lack the capacity or ability to speak for themselves.
* **For healthcare providers,** it is a medical order communicating their patient’s treatment preferences to other medical providers. It provides guidance to:
  + Hospitals for creating in-hospital resuscitation status and other treatment order sets
  + Facilities for transfer care upon discharge
  + Other providers so they can align other treatments not covered by the POLST form they may offer or provide to the patient’s goals of care
* **For EMS personnel,** unlike advance directives, it provides immediately actionable orders regarding resuscitation procedures and transporting the patient to the hospital in an easy-to-understand format with a more useable timeframe.

This *HL7 CDA® R2 Implementation Guide: ePOLST: Resuscitation and Treatment Portable Medical Orders, Release 1 - US Realm* represents the National POLST Form and can be further constrained by local implementations that adapt it to the policies and legal needs of each state.

Current Project Scope

This specification builds on the extensive analysis of data elements by National POLST to define a CDA representation of each data element on the National POLST Form and define an electronic POLST (ePOLST) Portable Medical Orders CDA document (see the National POLST Form and Mapping Table in the Appendix). The specification addresses the base scenario in which an ePOLST is created and exchanged within health information systems that send and receive valid CDA documents. For example, a clinician creates an ePOLST for a patient and sends it with the patient during a planned transfer of care. The project scope is limited to National POLST Form data elements and may not include all clinical details involved in carrying out those orders.

ePOLST Design Approach

Templates in this CDA specification are open (see [Open and Closed Templates](#IG_OpenClosed)). This design allows states to implement additional fields to remain compliant with their state regulations while maintaining the minimum data exchange requirements in the *HL7 CDA® R2 Implementation Guide: ePOLST: Resuscitation and Treatment Portable Medical Orders, Release 1 - US Realm* specification. State forms that loosen requirements or address the same general concern in a conflicting manner will result in instances that do not pass validation (do not conform to this specification).

This CDA specification uses the US Realm Header elements defined in Consolidated CDA (C-CDA) with further constrains setId and versionNumber, legalAuthenticator, and authenticator, as defined in the ePOLST Medical Orders Document template. It also includes an unstructured document template (ePOLST Medical Orders-Unstructured), which is compliant with the Unstructured Document (V3) template from C-CDA, for exchange of a PDF POLST.

This specification relies on codes that capture the language of the orders portion of National POLST Form because that Form is the result of an extensive consensus process. In addition, two entry templates (“ePOLST Administrative Information” and “ePOLST Clinical Instructions”) accommodate text from the National POLST Form that is recommended but may be adjusted by implementers to better match state-specific text.

Relationship to Other Standards

This specification aligns with two C-CDA implementation guides, *C-CDA R2.1; Advance Directives Templates*[[7]](#footnote-8) and *Personal Advance Care Plan (PACP) Document*[[8]](#footnote-9), but this specification does not conform to those as it is a medical order authored by a clinician.

Recent work in advance directive information defines three information types[[9]](#footnote-10):

* Type I: Person-authored advance directive information for sharing an individual’s (patient’s) medical treatment and intervention goals, preferences, and priorities
* Type II: Practitioner-authored encounter-centric instructions related to a current, immediate episode of care
* Type III: Practitioner-authored portable medical orders intended to follow a patient and be available across the continuum of care

This CDA specification of the National ePOLST Form falls under the category of type III information.

Best Practices for Implementation

In addition to defining ePOLST concepts and data elements, this implementation guide includes best practices for implementers to aid the improvement of communication and patient care across settings and future medical encounters.

### Understanding State-Specific Requirements

States regulate advance care planning, including POLST forms. This means that implementations of an ePOLST CDA specification may require additional text, restrictions on who can use and sign the form, etc. Implementers must understand the legal and policy requirements for POLST forms in each state where the electronic form is being implemented.

This CDA specification provides options to include state-specific text in:

* **Administrative Information:** The ePOLST Administrative Information entry template provides the option to include information and form text that is administrative, instructional, and/or legal in nature and that needs to be present on an exchange of an ePOLST document.
* **Clinical Instructions:** The ePOLST Clinical Instructions entry template provides the option to include clinical instructions required in an exchange of an ePOLST document.
* **Original Text:** Each use of ePOLST-specific codes allows the additional use of the originalText element for form-specific code text. For example, if the Initial Treatment Orders choice is “Selective Treatment”, but the state form uses the term "Limited Treatment”, the implementer may use originalText to include that text in addition to the code.

Implementers also have the option to pre-select order options where a state mandates the choice. For example, in a state that does not permit orders about medically assisted nutrition on a POLST form, the implementer may pre-select the order value to be “Not discussed or no decision made (provide standard of care)."

Figure 1: Pre-selected Code Example

<code code="LA33492-2"  
 codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"  
 displayName="Not discussed or no decision made (provide standard of care)">

### Completing the National ePOLST Form

As National POLST points out in their publications, form completion requires a conversation between the provider and patient or patient’s surrogate. For that reason, the user interface for the ePOLST is a particularly important vehicle for both provider and patient education, conversation, shared decision making, and documentation. In some healthcare settings, these roles of education, discussion, shared decision making, and documentation are divided up among multiple members of a healthcare provider team. A healthcare provider author should complete this form only after a conversation with the patient or the patient’s representative. National POLST provides the following guidance:

Provider should document the basis for this form in the patient’s medical record.

Form completion should always be voluntary for the patient.

POLST forms are not for healthy individuals and should be used only for patients who have a serious life-limiting medical condition, which may include advanced frailty.[[10]](#footnote-11)

POLST forms do not expire but should be reviewed whenever the patient:

* + Is transferred from one care setting or level to another
  + Has a substantial change in health status
  + Changes primary provider
  + Changes their treatment preferences or goals of care

Providers should be trained on facilitating advance care planning and POLST forms with patients. This includes:

* + Understanding how to elicit patients’ goals of care considering their current medical condition
  + Aligning the patients’ treatment preferences with their expressed goals or known values
  + Accurately documenting patient treatment preferences as medical orders in a POLST order set
  + Understanding—and being able to explain to patients and families—the differences between POLST order sets and advance directives as well as their benefits[[11]](#footnote-12)

An ePOLST Form must be given to the patient and a printed rendering is recommended, in addition to any electronic format. The provider ensures that the ePOLST is either retained in the authoring system, is submitted to an authorized registry, or both.

### Rendering the National ePOLST Form

It is important for patients to see the full form with all options and instructions and an indication of the options selected, so the choices can be easily reviewed.

Implementers are encouraged to create appropriate renderings for each of the roles documented in the completed ePOLST: author(s), legalAuthenticator, patient, patient representative, and for EMS, other recipients, etc. Implementers must understand any state-specific requirements for ePOLST Form renderings (e.g., print copies) in the state of implementation.

### Roles on an ePOLST

The National POLST Form specifies certain roles. In this ePOLST CDA specification, those roles are defined by the US Realm Header and the ePOLST Medical Orders Document and the ePOLST Medical Orders-Unstructured document-level templates:

* **Author(s):** The author element is the creator of the clinical document: the person who provides the content in the document. For the ePOLST, the author should be the Health Care Provider listed in "Section F. Signature: Health Care Provider" of the National POLST Form. The US Realm Header allows more than one author, acknowledging that more than one clinician may be involved in the creation of an ePOLST. The author of the ePOLST Medical Orders Document may not necessarily be the same person as the legal authenticator.
* **Legal Authenticator:** The legalAuthenticator element is the individual who is responsible for the document. For the ePOLST, this is the signer in "Section F. Signature: Health Care Provider" of the National POLST Form (either the "Health Care Provider" or the "Supervising physician"). Only licensed healthcare providers authorized to sign POLST forms in their state or D.C. can sign this form.[[12]](#footnote-13)
* **Data Enterer:** The dataEnterer element is the person who transferred the content, written or dictated, into the clinical document. To clarify, an author provides the content found within the header or body of a document, subject to their own interpretation; a dataEnterer adds an author's information to the electronic system. For the ePOLST, this element can be used for the “Professional Assisting Health Care Provider w/ Form Completion” in the “Form Completion Information” section of the National POLST Form.
* **Authenticator:** The authenticator element is the individual attesting to the accuracy of information in the document. For the ePOLST, the authenticator is the signer in section "E. Signature: Patient or Patient Representative" of the National POLST Form (either the Patient or Patient's Representative). A patient representative is determined by applicable state law. If the authenticator is the patient, use the ID appropriate to that role, such as a medical record number (MRN). If the patient is a physician, for example, and has a National Provider Identifier (NPI), that identifier should not be used. Instead, use the MRN. If the authenticator is a patient representative, use an ID appropriate to that role.
* **Participant(s):** Multiple participant elements may be used for all other individuals and organizations listed on the ePOLST, for example emergency contacts, a primary care provider not otherwise listed, or a participating hospice organization. Participants do not sign the ePOLST.
* **Custodian:** CDA defines the document Custodian as the participant organization that is in charge of maintaining the document. The custodian is the steward that is entrusted with the care of the document. For an ePOLST, this could be the originating institution or a state registry.

### Electronic Signatures and Other Indications of "Validity"

Both the legalAuthenticator and authenticator require a signatureCode[[13]](#footnote-14) but do not require the sdtc:signatureText extension for a textual or multimedia depiction of the signature. State policies and regulations may tighten these signature requirements. Implementers must understand the state policies and legislation in each location.  
***Recommendation:*** The ePOLST development team recommends that implementers not further tighten the signature constraints for the authenticator (Patient or Patient Representative) unless required by state law, as this may create a technological barrier to the authenticator.

Some states regulate the form, content, and approval signatures for portable medical order documents such as the ePOLST. Implementers must know the rules and regulations of the locations where this standard will be implemented. The following explain who should fill each signer role in different state rule scenarios:

1. If both the provider and patient/patient representative must sign the ePOLST, then place the provider's information in the legalAuthenicator role and place the patient/patient representative information in the authenticator role.
2. If only the healthcare provider may legally sign the ePOLST, then place the provider's information in the legalAuthenticator role. Place the patient/patient representative information in the authenticator role and Null the authenticator signatureCode since they cannot legally sign the ePOLST in this situation.
3. If a resident doctor or other healthcare provider who requires supervision is the author, place the attending doctor information in the legalAuthenticator role.

Implementers should note that witnesses with signatures are not part of an ePOLST; only the legalAuthenticator and authenticator signatures are allowed.

*HL7 Implementation Guide for CDA® Release 2: Digital Signatures and Delegation of Rights, Release 1* provides a standardized method of applying Digital Signatures to CDA documents.[[14]](#footnote-15) Implementers may refer to this standard for guidance on multiple signers, signer’s declaration of their role, declaration of purpose of the signature, long-term validation of the digital signatures and data validation of the signed content.

In addition to a signature, a state may require the state medical license number of the legalAuthenticator to verify the signer’s scope of practice. This can be further specified by state implementations in the legalAuthenticator id and code.

### Exchange of Scans or PDF Versions of the National POLST Form

The ePOLST Medical Orders-Unstructured document-level template provides an option to exchange a scanned POLST Form (e.g., a PDF) electronically. This unstructured document uses the same US Realm Header constraints as the ePOLST Medical Orders Document document-level template.

***Recommendation:*** The ePOLST development team recommends exchanging discrete, structured ePOLST data (i.e., using the ePOLST Medical Orders Document document-level template), however, we recognize that paper and PDF POLSTs already exist and may need to be exchanged. Furthermore, some POLST workflows may require use of paper forms and “wet” signatures. The goal is to support and encourage as much structured content (discrete data) as possible.

### Versioning

This ePOLST CDA specification further constrains the US Realm Header setId and versionNumber to SHOULD (rather than MAY). The setId represents an identifier that is common across all document revisions, and the versionNumber is an integer that indicates the order of successive replacement documents. The setId and versionNumber, along with the document type code and patient identifiers, provide the information required for identification and management of successive ePOLST documents for a patient.

### Referencing a Related Document

Implementers may reference an external document (such as an original POLST form that has been replaced by the current updated, active ePOLST) by using the relatedDocument element in the document header. XFRM is the appropriate code to use when the ePOLST is a transformation of an original POLST with the same content, whereas RPLC is the correct code to use when the ePOLST is replacing an older POLST document. The base CDA® Release 2 standard allows multiple references to related documents (MAY contain zero or more [0..\*] relatedDocument). See CDA® Release 2, section 4.2.3 Header Relationships (subsection 4.2.3.1 ParentDocument) for details on the typeCode combinations allowed for multiple relatedDocuments.[[15]](#footnote-16)

The National POLST Form states, “If a translated POLST form is used during conversation, that information should be noted." The relatedDocument element in the ePOLST header is the appropriate place to note that relationship.

Recommendations for Further Work

### Testing “Signature on File”

Like this ePOLST CDA specification, the *HL7 CDA® R2 Attachment Implementation Guide: Exchange of C-CDA Based Documents, Release 1[[16]](#footnote-17)* also requires a legal authenticator and goes on to allow: “In the case of generated summary documents, institutions may meet the requirement for a legal authenticator by extending the practice of maintaining a ‘Signature on File’. The person/entity indicated is responsible for the contents of the note where it is understood that this legal authenticator is not an author of the document. Policy for determining who is responsible for legal authentication of the summary document rests with the originating organization.”  
***Recommendation:*** The ePOLST development team recommends testing this approach to “Signature on File” for the legal authenticator among state POLST organizations for viability and possible inclusion in later versions of this implementation guide.

### Supporting Query & Retrieval Functions

Beyond this content specification, the broader ePOLST system requires further development and testing of standardized transport and workflow specifications, particularly to support search or query functions required by EMS and other care providers in unplanned and emergency situations. Integration of ePOLST workflows and storage with EMS systems is key as EMS practitioners often need data segmented (i.e., patient identification and orders only). EMS providers and patients would benefit from EMS being able to access the patient’s ePOLST from within the EMS electronic patient care reporting (ePCR) system(s) during traumatic events. For example, treating cardiac arrests in the field requires fast actions and quick decision making. Having the ability to see the patient’s ePOLST would allow first responders to focus on the patient rather than searching for POLST documentation.

Similarly, an ePOLST system should support search or query functions required by a practitioner to review if an ePOLST document is current by, for example, requesting a patient’s ID on the document custodian system. The document custodian system would return possible matching patients and the practitioner would then request and receive the desired patient’s reference document. Similar capabilities are being developed for systems that use Fast Healthcare Interoperable Resources (FHIR®).[[17]](#footnote-18)

Foundational to these use cases is the understanding of where documents are stored. ePOLST documents may be authored, for example, within a healthcare system’s EHR or within a state’s ePOLST registry. An ePOLST from an EHR may be uploaded to a state’s registry, or an ePOLST from a state registry may be downloaded into one or more EHRs. Some states may not have registries while others may have multiple registries. Recognizing and addressing these complexities is crucial when exploring query and retrieval use cases.

***Recommendation:*** The ePOLST development team recommends further work on supporting coordination between EHRs and ePOLST registries and supporting ePOLST exchange scenarios beyond the base scenario, such as:

1. Patient with an ePOLST has a worsening condition and a new care provider creates a new ePOLST. How does the new care provider recognize that there is an existing ePOLST? Who is notified that there is a new ePOLST and how?
2. Patient with both an old ePOLST and a new ePOLST goes to the emergency room. How does that emergency department identify which is the active ePOLST?
3. Patient with an ePOLST faints at home and a neighbor calls 911. How does the responding EMS find and access any active ePOLST?
4. Patient traveling to another state has a medical emergency. How do EMS and/or an emergency department find and identify any active ePOLST?

### Voiding ePOLST Forms

As noted in the previous chapter, this ePOLST CDA specification constrains the US Realm Header setId and versionNumber to SHOULD, rather than MAY. Future releases of this specification may further tighten that to be required (SHALL) as implementing systems develop the capacity to manage and exchange meaningful setId and versionNumber with outside systems. Determining the most recent ePOLST for an individual patient is one part of meaningful version management. The other part is voiding old forms. State laws may limit who has the authority to void ePOLSTs. For these reasons, standardized use of the setId and versionNumber fields is important for patient safety and thus is a critical requirement.

If ePOLSTs are to be truly portable, they must be able to travel with the patient and be updated easily and securely (i.e., in accordance with patient / patient representative wishes). The POLST community wants the ability to retrieve a voided form for review and for historical purposes.

***Recommendation:*** The ePOLST development team recommends further work on the following capabilities:

Specifying and storing (not deleting) a CDA ePOLST document that is “void”

Exchanging ePOLSTs among disparate health information systems and retaining meaningful version numbering systems to ensure that the most recent valid ePOLST for a patient is accessible to those who need it

Sending notification of ePOLST change/update to:

* + Patient / patient representative, ensuring a backup notification process because a patient or caregiver may not have access to the EHR system or portal
  + Primary care provider and legal authenticator if ePOLST was updated in another system

### Aligning with Fast Healthcare Interoperable Resources (FHIR) Work

Future releases of this CDA specification may be able to make use of or align with several FHIR capabilities:

* **Provenance**: Once an ePOLST is in a health information system (EHR, EMS, registry, etc.) and is fully authenticated by the legalAuthenticator and authenticator, any receiving system should be able to assume authenticity and not have to verify it. This is especially important for EMS in emergency situations. *HL7 CDA® R2 Implementation Guide: Consolidated CDA Templates for Clinical Notes - US Realm* includes a Provenance - Author Participation template that represents key information for recording some aspects of provenance and may be used where CDA allows an author (e.g., in the document header).[[18]](#footnote-19) Future ePOLST development should evaluate options for tracking provenance, such as by including the Provenance - Author Participation CDA template or by adapting the approach used by FHIR. The FHIR Provenance resource “tracks information about the activity that created, revised, deleted, or signed a version of a resource, describing the entities and agents involved. This information can be used to form assessments about its quality, reliability, trustworthiness, or to provide pointers for where to go to further investigate the origins of the resource and the information in it.”[[19]](#footnote-20)
* **United States Core Data for Interoperability (USCDI):** None of the ePOLST-specific data elements are available in USCDI; however new data elements are being suggested every year. FHIR efforts on advance care planning will be dependent on codes in USCDI, as that data set informs the US Core profiles that are the base set of requirements for FHIR implementation in the US.

***Recommendation:*** The ePOLST development team recommends that this CDA specification effort coordinate and collaborate with FHIR projects in the same area of advance care planning, particularly in regard to cross-system exchange and versioning of ePOLSTs and recommending new data elements to USCDI.

### Testing CDA Document Types

The base CDA standard supports creation of documents that include either a structured body or a non-xml (“unstructured”) body, in addition to the structured header. In a “hybrid” CDA document, the structured body represents the document information using xml with section structures that include human readable information and machine processable data entries. The non-xml body embeds a base-64 encoded “blob” that holds an image (e.g., a scan or PDF) of the document’s information. The blob can’t be machine processed easily, but it can be decoded and rendered easily to present an exact view of the original source information.

Several use cases would benefit from the option to include both a preserved image of the original source information and the machine processable entries for efficient data processing. One example is the exchange of POLST documents where meaning is clarified by sharing both the source unstructured PDF file (the original POLST) preserved in exactly the required color and format specified by the jurisdiction, and by including the corresponding machine processable data (the ePOLST) for efficient information processing.

Techniques exist with CDA to use the ObservationMedia entry to record the blob that holds the unstructured PDF, using the renderMultiMedia tag to render the PDF within section.text, and to digitally sign the document to mitigate the inherent risks associated with rendering PDF files. Use of the HL7 Digital Signature standard allows the actual signing of the document which prevents content from being modified and allows trust-in-identity for the actual signatory.

***Recommendation:*** The ePOLST development team recommends further testing of digitally signed “hybrid” CDA documents (with both structured data and an encoded PDF of original source document) to determine if this option meets fundamental requirements of the ePOLST use case.

Figure 2: Section.text Example

<section>

<templateId root="New template id here"/>

<code code="48766-0" codeSystem="2.16.840.1.113883.6.1"/>

<title>INFORMATION SOURCE</title>

<text>

...

<renderMultiMedia referencedObject="MM1"/>

...

</text>

</section>

Figure 3: Entry Example

<entry>

<observationMedia ID="MM1" classCode="OBS" moodCode="EVN">

<value mediaType="image/jpeg" representation="B64">

<reference value="data:image/jpeg;base64,/9j/4AAQSkZJRgABAQAASABIAAD/4QBqRX ...

...

/>

</value>

</observationMedia>

</entry>

### Testing Additional Codes

The scope of this first version of the ePOLST CDA implementation guide is the current National POLST Form; therefore, this specification uses codes that match that Form’s language (employing a Model of Use approach). However, similar concepts exist in code systems such as SNOMED CT.

***Recommendation:*** The ePOLST development team recommends exploring additional codes that may be useful to states that wish to adapt this specification to their needs, taking a Model of Meaning approach.

### Reviewing Related Documents

The National POLST form does not currently require review of related documents, such as patient-authored advance directives.

***Recommendation:*** The ePOLST development team recommends exploring mechanisms and best practices for reviewing advance directives, personal care plans, and other documents that record a person’s wishes for healthcare options. Such mechanisms may include integrating with and possibly reusing the Advance Directive Observation CDA template.

# CDA R2 Background

CDA R2 is “… a document markup standard that specifies the structure and semantics of 'clinical documents' for the purpose of exchange” [CDA R2, Section 1.1]. Clinical documents, according to CDA, have the following characteristics:

Persistence

Stewardship

Potential for authentication

Context

Wholeness

Human readability

CDA defines a header for classification and management and a document body that carries the clinical record. While the header metadata are prescriptive and designed for consistency across all instances, the body is highly generic, leaving the designation of semantic requirements to implementation.

Templated CDA

CDA R2 can be constrained by mechanisms defined in the “Refinement and Localization” section of the *HL7 Version 3 Interoperability Standards*.[[20]](#footnote-21) The mechanism most commonly used to constrain CDA is referred to as “templated CDA”. In this approach, a library is created containing modular CDA templates such that the templates can be reused across any number of CDA document types. The following figure illustrates that the Continuity of Care Document (CCD) templates library can be reused by other CDA documents.

Figure 4: Templated CDA

Diagram

Description automatically generated

Many different kinds of templates may be created. Among them, the most common are:

* **Document-level templates**: These templates constrain fields in the CDA header, and define containment relationships to CDA sections. For example, a History-and-Physical document-level template might require that the patient's name be present, and that the document contain a Physical Exam section.
* **Section-level templates**: These templates constrain fields in the CDA section, and define containment relationships to CDA entries. For example, a Physical exam section-level template might require that the section/code be fixed to a particular code, and that the section contain a Systolic Blood Pressure observation.
* **Entry-level templates**: These templates constrain the CDA clinical statement model in accordance with real world observations and acts. For example, a Systolic-blood-pressure entry-level template defines how the CDA Observation class is constrained (how to populate observation/code, how to populate observation/value, etc.) to represent the notion of a systolic blood pressure.

A CDA implementation guide (such as this one) includes reference to those templates that are applicable. On the implementation side, a CDA instance populates the template identifier (templateId) field where it wants to assert conformance to a given template. On the receiving side, the recipient can test the instance for conformance against the CDA Extensible Markup Language (XML) schema, and can test the instance for conformance against asserted templates.

C-CDA is a library of templates based on CDA R2. This implementation guide is conformant to templates in the C-CDA R2.1 standard.

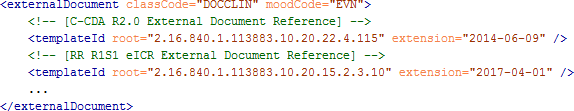
Further Constraining Existing Templates

A CDA template is a set of conformance constraints on either the base CDA model (CDA Refined Reference Information Model or RMIM) or another CDA template (such as an existing C-CDA R2.1 templates). A new template is created that contains all the constraints of the base template and which further constrains that template.

Constraints can only be tightened, not loosened. These further constraints can, for example, tighten a SHOULD to a SHALL or change [0..\*] to [1..1]. Constraints can also be applied to vocabulary, for example binding to a specific code system or value set or only allowing the use of a single code (single value binding).

Any new template is fully conformant to the template it is based on and contains the templateId of that template, as well as its own templateId. The following figure is an example of the presence of two templateIds to indicate that this template is asserting conformance to both templates.

Figure 5: Asserting Conformance to Two Templates



Status of a Template Version

The root object identifier (OID) identifies a template, and the extension identifies the version of the template. Use of the root OID allows for system backwards compatibility, and the extension points to the version to which conformance applies. Each version of a template has a status. For example, a template version can be draft, active, or deprecated, etc. The *HL7 Templates Standard: Specification and Use of Reusable Information Constraint Templates, Release 1* describes the various status states that may apply to a template version over the course of its lifecycle.[[21]](#footnote-22) Each version of a template has an associated status. Thus, one version of a template may be deprecated, while a newer version of that template may be draft or active. For a version to be “backward compatible”, it must assert that it is conformance to the earlier version (OID plus extension).

# Design Considerations

Design considerations describe overarching principles that have been developed and applied across the CDA templates in this guide. Material in this section can be thought of as “heuristics”, as opposed to the formal and testable constraints found in Volume 2 of this guide.

Rendering Header Information for Human Presentation

Metadata carried in the header may already be available for rendering from EHRs or other sources external to the document; therefore there is no strict requirement to render directly from the document. An example of this would be a doctor using an EHR that already contains the patient's name, date of birth, current address, and phone number. When a CDA document is rendered within that EHR, those pieces of information may not need to be displayed since they are already known and displayed within the EHR's user interface.

Good practice recommends that the following be present whenever the document is viewed:

* Document title and document dates
* Service and encounter types, and date ranges as appropriate
* Names of all persons along with their roles, participations, participation date ranges, identifiers, address, and telecommunications information
* Names of selected organizations along with their roles, participations, participation date ranges, identifiers, address, and telecommunications information
* Date of birth for recordTarget(s)

Unknown and No Known Information

In a number of cases, specifications for data collection allow the entry of “UNKNOWN” to represent the case in which desired information is not available or the patient or patient representative does not want to make a decision on an ePOLST order type. This concept is captured, within this implementation guide, through use of the nullFlavor “UNK”. An item may be unknown, not relevant, or not computable or measurable, such as when a patient arrives at an emergency department unconscious and with no identification.

The templates and value sets used in this guide are prescriptive about where a nullFlavor can be used and which values are appropriate. The following information serves as a general guide.

In many cases, the CDA standard stipulates that a piece of information is required (e.g., via a SHALL conformance verb). However, in most of these cases, the standard provides an “out”, allowing the sender to indicate that the information isn't known.

If an instance needs to contain a value such as UNK, that value is passed in the “@nullFlavor” attribute to indicate an exceptional value. Some flavors of null are used to indicate that the known information falls outside of value set binding constraints. Not all uses of the @nullFlavor attribute are associated with a case in which information is unknown. Allowable values for populating the attribute give details about the reason the information is unknown, as shown in the following example.

Figure 6: nullFlavor Example

<birthTime nullFlavor=”UNK”/> <!--Sender does not know the birthTime, but a proper value is applicable -->

Use nullFlavor for unknown, required, or optional attributes:

**NI** No information. This is the most general and default nullFlavor.

**NA** Not applicable. Known to have no proper value (e.g., last menstrual period for a male).

**UNK** Unknown. A proper value is applicable, but is not known.

**ASKU** Asked, but not known. Information was sought, but not found (e.g., the patient was asked but did not know).

**NAV** Temporarily unavailable. The information is not available, but is expected to be available later.

**NASK** Not asked. The patient was not asked.

**MSK** There is information on this item available, but it has not been provided by the sender due to security, privacy, or other reasons. There may be an alternate mechanism for gaining access to this information.

**OTH** The actual value is not an element in the value domain of a variable. (e.g., concept not provided by required code system).

The list above contains those nulls that are commonly used in clinical documents. For the full list and descriptions, see the nullFlavor vocabulary domain in the CDA R2 Normative Edition.

Any **SHALL**, **SHOULD** and **MAY** conformance statement may use nullFlavor, unless the nullFlavor is explicitly disallowed (e.g., through another conformance statement which includes a **SHALL** conformance for a vocabulary binding to the @code attribute, or through an explicit **SHALL NOT** allow use of nullFlavor conformance).

Figure 7: Attribute Required (nullFlavor not allowed)

**1. SHALL** contain exactly one [1..1] code (CONF:15407).

a. This code **SHALL** contain exactly one [1..1] **@code**="11450-4" Problem List   
 (CodeSystem: LOINC 2.16.840.1.113883.6.1) (CONF:15408).

or

2**. SHALL** contain exactly one [1..1] **effectiveTime/@value** (CONF:5256).

Figure 8: Allowed nullFlavors When Element is Required (with XML examples)

1. **SHALL** contain at least one [1..\*] id

2. **SHALL** contain exactly one [1..1] code

3. **SHALL** contain exactly one [1..1] effectiveTime

<entry>

<observation classCode="OBS" moodCode="EVN">

<id nullFlavor="**NI**"/>

<code nullFlavor="**OTH**">

<originalText>New Grading system</originalText>

</code>

<statusCode code="completed"/>

<effectiveTime nullFlavor="**UNK**"/>

<value xsi:type="CD" nullFlavor="OTH">

<originalText>Spiculated mass grade 5</originalText>

</value>

</observation>

</entry>

If a sender wants to state that a piece of information is unknown, the following principles apply:

1. If the sender doesn't know an attribute of an act, that attribute can be null.

Figure 9: Unknown Medication Example

1. **SHALL** contain exactly one [1..1] code

<entry>

**<text>patient was given a medication, but I do not know what it was</text>**

<substanceAdministration moodCode="EVN" classCode="SBADM">

<consumable>

<manufacturedProduct>

<manufacturedLabeledDrug>

<code **nullFlavor="NI"**/>

</manufacturedLabeledDrug>

</manufacturedProduct>

</consumable>

</substanceAdministration>

</entry>

2. If the sender doesn't know if an act occurred, the nullFlavor is on the act (detail could include specific allergy, drug, etc.).

Figure 10: Unknown Medication Use of Anticoagulant Drug Example

<entry>

<substanceAdministration moodCode="EVN" classCode="SBADM" **nullFlavor="NI">**

**<text>I do not know whether or not patient received an anticoagulant**

**drug</text>**

<consumable>

<manufacturedProduct>

<manufacturedLabeledDrug>

**<code code="81839001" displayName="anticoagulant drug"**

**codeSystem="2.16.840.1.113883.6.96"**

**codeSystemName="SNOMED CT"/>**

</manufacturedLabeledDrug>  
 </manufacturedProduct>  
 </consumable>  
 </substanceAdministration>  
</entry>

3. If the sender wants to state, "no known", a negationInd can be used on the corresponding act (substanceAdministration, Procedure, etc.)

Previously, CCD, Integrating the Healthcare Enterprise (IHE), and the Health Information Technology Standards Panel (HITSP) recommended using specific codes to assert no known content, for example 160244002 No known allergies or 160245001 No current problems or disability. Specific codes are still allowed; however, use of these codes is not recommended.

These next examples illustrate nuances of representing information in coded fields when information is a negative assertion; for example, it is not the case that the patient has an allergy, or it is not the case that a patient takes a medication. The phrases "no known allergies" or "no known medications" are typically associated with this type of negative assertion.

Figure 11: No Known Medications Example

<entry>

<substanceAdministration moodCode="EVN" classCode="SBADM" **negationInd="true">**

**<text>No known medications</text>**

<consumable>

<manufacturedProduct>

<manufacturedLabeledDrug>

**<code code="410942007" displayName="drug or medication"**

**codeSystem="2.16.840.1.113883.6.96"**

**codeSystemName="SNOMED CT"/>**

</manufacturedLabeledDrug>

</manufacturedProduct>

</consumable>

</substanceAdministration>

</entry>

Figure 12: Value Known, Code for Value Not Known

<entry>

<observation classCode="OBS" moodCode="EVN">

…

<value xsi:type="CD" nullFlavor="OTH">

<originalText>Spiculated mass grade 5</originalText>

</value>

</observation>

</entry>

Figure 13: Value Completely Unknown

<entry>

<observation classCode="OBS" moodCode="EVN">

…

<value xsi:type="CD" nullFlavor="UNK"/>

</observation>

</entry>

Figure 14: Value Known and Code in Required, Code System Not Known but Code from Another Code System is Known

<entry>

<observation classCode="OBS" moodCode="EVN">

…

<value xsi:type="CD" nullFlavor="OTH">

<originalText>Spiculated mass grade 5</originalText>

<translation code="129742005" displayName="spiculated lesion"

codeSystem="2.16.840.1.113883.6.96"

codeSystemName="SNOMED CT"/>/>

</value>

</observation>

</entry>

# Using This Implementation Guide

This chapter describes the rules and formalisms used to constrain the CDA R2 standard. It describes the formal representation of CDA templates, the mechanism by which templates are bound to vocabulary, and additional information necessary to understand and correctly implement the normative content found in Volume 2 of this guide. This guide further constrains templates in the C-CDA R2.1 standard.

Conformance Conventions Used in This Guide

Errata or Enhancements

Comments regarding errata or enhancements may be noted by creating an issue on the HL7 Jira Site (<https://jira.hl7.org/secure/Dashboard.jspa>) and selecting:

Project = “CDA Specification Feedback (CDA)”

Specification = “Portable Medical Orders (ePOLST) About Resuscitation and Initial Treatment (CDA)”

### Templates and Conformance Statements

Conformance statements within this implementation guide are presented as constraints from Trifolia Workbench, a template repository.[[22]](#footnote-23) An algorithm converts constraints recorded in Trifolia Workbench to a printable presentation. Each constraint is uniquely identified by an identifier at or near the end of the constraint (e.g., CONF: 81-7345). The digits in the conformance number before the hyphen identify which implementation guide the template belongs to and the number after the hyphen is unique to the owning implementation guide. Together, these two numbers uniquely identify each constraint. These identifiers are persistent but not sequential. Conformance numbers in this guide associated with a conformance statement that is carried forward from a previous version of this guide carry the same conformance number as the previous version. This is true even if the previous conformance statement has been edited. If a conformance statement is entirely new it has a new conformance number.

Bracketed information following each template title indicates the template type (section, observation, act, procedure, etc.), the OID or uniform resource name (URN), and whether the template is [open or closed](#IG_OpenClosed). The identifier OID is the templateId/@root value; all templateIds have an @root value. New and versioned templates also have an @extension value, which is a date identifying the version of this template; such templates are identified by URN and the HL7 version (urn:hl7ii). The URN identifier includes both the @root and @extension value for the templateId (for example, identifier urn:hl7ii:2.16.840.1.113883.10.20.5.5.41:2014-06-09).

Templates in Volume 2 of the guide include context tables with a “Contained By” column indicating which documents or sections use this template and a “Contains” column indicating any entries that the template uses. Templates also include constraints overview tables. Constraints overview tables summarize the constraint statements following the table. Value set tables, where applicable, and brief XML example figures are included with most explanations.

A typical template, as presented in this guide, is shown in the Constraints Format Example figure below. The next sections describe specific aspects of conformance statements—open vs. closed statements, conformance verbs, cardinality, vocabulary conformance, and containment relationships.

Figure 15: Constraints Format Example

Table

Description automatically generated

### Template Versioning

The versioning of a new template is indicated by “(Vn)” ((V2), V3, etc.) in the template name. A revised version of a previously published template keeps the same templateId/@root as the previous version but is assigned a new templateId/@extension. Versions are not necessarily forward or backward compatible. Versioning may be due to substantive changes in the template and/or the fact that a contained template has changed. The “(Vn)” designation is persistent; it appears with that template when it is used in subsequent guides.

### Open and Closed Templates

In open templates, all of the features of the CDA R2 base specification are allowed except as constrained by the templates. By contrast, a closed template specifies everything that is allowed, and nothing further may be included.

Templates included in the ePOLST Portable Medical Orders are open.

### Conformance Verbs (Keywords)

The keywords **shall, should, may, need not, should not,** and **shall not** in this document are to be interpreted as described in the *HL7 Version 3 Publishing Facilitator's Guide*[[23]](#footnote-24):

* shall: an absolute requirement
* shall not: an absolute prohibition against inclusion
* should/should not: best practice or recommendation; may be valid reasons to ignore an item, but the full implications must be understood and carefully weighed before choosing a different course
* may/need not: truly optional; can be included or omitted as the author decides with no implications

When conformance statements are nested (or have subordinate clauses), the conformance statements are to be read and interpreted in hierarchical order. These hierarchical clauses can be interpreted as “if then, else” clauses. Thus...

* 1. This structuredBody **SHOULD** contain zero or one [0..1] **component** (CONF:1098-29066) such that it
     1. **SHALL** contain exactly one [1..1] **Plan of Treatment Section ((V2))** (identifier: urn:hl7ii:2.16.840.1.113883.10.20.22.2.10:2014-06-09) (CONF:1098-29067).

...is understood as:

* 1. It is recommended (**SHOULD**) that the structureBody contains a component.
     1. **If** the component exists, **then** it must contain a Plan of Treatment Section ((V2)),
     2. **else** the component does not exist, and the conformance statement about the Plan of Treatment Section ((V2)) should be skipped.

In the case where the higher level conformance statement is a **SHALL**, there is no conditional clause. Thus...

* 1. This structuredBody **SHALL** contain exactly one [1..1] **component** (CONF:1098-29086) such that it
     1. **SHALL** contain exactly one [1..1] **Problem Section (entries required) ((V2))** (identifier: urn:hl7ii:2.16.840.1.113883.10.20.22.2.5.1:2014-06-09) (CONF:1098-29087).

...means that the structuredBody is always required to have a component.

### Cardinality

The cardinality indicator (0..1, 1..1, 1..\*, etc.) specifies the allowable occurrences within a document instance. The cardinality indicators are interpreted with the following format “m…n” where m represents the least and n the most:

* 0..1 zero or one
* 1..1 exactly one
* 1..\* at least one
* 0..\* zero or more
* 1..n at least one and not more than n

When a constraint has subordinate clauses, the scope of the cardinality of the parent constraint must be clear. In the next figure, the constraint says exactly one participant is to be present. The subordinate constraint specifies some additional characteristics of that participant.

Figure 16: Constraints Format – only one allowed

1. **SHALL** contain exactly one [1..1] **participant** (CONF:2777).

a. This participant **SHALL** contain exactly one [1..1] **@typeCode**="LOC"   
 (CodeSystem: 2.16.840.1.113883.5.90 HL7ParticipationType)   
 (CONF:2230).

In the next figure, the constraint says only one participant “like this” is to be present. Other participant elements are not precluded by this constraint.

Figure 17: Constraints Format – only one like this allowed

1. **SHALL** contain exactly one [1..1] **participant** (CONF:2777) such that it

a. **SHALL** contain exactly one [1..1] **@typeCode**="LOC" (CodeSystem:

2.16.840.1.113883.5.90 HL7ParticipationType) (CONF:2230).

### Optional and Required with Cardinality

The terms *optional* and *required* describe the *lower* bound of cardinality as follows:

*Optional* means that the number of allowable occurrences of an element may be 0; the cardinality is expressed as [0..1] or [0..\*] or similar. In these cases, the element may not be present in the instance. Conformances formulated with **MAY** or **SHOULD** are both considered “optional” conformances.

*Required* means that the number of allowable occurrences of an element must be at least 1; the cardinality is expressed as [m..n] where m>=1 and n>=m (for example, [1..1] or [1..\*]). In these cases, the element must be present in the instance. Conformance statements formulated with **shall** are required conformances. If an element is required, but is not known (and would otherwise be omitted if it were optional), the @nullFlavor attribute must be used. (See section [4.2 Unknown and No Known Information](#DC_Unknown).)

### Vocabulary Conformance

The templates in this document use terms from several code systems. These vocabularies are defined in various supporting specifications and may be maintained by other bodies, as is the case for the LOINC® (Logical Observation Identifiers Names & Codes) and SNOMED CT® (Systematized Nomenclature of Medicine, Clinical Terms) vocabularies.

Note that value set identifiers (e.g., ValueSet 2.16.840.1.113883.1.11.78 Observation Interpretation (HL7) **DYNAMIC**) do not appear in CDA XML instances; they tie the conformance requirements of an implementation guide to the appropriate code system for validation.

Value set bindings adhere to HL7 Vocabulary Working Group best practices, and include both a conformance verb (**shall**, **should**, **may**, etc.) and an indication of **dynamic** vs. **static** binding. Value set constraints can be **static**, meaning that they are bound to a specified version of a value set, or **dynamic**, meaning that they are bound to the most current version of the value set. If a **DYNAMIC** binding is specified, the value set authority and link to the base definition of the value set **SHALL** be included, if available, so implementers can access the current version of the value set. Throughout this implementation guide, the majority of bindings between coded attributes and the cited value sets are dynamic.

When a vocabulary binding binds to a single code, the stability of the binding is implicitly **STATIC**. A simplified constraint, used when the binding is to a single code, includes the meaning of the code, as follows.

Figure 18: Binding to a Single Code

**2. SHALL** contain exactly one [1..1] **code** (CONF:15403).

a) This code **SHALL** contain exactly one [1..1] **@code**="11450-4" Problem List

(CONF:15408).

b) This code **SHALL** contain exactly one [1..1] **@codeSystem=**"2.16.840.1.113883.6.1"

(CodeSystem: LOINC 2.16.840.1.113883.6.1 **STATIC**) (CONF: 31141).

The notation conveys the actual code (11450-4), the code's displayName (Problem List), the OID of the codeSystem from which the code is drawn (2.16.840.1.113883.6.1), and the codeSystemName (LOINC).

HL7 Data Types Release 1 requires the codeSystem attribute unless the underlying data type is “Coded Simple” or “CS”, in which case it is prohibited. The displayName and the codeSystemName are optional, but recommended, in all cases.

The above example would be properly expressed as follows.

Figure 19: XML Expression of a Single-code Binding

<code code="11450-4" codeSystem="2.16.840.1.113883.6.1"/>

<!-- or -->

<code code="11450-4" codeSystem="2.16.840.1.113883.6.1"

displayName="Problem List"

codeSystemName="LOINC"/>

A full discussion of the representation of vocabulary is outside the scope of this document; for more information, see the *HL7 Version 3 Normative Edition*[[24]](#footnote-25) sections on Abstract Data Types and XML Data Types R1.

There is a discrepancy in the implementation of translation code versus the original code between HL7 Data Types R1 and the convention agreed upon for this specification. The R1 data type requires the original code in the root. This implementation guide specifies a code from the required value set be used in the element and other codes not included in the value set are to be represented in a translation for the element. This discrepancy is resolved in HL7 Data Types R2.

Figure 20: Translation Code Example

<code code='206525008'

displayName='neonatal necrotizing enterocolitis'  
 codeSystem='2.16.840.1.113883.6.96'

codeSystemName='SNOMED CT'>

<translation code='NEC-1'

displayName='necrotizing enterocolitis'

codeSystem='2.16.840.1.113883.19'/>

</code>

In many cases, vocabularies are further constrained into value sets for use within this guide. Value set tables are present below a template or are referenced if they occur elsewhere in this specification, when there are value set bindings in the template. The value set table provides the value set identifier, a description, and a link to the source of the value set when possible. Ellipses in the last row indicate the value set members shown are examples and the true source must be accessed to see all members. Value set names and OIDs are summarized Volume 2 in Chapter 6: Value Sets in this Guide.

**Note:** If a value set binding has a **DYNAMIC** stability, implementers creating a CDA document must go to the provided location in the URL to check for the most current version of the value set expansion.

Table 2: Example Value Set Table (Referral Types)

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: Referral Types 2.16.840.1.113883.11.20.9.56  A value set of SNOMED-CT codes descending from "3457005" patient referral (procedure).  Value Set Source: | | | |
| Code | Code System | Code System OID | Print Name |
| 44383000 | SNOMED CT | 2.16.840.1.113883.6.96 | Patient referral for consultation |
| 391034007 | SNOMED CT | 2.16.840.1.113883.6.96 | Refer for falls assessment (procedure) |
| 86395003 | SNOMED CT | 2.16.840.1.113883.6.96 | Patient referral for family planning (procedure) |
| 306106002 | SNOMED CT | 2.16.840.1.113883.6.96 | Referral to intensive care service (procedure) |
| ... | | | |

### Containment Relationships

Containment constraints between a section and its entry are indirect in this guide, meaning that where a section asserts containment of an entry, that entry can either be a direct child or a further descendent of that section.

For example:

1. MAY contain zero or more [0..\*] entry (CONF:4511-33048) such that it
   1. SHALL contain exactly one [1..1] ePOLST Clinical Instructions (identifier: urn:hl7ii:2.16.840.1.113883.9.275.3.5:2021-12-01) (CONF:4511-33057).

In this constraint, the ePOLST Clinical Instructions entry can be a direct child of the ePOLST Medical Orders Section (i.e., section/entry/ ePOLSTClinicalInstructions) or a further descendent of that section (i.e., section/entry/…/ ePOLSTClinicalInstructions). Either of these are conformant.

All other containment relationships are direct, for example:

1. SHALL contain exactly one [1..1] code="55752-0" Clinical information (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:4511-33153).

### Data Types

All data types used in a CDA document are described in the CDA R2 Normative Edition. All attributes of a data type are allowed unless explicitly prohibited by this specification.

### Succession Management

CDA-conformant ePOLST documents use the elements defined in the header (documentId, setId, version number, and relatedDocument/typeCode) to manage replacements and updates of the ePOLSTs for each patient. As with all CDA documents, the ClinicalDocument/id uniquely identifies a document instance (an electronic file). Incremented version numbers identify subsequent versions of the document.

### Document-Level Templates “Properties” Heading

In Volume 2, each document-level template has a “Properties” heading for ease of navigation. The Properties heading is an organizational construct, underneath which relevant CDA act-relationships and roles are called out as headings in the document.

XML Conventions Used in This Guide

### XPath Notation

Instead of the traditional dotted notation used by HL7 to represent Reference Information Model (RIM) classes, this document uses XML Path Language (XPath) notation[[25]](#footnote-26) in conformance statements and elsewhere to identify the XML elements and attributes within the CDA document instance to which various constraints are applied. The implicit context of these expressions is the root of the document. This notation provides a mechanism that is familiar to developers for identifying parts of an XML document.

XPath statements appear in this document in a monospace font.

XPath syntax selects nodes from an XML document using a path containing the context of the node(s). The path is constructed from node names and attribute names (prefixed by a '@') and catenated with a '/' symbol.

Figure 21: XML Document Example

<author>

<assignedAuthor>

...

<code codeSystem='2.16.840.1.113883.6.96' codeSystemName='SNOMED CT'

code='17561000' displayName='Cardiologist' />

</assignedAuthor>

</author>

In the above example, the code attribute of the code could be selected with the XPath expression in the next figure.

Figure 22: XPath Expression Example

author/assignedAuthor/code/@code

### XML Examples and Sample Documents

XML examples appear in figures in this document in this monospace font. Portions of the XML content may be omitted from the content for brevity, marked by an ellipsis (...) as shown in the example below.

Figure 23: ClinicalDocument Example

<ClinicalDocument xmls="urn:h17-org:v3">

...

</ClinicalDocument>

Within the narrative, XML element (code, assignedAuthor, etc.) and attribute (SNOMED CT, 17561000, etc.) names also appear in this monospace font.

# References & Resources

HL7 CDA R2 Extensions webpage. <http://wiki.hl7.org/index.php?title=CDA_R2_Extensions>

*HL7 CDA® R2 Attachment Implementation Guide: Exchange of C-CDA Based Documents, Release 1,* <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=464>

*HL7 CDA® R2 Implementation Guide: C-CDA R2.1; Advance Directives Templates, Release 1* (US Realm), <https://www.hl7.org/implement/standards/product_brief.cfm?product_id=473>

*HL7 CDA® R2 Implementation Guide: Personal Advance Care Plan (PACP) Document, Release 1* (US Realm) STU Release 2, <https://www.hl7.org/implement/standards/product_brief.cfm?product_id=434>

*HL7 Clinical Document Architecture, Release 2 (CDA R2), Normative Edition* (May 2005). <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=7>

HL7 FHIR*®* R4, Resource Provenance, <https://www.hl7.org/fhir/provenance.html>

*HL7 Implementation Guide for CDA® Release 2: Digital Signatures and Delegation of Rights, Release 1,* <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=375>

*HL7 Templates Standard: Specification and Use of Reusable Information Constraint Templates, Release 1,* <https://www.hl7.org/implement/standards/product_brief.cfm?product_id=377>

*HL7 Version 3 Interoperability Standards*, <http://www.hl7.org/memonly/downloads/v3edition.cfm>

*HL7 Version 3 Normative Edition*, <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=161>

*HL7 Version 3 Publishing Facilitators Guide, Release 1* (2005). <http://www.hl7.org/v3ballot/html/help/pfg/pfg.htm>(Requires login)

*HL7 Version 3 Standard: Refinement, Constraint and Localization to Version 3 Messages, Release 2*. <http://www.hl7.org/v3ballot/html/infrastructure/conformance/conformance.htm> (Requires login)

Lantana Consulting Group, Trifolia Workbench. <http://trifolia.lantanagroup.com>

National POLST Form: Portable Medical Order, <https://polst.org/national-form>

National POLST, “History of POLST”, <https://polst.org/history-of-polst/>

National POLST, “Intended Population & Guidance for Health Care Professionals”, [www.polst.org/guidance-appropriate-patients-pdf](http://www.polst.org/guidance-appropriate-patients-pdf)

National POLST, “POLST Form Guide for Professionals”, <https://polst.org/form-guide-pdf>

National POLST, “POLST Program Names”, <https://polst.org/program-names/>

National POLST, “Signature Requirements for a Valid POLST Form by State, [www.polst.org/state-signature-requirements-pdf](http://www.polst.org/state-signature-requirements-pdf)

National POLST, Appropriate POLST Form Use Policy, <https://polst.org/appropriate-use-pdf>

National POLST, <https://polst.org/>

National POLST, Map of states adopting the National POLST Form, <https://polst.org/national-form-adoption-map-pdf>

National POLST, Map of states working with National POLST, <https://polst.org/map-pdf>

National POLST, National POLST Form and information on use: <https://polst.org/form-patients/>

W3C, XML Path Language. <http://www.w3.org/TR/xpath/>

1. Acronyms And Abbreviations

ACO accountable care organizations

AMA American Medical Association

CCD Continuity of Care Document

C-CDA Consolidated Clinical Document Architecture

CDA Clinical Document Architecture

CPR cardiopulmonary resuscitation

D.C. District of Columbia

DSTU Draft Standard for Trial Use

EHR electronic health records

EMS emergency medical services

ePCR electronic patient care reporting

ePOLST electronic POLST

FHIR Fast Healthcare Interoperable Resources

HIE health information exchanges

HITSP Health Information Technology Standards Panel

HL7 Health Level Seven International

ICD International Classification of Diseases

IHE Integrating the Healthcare Enterprise

IHTSDO International Health Terminology Standard Development Organisation

IV intravenous

LOINC Logical Observation Identifiers Names & Codes

MIME Multipurpose Internet Mail Extensions

MRN medical record number

NA not applicable

NPI National Provider Identifier

OID object identifier

ONC Office of National Coordinator for Health Information Technology

PACP Personal Advance Care Plan

PCP primary care provider

POLST portable medical order

RIM Reference Information Model

RMIM Refined Reference Information Model

sdtc Structured Documents Technical Committee

SDWG Structured Documents Working Group

SNOMED CT Systematized Nomenclature of Medicine, Clinical Terms

STU Standard for Trial Use

UD Unstructured Document

USCDI United States Core Data for Interoperability

XML Extensible Markup Language

XDS-SD Cross-Transaction Specifications and Content Specifications, Scanned Documents Module

XPath XML Path Language

WHO World Health Organization

1. National POLST Form

A PDF of the National POLST Form is available <https://polst.org/national-polst-form-pdf>. The following figures illustrates the two pages of the form.

Figure 24: National POLST Form, page 1

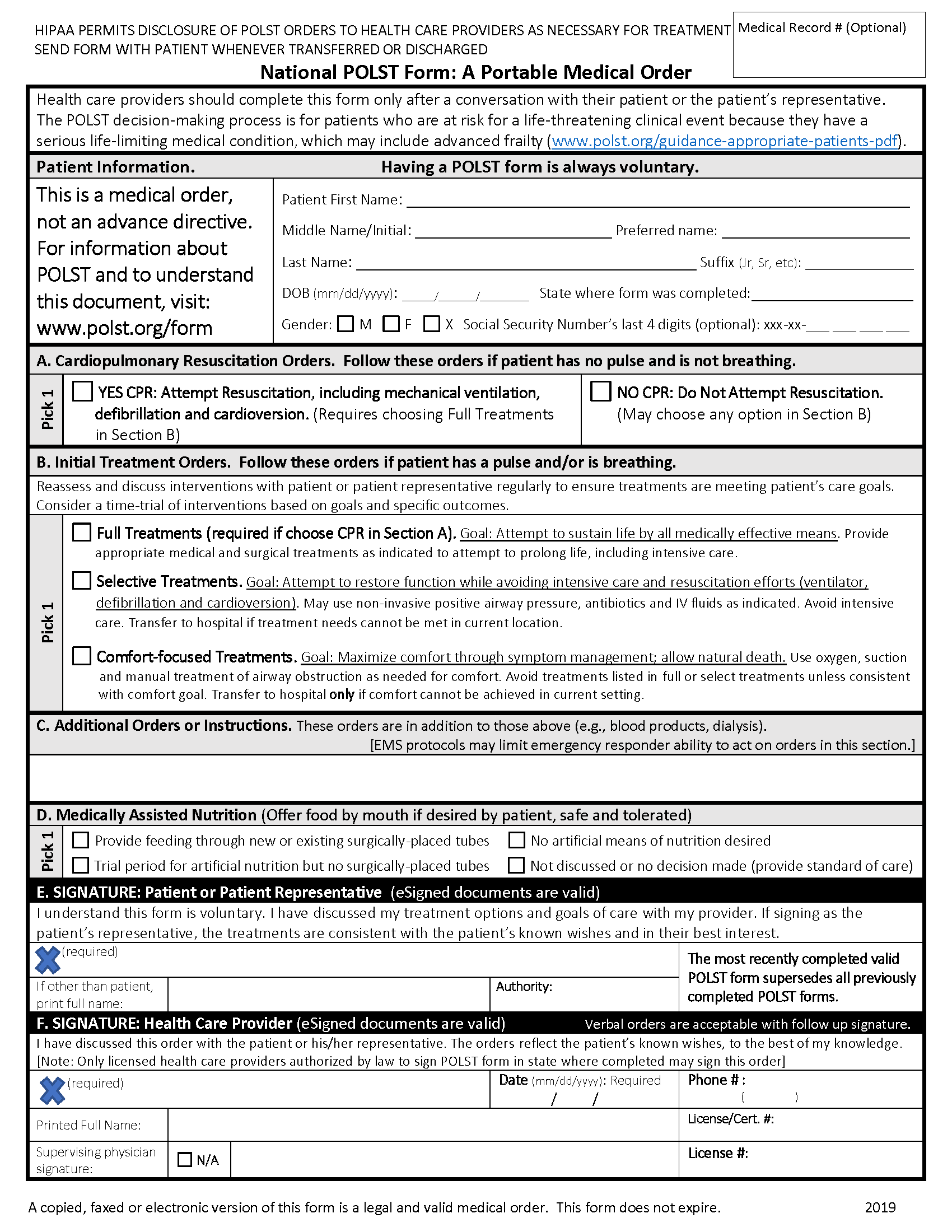
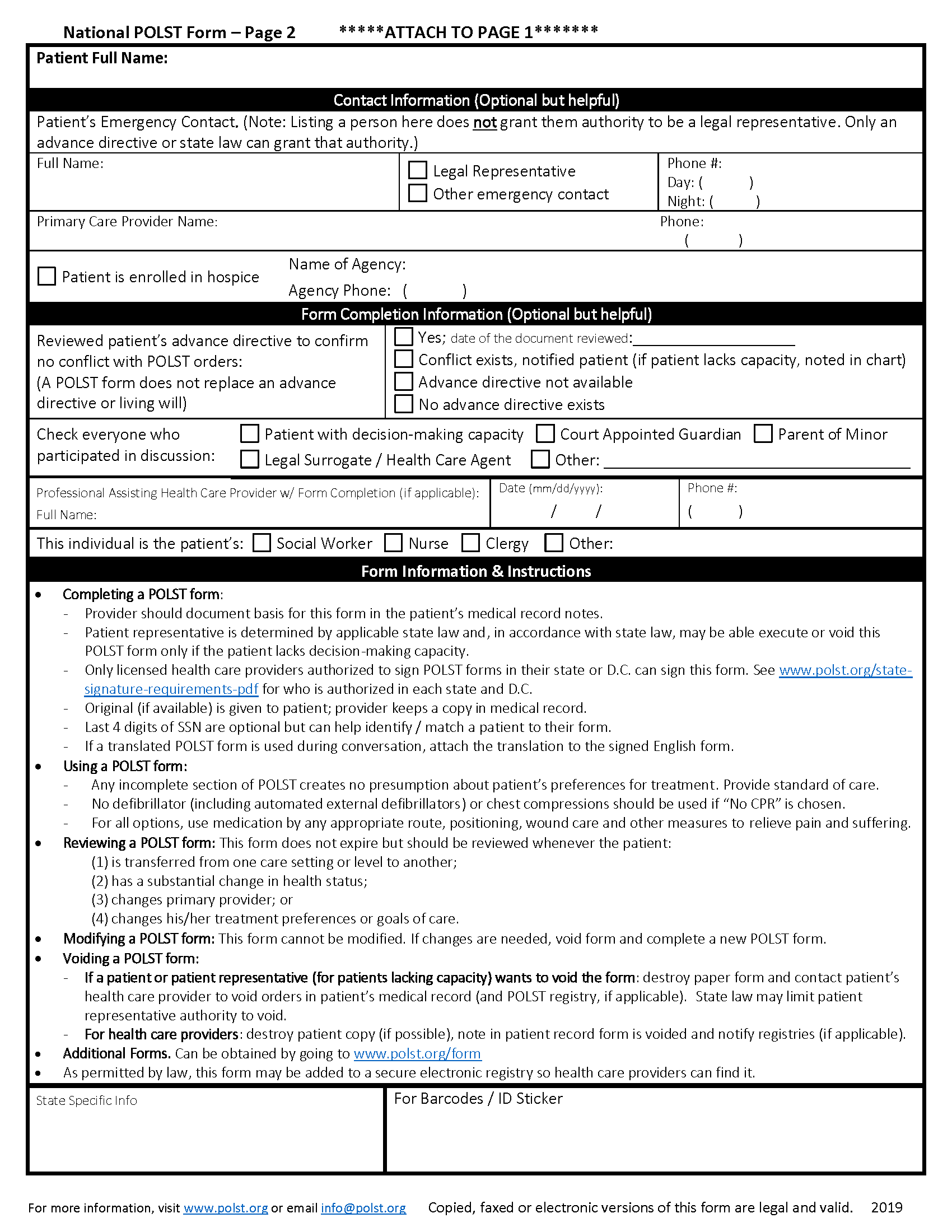


Figure 25: National POLST Form, page 2



1. POLST to ePOLST Mapping

The following table maps the elements found in the National POLST Form to the ePOLST: Resuscitation and Treatment Portable Medical Orders CDA elements.

Table 3: Mapping National POLST Form to CDA

| National POLST Form Content | ePOLST CDA Templates & Data Elements |
| --- | --- |
| ***Top of Form & Footer Information*** |  |
| National POLST Form: A Portable Medical Order | US Realm Header (V3), realmCode, title |
| HIPAA PERMITS DISCLOSURE OF POLST ORDERS TO HEALTH CARE PROVIDERS AS NECESSARY FOR TREATMENT SEND FORM WITH PATIENT WHENEVER TRANSFERRED OR DISCHARGED | ePOLST Medical Orders Section / ePOLST Administrative Information |
| Medical Record # (Optional) | US Realm Header (V3), recordTarget, patientRole, id |
| Health care providers should complete this form only after a conversation with their patient or the patient’s representative. The POLST decision-making process is for patients who are at risk for a life-threatening clinical event because they have a serious life-limiting medical condition, which may include advanced frailty (www.polst.org/guidance-appropriate-patients-pdf). | ePOLST Medical Orders Section / ePOLST Clinical Instructions |
| This form does not expire.  A copied, faxed or electronic version of this form is a legal and valid medical order.  For more information, visit www.polst.org or email info@polst.org. | ePOLST Medical Orders Section / ePOLST Administrative Information |
| ***Patient Information*** | US Realm Header (V3), recordTarget, patientRole, patient |
| Having a POLST form is always voluntary.  This is a medical order, not an advance directive. For information about POLST and to understand this document, visit: www.polst.org/form | ePOLST Medical Orders Section / ePOLST Administrative Information |
| Patient First Name  Middle Name/Initial  Preferred Name  Last Name  Suffix (Jr, Sr, etc.) | US Realm Header (V3), US Realm Patient Name (PTN.US.FIELDED) |
| DOB (mm/dd/yyyy) | US Realm Header (V3), recordTarget, birthTime |
| State where form was completed | US Realm Header (V3), author, assignedAuthor, US Realm Address (AD.US.FIELDED) |
| Gender | US Realm Header, recordTarget, patientRole, administrativeGenderCode |
| Social Security Number’s last 4 digits (optional): xxx-xx- | US Realm Header (V3), recordTarget |
| **A. Cardiopulmonary Resuscitation Orders** | **Cardiopulmonary Resuscitation Order Act (ePOLST),** originalText |
| Follow these orders if patient has no pulse and is not breathing. | * Cardiopulmonary Resuscitation Order Act (ePOLST) in-template guidance * Cardiopulmonary Resuscitation Order Act (ePOLST) / ePOLST Clinical Instructions |
| Pick 1 | * Planned CPR Procedure in-template guidance * Cardiopulmonary Resuscitation Order Act (ePOLST) / ePOLST Clinical Instructions |
| YES CPR | code |
| Attempt Resuscitation, including mechanical ventilation, defibrillation and cardioversion. | Cardiopulmonary Resuscitation Order Act (ePOLST) in-template guidance and originalText |
| (Requires choosing Full Treatments in Section B) | Cardiopulmonary Resuscitation Order Act (ePOLST) / ePOLST Clinical Instructions |
| NO CPR: Do Not Attempt Resuscitation. | code |
| (May choose any option in Section B) | Cardiopulmonary Resuscitation Order Act (ePOLST) / ePOLST Clinical Instructions |
| **B. Initial Treatment Orders.** | Initial Treatment Orders Act (ePOLST), originalText |
| Follow these orders if patient has a pulse and/or is breathing | * Initial Treatment Orders Act (ePOLST) in-template guidance and originalText * Initial Treatment Orders Act (ePOLST) / ePOLST Clinical Instructions |
| Pick 1 | * Planned Initial Treatment Procedure in-template guidance * Initial Treatment Orders Act (ePOLST) / ePOLST Clinical Instructions |
| Reassess and discuss interventions with patient or patient representative regularly to ensure treatments are meeting patient’s care goals. Consider a time-trial of interventions based on goals and specific outcomes. | * Initial Treatment Orders Act (ePOLST) / ePOLST Clinical Instructions |
| Full Treatments | code |
| (required if choose CPR in Section A) | Initial Treatment Orders Act (ePOLST) / ePOLST Clinical Instructions |
| Goal: Attempt to sustain life by all medically effective means. Provide appropriate medical and surgical treatments as indicated to attempt to prolong life, including intensive care. | code originalText |
| Selective Treatments | code |
| Goal: Attempt to restore function while avoiding intensive care and resuscitation efforts (ventilator, defibrillation and cardioversion). May use non-invasive positive airway pressure, antibiotics and IV fluids as indicated. Avoid intensive care. Transfer to hospital if treatment needs cannot be met in current location. | code originalText |
| Comfort-focused Treatments | code |
| Goal: Maximize comfort through symptom management; allow natural death. Use oxygen, suction and manual treatment of airway obstruction as needed for comfort. Avoid treatments listed in full or select treatments unless consistent with comfort goal. Transfer to hospital only if comfort cannot be achieved in current setting. | code originalText |
| **C. Additional Orders or Instructions** | Additional Orders Act (ePOLST) |
| These orders are in addition to those above (e.g., blood products, dialysis). [EMS protocols may limit emergency responder ability to act on orders in this section.] | * Additional Orders Act (ePOLST) with in-template guidance and originalText * Additional Orders Act (ePOLST) / ePOLST Clinical Instructions |
| *(free text space)* | Planned Additional Orders Procedure   * Allows free text * Allows codes |
| **D. Medically Assisted Nutrition** | Medically Assisted Nutrition Orders Act (ePOLST) |
| (Offer food by mouth if desired by patient, safe and tolerated) | * Medically Assisted Nutrition Orders Act (ePOLST) originalText * Medically Assisted Nutrition Orders Act (ePOLST) / ePOLST Clinical Instructions |
| Pick 1 | Planned Medically Assisted Nutrition Orders Procedure in-template guidance |
| Provide feeding through new or existing surgically-placed tubes | code |
| No artificial means of nutrition desired | code |
| Trial period for artificial nutrition but no surgically-placed tubes | code |
| Not discussed or no decision made (provide standard of care) | code |
| **E. SIGNATURE: Patient or Patient Representative** | US Realm Header (V3), authenticator |
| (eSigned documents are valid) | ePOLST Medical Orders Document in-template guidance |
| I understand this form is voluntary. I have discussed my treatment options and goals of care with my provider. If signing as the patient’s representative, the treatments are consistent with the patient’s known wishes and in their best interest. | ePOLST Medical Orders Section / ePOLST Administrative Information |
| X (required) | US Realm Header (V3), authenticator, sdtc:signatureText |
| If other than patient, print full name: | US Realm Header (V3), authenticator |
| Authority: | code |
| The most recently completed valid POLST form supersedes all previously completed POLST forms. | ePOLST Medical Orders Section / ePOLST Administrative Information |
| F. SIGNATURE: Health Care Provider | US Realm Header (V3), legalAuthenticator |
| (eSigned documents are valid) Verbal orders are acceptable with follow up signature. | ePOLST Medical Orders Section / ePOLST Administrative Information |
| I have discussed this order with the patient or his/her representative. The orders reflect the patient’s known wishes, to the best of my knowledge. [Note: Only licensed health care providers authorized by law to sign POLST form in state where completed may sign this order] | ePOLST Medical Orders Section / ePOLST Administrative Information |
| X (required)  *(image field)* | US Realm Header (V3), legalAuthenticator sdtc:signatureText |
| Date (mm/dd/yyyy)  Phone #  Printed Full Name  License/Cert. #: | US Realm Header (V3), legalAuthenticator or participant (if supervising physician is legalAuthenticator) |
| Supervising physician signature:  *(image field)* | US Realm Header (V3), legalAuthenticator sdtc:signatureText |
| License #: | US Realm Header (V3), legalAuthenticator |
| **Contact Information (Optional but helpful)** | US Realm Header (V3), participant |
| Patient’s Emergency Contact | US Realm Header (V3), participant |
| (Note: Listing a person here does not grant them authority to be a legal representative. Only an advance directive or state law can grant that authority.) |  |
| Full Name: | US Realm Header (V3), participant |
| Legal Representative | US Realm Header (V3), participant |
| Other emergency contact | US Realm Header (V3), participant |
| Phone # | US Realm Header (V3), participant |
| Phone # Day | US Realm Header (V3), participant |
| Phone # Night | US Realm Header (V3), participant |
| Primary Care Provider Name: | US Realm Header (V3), participant |
| Phone: | US Realm Header (V3), participant |
| Patient is enrolled in hospice | US Realm Header (V3), participant |
| Name of Agency: | US Realm Header (V3), participant |
| Agency Phone: | US Realm Header (V3), participant |
| **Form Completion Information (Optional but helpful)** | ePOLST Completion Information Section |
| Reviewed patient’s advance directive to confirm no conflict with POLST orders: (A POLST form does not replace an advance directive or living will) | ePOLST Completion Information Section / ePOLST Administrative Information |
| Yes; date of the document reviewed: | code |
| Conflict exists, notified patient (if patient lacks capacity, noted in chart) | code |
| Advance directive not available | code |
| No advance directive exists | code |
| Check everyone who participated in discussion: | ePOLST Completion Information Section / ePOLST Administrative Information |
| Patient with decision-making capacity | code |
| Court Appointed Guardian | code |
| Parent of Minor | code |
| Legal Surrogate / Health Care Agent | code |
| Other: | code |
| Professional Assisting Health Care Provider w/ Form Completion (if applicable) Full Name | US Realm Header (V3), dataEnterer |
| Date (mm/dd/yyyy) | US Realm Header (V3), dataEnterer |
| Phone # | US Realm Header (V3), dataEnterer |
| This individual is the patient’s: | US Realm Header (V3), dataEnterer |
| Social Worker | US Realm Header (V3), dataEnterer |
| Nurse | US Realm Header (V3), dataEnterer |
| Clergy | US Realm Header (V3), dataEnterer |
| Other: | US Realm Header (V3), dataEnterer |
| Form Information & Instructions | US Realm Header (V3), dataEnterer |
| State Specific Info | *Not addressed in this specification* |
| For Barcodes / ID Sticker | US Realm Header (V3), id |
| **Form Information & Instructions** | Volume 1 |

1. Extensions To CDA R2

Where there is a need to communicate information for which there is no suitable representation in CDA R2, extensions to CDA R2 have been developed. (An extension is a collection of element or attribute declarations and rules added to the base CDA R2 standard.) This section summarizes the applicable extensions and provides implementation guidance. For a full list of approved extension see HL7’s wiki page for CDA\_R2\_Extensions.[[26]](#footnote-27) Extensions created for this guide include:

* sdtc:raceCode - The **raceCode** extension allows for multiple races to be reported for a patient.
* sdtc:ethnicGroupCode - The **ethnicGroupCode** extension allows for multiple ethnicities to be reported for a patient.
* sdtc:signatureText – The **signatureText** extension adds an attribute for **authenticator** and **legalAuthenticator** to record encoded digital signature information.
* sdtc:id - The **id** extension in the family history organizer on the related subject allows for unique identification of the family member(s).
* sdtc:deceasedInd - The **deceasedInd** extension (= "true" or "false") in the family history organizer on the related subject is used inside to indicate if a family member is deceased.
* sdtc:deceasedTime - The **deceasedTime** extension in the family history organizer on the related subject allows for reporting the date and time a family member died.
* sdtc:birthTime – The **birthTime** extension allows for the birth date of any person to be recorded. The purpose of this extension is to allow the recording of the subscriber or member of a health plan in cases where the health plan eligibility system has different information on file than the provider does for the patient.
* sdtc:dischargeDispositionCode - The **dischargeDispositionCode** extension allows the provider to record a discharge disposition in an encounter activity.

Extensions are designed as follows:

* Extension element names shall be derived from attributes defined in the RIM.
* A single namespace has been defined for all extensions created by the HL7 Structured Documents Working Group (formerly Structured Documents Technical Committee) which is urn:hl7-org:sdtc.
* This namespace shall be used as the namespace for any extension elements or attributes that are used by this implementation guide.
* Each extension element shall use the same HL7 vocabularies and data types used by CDA R2.
* Each extension element shall use the same conventions for order and naming as is used by the current HL7 tooling.
* An extension element shall appear in the XML where the expected RIM element of the same name would have appeared had that element not been otherwise constrained from appearing in the CDA XML schema.

1. Mime Multipart/Related Messages

The contents of this appendix were added in the event that implementers want additional guidance when referencing external observations or documents using Multipurpose Internet Mail Extensions (MIME) multipart messages. The following text is taken from the Claims Attachments Implementation Guide (AIS00000) in Section 2.4 <http://www.hl7.org/documentcenter/public/wg/ca/CDAR2AIS0000R030_ImplementationGuideDraft.pdf>. For up-to-date guidance, refer to the latest edition of that specification.

***MIME Multipart/Related Messages***

An attachment is comprised of the CDA document, including any supporting files necessary to render the attested content of the document. Two Internet request for comments (RFCs) are needed to properly construct the MIME multipart message. When supporting files are needed, the collection of information shall be organized using a MIME multipart/related package constructed according to RFC 2557. Within the MIME package, supporting files must be encoded using Base-64. RFC-4648 should be used when encoding the contents of the MIME package using Base-64. Finally, RFC-2392 may be used to reference other content that appears in the same X12 transaction to use the same content to answer multiple questions for a single claim. Internet RFCs can be downloaded from the RFC editor page at <http://www.rfc-editor.org>.

***RFC-2557 MIME Encapsulation of Aggregate Documents, Such as HTML (MHTML)***

This RFC describes how to construct a MIME multipart/related package, and how URLs are resolved within content items of that package. RFC-2557 can be obtained at: <http://www.rfc-editor.org/rfc/rfc2557.txt>

A MIME multipart/related package is made up of individual content items. Each content item has a MIME header identifying the item. Each content item is delimited from other content items using a string of application specified text. In addition, there must be an ending boundary. The actual content is recorded between these delimiter strings using a BASE-64 encoding of the content item. There is also a MIME header for the entire package.

The first content item of a multipart/related message supporting attachments is the CDA document, containing the header and structured or non-structured body. Subsequent content items included in this package will contain additional content that appears within the body of the document. The CDA document will reference these additional content items by their URLs.

***Referencing Supporting Files in Multipart/Related Messages***

Because the CDA document and its supporting files may have already existed in a clinical information system, references may already exist within the CDA document to URLs that are not accessible outside of the clinical information system that created the document. When the CDA document is sent via attachments, these URLs may no longer be accessible by the receiving information system. Therefore, each content item that is referenced by a URL within the CDA document must be included as a content item in the MIME package. Each content item may specify the URL by which it is known using the Content-Location header. The receiver of this MIME package shall translate URL references according to the RFC-2557. This will ensure resolution of the original URL to the correct content item within the MIME package. Thus, URL references contained within an original document need not be rewritten when the CDA package is transmitted. Instead, these URLs are simply supplied as the value of the Content-Location header in the MIME package.

This capability allows for the same content item to be referred to more than once in a MIME multipart/related package without requiring the content item to be supplied twice. However, it does not allow a separate MIME multipart/related package to contain references to information sent in a previously recorded package.

***Referencing Documents from Other Multiparts within the Same X12 Transactions***

RFC-2392 is used when referencing content across MIME package boundaries, but still contained within the same X12 transaction (ST to SE). This can occur when the same document answers multiple questions for a single claim. Each component of a MIME package may be assigned a content identifier using the Content-ID header for the content item. For example, this header would appear as:

Content-ID: <07EE4DAC-76C4-4a98-967E-F6EF9667DED1>

This content identifier is a unique identifier for the content item, which means it must never be used to refer to any other content item. RFC-2392 defines the cid: URL scheme (http: and ftp: are two other URL schemes). This URL scheme allows for references by the Content-ID header to be resolved. The URL for the content item identified above would be:

cid:07EE4DAC-76C4-4a98-967E-F6EF9667DED1

Receivers of the MIME multipart message must be able to resolve a cid: URL to the content item that it identifies. Senders must ensure that they only refer to items that have already been transmitted to the receiver by their cid: URL. Thus, this implementation guide prohibits forward URL references using the cid: URL scheme.

Content items shall not be referenced across X12 transactions using the cid: URL scheme. For example, if the payer previously requested information using a 277, and the provider returned that information in a MIME multipart/related package in a 275, and then the payer requested additional information in another 277, the provider may not refer to the content item previously returned in the prior 275 transaction.

1. National POLST Form: Portable Medical Order, <https://polst.org/national-form> [↑](#footnote-ref-2)
2. National POLST, “Intended Population & Guidance for Health Care Professionals”, [www.polst.org/guidance-appropriate-patients-pdf](http://www.polst.org/guidance-appropriate-patients-pdf) [↑](#footnote-ref-3)
3. National POLST, <https://polst.org/> [↑](#footnote-ref-4)
4. National POLST, “POLST Program Names”, <https://polst.org/program-names/> [↑](#footnote-ref-5)
5. National POLST, “History of POLST”, <https://polst.org/history-of-polst/> [↑](#footnote-ref-6)
6. National POLST, “POLST Form Guide for Professionals”, <https://polst.org/form-guide-pdf> [↑](#footnote-ref-7)
7. *HL7 C-CDA R2.1; Advance Directives Templates,* <https://www.hl7.org/implement/standards/product_brief.cfm?product_id=473> [↑](#footnote-ref-8)
8. *HL7 CDA Personal Advance Care Plan (PACP) Document,* <https://www.hl7.org/implement/standards/product_brief.cfm?product_id=434> [↑](#footnote-ref-9)
9. HL7 FHIR PACIO Advance Directive Interoperability Implementation Guide, <https://build.fhir.org/ig/HL7/pacio-adi/index.html#content_types> [↑](#footnote-ref-10)
10. National POLST, “Intended Population & Guidance for Health Care Professionals”, [www.polst.org/guidance-appropriate-patients-pdf](http://www.polst.org/guidance-appropriate-patients-pdf) [↑](#footnote-ref-11)
11. National POLST, “Appropriate POLST Form Use Policy”, <https://polst.org/appropriate-use-pdf> [↑](#footnote-ref-12)
12. See [www.polst.org/state-](http://www.polst.org/state-signature-requirements-pdf) [signature-requirements-pdf](http://www.polst.org/state-signature-requirements-pdf) for who is authorized in each state and D.C. [↑](#footnote-ref-13)
13. @code="S" (CodeSystem: HL7ParticipationSignature urn:oid:2.16.840.1.113883.5.89 STATIC) [↑](#footnote-ref-14)
14. *HL7 CDA: Digital Signatures and Delegation of Rights,* <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=375> [↑](#footnote-ref-15)
15. *HL7 CDA R2,* <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=7> [↑](#footnote-ref-16)
16. HL7 CDA R2 Attachment, <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=464> [↑](#footnote-ref-17)
17. HL7 FHIR PACIO Advance Directive Interoperability Implementation Guide, <https://build.fhir.org/ig/HL7/pacio-adi/use_cases.html#use-case-3-query-and-access-content> [↑](#footnote-ref-18)
18. HL7 C-CDA Online, <https://hl7.org/ccdasearch/templates/2.16.840.1.113883.10.20.22.5.6.html> [↑](#footnote-ref-19)
19. HL7 FHIR® R4, Resource Provenance, <https://www.hl7.org/fhir/provenance.html> [↑](#footnote-ref-20)
20. *HL7 V3: Refinement, Constraint and Localization to Version 3 Messages,* <http://www.hl7.org/v3ballot/html/infrastructure/conformance/conformance.htm> [↑](#footnote-ref-21)
21. *HL7 Templates Standard: Specification and Use of Reusable Information Constraint Templates,* <https://www.hl7.org/implement/standards/product_brief.cfm?product_id=377> [↑](#footnote-ref-22)
22. Lantana Consulting Group, Trifolia Workbench. <http://trifolia.lantanagroup.com> [↑](#footnote-ref-23)
23. *HL7 Version 3 Publishing Facilitator's Guide.* <http://www.hl7.org/v3ballot/html/help/pfg/pfg.htm> [↑](#footnote-ref-24)
24. *HL7 Version 3 Normative Edition, 2010.* <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=161> [↑](#footnote-ref-25)
25. W3C, XML Path Language. <http://www.w3.org/TR/xpath/> [↑](#footnote-ref-26)
26. HL7 CDA R2 Extensions webpage. <http://wiki.hl7.org/index.php?title=CDA_R2_Extensions> [↑](#footnote-ref-27)