1st American Systems and Services LLC

Initial Assessment:
Standards Compatibility in Medication Reconciliation

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Prepared by 1st American Systems and Services LLC

for

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NIST NCPDP Analysis – Initial Assessment: Standards Compatibility in Medication Reconciliation

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Contents

A. Introduction

The goal of this document is to provide an initial assessment of the potential use and compatibility of the NCPDP SCRIPT, C32 CCD, and ASTM CCR standards in the medication reconciliation process. Included is an identification of points during medication reconciliation where related information is gathered or passed on using multiple standards, and a comparison of how each standard represents these common pieces of information.

The document identifies gaps between the standards and translation points where information is represented differently in the standards. In addition, the analysis looks at how clinical information used during medication reconciliation is represented in the different message types within the SCRIPT standard itself, identifying issues and noting opportunities.

Document sections:

Background on Assessed Standards. Overview of the standards and particular messages/documents reviewed in this analysis.

Standards Interaction Overview. Identification of points during the sample medication reconciliation scenarios where information is exchanged using the different standards and used together in the care of the patient or transferred from one standard to another as part of the information flow. This section also gives a high-level comparison of how each standard represents common pieces of information.

Assessed Scenarios. This analysis focuses on a limited number of medication reconciliation scenarios in which the three standards might all be used in the care of a patient. This section describes these scenarios.

Standards Comparison. This section provides a more detailed comparison of concepts shared between the NCPDP, HL7 and ASTM standards focusing on the key aspects of medication vocabulary, administration directions, dispensing status and dates that come into play in the medication reconciliation process. This part of the document includes analysis of how information is represented between the standards (data types, lengths, etc.), vocabularies used, identification of gaps—such as information that can be conveyed in one standard but not the other, and identification of translation points, where two standards represent the same information, but in different ways.

Standards Comparison. This section compares how clinical content related to medication reconciliation—such as diagnoses, observations and allergies—is represented across different message types in the SCRIPT. Where there are differences or issues, the section recommends ways for NCPDP to address them.

Summary of Findings. Summary of compatibility and conflicts between the analyzed standards and representation of clinical concepts within the SCRIPT standard itself.

B. Background on Assessed Standards

This analysis focuses on three electronic data exchange standards in which information about patient medications and other related clinical information can be used during a medication reconciliation process to:

- gather patient medications and other clinical information from other providers, insurance companies, pharmacies, or other sources such as state-based health information organizations (HIOs)
- electronically transmit prescriptions resulting from medication reconciliation to the patient's pharmacy
- include pertinent observations and clinical alerts such as allergies an potential drug conflicts in prescriptions transmitted to the pharmacy,
- enable a nursing home or other long-term or post-acute care facility to electronically share a new resident patient's allergies and problems discovered during medication reconciliation with the facility's partner institutional pharmacy.

These standards are…

- the NCPDP SCRIPT standard, including the Medication History, New Prescription, Cancel Prescription and Census messages
- the HITSP C32 CCD document, and
- the ASTM CCR message

… and are described further below.

NCPDPD SCRIPT

SCRIPT is a standard that includes several messages supporting medication management. This analysis focuses on those most closely associated with a medication reconciliation process—either providing patient clinical information to the process, or transmitting prescriptions and related information resulting from the process to the patient's pharmacy. Those messages are briefly described below.

- **Medication History (NCPDP SCRIPT RXHREQ, RXHRES)**

The NCPDP SCRIPT Medication History message is the most common means by which medication history information is shared between a patient's pharmacy benefit insurer and their physician or other practitioner. The SCRIPT Medication History format is named by CMS for use in the care of Medicare Part D recipients, and is required for participation in the federal MIPPA e-prescribing incentive program for practitioners. Medication History is not, however, included in currently defined Meaningful Use criteria.

- **New Prescription (NCPDP SCRIPT NEWRX)**

The NCPDP SCRIPT New Prescription message is used to transmit prescriptions electronically to the patient's pharmacy.

The New Prescription message is named by CMS for use in the care of Medicare Part D recipients, and is required for participation in the federal MIPPA e-prescribing incentive program for

practitioners. Use of the New Prescription message is also required of prescribing systems wishing to meet current Meaningful Use certification.

- **Cancel Prescription (NCPDP SCRIPT CANRX)**

The NCPDP SCRIPT Cancel Prescription message is used to electronically cancel a prescription previously sent to the patient's pharmacy. The use of Census is very limited today, and only in the long-term and post-acute care (LTPAC) setting. However, the message is mentioned here because of its current role in medication reconciliation in LTPAC settings today, and its potential to be adopted in ambulatory settings in the future.

- **Census Update (NCPDP SCRIPT CENSUS)**

The NCPDP SCRIPT Census message is used by long-term and post-acute care (LTPAC) facilities to notify partner institutional pharmacies of resident patient admissions, discharges and other census events, and can also be used to convey a profile of patient allergies and diagnoses.

The use of Census is very limited today, and only in the LTPAC setting. However, the message is included in this analysis because of its potential role in medication reconciliation in LTPAC settings, and because it is the only SCRIPT message that contains the standard's Allergy and Diagnosis segments. The Census message is not currently included in Meaningful Use criteria.

- **Prescription Fill Status (NCPDP SCRIPT RXFILL)**

The NCPDP SCRIPT Fill Status message enables the dispensing pharmacy to notify the prescriber when a prescription is dispensed and picked up by (or delivered to) the patient. The message also enables the prescriber to be notified if the order can't be dispensed or if the patient does not take possession of the medication.

The standard is not in wide use today—with initial usage primarily in the long-term and post-acute care settings. However, the standard is named for optional use by CMS for Medicare Part D patients, and its potential value in the ambulatory setting to alert prescribers of non-compliance by their patients has been noted.

Similar to dispense-based medication history provided by healthcare payers, the Fill Status can augment EMR-based medication information, which typically reflects medication orders which may or may not have actually been filled and picked up by the patient.

SCRIPT Versions

The 8.1 version of the SCRIPT standard is in most common use today, though where SCRIPT is named for federal programs, the 10.6 version is also allowed to be used. The industry is expected to implement the 10.6 version over the course of the upcoming 2-4 years. This analysis will focus on the 10.6 version of the standard.

Continuity of Care Record (ASTM CCR)

The Continuity of Care Record, or CCR, is a patient medical summary format managed by ASTM International. It represents a core data set of the most relevant facts about a patient's health care. The CCR standard pre-dates, and provided the clinical content model, for the Continuity of Care Document—which was created in

conjunction with HL7. The CCR has continued to evolve since the creation of the CCD, though the content of the two formats remains very similar.

Medication content in the CCR is held in its Medications section, which is used to list and describe the patient's current medications and pertinent medication history. According to the CCR implementation guide, "at a minimum, the currently active medications should be listed, with an entire Medication History as an option, particularly when the CCR is used for comprehensive data export."

CCR Version

Meaningful Use rules allow use of the ASTM E2369 Standard Specification for Continuity of Care Record.

Continuity of Care Document (HL7 CCD)
The CCD is a patient summary format based on the clinical information contained in the Continuity of Care Record and the HL7 Clinical Document Architecture (CDA) electronic document structure. As such, it's content is very similar to that of the CCR, though not identical—as the two standards have evolved since the creation of the CCD.

CCR Version

Meaningful Use rules identify the following as the CCD version and implementation guidance: HITSP (Healthcare Information Technology Standards Panel) Summary Documents Using HL7 CCD Component HITSP/C32.

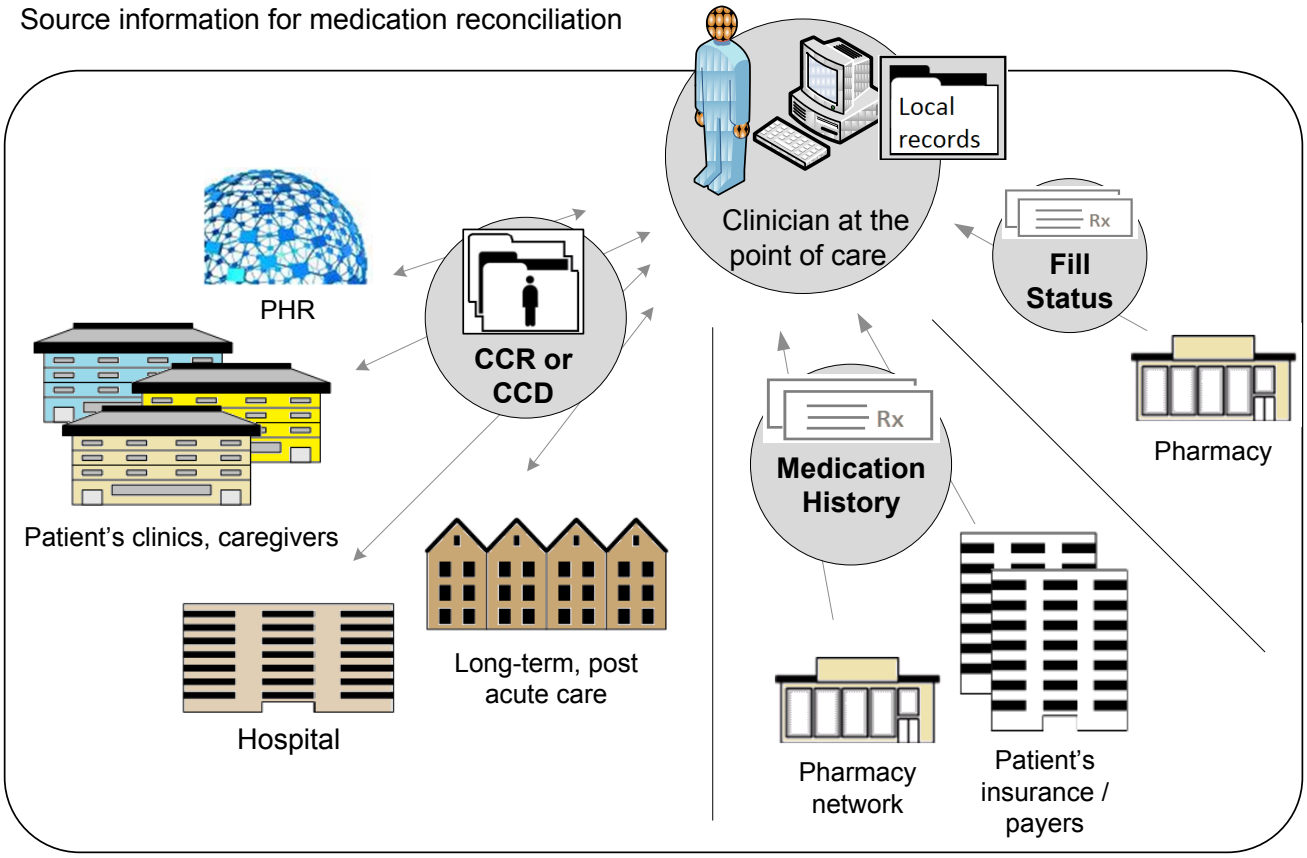
C. Integrating multiple source standards into medication reconciliation

Where the source standards are used
Each information source standard included in this review has the potential to be used in a range of clinical systems and to be available through multiple networks or other means. However, in today's environment…

- the NCPDP Medication History transaction is typically used by insurance companies to share claims-based medication information, and to a lesser extent, also used to retrieve dispensed drug information from pharmacies. It typically contains prescription medications dispensed by retail and mail service pharmacies for ambulatory patients, as well as a portion of medications dispensed for patients residing in long-term and post-acute care facilities (specifically, those medications paid by the patient's Medicare Part D coverage or other commercial coverage)
- CCDs and CCRs are commonly used by electronic medical record systems to publish and receive patient clinical summaries, and CCRs have been commonly implemented by personal health record (PHR) systems. Depending on the source system, content may can reflect both inpatient and ambulatory care, and is not limited by the insurance or other means by which treatment was covered
- the Fill Status and Cancel messages used primarily in long-term and post-acute care settings today, exchanged between institutional pharmacies and facility electronic medical record systems. In the future, these may be adopted in ambulatory settings as well.
- the Census message is designed to be used only in long-term and post-acute care settings, sent by facilities to their partner long-term care pharmacies to notify them of patient admissions, changes, etc.

Gathering source material for the medication reconciliation process

The graphic below illustrates electronic sources of information used during medication reconciliation, and the standards typically employed today.



Sources' points of view reflected in the standards

The medication details conveyed by different sources may vary due to the source's role and its relationship with the patient as well as the use of differing data exchange standards. For example, the clinic's record may reflect the prescriber's directions for use of the medication:

- Current medication started June 2010: Inderal (brand) 80mg by mouth daily for migraines

whereas the medication history will reflect the specific product dispensing events that were paid-for by the patient's insurance plan:

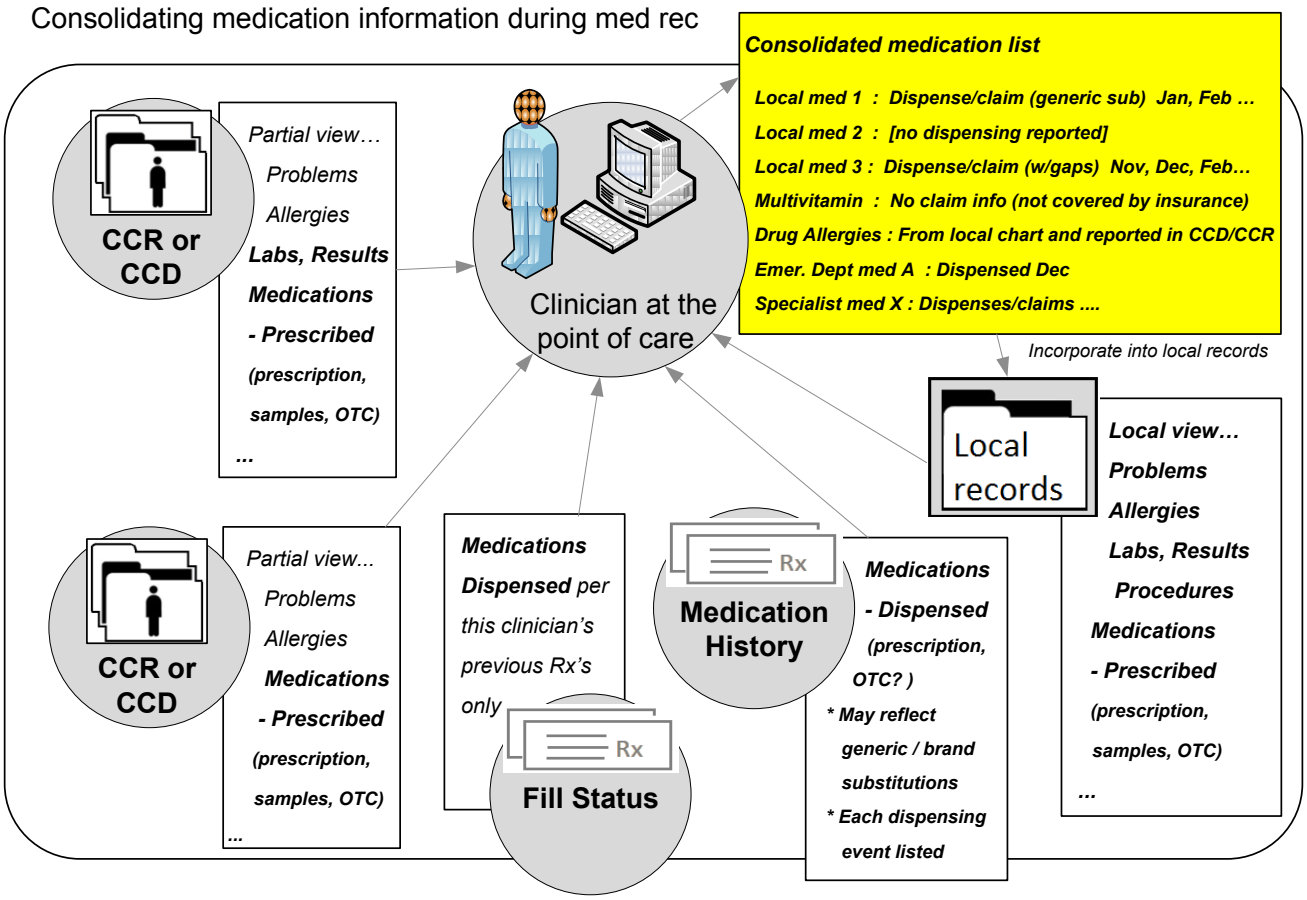
- Propranolol (generic) 80mg tablet. Qty: 30. Dispensed Sep 30, July 30, June 15…

and a summary received from a hospital whose emergency department was visited by the patient may include only partial information gathered as part of a patient history:

- Current medication: propranolol.

The resulting challenge for the clinician performing medication reconciliation using information received from multiple electronic sources is to align the various reports, "de-duplicating" where the same medication is reported in different ways, yet capturing aspects present in one source but not others. In the example above, for instance, once the receiving system associates the prescribed Inderal to the dispensed generic propranolol, the clinician might note that the patient isn't getting their prescription filled as directed (as evidenced by the non-regular dispensing dates received from the patient's insurance company).

The illustration below reflects the perspectives typically reflected by users of the CCD, CCR, and claims-based Medication History standard.



Aligning medications from different sources

The first step in utilizing medication data from multiple sources is to determine which records in *Source A* represent the same prescriptions reported in *Source B*. For example, clinical summaries from two practitioners that care for a patient may contain the same five medications, but might report them using different brand names or identifiers. And a claims-based medication history message might report those same five medications—but in the form of sixty separate dispensing events occurring during the year, using another set of identifiers.

Key challenges when aligning information received via different standards are identified below.

- **Coded drug identifiers are not always present**

Not all standards require that a coded drug identifier accompany each drug's textual description. Of the three standards reviewed here, only one—the C32 CCD—strictly requires coded drug identifiers, though even in that case it is allowable to use a coded form of "unknown" rather than an actual medication code.

While not required in the NCPDP Medication History, data sources typically include NDC codes for dispensed medications (but note that the Medication History message is not covered under current Meaningful Use rules and its RxNorm requirement). Drug codes are optional in the ASTM CCR.

- **Different drug identifiers are used**

Even if two sources both include coded drug identifiers, they may not be from the same code system. For example, the clinician may receive a Medication History containing NDC codes but no RxNorm identifiers, and a CCD containing the opposite: RxNorm IDs but no NDCs. When no identifiers are present in one or more sources, matching must rely on text string comparisons (typically with manual actions by the clinician using the system). If different code systems are used, translation may be possible, though results will be less reliable due to gaps and "shading differences" between code systems, and human review will be more critical. Below are the drug coding systems required or most typically used in the three standards being reviewed here.

NCPDP Medication History. Traditionally, implementers of the NCPDP medication history have used the NDC 11 code of the dispensed product as the sole drug identifier in the message, and today that is still the case. However, it is expected that the RxNorm terminology will start to be used as implementers move to the 10.6 version of the standard and take steps to support federal Meaningful Use requirements for use of RxNorm in the New Prescription message. NDC 11 codes will likely continue to be included while the industry moves to add RxNorm to the messages, and potentially even after RxNorm is adopted—for the purpose of identifying the particular packaged products dispensed.

C32 CCD. The C32 CCD specification requires that medication references include a coded value. When the reference is to a prescribing-level brand or generic drug, RxNorm is to be used. Meaningful Use rules further require a RxNorm code to be present. If also specifying a particular packaged product (e.g., 30 tablet bottle of drug A), the NDC is to be used.

ASTM CCR. Use of coded drug identifiers is optional, with RxNorm recommended, and NDC codes allowed.

- **Prescribed versus dispensed medications**

As noted above, one challenge in integrating medication information from the three formats discussed above is that the SCRIPT Medication History reflects medication products that have been dispensed by a pharmacy, while the CCD and CCR primarily represent current medications ordered by a clinician, and optionally historical medications reported by the patient or another provider.

When integrating information from a Medication History and a CCD or CCR, the receiver matches the ordered medications to the related dispensing event(s), and must be careful not to "double count" medications present in both sources. In addition, there may be differences in how a given medication is reported between the order and dispensing event, including:

- *brand versus generic*—for example if a branded medication is ordered but fulfilled using a generic substitute
- *strength / quantity*—for example if the order specifies "30 tablets. Take 1 20mg tablet daily" and the pharmacy dispenses 60 10mg tablets instead, with patient instructions to take 2 10mg tablets daily
- *multiple dispensing events for a single order*—for example where a maintenance medication is dispensed twelve times per year based on a single order, potentially with generic/brand differences or strength/quantity differences between dispensing events.

- **Active versus inactive medications**

A reference to a patient medication in any of the standards does not by itself indicate whether the patient is actually taking the drug in compliance with the prescriber's directions. However, the CCD and CCR both enable a source to indicate whether a medication is currently being taken, whereas the NCPDP Medication History does not.

- A claims-based Medication History message as implemented by industry stakeholders today does not contain any direct indication of whether the patient is still taking a medication, though information about the patient's compliance may be surmised by the presence or absence of dispensing records for a medication. For example, if a daily medication has been dispensed on an irregular basis, it may indicate that the patient isn't taking it as directed.
- The C32 CCD requires start and stop dates for medications, indicating whether the patient is currently taking the medication.
- While not required, the CCR enables a medication's status to be specified (Active, On Hold, Prior History No Longer Active) as well as start and stop dates.

- **Over the counter (OTC) products, inpatient medications, and patient-reported drugs**

The three standards differ in the types of medications they report—based on the roles of the entities that use each standard. In addition, the underlying sources differ as well, with clinic-based summaries and personal health records containing patient-reported medications.

- Medications reported in NCPDP Medication History messages consist typically include only prescription drugs covered by the patient's insurance drug plan. Over the counter products, which are ordinarily paid for by the patient, are rarely included. And medications administered during inpatient care (including the initial period of nursing home or post-acute facility care) are not included either—as they are paid for by the patient's medical benefit rather than the pharmaceutical aspect of their health plan.
- CCD or CCR clinical summaries sourced from care providers may contain over the counter products and medications associated with inpatient care. Patient-reported medications (e.g.,

taken as part of a patient history) may also be included. The amount and reliability of coded content for such information may vary in specificity and accuracy.

- Personal health records may contain products not included in either clinic-based or claims-based sources, such as vitamins, herbals, or other over the counter products not prescribed by a clinician. Coded identifiers for such content is unlikely to be present.

Incorporating other clinical information from the CCD, CCR or medication history into the process

In addition to the drugs themselves, the CCD and CCR have the ability to convey additional clinical information critical during medication reconciliation—such as the diagnosis or indication for which the medication was prescribed, other patient conditions, and patient allergies or other alerts. In comparison, the NCPDP Medication History message has very limited support for other clinical information, which is rarely used today.

Using this information effectively in drug interaction checks such as for…

- Drug allergies
- Drug to drug interactions
- Duplicate therapy

depends in large part on whether the information is codified in a manner understandable to the e-prescribing system or other system being use for medication reconciliation. Each of the three standards supports codification of drug and allergy content, but with some differences in the coded terminologies used and the extent to which that codification is required. Required vocabulary standards in Meaningful Use apply in some but not cases—for example, the Medication History message is not covered by current MU rules—and so the system supporting med rec will typically need to deal with content that has no coded representation as well as cases where sources both provide coded content, but reflecting different code sets.

Below is a brief summary of how clinical content is represented in the analyzed standards. Additional examples and comparisons will follow in other sections.

- **Diagnosis or indication**

While diagnosis / indication information can be conveyed in all three standards, today it is typically only included in the CCD and CCR clinical summaries.

- The clinical summary standards, CCD and CCR, typically contain patient conditions. However, coded diagnoses are optional. The CCD specifies that SNOMED codes should be used, but allows other terminologies through translation code. The CCR recommends SNOMED and ICD-9 codes.
- The NCPDP Medication History includes elements for identification of a primary and secondary diagnosis related to each medication using ICD-9, ICD-10, SNOMED, First Databank, Micromedex or Medispan codes. This content is rarely included in the message, however. (Note that when diagnoses are included in the NCPDP New Prescription message, the ICD-9 code set is typically used.)

- **Patient allergies**

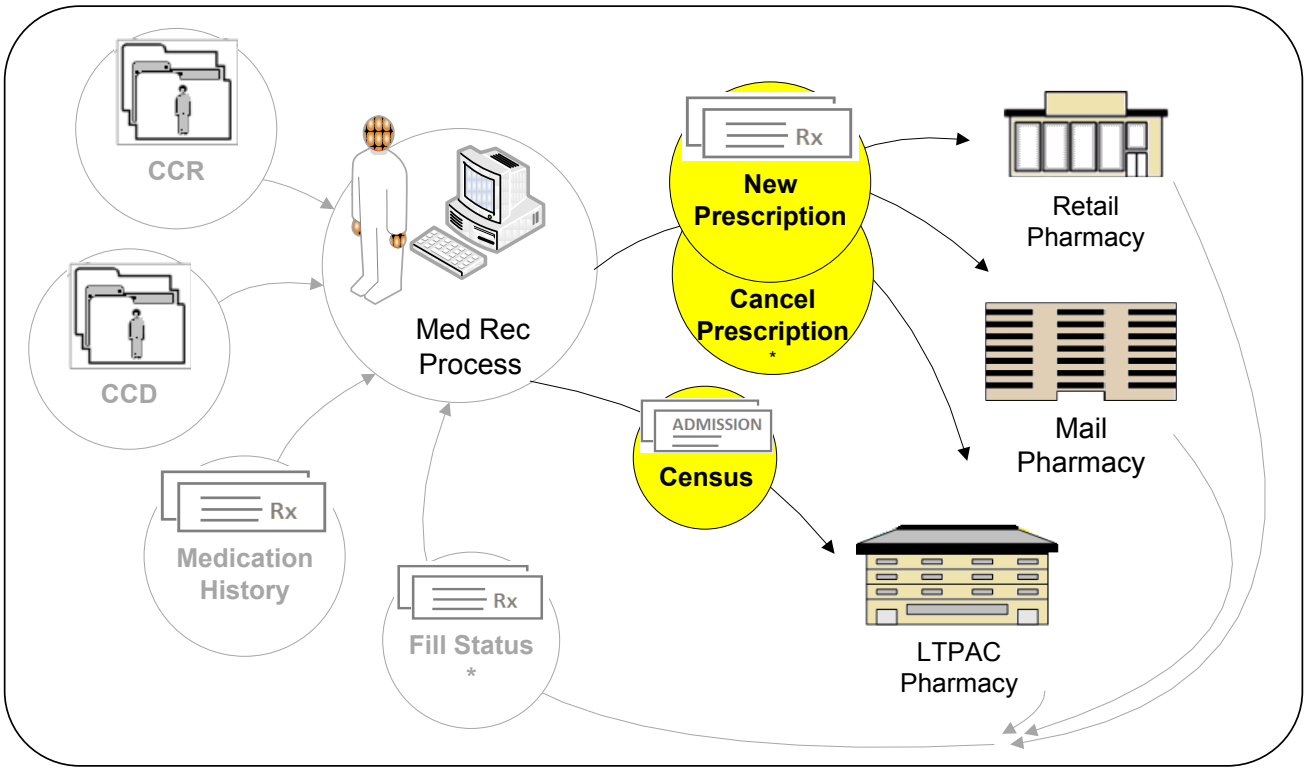
The three standards differ in the level of support for patient allergies and intolerances, and the codes used to identify them.

- The NCPDP Medication History has no support for patient allergies.
- The NCPDP New Prescription message can include an allergy-related interaction considered while prescribing the medication.
- The C32 CCD requires start and stop dates for medications, indicating whether the patient is currently taking the medication.
- While not required, the CCR enables a medication's status to be specified (Active, On Hold, Prior History No Longer Active) as well as start and stop dates.

D. Output flow: Conveying the results of med rec to other parties

The process of medication reconciliation doesn't stop after the clinician learns of the patient's current medications and other clinical information, but instead continues into the prescribing of continued or new medications and the canceling of medications no longer needed. In addition, the patient information gained during medication reconciliation may be forwarded to other providers who will take part in the patient's care.

Below are messages from the SCRIPT 10.6 standard into which medication and related clinical information gained from medication reconciliation may be conveyed to other parties. Following the graphic is a brief identification of the types of information supported by each message, and a later section analyzes more fully how clinical information is represented in the SCRIPT standard.



** Note: Adoption of Fill Status and Cancel Prescription is currently limited to the long-term and post-acute care settings*

- **New Prescription**

In addition to carrying prescribed medication details, the NEWRX can also convey related clinical information to the pharmacy, including:

- the diagnosis for which the prescription was written
- one or more clinical observations related to the prescription or dosing
- clinical alerts that arose and were considered by the prescriber, including relevant allergies or intolerances, or potential drug conflicts.

Also, the Structured Sig segment in the message allows for an indication to be incorporated into the coded directions—for example to indicate that the medication should be taken when an observation reading exceeds a particular value.

- **Cancel Prescription**

The Cancel Prescription message serves the single purpose of canceling a previously-transmitted prescription. As such, it simply "echoes" the medication, prescriber and pharmacy information previously included in the New Prescription, with direction to either discontinue refills on an active prescription, or to cancel a prescription that has not yet been dispensed.

- **Census**

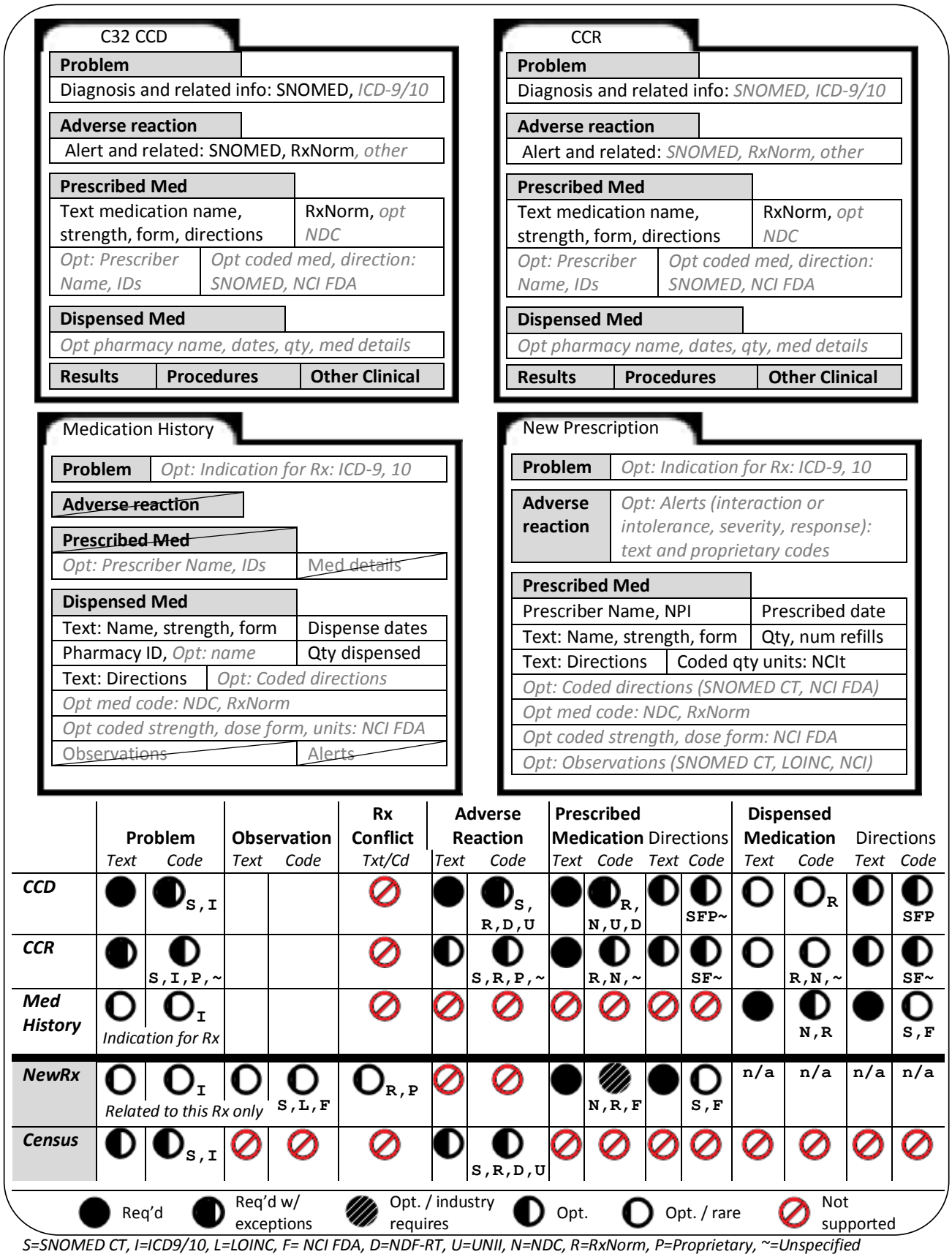
The Census message is used in long-term and post-acute settings to notify partner pharmacies of resident patient admissions, discharges and other census events. It also contains sections in which patient problem and allergy profiles can be shared.

E. High-Level Illustration of Content Differences

The graphic below provides a very high-level comparison of medication, adverse reaction and diagnosis content in the reviewed standards. As the picture illustrates, there are areas of both consistency and inconsistency between the standards, with regard to the types of information conveyed, the level of coded information, and the terminology used.

These comparisons are detailed further in later sections of the analysis.

High-level illustration of content in CCR, CCD, and related NCPDP messages



	Problem		Observation		Rx Conflict	Adverse Reaction		Prescribed Medication Directions				Dispensed Medication		Directions	
	Text	*Code*	*Text*	*Code*	*Txt/Cd*	*Text*	*Code*	*Text*	*Code*	*Text*	*Code*	*Text*	*Code*	*Text*	*Code*
CCD	●	◑ S,I			⊘	●	◑ S, R,D,U	●	◑ R, N,U,D	◑	◑ SFP~	○	○ R	◑	◑ SFP
CCR	◑	◑ S,I,P,~			⊘	◑	◑ S,R,P,~	●	◑ R,N,~	◑	◑ SF~	○	○ R,N,~	◑	◑ SF~
Med History	○ *Indication for Rx*	○ I			⊘	⊘	⊘	⊘	⊘	⊘	⊘	●	◑ N,R	●	○ S,F
NewRx	○ *Related to this Rx only*	○ I	○	○ S,L,F	○ R,P	⊘	⊘	●	▨ N,R,F	●	○ S,F	n/a	n/a	n/a	n/a
Census	◑	◑ S,I	⊘	⊘	⊘	◑	◑ S,R,D,U	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘

● Req'd ◑ Req'd w/ exceptions ▨ Opt. / industry requires ◑ Opt. ○ Opt. / rare ⊘ Not supported

S=SNOMED CT, I=ICD9/10, L=LOINC, F= NCI FDA, D=NDF-RT, U=UNII, N=NDC, R=RxNorm, P=Proprietary, ~=Unspecified

F. Assessed Scenario Overview

This analysis uses the following scenarios as a basis for comparing the three standards. While somewhat unlikely given the current level of adoption of electronic health records, each of these scenarios include exchange of the NCPDP Medication History, C32 CCD, and ASTM CCR standards—in order to enable comparison between them.

The first scenario is the basis for comparing historical medication information as it might be conveyed in the three reviewed standards. An example Medication History, CCD and CCR were created based on the same real-world information, but using the elements and codes of each standard. The examples include optional content included in the standards but not necessarily commonly used. This applies especially to the Medication History message, for which the example message contains coded content rarely populated today.

The second scenario illustrates the similarities and differences in representation of diagnosis and adverse event information between the CCD, CCR, and NCPDP Census message. This scenario also points out that is can be problematic for the receiver of an NCPDP Medication History message to infer the condition for which a drug has been dispensed; diagnosis information from a CCD or CCR coming from the patient's physician or other provider is needed to clarify the reason the patient is taking a medication that has multiple clinical uses.

	Scenario	Description	Standards Used	Topics
1	New patient with inconsistent compliance with maintenance medication	A patient is seen a physician office complaining of headaches. The patient is new to this physician so he reviews her clinical summary as received from her referring physician, and also orders a medication history from her payer. He assesses the profile and notes that the patient is hypertensive and appears to be non-compliant with her medications--her medication has not been picked up on a regular 30-day basis. The patient indicates that she has a hard time in remembering to take her medication. The prescriber orders a prescription for the patient's medication, but changes the dose to a single daily dose in the morning.	Patient profile from the referring physician (for analysis, in both CCD and CCR forms) Medication History New Prescription Fill Status	EMR-based CCD contains prescribed information only, while NCPDP Medication History contains only dispensed drug information. Differences in terminology and element details

	Scenario	Description	Standards Used	Topics
2	Patient taking medications that can prescribed for different medical conditions—increasing the need for diagnosis / indication information	A patient arrives at an emergency department in a semi-conscious state. Claims-based medication history is retrieved from the patient's insurance company—but the indications for the patient's medications is not apparent, since the drugs are used to treat several different conditions, and the Medication History message typically does not include diagnosis information. However, staff are able to retrieve clinical summary information from the patient's primary care physician through a state-based health information exchange (in a CCD) and the patient's companion also provides access to a patient-maintained personal health record, which is retrieved as a CCR.	CCD from primary care physician, CCR from PHR, Medication History from payer, Census message containing allergies sent to LTC pharmacy	Claims-based Medication History does not contain diagnosis information needed to determine the clinical purpose for medications it contains. Information from other clinical summaries is needed to create the full picture

Key content from these example messages / documents is compared in the next section. The full contents are included in the appendices and attached as separate files.

- Scenario One:
  - Scen_1_Med_Hist_Response.xml
    - Claims based medication history retrieved from the patient's insurance company
  - Scen_1_CCD.xml
    - Clinical summary from a provider
  - Scen_1_CCR.xml
    - Clinical summary from a provider
  - Scen_1_NewRx.xml
    - Continued medication, with a change to once-daily administration based on a recognition that the patient was not compliant with the previous twice-daily regime
  - Scen_1_FillStatus.xml
    - Fill status sent by the pharmacy, indicating that the patient didn't pick up the continued medication order and that it was returned to stock
- Scenario Two:
  - Scen_2_Med_Hist_Response.xml
    - Claims based medication history, which lacks the diagnosis information needed to determine the conditions being treated with the medications dispensed
  - Scen_2_CCD.xml
    - Clinical summary from a provider
  - Scen_2_CCR.xml
    - Clinical summary from a provider
  - Scen_2_Census.xml
    - Forwards the adverse event and diagnosis information to a long-term care pharmacy

G. Scenario Content Summary

The table below highlights which content is supported and typically available in each standard, with required content bolded, content typically included set in plain text, and optional content in grey italics. Code values and terminology is also compared. (A more thorough review of terminologies follows in a later section.)

Standards Compatibility Scenarios

Key: BOLD CAPS= Always present
Regular: Typically present.
Grey italic: Optional, not always or seldom present

		Raw information content	Standard-specific clinical summary content			SCRIPT message content in post-reconciliation messages
			NCPDP Med. History (RxHistoryResponse)	**C32 CCD**	**ASTM CCR**	
Scenario 1. New patient with inconsistent compliance with maintenance medication			Claims-based medication history from the patient's insurance company	Clinical summary from thereferring physician	Clinical summary from thereferring physician (alternative format--for comparison)	
Patient profile						
Problems, diagnoses	Hypertension. 9/27/2010 to present	Type: Disorder: SNOMED 64572001 Hypertension SNOMED: 59621000 ICD9: 401.9	*not supported*	Type: Disorder: SNOMED 64572001 **HYPERTENSION** *[OPT: SNOMED: 59621000 | ICD9: 401.9*	*[OPT: Type: Disorder | CCR code: 'Condition '] **HYPERTENSION** [OPT: SNOMED: 59621000 | ICD9: 401.9*	
	Headaches 1/1/2010 to 10/31/2010. ICD9: 784.0 Headache	SNOMED: 230461009 Headache Reduced severity after once-daily treatment started	*not supported*	Type: Disorder: SNOMED 64572001 **HEADACHE** *[OPT: SNOMED: 230461009 | ICD9: 784.0]*	*[OPT: Type: Disorder | CCR code: 'Condition '] **HEADACHE** [OPT: SNOMED: 230461009 | ICD9: 784.0]*	
Adverse Reactions	Diarrhea associated with use of ACE inhibitor. Minor and deemed tolerable. Agent: Angiotensin-converting Enzyme Inhibitors (NDF-RT NUI: N0000000181)	Adverse Event: SNOMED: 59037007 Intolerance to a drug. (NCPDP qualifier "LD") Reaction: SNOMED: 128333008 Diarrheal disorder Severity: SNOMED 371923003 Mild to Moderate	*not supported*	**Type: INTOLERANCE TO A DRUG | SNOMED 59037007** Agent: ndf-rt: N0000000181 Reaction: SNOMED: 128333008 Diarrheal disorder Severity: SNOMED 371923003 Mild to moderate	**Type: INTOLERANCE TO A DRUG | SNOMED 59037007** Agent: ndf-rt: N0000000181 Reaction: SNOMED: 128333008 Diarrheal disorder Severity: SNOMED 371923003 Mild to moderate	

	Raw information content		NCPDP Med. History (RxHistoryResponse)	C32 CCD	ASTM CCR		
Medications							
1. Vasotec (Enalapril Maleate)			**Profile Medication**			**NCPDP New Prescription (NewRx)** *Rx continued after med rec event… differs in some respects from profile med*	
Drug description	Vasotec 5mg twice daily		*If brand dispensed:* **VASOTEC 5 MG TABLET** *If generic:* **ENALAPRIL MALEATE 5 MG TABLET**	Product Name: **ENALAPRIL MALEATE 5 MG TABLET** Brand Name: Vasotec 5 mg Tablet	Product Name: **ENALAPRIL MALEATE 5 MG TABLET** *[OPT: Brand Name: Vasotec 5 mg Tablet]*	*Changed to once / day*	**ENALAPRIL MALEATE 10 MG TABLET**
Coded medication	Branded: Enalapril Maleate 5mg oral tablet (Vasotec name RxCUI = 224921) RxN SBD: 858815 NDC: 00247057830	Generic: Enalapril Maleate 5mg oral tablet RxN SBD: 858815 RxN SCD: 858813 NDC: 21695048730	*NDC opt. but present by industry convention* ***BRAND:*** **00247057830** **OR *GENERIC:* 21695048730** *[RxNorm optional, but rarely included today: SBD | 858815 or SCD | 858813]*	RxNorm (required for MU): **GENERIC: SCD | 858813** Brand: SBD | 858815 *[Opt: NDC: 21695048730 AND/OR 00247057830]*	RxNorm (required for MU): **GENERIC: SCD | 858813** *[OPT: Brand: SBD | 858815] [Opt: NDC: 21695048730 AND/OR 00247057830]*	Enalapril Maleate 10mg oral tablet SCD: 858817 NDC: 21695048830	**NDC | 21695048830** *[OPT: SCD | 858817]*
Coded strength	NCI C28253 (mg)		*[OPT: NCI: C28253]*	*[Strength units not codified]*	*[OPT: SNOMED: 258684004]*		*[OPT: NCI: C28253]*
Coded dose form	NCI C42998 (tablet)		*[OPT: NCI: C42998]*	*[OPT: NCI: C42998]*	*[OPT: SNOMED: 385055001]*		*[OPT: NCI: C42998]*
Indication / diagnosis	Hypertension SNOMED: 59621000 Essential hypertension	ICD9: 401.9 Hypertension, Unspecified	*[OPT: ICD9 | 401.9 (rarely used)]*	*[OPT: SNOMED 59621000]*	*[OPT: SNOMED 59621000 ICD9 | 401.9]*		*[OPT: ICD9 401.9]*
Secondary Indication / diagnosis	Headache +A4 (disorder)	ICD9: 784.0 Headache	*[OPT: ICD9 | 784.0 (rarely used)]*	*[OPT: SNOMED 230461009]*	*[OPT: SNOMED 230461009 ICD9 | 784.0]*		*[OPT: ICD9 784.0]*
Administration directions (sig)	TAKE 1 TABLET TWICE DAILY		**TAKE 1 TABLET TWICE DAILY**	*[OPT: take 1 tablet twice daily]*	*[OPT: take 1 tablet twice daily]*		**TAKE ONE TABLET DAILY**
Codified administration directions							
Delivery Method	TAKE | SNOMED: 419652001		*[OPT (rarely used): TAKE | SNOMED: 419652001]*	*not supported*	*[OPT : TAKE | SNOMED: 419652001]*		*[OPT: TAKE | SNOMED: 419652001]*
Dose / Unit of Administration	NCI unit of presentation: C48542 (tablet)	NCI pharmaceutical dosage form: C42998 (tablet)	*[OPT (rarely used): TABLET | NCI NCPDP Strength Form (Pharmaceutical Dosage Form): C42998]*	*[OPT: NCI unit of presentation - name only {Tablet}]*	*[OPT: TABLET | NCI: Pharmaceutical Dosage Form C42998]*		*[OPT: NCI Unit of Presentation: C42998]*
Route of Administration	Swallow, oral NCI: C38288 BY MOUTH, SNOMED: 26643006		*[OPT (rarely used): SNOMED: 26643006]*	*[OPT: Oral NCI FDA: C38288]*	*[OPT: SNOMED: 26643006]*		*[OPT: SNOMED: 26643006]*
Administration Timing Time Period	2 per DAY | SNOMED: 258703001		*[OPT (rarely used): DAY | SNOMED: 258703001]*	*[OPT: DAY | PIVL_TS period: 'd']*	*[OPT: DAY | SNOMED: 258703001]*		*[OPT: DAY | SNOMED: 258703001]*

	Raw information content		NCPDP Med. History (RxHistoryResponse)	C32 CCD	ASTM CCR	
Medications						**NCPDP New Prescription (NewRx)** *Rx continued after med rec event… differs in some respects from profile med*
1. Vasotec (Enalapril Maleate)			**Profile Medication**			
Interactions or conflicts	Mild diarrhea; side effect of ACE inhibitors. Agent: Angiotensin-converting Enzyme Inhibitors (NDF-RT) NUI: N0000000181	Adverse Event: SNOMED: 59037007 Intolerance to a drug. (NCPDP qualifier "LD") Reaction: SNOMED: 128333008 Diarrheal disorder Severity: SNOMED 371923003 Mild to Moderate	*[OPT (Rarely used): AR (Adverse drug reaction); MB (Overriding benefit - outweighs the risks); 4A (Prescribed anyway); 38 | 858817 (SCD for enalapril 10 mg); 3 (minor clinical significance) "TOLERABLE DIARRHEA SIDE EFFECT OF ACE INHIBITOR"*	*not supported*	*not supported*	*SCRIPT does not support NDF-RT in this element (options are RxNorm or NDC).* Co-AgentID: SCD | 858817 Enalapril Maleate 10mg oral tablet	*[OPT: AR (Adverse drug reaction); MB (Overriding benefit - outweighs the risks); 4A (Prescribed anyway); 38 | 858817 (SCD for enalapril 10 mg); 3 (minor clinical significance) "TOLERABLE DIARRHEA SIDE EFFECT OF ACE INHIBITOR"*
Quantity prescribed	60		*not supported*	60	*[OPT: 60]*	**30**
Coded quantity unit of measure	NCI unit of presentation: C48542 (tablet)	NCI pharmaceutical dosage form: C42998 (tablet)	*not supported*	NCI pharmaceutical dosage form: C42998 (tablet)	*[OPT: NCI unit of presentation: C48542 (tablet)]*	**NCI UNIT OF PRESENTATION: TABLET | C48542**
Refills allowed	2		*[OPT: 2]*	*[OPT: 2]*	*[OPT: 2]*	**1**
Prescribed date	2010-09-27 and 2010-12-29		*[OPT: 2010-09-27 and 2010-12-29 (reported with associated dispense events]*	*[OPT: 2010-09-27+]*	*[OPT: 2010-09-27+]*	**2011-03-24T16:01:20**
Prescribing clinician	MICHAEL PETER BALZARY, NPI9999999, DEA999999, LIC99999	CORCORAN CLINIC, 500 SEVENTEENTH ST NW, WASHINGTON DC 20006 PH: 2026391800 FAX: 2026391800	*[OPT: MICHAEL PETER BALZARY | NPI9999999 | DEA999999 | LIC99999 |CORCORAN CLINIC, 500 SEVENTEENTH ST NW, WASHINGTON DC 20006, PH | 2026391800, FAX | 2026391800]*	*[OPT: MICHAEL PETER BALZARY …]*	*[OPT: MICHAEL PETER BALZARY …]*	**DR ANNA-KATHERINE HARTLEY NPI1010101** *[OPT: DEA101010, LIC101010, CORCORAN CLINIC]* **500 SEVENTEENTH ST NW, WASHINGTON DC 20006, PH | 2026391800** *[OPT: FAX | 2026391800]*
Administration start / end	2010-09-27 until instructed to stop		*not supported*	2010-09+	*[OPT: 2010-09+]*	*N/A*
Drug status (e.g., Active, on-hold…	Active		*not supported*	Active	*[OPT: Active]*	*N/A*
Dispensed date	**2010-09-30, 2010-11-15, 2011-01-03, 2011-02-01**		*[OPT: 2010-09-30, 2010-11-15, 2011-01-03, 2011-02-01]*	*[OPT: 2010-09-30, 2010-11-15, 2011-01-03, 2011-02-01]*	*[OPT: 2010-09-30, 2010-11-15, 2011-01-03, 2011-02-01]*	*N/A*
Dispensing pharmacy	PHILLIPS PHARMACY	NCPDP03 NPI3300330 DEA330033	**PHILLIPS PHARMACY NCPDP03**… (optional but included by industry convention)	*[OPT: PHILLIPS PHARMACY]*	*[OPT: PHILLIPS PHARMACY]*	*N/A*
Quantity dispensed	30		*[OPT: 60]*	*[OPT: 60]*	*not supported*	*N/A*
Coded quantity unit of measure	NCI: C48542 (tablet)		*[OPT: NCI: AC | C48542]*	*[NCI pharmaceutical dosage form: C42998 (tablet)]*	*not supported*	*N/A*

	Raw information content		NCPDP Med. History (RxHistoryResponse)	C32 CCD	ASTM CCR		
2. Multigen Plus (multivitamin)			**Profile Medication**			**Continued Medication**	
Drug description	Multigen Plus		***Over-the-counter (non-prescription) products are typically not included in claims-based medication history***	Product Name: **CALCIUM ASCORBATE 60 MG / CALCIUM THREONATE 0.8 MG / FERROUS ASPARTO GLYCINATE 50 MG / FERROUS FUMARATE 101 MG / FOLIC ACID 1 MG / SUCCINIC ACID 50 MG / VITAMIN B 12 0.01 MG ORAL TABLET** Brand Name: Multigen Plus	Product Name: **CALCIUM ASCORBATE 60 MG / CALCIUM THREONATE 0.8 MG / FERROUS ASPARTO GLYCINATE 50 MG / FERROUS FUMARATE 101 MG / FOLIC ACID 1 MG / SUCCINIC ACID 50 MG / VITAMIN B 12 0.01 MG ORAL TABLET** *[OPT: Brand Name: Multigen Plus]*		**Multigen Plus**
Coded medication	RxNorm SCD: 802503 SBD: 802748 NDC: Brand: 10267349400			RxNorm (required for MU): **GENERIC: SCD | 802503** Brand: SBD | 802748 *[Opt: NDC: Brand (generic not commercially avail.) 10267349400]*	RxNorm (required for MU): **GENERIC: SCD | 802503** *[OPT: Brand: SBD | 802747]* *[Opt: NDC: 10267349400]*	Continued with same product	**NDC | 10267349400** *[OPT: SBD | 802748]*
Coded strength	NCI: C28253 (mg)			*strength not stated for this multi-ingredient product*	*strength not stated for this multi-ingredient product*		*[OPT: AB | C28253 (mg)]*
Coded dose form	NCI: C42998 (tablet)			*[OPT: NCI: C42998]*	*[OPT: SNOMED: 385055001]*		*[OPT; AA | C42998 (tablet)]*
Indication / diagnosis	n/a			*[OPT: SNOMED 59621000]*	*[OPT: SNOMED 59621000 ICD9 | 401.9]*		*N/A*
Secondary Indication / diagnosis	n/a			*[OPT: SNOMED 230461009]*	*[OPT: SNOMED 230461009 ICD9 | 784.0]*		*N/A*
Administration directions (sig)	TAKE ONE TABLET DAILY			*[OPT: take 1 tablet twice daily]*	*[OPT: take 1 tablet twice daily]*		**TAKE ONE TABLET DAILY**
Codified administration directions							
Delivery Method	TAKE | SNOMED: 419652001			*not supported*	*[OPT : TAKE | SNOMED: 419652001]*		*[OPT: TAKE | SNOMED: 419652001]*
Dose / Unit of Administration	NCI Unit of Presentation: C48542 (tablet)	NCI Pharmaceutical Dosage Form: C42998 (tablet)		*[OPT: NCI unit of presentation - name only {Tablet}]*	*[OPT: TABLET | NCI: Pharmaceutical Dosage Form C42998]*		*[OPT: NCI Pharmaceutical Dosage Form: C42998]*

	Raw information content		NCPDP Med. History (RxHistoryResponse)	C32 CCD	ASTM CCR	
2. Multigen Plus (multivitamin)			**Profile Medication**			**Continued Medication**
Route of Administration	Swallow, oral NCI: C38288 BY MOUTH, SNOMED: 26643006			*[OPT: Oral NCI FDA: C38288]*	*[OPT: SNOMED: 26643006]*	*[OPT: SNOMED: 26643006]*
Administration Timing Time Period	1 per DAY | SNOMED: 258703001			*[OPT: DAY | PIVL_TS period: 'd']*	*[OPT: DAY | SNOMED: 258703001]*	*[OPT: DAY | SNOMED: 258703001]*
Interactions or conflicts	None			*not supported*	*not supported*	
Quantity prescribed	120			120	*[OPT: 120]*	**90**
Coded quantity unit of measure	NCI Unit of Presentation: C48542 (tablet)	NCI Pharmaceutical Dosage Form: C42998 (tablet)		NCI pharmaceutical dosage form: C42998 (tablet)	*[OPT: NCI unit of presentation: C48542 (tablet)]*	**NCI Unit of Presentation: C448542**
Refills allowed	12			*[OPT: 1]*	*[OPT: 1]*	**12**
Prescribed date	4/1/2010			*[OPT: 2010-09-27+]*	*[OPT: 2010-09-27+]*	**2011-03-24T16:01:20**
Prescribing clinician	MICHAEL PETER BALZARY, NPI9999999, DEA999999, LIC99999	CORCORAN CLINIC, 500 SEVENTEENTH ST NW, WASHINGTON DC 20006 PH: 2026391800 FAX: 2026391800		*[OPT: MICHAEL PETER BALZARY …]*	*[OPT: MICHAEL PETER BALZARY …]*	**DR ANNA-KATHERINE HARTLEY NPI1010101** *[OPT: DEA101010, LIC101010, CORCORAN CLINIC]* **500 SEVENTEENTH ST NW, WASHINGTON DC 20006, PH | 2026391800** *[OPT: FAX | 2026391800]*
Administration start / end	2010-04-01 until instructed to stop			2010-04+	*[OPT: 2010-04+]*	*N/A*
Drug status (e.g., Active, on-hold, prior history / no longer active)	Active			Active	*[OPT: Active]*	*N/A*
Dispensed date	**2010-04-01, 2010-08-01, 2010-12-01**			*[OPT: 2010-04-01, 2010-08-01, 2010-12-01]*	*[OPT: 2010-04-01, 2010-08-01, 2010-12-01]*	*N/A*
Dispensing pharmacy	PHILLIPS PHARMACY NCPDP03 NPI3300330 DEA330033	1600 21ST ST NW WASHINGTON DC 20009-1090, PH: 2023872151X238 FAX: 2023872436		*[OPT: PHILLIPS PHARMACY]*	*[OPT: PHILLIPS PHARMACY]*	*N/A*
Quantity dispensed	120 each dispense			*[OPT: 120]*	*not supported*	*N/A*
Coded quantity unit of measure	NCI Unit of Presentation: C48542 (tablet)	NCI Pharmaceutical Dosage Form: C42998 (tablet)		*[NCI pharmaceutical dosage form: C42998 (tablet)]*	*not supported*	*N/A*

		Raw information content	NCPDP Med. History (RxHistoryResponse)	C32 CCD	ASTM CCR	
Scenario 2. Patient taking medications that can prescribed for different medical conditions--increasing the need for diagnosis / indication information			Claims-based medication history from the patient's insurance company	Patient's primary care physician through a state-based Health Information Exchange	Patient-maintained personal health record (PHR)	**NCPDP Census (LTPAC settings only)** Information forwarded to a long-term care pharmacy upon subsequent admission to a nursing facility
Patient profile						
	Problems, diagnoses	Migraine diagnosed 2009-12-20	SNOMED PLS: 37796009 Migraine ICD9: 346.0 Migraine with aura	*not supported*	Type: Disorder: SNOMED 64572001 **MIGRAINE** *[OPT: SNOMED: 37796009 | ICD9: 346.0*	*[OPT: Type: Disorder | CCR code: 'Condition '] **MIGRAINE** [OPT: SNOMED: 37796009 | ICD9: 346.0*	SNOMED PLS: 37796009 MIGRAINE Effective Date: 2009-12-20
		Depression diagnosed 2010-09-10	SNOMED PLS: 18818009 Moderate Recurrent Major Depression ICD9: 296.3 Major Depression, recurrent episode	*not supported*	Type: Disorder: SNOMED 64572001 **MODERATE RECURRENT MAJOR DEPRESSION** *[OPT: SNOMED: 18818009 | ICD9: 296.3]*	*[OPT: Type: Disorder | CCR code: 'Condition '] **MODERATE RECURRENT MAJOR DEPRESSION** [OPT: SNOMED: 18818009 | ICD9: 296.3]*	SNOMED: 18818009 MODERATE RECURRENT MAJOR DEPRESSION Effective Date: 2010-09-10
	Adverse Reactions	Food allergy. Agent: Peanut | UNII: QE1QX6B99R Identified 1952-01-02	Adverse Event: SNOMED: 414285001 Allergy to a food. Reaction: ANAPHYLAXIS SNOMED: 91941002 Severity: SNOMED 371924009 Moderate to Severe	*not supported*	**Type: INTOLERANCE TO A FOOD | SNOMED 414285001** Agent: UNII: QE1QX6B99R Reaction: SNOMED: 91941002 Anaphylaxis Severity: SNOMED 371924009 Moderate to severe	**Type: INTOLERANCE TO A FOOD | SNOMED 414285001** Agent: UNII: QE1QX6B99R Reaction: SNOMED: 91941002 Anaphylaxis Severity: SNOMED 371924009 Moderate to severe	SNOMED: 414285001 Allergy to a food. PEANUT | UNII Code: QE1QX6B99R Reaction: ANAPHYLAXIS SNOMED: 91941002 Severity: SNOMED 371924009 Moderate to Severe Effective Date: 1952-01-02

Medications				
1. Bupropion (brand: Budeprion)			**Profile Medication**	
Drug description	12 HR Bupropion Hydrochloride 100 MG Extended Release Tablet [Budeprion]	*Note: Bupropion is used as an antidepressant as well as for smoking cessation. This patient takes the medication as an antidepressant.*	*Drug details not illustrated in this scenario*	
Drug details not illustrated in this scenario				
2. Propranolol Hydrochloride (Inderal)			**Profile Medication**	
Drug description	Inderal 40MG Tablet	*Note: • Propranolol is used to treat hypertension, angina, tachycardia, migraines as well as some off label uses. This patient takes the medication as treatment for migraines*	*Drug details not illustrated in this scenario*	

H. Medication Content Excerpts

Below are excerpts showing the Scenario One drug, Vasotec (Enalapril Maleate) as represented in the Medication History, CCD, and CCR.

Medication History - Medication Content

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CCR - Medication Content

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C32 CCD - Medication Content

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      <high nullFlavor="UNK"/>
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    <!-- DOSE TIMING -->
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codeSystemName="NCI - FDA RouteOfAdministration">
…
      <translation code="PO" codeSystem="2.16.840.1.113883.5.112" codeSystemName="HL7
RouteOfAdministration" displayName="Swallow, oral"/>
    </routeCode>

    <!-- DOSE, UNITS OF ADMINISTRATION -->
    <doseQuantity value="1" unit="{TABLET}"/>

    <!-- DOSAGE FORM -->
    <administrationUnitCode code="C42998" displayName="Tablet"
codeSystem="2.16.840.1.113883.3.26.1.1" codeSystemName="NCI - FDA Dosage Forms">
…
    </administrationUnitCode>

    <consumable>
      <manufacturedProduct>
…
        <manufacturedMaterial>

          <!-- GENERIC -->
            <code code="858813" codeSystem="2.16.840.1.113883.6.88" displayName="Enalapril
Maleate 5 Mg Tablet" codeSystemName="RxNorm">
…
              <!-- BRAND NAME -->
              <translation code="224921" codeSystem="2.16.840.1.113883.6.88"
displayName="Vasotec" codeSystemName="RxNorm"/>
    <!—ORDER INFORMATION-->
          <!-- BRAND PRODUCT -->
            <translation code="00247057830" codeSystem="2.16.840.1.113883.6.69"
displayName="Vasotec 5 mg Tablet" codeSystemName="NDC"/>
          </code>
        </manufacturedMaterial>
      </manufacturedProduct>
    </consumable>

    <entryRelationship typeCode="REFR">
      <supply classCode="SPLY" moodCode="INT">
…
        <!-- REFILLS-->
        <repeatNumber value="2"/>

        <!—QUANTITY -->
        <quantity value="60" unit="{TABLET}"/>
        <author>

          <!—PRESCRIBED DATE -->
          <time value="20100927"/>
          <assignedAuthor>
            <id root="ProviderID"/>
            <addr/>
            <telecom/>
            <assignedPerson>
              <name>"MICHAEL PETER BALZARY"</name>
            </assignedPerson>
          </assignedAuthor>
        </author>
      </supply>
    </entryRelationship>
    <entryRelationship typeCode="REFR">

      <!-- STATUS -->
      <observation classCode="OBS" moodCode="EVN">
        <templateId root="2.16.840.1.113883.10.20.1.47"/>
        <code code="33999-4" displayName="Status" codeSystem="2.16.840.1.113883.6.1"
codeSystemName="LOINC"/>
        <value xsi:type="CE" displayName="Active" code="55561003"
codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT">
…
        </value>
      </observation>
    </entryRelationship>
  </substanceAdministration>
</entry>
```

I. Adverse Reaction Excerpts

Below are excerpts showing the Scenario Two adverse reactions as represented in the NCPDP Census, CCD, and CCR.

Census - Adverse Reactions

```
<Allergy>
  <NoKnownAllergies>N</NoKnownAllergies>
  <SourceOfInformation>C</SourceOfInformation>
  <EffectiveDate>
    <Date>1991-01-02</Date>
  </EffectiveDate>
  <AdverseEvent>
    <ItemDescriptionLong>FOOD ALLERGY</ItemDescriptionLong>
    <ItemNumber>414285001</ItemNumber>
    <CodeListQualifier>LD</CodeListQualifier>
  </AdverseEvent>
  <DrugProductCoded>
    <ItemDescriptionLong>PEANUT</ItemDescriptionLong>
    <ItemNumber>QE1QX6B99R</ItemNumber>
    <CodeListQualifier>UN</CodeListQualifier>
  </DrugProductCoded>
  <ReactionCoded>
    <ItemDescriptionLong>ANAPHYLAXIS</ItemDescriptionLong>
    <ItemNumber>91941002</ItemNumber>
    <CodeListQualifier>LD</CodeListQualifier>
  </ReactionCoded>
  <SeverityCoded>
    <ItemDescriptionLong>MODERATE TO
SEVERE</ItemDescriptionLong>
    <ItemNumber>371924009</ItemNumber>
    <CodeListQualifier>LD</CodeListQualifier>
  </SeverityCoded>
</Allergy>
```

CCR - Adverse Reactions

```
<Alerts>
  <Alert>
    <CCRDataObjectID>HnVGINV2vpU-0</CCRDataObjectID>
    <DateTime>
      <Type>
        <Text>Start date</Text>
      </Type>
      <ExactDateTime>1953</ExactDateTime>
    </DateTime>
    <Type>
      <Text>Intolerance</Text>
    </Type>
    <Description>
      <Text>Peanut</Text>
      <Code>
        <Value>QE1QX6B99R</Value>
        <CodingSystem>UNII</CodingSystem>
      </Code>
    </Description>
    <Status>
      <Text>Active</Text>
    </Status>
    <Source>
      <Actor>
        <ActorID>ProviderID</ActorID>
        <ActorRole>
          <Text>Provider</Text>
        </ActorRole>
      </Actor>
    </Source>
    <Reaction>
      <Description>
        <ObjectAttribute>
          <Attribute>Reaction</Attribute>
          <AttributeValue>
            <Value>Anaphylaxis</Value>
            <Code>
              <Value>91941002</Value>
              <CodingSystem>SNOMED
CT</CodingSystem>
              <Version>20090701</Version>
            </Code>
          </AttributeValue>
        </ObjectAttribute>
      </Description>
      <Severity>
        <Text>MODERATE TO SEVERE</Text>
        <Code>
          <Value>371924009</Value>
          <CodingSystem>SNOMED CT</CodingSystem>
          <Version>20090701</Version>
        </Code>
      </Severity>
    </Reaction>
  </Alert>
</Alerts>
```

C32 CCD - Adverse Reactions

```
<entry typeCode="DRIV">
   <act classCode="ACT" moodCode="EVN">
…
         <entryRelationship typeCode="SUBJ" inversionInd="false">
         <observation classCode="OBS" moodCode="EVN">

            <!-- TYPE OF ADVERSE REACTION -->
            <code code="414285001" codeSystem="2.16.840.1.113883.6.96" displayName="allergy to a
food" codeSystemName="SNOMED CT"/>
…
            <!—DATES PRESENT -->
            <effectiveTime>
               <low value="1952"/>
               <high nullFlavor="UNK"/>
            </effectiveTime>
…
            <!—CO-AGENT -->
            <value xsi:type="CD" code="QE1QX6B99R" codeSystem="2.16.840.1.113883.4.9"
displayName="peanut" codeSystemName="UNII">
…
            </value>
            <participant typeCode="CSM">
               <participantRole classCode="MANU">
…
                  <playingEntity classCode="MMAT">
                     <code code="QE1QX6B99R" codeSystem="2.16.840.1.113883.4.9"
displayName="peanut" codeSystemName="UNII">
…
                     </code>
                     <name>peanut</name>
                  </playingEntity>
               </participantRole>
            </participant>

         <!—REACTION -->
         <entryRelationship typeCode="MFST" inversionInd="true">
               <observation classCode="OBS" moodCode="EVN">
                  <templateId root="2.16.840.1.113883.10.20.1.54"/>
                  <code code="ASSERTION" codeSystem="2.16.840.1.113883.5.4"/>
                  <statusCode code="completed"/>
                  <value xsi:type="CD" code="91941002" codeSystem="2.16.840.1.113883.6.96"
displayName="anaphylaxis">
…
                  </value>
                        <!—SEVERITY -->
                        <entryRelationship typeCode="SUBJ">
                           <observation classCode="OBS" moodCode="EVN">
…
                              <code code="SEV" displayName="Severity" codeSystemName="HL7 ActCode"
codeSystem="2.16.840.1.113883.5.4"/>
…
                              <value xsi:type="CE" displayName="moderate to severe" code="371924009"
codeSystemName="SNOMED"
                              codeSystem="2.16.840.1.113883.6.96"/>
                           </observation>
                        </entryRelationship>
                     </observation>
                  </entryRelationship>

                  <!—STATUS -->
                  <entryRelationship typeCode="REFR">
                     <observation classCode="OBS" moodCode="EVN">
…
                        <code code="33999-4" codeSystem="2.16.840.1.113883.6.1" displayName="Status"/>
                        <statusCode code="completed"/>
                        <value xsi:type="CE" code="55561003" codeSystem="2.16.840.1.113883.6.96"
displayName="Active">
…
                        </value>
                     </observation>
                  </entryRelationship>
               </observation>
            </entryRelationship>
   </act>
</entry>
```

J. Problem Excerpts

Below are excerpts showing the Scenario Two problems / conditions as represented in the NCPDP Census, CCD, and CCR.

Census - Problems

```
<DiagnosisGeneral>
  <SourceOfInformation>C</SourceOfInformation>
  <EffectiveDate>
    <Date>2009-12-20</Date>
  </EffectiveDate>
  <ProblemType>
    <ItemDescriptionLong>DIAGNOSIS</ItemDescriptionLong>
    <ItemNumber>282291009</ItemNumber>
    <CodeListQualifier>LD</CodeListQualifier>
  </ProblemType>
  <ProblemNameCoded>
    <ItemDescriptionLong>MIGRAINE</ItemDescriptionLong>
    <ItemNumber>37796009</ItemNumber>
    <CodeListQualifier>LD</CodeListQualifier>
  </ProblemNameCoded>
</DiagnosisGeneral>
<DiagnosisGeneral>
  <SourceOfInformation>C</SourceOfInformation>
  <EffectiveDate>
    <Date>2010-09-10</Date>
  </EffectiveDate>
  <ProblemType>
    <ItemDescriptionLong>DIAGNOSIS</ItemDescriptionLong>
    <ItemNumber>282291009</ItemNumber>
    <CodeListQualifier>LD</CodeListQualifier>
  </ProblemType>
  <ProblemNameCoded>
    <ItemDescriptionLong>MODERATE RECURRENT MAJOR
DEPRESSION</ItemDescriptionLong>
    <ItemNumber>18818009</ItemNumber>
    <CodeListQualifier>LD</CodeListQualifier>
  </ProblemNameCoded>
</DiagnosisGeneral>
```

CCR - Problems

```
<Problems>
  <Problem>
    <CCRDataObjectID>QWP4gERwq.4-
0</CCRDataObjectID>
    <DateTime>
      <Type>
        <Text>Start date</Text>
      </Type>
      <ExactDateTime>2009-12-20</ExactDateTime>
    </DateTime>
    <Description>
      <Text>Migraine</Text>
      <Code>
        <Value>37796009</Value>
        <CodingSystem>SNOMED CT</CodingSystem>
        <Version>20090701</Version>
      </Code>
      <Code>
        <Value>346.0</Value>
        <CodingSystem>ICD9</CodingSystem>
      </Code>
    </Description>
    <Status>
      <Text>Active</Text>
    </Status>
    <Source>
      <Actor>
        <ActorID>ProviderID</ActorID>
        <ActorRole>
          <Text>Provider</Text>
        </ActorRole>
      </Actor>
    </Source>
  </Problem>
  <Problem>
    <CCRDataObjectID>Ev0tYUFXODA-0</CCRDataObjectID>
    <DateTime>
      <Type>
        <Text>Start date</Text>
      </Type>
      <ExactDateTime>2010-09-10</ExactDateTime>
    </DateTime>
    <Type>
      <Text>Condition</Text>
    </Type>
    <Description>
      <Text>Moderate Recurrent Major Depression</Text>
      <Code>
        <Value>18818009</Value>
        <CodingSystem>SNOMED CT</CodingSystem>
        <Version>20090701</Version>
      </Code>
      <Code>
        <Value>296.3</Value>
        <CodingSystem>ICD9</CodingSystem>
      </Code>
    </Description>
    <Status>
      <Text>Active</Text>
    </Status>
    <Source>
      <Actor>
        <ActorID>ProviderID</ActorID>
        <ActorRole>
          <Text>Provider</Text>
        </ActorRole>
      </Actor>
    </Source>
  </Problem>
</Problems>
```

C32 CCD - Problems

```
<entry typeCode="DRIV">
  <act classCode="ACT" moodCode="EVN">
…
    <!— PROBLEM TYPE -->
    <entryRelationship typeCode="SUBJ" inversionInd="false">
      <observation classCode="OBS" moodCode="EVN">
…
        <code code="64572001" displayName="Condition" codeSystem="2.16.840.1.113883.6.96"
codeSystemName="SNOMED-CT"/>
…
        <!— DATES PRESENT -->
        <statusCode code="completed"/>
        <effectiveTime>
          <low value="200912"/>
        </effectiveTime>

        <!— NAME -->
        <value xsi:type="CD" displayName="Migraine" code="37796009" codeSystemName="SNOMED-
CT" codeSystem="2.16.840.1.113883.6.96">
          <translation code="346.0" displayName="Migraine" codeSystem="2.16.840.1.113883.6.103"
codeSystemName="ICD-9-CM" />
        </value>
        <entryRelationship typeCode="REFR">
          <observation classCode="OBS" moodCode="EVN">
            <templateId root="2.16.840.1.113883.10.20.1.50"/>

            <!— STATUS -->
            <code code="33999-4" codeSystem="2.16.840.1.113883.6.1" displayName="Status"/>
            <statusCode code="completed"/>
            <value xsi:type="CE" code="55561003" codeSystem="2.16.840.1.113883.6.96"
displayName="Active">
…
            </value>
          </observation>
        </entryRelationship>
      </observation>
    </entryRelationship>
  </act>
</entry>
```

```
<entry typeCode="DRIV">
  <act classCode="ACT" moodCode="EVN">

    <!— PROBLEM TYPE -->
    <entryRelationship typeCode="SUBJ" inversionInd="false">
      <observation classCode="OBS" moodCode="EVN">
…
        <code displayName="Condition" code="64572001" codeSystemName="SNOMED-CT"
codeSystem="2.16.840.1.113883.6.96" />
…
        <!— DATES PRESENT -->
        <effectiveTime>
          <low value="201009"/>
          <high nullFlavor="UNK"/>
        </effectiveTime>

        <!— NAME -->
        <value xsi:type="CD" displayName="Moderate Recurrent Major Depression" code="18818009"
codeSystemName="SNOMED" codeSystem="2.16.840.1.113883.6.96">
          <translation code="296.3" displayName="Major Depression, recurrent episode"
codeSystem="2.16.840.1.113883.6.103" codeSystemName="ICD-9-CM" />
        </value>
        <entryRelationship typeCode="REFR">
          <observation classCode="OBS" moodCode="EVN">
            <templateId root="2.16.840.1.113883.10.20.1.50"/>

            <!— STATUS -->
            <code code="33999-4" codeSystem="2.16.840.1.113883.6.1" displayName="Status"/>
            <statusCode code="completed"/>
            <value xsi:type="CE" code="55561003" codeSystem="2.16.840.1.113883.6.96"
displayName="Active">
…
            </value>
          </observation>
        </entryRelationship>
      </observation>
    </entryRelationship>
  </act>
</entry>
```

K. Detailed Comparison: Compatibility of Coded Values and Terminology

Below is a detailed comparison of coded medication, adverse reaction, and problem content across the three standards reviewed. *Findings are presented in the following section.*

Terminology comparison
Medication and related concepts: NCPDP SCRIPT, C32 CCD, ASTM CCR

		SCRIPT				CCD			CCR		
Concept	**Example**	**Coded Term Element**	**Opt**	**Current Industry Use**	**Terminology**	**Coded Term Element**	**Opt of code**	**Terminology**	**Coded Term Element**	**Opt of code**	**Terminology**
Drug Product and Prescribed / Dispensed Qty											
Medication Product	NDC, RxNorm code	DrugCoded: **DrugDBCode /** DrugDBCodeQualifier	O	**NewRx:** Required for MU, containing RxNorm code **MedHistory, FillStatus:** Uncommon to include drug codes beyond the dispensed NDC. RxNorm will be adopted over time but is not mandated by MU for these messages today	**NewRx:** RxNorm and RxNorm sources (per MU restrictions) **MedHistory, FillStatus:** RxNorm and others including proprietary drug databases	**Product name:** *[substanceAdministration]...* cda:manufactured Material/cda:code/@code	R if known	**RxNorm** (and RxNorm sources per MU restrictions) **NDF-RT** NUI if only the drug class is known (concept types of "Mechanism of Action - N0000000223", "Physiologic Effect - N0000009802" or "Chemical Structure - N0000000002") **UNII** if only the ingredient is known	Medications: Medication: Product: ProductName: Code	R	RxNorm (and RxNorm sources per MU restrictions). Products and agents should be coded with RxNorm to as granular a level as possible+P7
Commercial Product, Brand Name	RxNorm code, NDC	DrugCoded: **ProductCode /** ProductCodeQualifier	O	**MedHistory:** Nearly always in dispensed med **NewRx:** Always **FillStatus:** Always in dispensed med **Census:** n/a (drug info not in msg)	NDC11 of generic or brand product, as prescribed (NewRx, FillStatus) or dispensed (MedHistory, FillStatus)	**Brand name:** *[substanceAdministration]...[manufacturedMaterial]...* cda:translation/@code	R if known	RxNorm, NDC (10-digit)	Medications: Medication: Product: BrandName: Code	O	RxNorm, NDC (10-digit) In addition [to RxNorm, products] may be coded with another standard as applicable (NDC, for example) or proprietary code, with the type of code and the source and version clearly defined. If any coding system is used, however, an RxNorm code must be included, if legally required.
Dosage Form	Capsule, tablet, suspension, inhaler	FormSourceCode / FormCode *See also: Structured Sig:* DoseFormCodeQualifier / DoseFormCode	O	**MedHistory, NewRx, FillStatus.** To be seen. (Element is new in SCRIPT 10.6)	NCI NCPDP StrengthForm (NCI subset code C89508). Subset of NCI FDA Pharmaceutical Dosage Form: C42636. Corresponds to the SPL Pharmaceutical Dosage Form (NCI subset C54456), with some omissions	*[substanceAdministration]...* cda:administration UnitCode/@code	O	NCI concept code for pharmaceutical dosage form: C42636	Medications: Medication: Product: Form: Code	O	[No terminology cited specifically for this element. SNOMED cited generally as a preferred code source]

			SCRIPT				CCD			CCR		
	Concept	Example	Coded Term Element	Opt	Current Industry Use	Terminology	Coded Term Element	Opt of code	Terminology	Coded Term Element	Opt of code	Terminology
	Strength Unit of Measure	Milligram, gram, curie, milligram per 5 milliliters	StrengthSourceCode / StrengthCode	O	**MedHistory, NewRx, FillStatus.** To be seen. (Element is new in SCRIPT 10.6)	NCI NCPDP Strength Unit of Measure (NCI subset code 89509). Corresponds to the SPL Potency Terminology (NCI subset C54458) but lacking some SPL codes and containing codes not in SPL	*None - not specified*	*n/a*	*Product strength (Concentration) is inferred from the product code* *[See* Dose Unit of Administration *below for administration units of measure]*	Medications: Medication: Product: Strength: Code OR Medications: Medication: Product: Concentration: Code (e.g., 250mg/ml)	O	Product strength is optional. Can be inferred from the product code [No terminology cited specifically for this element. SNOMED cited generally as a preferred code source]
	Medication type	Prescription, Over-the-counter	*Not supported*	-	*In all SCRIPT messages, medication type (prescription versus over-the-counter) is derived from the drug name/code*	*n/a*	*[substanceAdministration]...* cda:entryRelationship[@typeCode='REFR']/ cda:observation[cda:templateId/@root='2.16.840.1.113883.10.20.1.47']/ cda:value/@code	R if known	*Product strength (Concentration) is inferred from the product code* *[See* Dose Unit of Administration *below for administration units of measure]*	*Not supported (Note: The Medication: Type element suggested values are not Rx versus OTC, but instead: medication, IV fluid, parental nutrition, etc.)*	-	*Derived from the drug name/code*
	Ordered Quantity Unit of Measure	Capsule, package, packet, tablet, ounce	Quantity: UnitSourceCode / PotencyUnitCode	R	**NewRx:** Required by SCRIPT 10.6 **MedHistory, FillStatus:** To be seen (element is new in 10.6)	NCI NCPDP Quantity Unit of Measure (NCI subset code 89510). Corresponds primarily to the SPL Unit of Presentation (NCI C87300) but lacks some of those values. Also includes terms in SPL Potency (subset C54458) and Unit Of Measure (subset C92951) terminologies.	*[substanceAdministration]... [REFR:supply]...* cda:quantity	R if known Coded units if differ from admin units	NCI pharmaceutical dosage form: C42636 If **other (liquid, mass):** UCUM *Inconsistency note: The C83 C83-[DE-8.26-CDA-4] and C80 2.2.3.3.3 constraints refer to "units of presentation", but specify instead the NCI C42636 pharmaceutical dosage form terminology*	Medications: Medication: Quantity: Units: Code	O	[No terminology cited specifically for this element. SNOMED cited generally as a preferred code source]
	Medication Status	Active	*Not supported*	-	*In the Medication History and Fill Status messages, status is inferred based on dispense dates for the medication.*	*n/a*	*[substanceAdministration]...* cda:entryRelationship[@typeCode='REFR']/ cda:observation[cda:templateId/@root='2.16.840.1.113883.10.20.1.47']/ cda:value/@code	R if known	No specific guidance on values / value set in C80, C83 IHE PCC Technical Framework Vol. 2 Rev 5.0 or CCD 1.0 Imp Guide. To be based on CCR values	Medications: Medication: Status: Text	O	From IG: Active, On Hold, Prior History No Longer Active

	Concept	Example	SCRIPT Coded Term Element	Opt	Current Industry Use	Terminology	CCD Coded Term Element	Opt of code	Terminology	CCR Coded Term Element	Opt of code	Terminology
	Interactions considered	Drug/drug, drug/dose	Type of interaction: <Service ReasonCode> Prescriber's response: <ProfessionalService Code> / <Service ResultCode> / <Acknowledgment Reason> CoAgent: <CoAgentID> / <CoAgentQualifier> Severity: <Clinical SignificanceCode>	O	**NewRx:** Optional element new in SCRIPT 10.6. Future adoption level is unknown	CoAgent: RxNorm Other: Proprietary NCPDP code values	*Not suppported*	O	*It does not appear that the standard enables capturing of potential interactions considered during the prescribing process (drug/drug, drug/adverse reaction, drug/dose, etc.)* *The HITSP Interaction (8.23 - templateID 2.16.840.1.113883.10.20.1.54) conveys actual reactions occuring after patient started the medication*	*Unknown. Appears to not be supported*	-	*n/a*
Medication Administration					**Usage note: T**he SCRIPT Structured Sig segment is in trial use. Future adoption level is unknown							
	Free Text Directions	Take 1 tablet daily	Directions	R	**MedHistory, NewRx, FillStatus:** Required in SCRIPT 10.6		*[substanceAdministration]…* cda:text	O	n/a	Medications: Medication: Directions: Direction: Description: Text	O	n/a
	Delivery Method	Take, apply	Structured Sig: DoseDeliveryMethod Code / DoseDeliveryMethod CodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*[substanceAdministration]…* cda:code/@code	O	*Vocabulary not defined pending completion of NCPDP Structured Sig piloting.*	Medications: Medication: Directions: Direction: DeliveryMethod: Code	O	Per CCR IG: "codes and content to follow NCPCP Script SIG standard" [Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Delivery Method Modifier	Gently, repeatedly	Structured Sig: DoseDeliveryMethod ModifierCode / DoseDeliveryMethod ModifierCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*Concept not directly supported in C32 CCD.*	n/a	*Coded value: n/a Potentially could include textual form in the free text description of delivery method.*	*Not supported*	-	*n/a*

			SCRIPT				CCD			CCR		
	Concept	Example	Coded Term Element	Opt	Current Industry Use	Terminology	Coded Term Element	Opt of code	Terminology	Coded Term Element	Opt of code	Terminology
	Dose Unit of Administration	Tablet, puff	Structured Sig: DoseFormCode / DoseFormCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI NCPDP StrengthForm, as specified for the FormCode element, above	*[substanceAdministration]…* cda:doseQuantity	O	If ordered in **administration units:** NCI Units of Presentation… name, rather than code value, in brackets--e.g., {Tablet}. If **other (liquid, mass):** UCUM	Medications: Medication: Directions: Direction: Dose: Units: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Maximum Dose Unit of Administration	Tablet, puff	Structured Sig: MaximumDoseRestrictionUnitsCode / MaximumDoseRestrictionCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI NCPDP StrengthForm, as specified for the FormCode element, above	*[substanceAdministration]…* cda:maxDoseQuantity	O	*see above*	Medications: Medication: Directions: Direction: DoseRestriction: Dose: Units: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Route of Administration	Oral, topical	Structured Sig: RouteOfAdministrationCode / RouteOfAdministrationCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI FDA RouteOfAdministration terminology)	*[substanceAdministration]…* cda:routeCode/@code	O	NCI FDA RouteOfAdministration terminology. (NCI concept code for route of administration: C38114)	Medications: Medication: Directions: Direction: Route: Code	O	IG give latin abbreviations (e.g., "po" for "by mouth") [Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Site of Administration	Each cheek, affected area	Structured Sig: SiteofAdministrationCode / SiteofAdministrationCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*[substanceAdministration]…* cda:approachSiteCode/@code	O	Value descending from the SNOMED CT® Anatomical Structure (91723000) hierarchy or Acquired body structure (body structure) (280115004) or Anatomical site notations for tumor staging (body structure) (258331007) or Body structure, altered from its original anatomical structure (morphologic abnormality) (118956008) or Physical anatomical entity (body structure) (91722005)	Medications: Medication: Directions: Direction: Site: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]

			SCRIPT				CCD			CCR		
	Concept	Example	Coded Term Element	Opt	Current Industry Use	Terminology	Coded Term Element	Opt of code	Terminology	Coded Term Element	Opt of code	Terminology
	Administration Timing (descriptive or based on activities of daily living)	Every morning, every evening	Structured Sig: AdministrationTiming Code / AdministrationTiming CodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*[substanceAdministration]…* cda:effectiveTime [2]	O	HL7 TimingEvent vocabulary	Medications: Medication: AdministrationTiming: ApproximateDateTime: Code	O	*Imp. Guide indicates that this element contains text only. However, a Code element is present. Intent is unclear.* [Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Frequency Time Period	Day, week (e.g., "day" in frequency of "2 times per day")	Structured Sig: FrequencyUnitsCode / FrequencyUnitsCode Qualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*[substanceAdministration]…* cda:effectiveTime [2]	O	PIVL_TS definition includes: “Legal values for the unit attribute of <period> are s, min, h, d, wk and mo. Frequency admin timing has institutionSpecified attribute value of "true"	Medications: Medication: Directions: Direction: Frequency: Units: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Interval Time Period	Day, hour (e.g., "hour" in interval of "every 3 hours")	Structured Sig: IntervalUnitsCode / IntervalUnitsCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*[substanceAdministration]…* cda:effectiveTime [2]	O	PIVL_TS definition includes: “Legal values for the unit attribute of <period> are s, min, h, d, wk and mo. Interval admin timing has institutionSpecified attribute value of "false"	Medications: Medication: Directions: Direction: Interval: Units: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Duration Period	Week, month (e.g., "week" in "apply to affected area as needed for up to one week then stop"	Structured Sig: DurationTextCode / DurationTextCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*[substanceAdministration]…* cda:effectiveTime [2]	O	The <width> element represents the duration of the dose administration (e.g., for IV administration). Utilizes the HL7 PIVL_TS data type / code values	Medications: Medication: Directions: Direction: Duration: Units: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Rate of Administration	Seconds, minutes, days	Structured Sig: RateUnitofMeasureCode / RateUnitofMeasureCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*[substanceAdministration]…* cda:effectiveTime [2]	O	The rate is specified in the <rateQuantity> element. Time unit (s, min, h or d). (IHE Patient Care Coordination Technical Framework Volume 2 Rev 5.0)	Medications: Medication: Directions: Direction: Dose: Rate: Units: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
	Calculated Dose Time Period	Day, hour (e.g., "day" in a dose calculated as mg / kg / day)	Structured Sig: TimePeriodBasisCode / TimePeriodBasisCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. Allowed: FMT (particular terminology not specified. Presume NCI)	*Code set / values unknown*	-	*No specific guidance on time unit in C80, C83 IHE PCC Technical Framework Vol. 2 Rev 5.0. PIVL_TS limited to s, min, h, d, wk, mo… which is insufficient (e.g., omits Year, Lifetime)*	Medications: Medication: Directions: Direction: DoseCalculation: Rate: Units: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]

		SCRIPT				CCD			CCR		
Concept	Example	Coded Term Element	Opt	Current Industry Use	Terminology	Coded Term Element	Opt of code	Terminology	Coded Term Element	Opt of code	Terminology
Maximum Dose Time Period	Day, week (e.g., "day" in "not to exceed 3 per day")	Structured Sig: MaximumDoseRestrictionVariableUnitsCode / MaximumDoseRestrictionVariableUnitsCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*Code set / values unknown*	-	*No specific guidance on time unit in C80, C83 IHE PCC Technical Framework Vol. 2 Rev 5.0. PIVL_TS limited to s, min, h, d, wk, mo… which is insufficient (e.g., omits Year, Lifetime)*	Medications: Medication: DoseRestriction: Variable: Units: Code	O	[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]
Indication for medication use				**Usage note: T**he SCRIPT Structured Sig segment is in trial use. Future adoption level is unknown							
Indication Precursor Text	"As needed for", "as directed for", "when"	Structured Sig: IndicationPrecursorCode / IndicationPrecursorCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*Unkown whether supported*	-	*No guidance in C80, C83 IHE PCC Technical Framework Vol. 2 Rev 5.0*	*Not supported*	-	*n/a*
Indication for medication administration (optionally in conjunction with an observation)	"headache", "blood pressure", "finger stick blood glucose", "after feeding"	Structured Sig: IndicationTextCode / IndicationTextCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT (particular terminology not specified. Presume NCI)	*[substanceAdministration]…* cda:entryRelationship[@typeCode='RSON']/ cda:observation[cda:templateId/@root = '2.16.840.1.113883.10.20.1.28']	O	SNOMED CT, limited by HITSP to terms decending from the Clinical Findings (404684003) or Situation with Explicit Context (243796009) hierarchies	Medications: Medication: Directions: Direction: Indication: Problem: Description: Code	O	SNOMED CT recommended. ICD-9, 10 allowed. *Recommended that, when possible, all problems be coded (ICD-9CM, ICD-10, and/or SNOMED)... Section A2.3.4.1 Problems should be coded at the highest level using SNOMED CT and the most recent ICD-9 CM codes at the time the CCR is generated. ... It is recommended that problems be categorized with SNOMED CT codes to as granular a level as possible*
Indication value unit of measure	blood glucose of ___ mg/dL	Structured Sig: IndicationValueUnitofMeasureCode / IndicationValueUnitofMeasureCodeQualifier	O	**MedHistory, NewRx, FillStatus.** *See usage note above*	Recommended: SNOMED CT. No constraints specified. Allowed: FMT **Note: inconsistent with SCRIPT element, Observation MeasurementUnitCode, which only allows FMT / NCI MeasurementUnit terms	*Unkown whether supported*	-	*No guidance in C80, C83 IHE PCC Technical Framework Vol. 2 Rev 5.0*	Medications: Medication: Directions: Direction: Indication: PhysiologicalParameter: Units: Code	O	[No terminology cited specifically for this element. SNOMED cited generally as a preferred code source]

			SCRIPT				CCD			CCR		
	Concept	Example	Coded Term Element	Opt	Current Industry Use	Terminology	Coded Term Element	Opt of code	Terminology	Coded Term Element	Opt of code	Terminology
Adverse Reaction					**Usage note:** The SCRIPT Allergy segment is only in the Census message, which is in limited use in LTPAC settings only							
	Type of allergy or adverse event	drug allergy, food intolerance	Allergy: AdverseEvent: ItemNumber	O*	**Census.** *See usage note above* * Element required if "no known allergies" is not specified	Set of SNOMED CT values defined in HITSP C80 Table 2-86 *Allergy / Adverse Event Type Value Set Definition*	*[allergy / drug sensitivity observation]…* cda:code/@code	R	Set of SNOMED CT values defined in HITSP C80 Table 2-86 *Allergy / Adverse Event Type Value Set Definition*	Alerts: Alert: Type: Text	O	Must be one of the defined structured text values: Allergy, Adverse Reaction, Alert, Critical Result
	Medication product	penicillin	Allergy: DrugProductCoded: ItemNumber	O	**Census.** *See usage note above*	RxNorm, representative NDC11, UPC, or Mfr. Code	*[allergy / drug sensitivity observation]… cda:participant[@typeCode='CSM']/* cda:code/@code	R if known	**RxNorm** (and RxNorm sources per MU restrictions)	Alerts: Alert: Agent: Products: Product: ProductName: Code	O	RxNorm. Optionally: NDC or other proprietary code. *A2.3.4.3 Products and agents should be coded with RxNorm to as granular a level as possible. In addition, they may be coded with another standard as applicable (NDC, for example) or proprietary code. .. If any coding system is used, however, an RxNorm code must be included, if legally required.*
	Drug class	ACE inhibitors	Allergy: DrugProductCoded: ItemNumber	O	**Census.** *See usage note above*	NDF-RT	*[allergy / drug sensitivity observation]… cda:participant[@typeCode='CSM']/* cda:code/@code	R if known	**NDF-RT NUI** if only the drug class is known (concept types of "Mechanism of Action - N0000000223", "Physiologic Effect - N0000009802" or "Chemical Structure - N0000000002")	Alerts: Alert: Agent: Products: Product: ProductName: Code	O	[Terminology for drug class not specified. RxNorm cited for other medication concepts]
	Food	peanut	Allergy: DrugProductCoded: ItemNumber	O	**Census.** *See usage note above*	UNII	*[allergy / drug sensitivity observation]… cda:participant[@typeCode='CSM']/* cda:code/@code	R if known	**UNII** if only the ingredient is known	Alerts: Alert: Agent: EnvironmentalAgent: Description: Code	O	[Terminology for environmental agents not specified.]

			SCRIPT				CCD			CCR		
	Concept	Example	Coded Term Element	Opt	Current Industry Use	Terminology	Coded Term Element	Opt of code	Terminology	Coded Term Element	Opt of code	Terminology
	Reaction	hives	Allergy: ReactionCoded: ItemNumber	O	**Census.** *See usage note above*	Values are a subset of those defined in HITSP C80 (v2.01) 2.2.3.4.2 Allergy / Adverse Event Type. Specifically, only Clinical Findings (concepts descending from 404684003) are allowed, and not concepts descending from Situation with Explicit Context (243796009). *** Note: variance due to SCRIPT's use of initial VA/KP problem list definition*	*[allergy / drug sensitivity observation]…* cda:entryRelationship[@typeCode='MFST']/ cda:observation[templateId/@root='2.16.840.1.113883.10.20.1.54'] cda:value/@code	R if known	SNOMED CT limited by HITSP to terms descending from the Clinical Findings (404684003) or Situation with Explicit Context (243796009) hierarchies	Alerts: Alert: Reaction: Description: Code	O	Can be a string or can be used to encode the reaction (recommended/preferred). .. It is recommended that, when possible, all instances of <Alert> be coded with SNOMED CT
	Reaction Severity	Severe, mild	Allergy: SeverityCoded: ItemNumber	O	**Census.** *See usage note above*	Values conform to HITSP C80 2.2.3.1.6 Table 2-67 Problem Severity set	*[allergy / drug sensitivity observation]…* cda:entryRelationship[@typeCode='SUBJ']/ cda:observation[templateId/@root='2.16.840.1.113883.10.20.1.55'] cda:value/@code	R if known	SNOMED CT limited by HITSP to the value set in C80 2.2.3.1.6 Table 2-67 Problem Severity Value Set Definition. These terms descend from the severities (272141005) concept	Alerts: Alert: Reaction: Severity: Text	O	Restricted content that must be one of the defined structured text values. Minimal, Mild, Moderate, Severe, Life Threatening, Critical.

			SCRIPT				CCD			CCR		
	Concept	Example	Coded Term Element	Opt	Current Industry Use	Terminology	Coded Term Element	Opt of code	Terminology	Coded Term Element	Opt of code	Terminology
Problem					**Usage note: T**he SCRIPT Diagnosis segment is only in the Census message, which is in limited use in LTPAC settings only							
	Problem type	finding, symptom, problem	Diagnosis: ProblemType: ItemNumber	O	**Census.** *See usage note above*	Values conform to HITSP C80 2.2.3.1.2 Table 2-60 Problem Type Value Set Definition	*[Condition observation]…* cda:code/@code	R if known	SNOMED CT limited by HITSP to the value set in C80 2.2.3.1.2 Table 2-60 Problem Type Value Set Definition	Problems: Problem: Type: Text	O	Must be one of the defined structured text values. Problem, Condition, Diagnosis, Symptom, Finding, Complaint, Functional Limitation
	Problem name	hypertension, migraine	Diagnosis: ProblemNameCoded: ItemNumber	O*	**Census.** *See usage note above* * Element required if Diagnosis segment is used	Values are a subset of those defined in HITSP C80 (v2.01) 2.2.3.1.1 Problem Value Set. Specifically, only Clinical Findings (concepts descending from 404684003) are allowed, and not concepts descending from Situation with Explicit Context (243796009). ** Note: variance due to SCRIPT's use of initial VA/KP problem list definition ICD-9 and ICD-10 also allowed.	*[Condition observation]…* cda:value/@code	O	SNOMED CT limited by HITSP to terms decending from the Clinical Findings (404684003) or Situation with Explicit Context (243796009) hierarchies. Meaningful Use rules also allow ICD-9 and ICD-10.	Problems: Problem: Description: Code	O	SNOMED CT recommended. ICD-9, 10 allowed. *Recommended that, when possible, all problems be coded (ICD-9CM, ICD-10, and/or SNOMED)... Section A2.3.4.1 Problems should be coded at the high-est level using SNOMED CT and the most recent ICD-9 CM codes at the time the CCR is generated. ... It is recommended that problems be categorized with SNOMED CT codes to as granular a level as possible*
	Problem status	active, resolved	*Not supported*	-	In the Census message, status is inferred from problem effectiveDate (start) and expirationDate (end) values	n/a	*[Condition observation]…* cda:entryRelationship/cda:observation [cda:templateId/@root = '2.16.840.1.113883.10.20.1.50']/ value/@code	O	SNOMED Code from C80 2.2.3.1.8 Table 2-70 Problem Status Value Set Definition (active, inactive, resolved)	Problems: Problem: Status: Text	O	Must be one of the defined structured text values: Active, Inactive, Chronic, Intermittent, Recurrent, Rule Out, Ruled Out, Resolved

L. Comparison Findings – Compatibility of Coded Content and Terminology

The analysis found points of consistency and difference in coded content and terminology used in the three standards. Below is a summary of those findings.

Drug Product and Prescribed / Dispensed Qty

Medication Product

E.g., NDC, RxNorm code

Compatibility: ***CCD and CCR same for drug products; Med History differs. CCD and CCR differ for drug classes and ingredients***

> **Drug products:** CCD, CCR and New Prescription: RxNorm required by Meaningful Use rules. Medication History is not covered by MU, however, and RxNorm is not typically used. Rather, the NDC of the dispensed medication is used.
>
> **Drug classes and ingredients:** The CCD and CCR may include a drug class or ingredient rather than specific drug product in a patient's history (e.g., if the specific product isn't known). The CCD directs use of NDF-RT and UNII, respectively in such cases, whereas the CCR doesn't specify terminologies. (A drug class would not be reported in a Medication History, which only conveys specific dispensed products.)

Commercial Product, Brand Name

E.g., RxNorm code, NDC

Compatible (though implementers need to convert between NDC10 and NDC11 formats)

> All reviewed standards enable particular commercial products to be identified using the National Drug Code (NDC). However, the NDC is a secondary identifier in the CCD and CCR after RxNorm, and then used to specify a particular brand as an addition attribute of a medication already specified using RxNorm.
>
> The NCPDP SCRIPT messages have traditionally used the NDC to represent both specific brand products as well commercially-available generic medication concepts. Where not required by MU to use RxNorm, the SCRIPT messages continue to use NDC to represent both concepts.
>
> The NDC format differs between the SCRIPT, CCD and CCR standards (NDC11 for SCRIPT and NDC10 in the others). That difference can be resolved by converting between formats if segment dashes are included in the NDC10 values.

Dosage Form

E.g., Capsule, tablet, suspension, inhaler

CCD, Med History and CCR: When present, terminology is compatible

> Both the CCD and SCRIPT standards use National Cancer Institute code sets to represent dosage forms, though with some differences. The C32 CCD limits values to the NCI pharmaceutical dosage form terminology (C42636), whereas NCI provides a subset of those terms for use in SCRIPT. However, NCPDP allows implementers to use additional NCI values not contained in the subset.

The CCR does not specify a terminology, but supports the terms used in the CCD and Med History.

Strength Unit of Measure

E.g., Milligram, gram, curie, milligram per 5 milliliters

Not directly comparable between CCD, CCR, and Med History. Optional in all, with different coding

The strength or concentration of a medication can be conveyed in the drug description / code in combination with other medication attributes (drug name, dose form) in all standards. It can be stated separately in the SCRIPT and CCR standards, but is optional in both and a specific terminology is not cited for the CCR.

Medication type

E.g., Prescription, Over-the-counter

Only supported by the CCD

Only the CCD has an element dedicated to specifying whether a product requires a prescription or is available over the counter. In the other standards, this characteristic of the medication product is determined based on the drug name and/or code, using third-party data sources.

Ordered Quantity Unit of Measure

E.g., Capsule, package, packet, tablet, ounce

C32 CCD and NCPDP Med History / CCR use different NCI FDA terminologies. CCD includes the Pharmaceutical Dosage Form name only (rather than the code value)

The Medication History (and CCR by reference) use a subset of the NCI Unit of Presentation terminology (C87300) whereas the C32 CCD uses the NCI Pharmaceutical Dosage Form terminology (C42636).

Note that for dose units of administration, the situation is reversed, with the C32 CCD using units of presentation and Medication History / CCR using pharmaceutical dosage form.

Medication Status

E.g., Active

Not supported by the Medication History message

The CCD and CCR enable a patient medication to be identified as active, inactive, etc. The CCR uses proprietary values for this element, and the CCD indicates an intent to base its value set on the CCR's. Recipients of the NCPDP Medication History must infer whether the patient is actively taking a medication based on its dispense history.

Interactions considered

E.g., Drug/drug, drug/dose

Only supported by the NCPDP SCRIPT New Prescription message

The SCRIPT New Prescription message can convey information about potential drug conflicts considered during the ordering process, as well as the practitioner's rationale for ultimately prescribing the drug. This information is to be used by the pharmacist when he/she performs their own drug utilization review prior to dispensing.

Medication Administration

Free Text Directions

E.g., Take 1 tablet daily

Free text directions ("sig") are mandatory only in the SCRIPT messages

> Free text directions are required in the SCRIPT Medication History, New Prescription, Fill Status and other messages. The individual administration components (dose, timing, etc.) are optional in all three standards reviewed.

Delivery Method

E.g., Take, apply

Optional in all reviewed standards. Consistent terminology

> The terminology for this element in all reviewed standards is to be directed by the NCPDP Structured Sig standard. The current Structured Sig implementation guide (v1.1) cites SNOMED CT as the recommended terminology.

Delivery Method Modifier

E.g., Gently, repeatedly

Only supported in the SCRIPT standard

> This element is only present in the SCRIPT standard's Structured Sig element. However, the CCR standard indicates an intent to be consistent with the Structured Sig standard (and the CCD would presumably reflect the CCR data elements). It can be presumed that this element will eventually be incorporated into future versions of the CCR and CCD standards.

Dose Unit of Administration

E.g., Tablet, puff

C32 CCD and NCPDP Med History / CCR use different NCI FDA terminologies. CCD includes the Unit of Presentation name only (rather than the code value)

> The Medication History (and CCR by reference) use a subset of the NCI Pharmaceutical Dosage Form terminology (C42636), whereas the C32 CCD uses the NCI Unit of Presentation terminology (C87300). Note that for ordered quantity, the situation is reversed, with the C32 CCD using pharmaceutical dosage form and Medication History / CCR using units of presentation.

Maximum Dose Unit of Administration

E.g., Tablet, puff

C32 CCD and NCPDP Med History / CCR use different NCI FDA terminologies. CCD includes the Unit of Presentation name only (rather than the code value)

> *See Dose Unit of Administration comment, above.*

Route of Administration

E.g., Oral, topical

Different terminologies used

The NCPDP Medication History (and the CCR, which refers to NCPDP Structured Sig) use SNOMED CT, and the C32 CCD uses NCI FDA.

Site of Administration
E.g., Each cheek, affected area
Optional in all reviewed standards. Roughly consistent terminology

SNOMED CT is the terminology for this element in all reviewed standards; however, the allowed set of SNOMED CT codes is restricted further in the C32 CCD than in the NCPDP or CCR standards.

Administration Timing (descriptive or based on activities of daily living)
E.g., Every morning, every evening
Different terminologies used

The NCPDP standard (and the CCR, which refers to NCPDP Structured Sig) use SNOMED CT, and the C32 CCD uses a proprietary HL7 code set.

Frequency Time Period
E.g., Day, week (e.g., "day" in frequency of "2 times per day")
Different terminologies used

The NCPDP standard (and the CCR, which refers to NCPDP Structured Sig) use SNOMED CT, and the C32 CCD uses a proprietary HL7 code set.

Interval Time Period
E.g., Day, hour (e.g., "hour" in interval of "every 3 hours")
Different terminologies used

The NCPDP standard (and the CCR, which refers to NCPDP Structured Sig) use SNOMED CT, and the C32 CCD uses a proprietary HL7 code set.

Duration Period
E.g., Week, month (e.g., "week" in "apply to affected area as needed for up to one week then stop"
Different terminologies used

The NCPDP standard (and the CCR, which refers to NCPDP Structured Sig) use SNOMED CT, and the C32 CCD uses a proprietary HL7 code set.

Rate of Administration
E.g., Seconds, minutes, days
Different terminologies used

The NCPDP standard (and the CCR, which refers to NCPDP Structured Sig) use SNOMED CT, and the C32 CCD uses a proprietary HL7 code set.

Calculated Dose Time Period
E.g., Day, hour (e.g., "day" in a dose calculated as mg / kg / day)
Different terminologies used

> The NCPDP standard (and the CCR, which refers to NCPDP Structured Sig) use SNOMED CT, and the C32 CCD uses a proprietary HL7 code set.

Maximum Dose Time Period
E.g., Day, week (e.g., "day" in "not to exceed 3 per day")
Different terminologies used

> The NCPDP standard (and the CCR, which refers to NCPDP Structured Sig) use SNOMED CT, and the C32 CCD uses a proprietary HL7 code set.

Indication for medication use

Indication Precursor Text
E.g., "As needed for", "as directed for", "when"
Only supported in the SCRIPT standard

> This element is only present in the SCRIPT standard's Structured Sig element. However, the CCR standard indicates an intent to be consistent with the Structured Sig standard (and the CCD would presumably reflect the CCR data elements). It can be presumed that this element will eventually be incorporated into future versions of the CCR and CCD standards.

Indication for medication administration (optionally in conjunction with an observation)
E.g., "headache", "blood pressure", "finger stick blood glucose", "after feeding"
Optional in all reviewed standards. Roughly consistent terminology

> SNOMED CT is the recommended terminology for this element in all reviewed standards (with ICD-9 and ICD-10 also allowed). However, the allowed set of SNOMED CT codes is restricted further in the C32 CCD than in the NCPDP or CCR standards.

Indication value unit of measure
E.g., blood glucose of ___ mg/dL
Optional in all reviewed standards. Non-specific guidance in all. Internal SCRIPT inconsistency

> The guidance for terminology in this element is not specific in any of the reviewed standards. In addition, the SCRIPT standard contains terminology inconsistencies between elements in different parts of the standard that could represent this concept.

Adverse Reaction

Type of allergy or adverse event
E.g., drug allergy, food intolerance

Differences in optionaity and terminology

This element is required in the CCD and SCRIPT Census message, but is optional in the CCR. The terminologies to be used in the SCRIPT message and CCD are the same (a HITSP-defined SNOMED CT subset), but the CCR uses a proprietary set of text values.

Medication product

E.g., penicillin

Optional in all reviewed standards. Roughly consistent terminology

The element is effectively optional in all reviewed standards ("required if known" in the CCD). RxNorm is the preferred terminology due to Meaningful Use rules (though not all SCRIPT messages are covered currently by MU). SCRIPT allows additional code sets--representative NDC, manufacturer code and UPC--though RxNorm is recommended, and the manufacturer code and UPC are not used in the industry.

Drug class

E.g., ACE inhibitors

Optional in all reviewed standards. Roughly consistent terminology

NDF-RT is the recommended terminology for this element in all reviewed standards. However, the allowed set of NDF-RT codes is restricted further in the C32 CCD than in the NCPDP or CCR standards.

Food

E.g., peanut

Optional in all reviewed standards. Roughly consistent terminology

UNII is the only allowed terminology in the SCRIPT and CCD standards. A terminology is not identified for the CCR.

Reaction

E.g. hives

Optional in all reviewed standards. Variance in terminology

Both the CCD and SCRIPT standards refer to the VA/KP SNOMED CT Problem List Subset. However, a variance has arisen due to a change to the original HITSP specification, on which the SCRIPT direction was based. The CCR does not specify a terminology for this element, but recommends SNOMED CT in general.

Reaction Severity

E.g., Severe, mild

Optional in all standards. Inconsistent terminology

There is consistency between terminology specified for SCRIPT and the CCR (a SNOMED CT subset identified by HITSP), but the CCR utilizes a proprietary textual value set.

Problem

Problem type

E.g., finding, symptom, problem

Optional in all standards. Inconsistent terminology

There is consistency between terminology specified for SCRIPT and the CCR (a SNOMED CT subset identified by HITSP), but the CCR utilizes a proprietary textual value set.

Problem name

E.g., hypertension, migraine

Optional in all reviewed standards. Different terminologies.

Both the CCD and SCRIPT standards refer to the VA/KP SNOMED CT Problem List Subset. However, a variance has arisen due to a change to the original HITSP specification, on which the SCRIPT direction was based. The CCR recommends use of SNOMED CT, but does not specify restrictions on the range of codes.

Problem status

E.g., active, resolved

Not supported by SCRIPT. Different terminologies

The CCD specifies a subset of SNOMED CT codes, whereas the CCR uses a proprietary text value set. The element is not included in the SCRIPT standard; instead, status must be inferred from the problem's start and end dates.

Appendix A: Standards Sources

C32 CCD

HITSP Summary Documents Using HL7 Continuity of Care Document (CCD) Component, HITSP/C32, July 8, 2009, Version 2.5.

HITSP CDA Content Modules Component, HITSP/C83, January 31, 2010, Version 2.0.1

American National Standards Institute, Health Information Technology Standards Panel (HITSP) Secretariat, 25 West 43rd Street – Fourth Floor, New York, NY 10036, http://www.hitsp.org

ASTM CCR

ASTM E2369-05: Standard Specification for Continuity of Care Record (CCR), year of adoption 2005, ASTM approved July 17, 2006. ASTM E2369-05 (Adjunct to E2369): Standard Specification Continuity of Care Record, - Final Version 1.0 (V1.0), November 7, 2005

ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959 USA; Telephone (610) 832-9585 or http://www.astm.org

NCPDP Medication History

SCRIPT Standard, Implementation Guide, Version 10.6, October, 2008, (Approval date for ANSI: November 12, 2008)

National Council for Prescription Drug Programs, Incorporated, 9240 E. Raintree Drive, Scottsdale, AZ 85260–7518; Telephone (480) 477–1000; and Facsimile (480) 767–1042 or http://www.ncpdp.org

NCIt Subset for NCPDP

National Cancer Institute Enterprise Vocabulary Services

ncicb@pop.nci.nih.gov

http://evs.nci.nih.gov/ftp1/NCPDP/About.html

NCIt Subset Name	Subset Description	Used in NCPDP SCRIPT Element(s)
NCPDP DEASchedule Terminology	A set of terminology for NCPDP that contains concepts within the Drug Enforcement Administration (DEA) Schedule of Controlled Substances.	DEASchedule
NCPDP MeasurementUnitCode Terminology	A set of terminology for NCPDP that contains concepts of various measurements of vital signs, particularly those pertaining to information about a patient that	Observation: MeasurementUnitCode (MeasurementSourceCode = “AD”)

	would be shared between the clinician and pharmacy in order to determine proper pharmaceutical care.	
NCPDP QuantityUnitOfMeasure Terminology	A set of terminology for NCPDP that contains concepts of the intended or actual dispensed quantity unit of measure (e.g., 1 *Pack*, 1 *Inhaler*, 17 *grams*, 30 *tablets*, 473 *ML*, 3 *Eaches*. Upon billing, this data is translated to Milliliters, Grams, for Eaches. Days supply is not allowed as a prescribed quantity for eRx. (Dispensed quantity from claims likely constrained to these values).	PotencyUnitCode (UnitSourceCode qualifier = "AC")
NCPDP StrengthForm Terminology	A set of terminology for NCPDP that contains concepts that qualify the strength and strength unit of measure associated with the prescribed product (e.g., Amoxicillin 250 mg *Tablet*, Allbuterol HFA 17 grams *Inhaler*, Cefaclor 250 MG/5ML *Suspension*, Fentanyl 12 mcg/hr *Patch*, Epinephrine 0.3 mg [implied per dose] *Auto-Injector*, Timolol 0.25% *Ophthalmic Drops*, Sprintec *28 Day Pack*, Hydrocortisone 1% *Ointment*).	FormCode (FormSourceCode qualifier = "AA")
NCPDP StrengthUnitOfMeasure Terminology	A set of terminology for NCPDP that contains concepts of dosage form strength (e.g., 250 *mg*, 250 *MG/5ML*), a delivery rate (e.g., 12 *mcg/hr*, a dosage form concentration (e.g., 0.05*%*, 1*%*), the dosage released from a single delivery device actuation (e.g., 90 *mcg* [implied as per inhalation], 5 *grams*), the days supply or quantity in a package (e.g., 28 *day*, 60 *grams*).	StrengthCode (StrengthSourceCode qualifier = "AB")

Appendix B: Coded Content and Terminology Guidance from Source Standards

A challenge encountered when attempting to determine the compatibility of standards is collecting and aligning the definitions and directions for use each concept, including optionality, structure and terminology constraints. This section gathers direction from the source standard implementation guides and related documents—arranging it by standard and concept.

NCPDP SCRIPT Terminology References

Excerpts from the:

- NCPDP SCRIPT 10.6 Implementation Guide
- Structured Sig Implementation Guide 1.1
- NCPDP External Code List, April 2011 version

Note: The NCPDP SCRIPT 10.6 Implementation Guide describes the structure and data element contents of the SCRIPT standard, but typically refers to the Extended Code List document (ECL) to identify allowed code values and terminologies. In addition, SCRIPT 10.6 incorporates the NCPDP Structured Sig standard into its SIG segment. While the 10.6 guide doesn't refer to the Structured Sig Implementation Guide, the Sig guide provides additional direction on the terminology recommended for use in Structured Sig.

Below are excerpts from those three documents related to terminology for medications, adverse reactions and diagnoses. The material focuses on the message types most pertinent to medication reconciliation.

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Medication	
Generic Medication Name - OR - Brand Name (R)	***Text (Required)*** *<DrugDescription>* Per 10.6 IG: Must include: full drug name, strength, and form. May be abbreviated to fit the information in 35 or less bytes. In the SCRIPT new prescription message, either the generic or branded medication is included—but not both—along with the associated identifier(s). --- ***Coded (Optional, but populated by industry convention)*** *<ProductCode>: NDC11, included in both message types.* • ***In the New Prescription,*** the NDC is representative of the prescribed medication, strength, and dosage form. However, the package information contained in the NDC (bottle size, etc.) is ignored by the receiving pharmacy. While specified as optional in the SCRIPT 10.6 implementation guide, the ProductCode is nearly always included in the NewRx message by industry convention, containing an NDC 11-digit identifier. • ***In the Medication History or Fill Status message***, the element conveys the NDC of the dispensed product. ○ The NDC is nearly always included in the Fill Status message ○ The NDC is typically, but not always, included in Medication History message **External Code List: ProductQualifierCode (3Ø55)** CODE DESCRIPTION *Note: NDC used by industry convention:* ND NDC *Note: Other types allowed by the standard, but not used in the industry:* UP UPC MF MFG RT NDF-RT – National Drug File Reference Terminology NH HRI – Health Related Item UN UNII - Unique Ingredient Identifier *<DrugDBCode>: RxNorm (Optional, but required in NewRx per Meaningful Use rules).* The DrugDBCode element holds the RxNorm code associated with the prescribed or dispensed medication identified in the DrugDescription element. The RxNorm code (or code from another information source to RxNorm) is required to be present in New Prescription messages. Other messages including the Medication History response are not included in current MU rules, and the RxNorm code is optional. **External Code List: DrugDBCodeQualifier (1153)** *Note: RxNorm codes recommended by SCRIPT:* BPK: RxNorm BPCK, GPK: RxNorm GPCK, SBD: RxNorm SBD, SCD: RxNorm SCD *Note: Other types allowed by the standard, but not used in the industry:* FG: FDB GCN SEQNO, FM: FDB MedID, FI: FDB MedID, FS: FDB Smartkey, FN: FDB Medication Name ID, FL: FDB Ingredient List ID (HICL_SEQNO), FD: FDB Routed Dosage Form Med ID, MG: Medi-Span Generic Product Indicator (GPI), MM: Multum MMDC, MD: Medi-Span Product Line (DDID), MC: Multum Drug ID, AF: American Hospital Formulary Serice (AHFS), G: Medical Economics Generic Master (GM), E: Medical Economics Generic Formulation Code (GFC)

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Dosage Form (O)	***Text (Required)*** *Required to be included in <DrugDescription>* ***Coded (Optional)*** *<FormCode>* *Structured Sig: <DoseFormCodeQualifier> / <DoseFormCode>* ECL: Terminology: NCI Code - NCI Values - NCPDP Drug StrengthForm Terminology - available at http://www.cancer.gov/cancertopics/terminologyresources/page7 For NCPDP Specific Terminology *Note: The NCI NCPDP StrengthForm (NCI subset code C89508) is a subset of NCI Pharmaceutical Dosage Form: C42636 and corresponds to the SPL Pharmaceutical Dosage Form (NCIt subset C54456), with some omissions*
Strength, Strength Unit of Measure (O)	***Text (Required)*** *Required to be included in <DrugDescription>* ***Coded (Optional)*** *<StrengthCode>* ECL: NCICode - NCI Values - NCPDP Drug StrengthUnitOfMeasure Terminology - available at http://www.cancer.gov/cancertopics/terminologyresources/page7 For NCPDP Specific Terminology *Note: The NCI NCPDP Strength Unit of Measure terminology (NCIt subset code 89509) corresponds to the SPL Potency Terminology (NCIt subset C54458) but lacks some SPL codes and contains other NCI codes not included in the SPL set.*
Type of Medication	*Not supported*
Orders and Status	
Quantity Ordered / Unit of Measure (O)	***Text (Required)*** *Required to be included in <DrugDescription>* ***Coded (Optional)*** *<PotencyUnitCode>* ECL: Terminology: NCI Code - NCI Values - NCPDP Drug StrengthForm Terminology - available at http://www.cancer.gov/cancertopics/terminologyresources/page7 For NCPDP Specific Terminology *Note: The NCI NCPDP Quantity Unit of Measure (NCIt subset code 89510) corresponds primarily to the SPL Unit of Presentation (NCIt subset C87300) but lacks some of those values. Also includes terms in SPL Potency (subset C54458) and Unit Of Measure (subset C929510) terminologies.*
Fills (NewRx: R MedHist: O)	***(NewRx: Required, Medication History Response: Optional)*** <Refills><Value>

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Medication Status	*Not supported* *In the Medication History and Fill Status messages, status is inferred based on dispense dates for the medication.*
Potential Interactions	*Potential interaction:* The following elements enable capturing of potential interactions considered by the prescriber, including drug/drug, drug/adverse reaction, drug/dose, and others. Type of interaction: <Service ReasonCode> Prescriber's response: <ProfessionalServiceCode> / <Service ResultCode> / <Acknowledgment Reason> CoAgent: <CoAgentID> / <CoAgentQualifier> Severity: <Clinical SsignificanceCode>
Directions	
Free Text Sig (R)	***(Required)*** *<Directions>*
Delivery Method (O)	***(Optional)*** *Structured Sig: <DoseDeliveryMethodCode> / <DoseDeliveryMethodCodeQualifier>* *Terminology* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Delivery Method Modifier	***(Optional)*** *Structured Sig: <DoseDeliveryMethod ModifierCode> / <DoseDeliveryMethod ModifierCodeQualifier>* *Terminology* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Dose Unit of Administration (O)	***(Optional)*** *Structured Sig: <DoseFormCode> / <DoseFormCodeQualifier>* *Terminology* ECL: • SNOMED CT (No constraints specified) • FMT *[Particular terminology not specified in the ECL, but NCI NCPDP StrengthForm terminology is assumed (see Dose Form, above)]* Structured Sig Implementation Guide: • Recommended: FMT
Maximum Dose Unit of Administration (O)	***(Optional)*** *Structured Sig: <MaximumDoseRestrictionUnitsCode> / <MaximumDoseRestrictionCodeQualifier Terminology>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Route of Administration (O)	***(Optional)*** *Structured Sig: <RouteOfAdministrationCode> / <RouteOfAdministrationCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL. Assumed NCI FDA RouteOfAdministration terminology]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Site of Administration (O)	***(Optional)*** *Structured Sig: <SiteofAdministrationCode> / <SiteofAdministrationCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Frequency Time Period (O)	***(Optional)*** *Structured Sig: <FrequencyUnitsCode> / <FrequencyUnitsCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Interval Time Period (O)	***(Optional)*** *Structured Sig: <IntervalUnitsCode> / <IntervalUnitsCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Administration Timing (descriptive or based on activities of daily living) (O)	***(Optional)*** *Structured Sig: <AdministrationTimingCode> / <AdministrationTimingCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Duration Period (O)	***(Optional)*** *Structured Sig: <DurationTextCode> / <DurationTextCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Rate of Administration (O)	***(Optional)*** *Structured Sig: <RateUnitofMeasureCode> / <RateUnitofMeasureCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Calculated Dose Time Period (O)	***(Optional)*** *Structured Sig: <TimePeriodBasisCode> / <TimePeriodBasisCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Maximum Dose Time Period	***(Optional)*** *Structured Sig: <MaximumDoseRestrictionVariableUnitsCode> / <MaximumDoseRestrictionVariableUnitsCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Indication (O)	***(Optional)*** *Structured Sig: <IndicationPrecursorCode> / <IndicationPrecursorCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Indication Precursor Text	***(Optional)*** *Structured Sig: <IndicationTextCode> / <IndicationTextCodeQualifier>* ECL: • SNOMED CT *[No constraints specified]* • FMT *[Particular terminology not specified in the ECL]* Structured Sig Implementation Guide: • Recommended: SNOMED CT
Indicate Medication Stopped	*Not supported*
Adverse Reaction (Census message only)	
Type of Allergy or Adverse Reaction (O)	***(Optional)*** *Allergy: <AdverseEvent> <ItemNumber>* ECL: SNOMEDAdverseEventCode 420134006 Used to record an adverse reaction. 418038007 Used to record an adverse reaction to an environmental agent. 419511003 Used to record an adverse reaction to a drug. 418471000 Used to record an adverse reaction to a food. 419199007 Used to record an allergy to an environmental agent. 416098002 Used to record an allergy to a drug. 414285001 Used to record an allergy to a food. 59037007 Used to record intolerance to a drug. 235719002 Used to record intolerance to a food. *Note: Allowed values match the set of SNOMED CT values defined in HITSP C80 Table 2-86 Allergy / Adverse Event Type Value Set Definition*

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Medication product (O)	***(Optional)*** *Allergy: <DrugProductCoded><ItemNumber>* 10.6 Implementation Guide direction: The product causing the adverse event shall be coded to UNII for Food and substance allergies, or RxNorm or NDC when to medications, or NDF-RT when to classes of medications. **External Code List document excerpts:** (Note: April 2011 ECL: AllergyDrugProductCodedQualifier concept contains the note: "Used in Specialized Standard Version 2Ø1Ø121 or later not in earlier versions." Implementers should defer to the October 2008 ECL, excerpts below) *October 2008 ECL:* Code List Responsibility Agency (ALG Ø5Ø-SØ37-Ø3-3Ø55) for Drug-Product Coded (ALG Ø5Ø-SØ38-Ø2-714Ø): **CODE DESCRIPTION** ND NDC RX RXNORM - Maintained and distributed by National Library of Medicine (NLM) *[Note that separate qualifiers for the different RxNorm types (SCD, SBD, etc.) are not supported in the ECL allowed for SCRIPT 10.6]* RT NDF-RT – National Drug File Reference Terminology … for classes of medication UP UPC * MF MFG * *[* Note that, in addition to the terminologies directed in the Implementation Guide (RxNorm, NDC, NDF-RT, UNII), the ECL also allows MFG/Manufacturer's code and HRI/Health Related Item. This is contrary to the IG guidance and the original intent of the segment to stay consistent with HITSP C32.]* Values for Code List Responsibility Agency (ALG Ø5Ø-SØ37-Ø3-3Ø55) for Drug-Product Coded for Food and Substance Allergies (ALG Ø5Ø-SØ38-Ø2-714Ø): **CODE DESCRIPTION** UN UNII - Unique Ingredient Identifier - Maintained by FDA and EPA, distributed by FDA Substance Registration System (SRS)

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Reaction (O)	***(Optional)*** *Allergy: <ReactionCoded> <ItemNumber>* **External Code List document excerpts:** (Note: April 2011 ECL: ReactionCoded concept contains the note: "Used in Specialized Standard Version 2Ø1Ø121 or later." Implementers should defer to the October 2008 ECL, excerpts below) *October 2008 ECL:* Values for Code List Responsibility Agency (ALG Ø6Ø-SØ37-Ø3-3Ø55) for Reaction Coded (ALG Ø6Ø-SØ38-Ø2-714Ø): The values shall be coded using the VA/KP Problem list subset of SNOMED CT, and shall be terms that descend from clinical finding (404684003) concept. *[Values are a subset of those defined in HITSP C80 (v2.01) 2.2.3.4.2 Allergy / Adverse Event Type. Specifically, only Clinical Findings (concepts descending from 404684003) are allowed, and not concepts descending from Situation with Explicit Context (243796009).* *This variance o the HITSP guidance is due to SCRIPT's use of initial VA/KP problem list definition]*
Reaction Severity (O)	***(Optional)*** *Allergy: <SeverityCoded><ItemNumber>* **External Code List document excerpts:** (Note: April 2011 ECL: SeverityCoded concept contains the note: "Used in Specialized Standard Version 2Ø1Ø121 or later." Implementers should defer to the October 2008 ECL, excerpts below) *October 2008 ECL:* Values for Code List Responsibility Agency (ALG Ø7Ø-SØ37-Ø3-3Ø55) for Severity Coded (ALG Ø7Ø-SØ38-Ø2-714Ø): The terminology used for severity of the adverse event shall be recorded using the subset of SNOMED CT terms that descend from the severities (272141005) concept. *[Values conform to HITSP C80 2.2.3.1.6 Table 2-67 Problem Severity set]*
Problem / Condition (Census message only)	
Diagnosis Priority	*Not supported*

Excerpts from the SCRIPT 10.6 IG, Structured Sig 1.1 IG, and April 2011 ECL document	
Problem Type	***(Optional)*** *Diagnosis: <ProblemType><ItemNumber>* **External Code List document excerpts:** (Note: April 2011 ECL: ProblemTypeCode concept contains the note: "Used in Specialized Standard Version 2Ø1Ø121 or later." Implementers should defer to the October 2008 ECL, excerpts below) *October 2008 ECL:* Values for Code List Responsibility Agency (DIA Ø3Ø-SØ37-Ø3-3Ø55) for Problem Types (DIA Ø3Ø-SØ37-Ø2-714Ø): CODE DESCRIPTION LD SNOMED - Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT) *[Values conform to HITSP C80 2.2.3.1.2 Table 2-60 Problem Type Value Set Definition]*
Problem Code (R)	***(Element required if Diagnosis segment is used)*** *Diagnosis: <ProblemNameCoded><ItemNumber>* **External Code List document excerpts:** (Note: April 2011 ECL: ProblemNameCodeQualifier concept contains the note: "Used in Specialized Standard Version 2Ø1Ø121 or later." Implementers should defer to the October 2008 ECL, excerpts below) *October 2008 ECL:* Values for Code List Responsibility Agency (DIA Ø4Ø-SØ37-Ø3-3Ø55) for Problem Name Coded (DIA Ø4Ø-SØ38-Ø2-714Ø): • Values from the ProblemListSubset from SNOMED (preferred) ** • ICD-9 • ICD-10 *[** Values are a subset of those defined in HITSP C80 (v2.01) C80 (v2.01) 2.2.3.1.1 Problem Value Set. Specifically, only Clinical Findings (concepts descending from 404684003) are allowed, and not concepts descending from Situation with Explicit Context (243796009). This variance o the HITSP guidance is due to SCRIPT's use of initial VA/KP problem list definition]* ***NOTE:*** Meaningful Use rules allow… (from Table 2A, 45 CFR Part 170) *Stage 1: Applicable HIPAA code set required by law (i.e.,ICD-9-CM); or SNOMED CT®* *Stage 2: Applicable HIPAA code set required by law (e.g.,ICD-10-CM) or SNOMED CT®*
Problem Status	*Not supported*

CCR Terminology References

Excerpts from the ASTM E2369 CCR Implementation guide

Note: Whereas terminology sources are specified for the C32 CCD and Medication History, typically at an element-by-element level, the CCR standard includes few constraints on the terminology to be used to state and/or codify values. Most elements are optional in either text or coded form, and the optionality of codified values are typically not called out separately from the textual value.

The implementation guide commonly recommends terminologies, and in some cases indicates a particular terminology should be used. However, there are very few cases where a particular value set is required, and in those cases the values are typically textual and proprietary to the CCR—not references to an external terminology.

Below is guidance contained in the CCR implementation guide regarding medication and related concepts.

<table>
<tr><th colspan="2">CCR Guidance Excerpts (ASTM E2369 Implementation Guide)</th></tr>
<tr><td colspan="2">Medication</td></tr>
<tr><td>Example from Imp Guide</td><td>Example 32 – <Medication>/<Product> (excerpt)

<Medication>
<CCRDataObjectID>_____</CCRDataObjectID>
<DateTime>
<Type>
<Text>Prescription Date</Text>
</Type>
<ExactDateTime>2004-09-01T13:25:34-05:00</ExactDateTime>
</DateTime>
<Type>
<Text>Medication</Text>
</Type>
<Source>
<Actor>
<ActorID>75307</ActorID>
<ActorRole>
<Text>Primary Care Provider</Text>
</ActorRole>
</Actor>
</Source>
<Product>
<ProductName>
<Text>Amoxicillin</Text>
<Code>
<Value>_____</Value>
<CodingSystem>RxNorm</CodingSystem>
<Version>_____</Version>
</Code>
</ProductName>
<BrandName>
<Text>Amoxil</Text>
<Code>
<Value>_____</Value>
<CodingSystem>RxNorm</CodingSystem>
<Version>_____</Version>
</Code>
</BrandName>
<Strength>
<Value>250</Value>
<Units>
<Unit>mg</Unit>
</Units>
</Strength>
</Product>
…
</Medication></td></tr>
<tr><td>Generic Medication Name
(R)</td><td><ProductName> / <ProductName> <Code>
Instance of CodedDescriptionType. Required and Bounded to one instance (0..1).
The generic, non-proprietary, name of the product.

5. Specifications. 5.5.3: Products and agents should be coded with RxNorm to as granular a level as possible. In addition, they may be coded with another standard as applicable (NDC, for example) or proprietary code, with the type of code and the source and version clearly defined. If any coding system is used, however, an RxNorm code must be included, if legally required.</td></tr>
</table>

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	
Brand Name (O)	<BrandName> / <BrandName><Code> Instance of CodedDescriptionType. Optional and Bounded to one instance (0..1). The Brand Name Terminology: RxNorm *(See 5. Specifications. 5.5.3, cited above)*
Dosage Form (O)	<Form> / <Form><Code> Child of Product and instance of CodedDescriptionType. Optional and Unbounded (0..n). The Form – Tablet, Capsule, Elixir, Suspension, Crème, Powder, Box, Syringe, and so forth *[No terminology cited specifically for this element. SNOMED cited generally as a preferred code source]*
Strength, Strength Unit of Measure (O)	<Strength> / <Strength><Code> Child of Product and instance of MeasureType. Optional and Unbounded (0..n) The predefined strength that the medication comes in –500mg tablets, for example. <Concentration> / <Concentration><Code> Child of Product and instance of MeasureType. Optional and Unbounded (0..n). Used to define product concentration, when applicable – 250 mg/ml, for example. *[No terminology cited specifically for this element. SNOMED cited generally as a preferred code source]*
Type of Medication	*Not supported*
Orders and Status	
Example from Imp. Guide	Example 32 – <Medication>/<Product> (excerpt) <Medication> … <Quantity> <Value>30</Value> <Units> <Unit>Capsules</Unit> </Units> </Quantity> … </Medication>
Prescribed Date (O)	<DateTime> This can be an exact DateTime, an age, an approximate DateTime, or a DateTime range. Optional and Unbounded (0..n).
Quantity Ordered / Unit of Measure (O)	<Quantity><Units> / <Quantity><Units><Code> Instance of MeasureType. Optional and Unbounded (0..n). Defines the quantity – to be ordered, dispensed, or used, for example. *[No terminology cited specifically for this element. SNOMED cited generally as a preferred code source]*

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	
Fills (O)	<Refill> A Child of <Refills> and includes <Number>, <Quantity>, <DateTime>, to define 'Last Refill', for example, and <Comment> for any specific <Refill> alerts or comments. Optional and Unbounded (1..n). Number of allowed refills per prescription.
Medication Status (O)	<Status> Instance of CodedDescriptionType with restricted content that must be one of the **defined structured text values. Active, On Hold, Prior History No Longer Active.** Optional and Bounded to one instance (0..1) Defines the <Status> of the <Product>.
Potential Interactions	*It does not appear that potential interactions considered during prescribing are supported.*
Directions	
Note re.: all Directions elements (CCR imp. guide page 75)	A2.5.4.9 <Medications>, <MedicalEquipment>, and <Immunizations> … (4) Careful consideration has gone to make StructuredProductType within the CCR map explicitly to and support: (a) NCPDP Script and the ongoing cooperative work on SIG definitions for medication prescriptions and orders with NCPDP, HL7, and ASTM. **Note—The <Directions> under <Product> within this Implementation Guide maps explicitly to the latest available version of NCPCP Script SIG submitted (DERF) by the SIG Workgroup October 7, 2005.** **…**
Imp Guide Example	Example 32 – <Medication>/<Product> (excerpt) <Medication> … <Directions> <Direction> <Dose> <Value>1</Value> </Dose> <Route> <Text>po</Text> </Route> <Frequency> <Value>tid</Value> </Frequency> <Duration> <Value>10</Value> <Units> <Unit>Days</Unit> </Units> </Duration> </Direction> </Directions> … </Medication>
Free Text Sig (O)	<Directions><Direction><Description> Container for the <Directions>/SIG. This maps explicitly to NCPDP Script SIG as submitted (DERF) October 7, 2005. Optional and Unbounded (0..n). Contains the directions for use. This is the 'SIG' component of the Prescription, for example, or is the use or administration instructions for a <Product>. <Description> can contain a text string or complex, coded data object.

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	
Delivery Method (O)	<Direction><DeliveryMethod><Code> The textual representation of the Dose Delivery Method. This is the method in which the dose is delivered (describes how the dose is administered/consumed). Optional and Bounded to one instance (0..1). Defines the method: take, apply, swish, swallow, inject, insert, chew, use, give, sprinkle, mix, dissolve… *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Delivery Method Modifier	*Not supported*
Dose Unit of Administration (O)	<Direction><Dose> <Units><Code> A Child of <Direction>. It is of MeasureType with <Value>, <Units>, and <Code>. Dose also contains <Rate>. Optional and Unbounded (0..n). Defines the dose parameter 125, 250, 500; units mg, mcg, g, U; rate per minute, per hour; and can repeat for multiple doses to support sliding scales, pulse *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Maximum Dose Unit of Administration (O)	<Direction><DoseRestriction> <Dose><Code> A Child of <Direction> and instance of DoseCalculationType. Optional and Unbounded (0..n). Used to provide a dose restriction. Otherwise, the same as above. *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Route of Administration (O)	<Direction><Route> <Code> A Child of <Direction> and instance of CodedDescriptionType. Optional and Unbounded (0..n). This defines the Route of administration – po, pr, sl, in either plain English or Latin abbreviation. *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Site of Administration (O)	<Direction><Site> <Code> A Child of <Direction> and instance of CodedDescriptionType. Optional and Unbounded (0..n). Physical location on the patient of use, implantation, or administration, when specified (commonly used in IM, IV, and immunizations, and implantable devices). *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Frequency Time Period (O)	<Direction><Frequency><Units><Code> A Child of <Direction> and can be expressed as a <Description> (CodedDescriptionType) or a <Value> and <Units>. Optional and Unbounded (0..n). Defines the frequency of administration – qd, bid, tid, qid, 5x/d… *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Interval Time Period (O)	<Direction><Interval><Units><Code> A Child of <Direction> and can be expressed as a <Description> (CodedDescriptionType) or a <Value> and <Units>. Optional and Unbounded (0..m). Defines an interval q15m, q2h, q4h, q12h. *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	
Administration Timing (descriptive or based on activities of daily living) (O)	<Direction><AdministrationTiming><ApproximateDateTime><Code> A Child of <Direction> and instance of DateTimeType Optional and Unbounded (0..n). This is used to define a specific administration or use time. Can repeat for more than one administration time. Can be a text string (Morning, Evening, Before Meals, 1 Hour After Meals, 3 Hours After Meals, Before Bed) or an exact time. A2.3.8.3 <ApproximateDateTime> (1) <ApproximateDateTime> is expressed as a text string using CodedDescriptionType. Since there are no currently encoded values to express <ApproximateDateTime>, Coded-DescriptionType is used as a text string container only as illustrated in the following examples: Example 10 – <ApproximateDateTime> <ApproximateDateTime><Text>One Week Ago</Text></ApproximateDateTime> <ApproximateDateTime><Text>As A Child</Text></ApproximateDateTime> <ApproximateDateTime><Text>Thirty Years Ago</Text></ApproximateDateTime> <ApproximateDateTime><Text>In 30s</Text></ApproximateDateTime> *[Note re: terminology: While A2.3.8.3 above indicates that only text strings are supported, the composite does contain a <Code> element, which presumably could contain a SNOMED CT code or other code. SCRIPT Sig segment, which the CCR imp guide cites as a model, allows SNOMED or FMT codes in this element (SNOMED preferred)]*
Duration Period (O)	<Direction><Duration><Units><Code. A Child of <Direction> and can be expressed as a <Description> (CodedDescriptionType) or a <Value> and <Units>. Optional and Unbounded (0..n). Defines the duration of use/administration. *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Rate of Administration (O)	<Direction><Dose><Rate><Units><Code> *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Calculated Dose Time Period (O)	<Direction><DoseCalculation> <Rate><Units><Code> A Child of <Direction> and instance of DoseCalculationType. Optional and Unbounded (0..n). Used to provide a dose calculation. <Dose> defines the dose parameter 125, 250, 500; <Unit> and <Rate> define the unit parameters mg/kg/hr, for example <Variables> defines dosing variables, which can be more than one. <Calculation> defines the calculation. *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*
Maximum Dose Time Period	<Direction><DoseRestriction>Variable: Units: Code A Child of <Direction> and instance of DoseCalculationType. Optional and Unbounded (0..n). Used to provide a dose restriction. Otherwise, the same as above. *[Per SCRIPT Sig: Recommended: SNOMED; allowed: FMT]*

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	
Indication (O)	<Indication> A Child of <Direction> and can be a <Description> or a <Problem> or a link to a <Problem> within the CCR, or one or more <PhysiologicalParameter>. Also includes a PRN designator. Optional and Unbounded (0..n). Indication for a product. *Terminology: SNOMED CT recommended. ICD-9, 10 allowed. Recommended that, when possible, all problems be coded (ICD-9CM, ICD-10, and/or SNOMED).* ***Section A2.3.4.1*** *Problems should be coded at the highest level using SNOMED CT and the most recent ICD-9 CM codes at the time the CCR is generated. ... It is recommended that problems be categorized with SNOMED CT codes to as granular a level as possible*
Indication Precursor Text	*Not supported*
Indicate Medication Stopped (O)	*See Status above*
Adverse Reaction	
Alerts (adverse reactions) section (O)	**A2.5.4.8 <Alerts>:** (1) <Alerts> is optional and bound to one instance (0..1). The child element <Alert> is required and unbounded (1..n) and contains data used to define a patient's warnings such as allergies, adverse reactions, and other alerts (for example, enzyme or metabolic pathway deficiencies and critical lab or result values).

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	

Imp Guide Example	Example 31 – <Alert> Data Object
	`<Alert>`
	`<CCRDataObjectID>_____</CCRDataObjectID>`
	`<DateTime>`
	`<Type>`
	`<Text>Onset Date</Text>`
	`</Type>`
	`<ApproximateDateTime>`
	`<Text>As A Child</Text>`
	`</ApproximateDateTime>`
	`</DateTime>`
	`<Type>`
	`<Text>Allergy</Text>`
	`</Type>`
	`<Status>`
	`<Text>Current</Text>`
	`</Status>`
	`<Source>`
	`<Actor>`
	`<ActorID>_____</ActorID>`
	`</Actor>`
	`</Source>`
	`<Agent>`
	`<Products>`
	`<Product>`
	`<CCRDataObjectID>_____</CCRDataObjectID>`
	`<Description>`
	`<Text>Penicillin</Text>`
	`<Code>`
	`<Value>_____</Value>`
	`<CodingSystem>RxNorm</CodingSystem>`
	`<Version>_____</Version>`
	`</Code>`
	`</Description>`
	`<Source>`
	`<Actor>`
	`<ActorID>_____</ActorID>`
	`</Actor>`
	`</Source>`
	`<Product>`
	`<ProductName>`
	`<Text>PenVK</Text>`
	`</ProductName>`
	`</Product>`
	`</Product>`
	`</Products>`
	`</Agent>`
	`<Reaction>`
	`<Description>`
	`<ObjectAttribute>`
	`<Attribute>Reaction</Attribute>`
	`<AttributeValue>`
	`<Value>Anyphylaxis</Value>`
	`<Code>`
	`<Value>_____</Value>`
	`<CodingSystem>SNOMED CT</CodingSystem>`
	`<Version>20050131</Version>`
	`</Code>`
	`</AttributeValue>`
	`</ObjectAttribute>`
	`</Description>`
	`<Severity>`
	`<ObjectAttribute>`
	`<Attribute>Severity</Attribute>`
	`<AttributeValue>`
	`<Value>Life Threatening</Value>`
	`<Code>`
	`<Value>_____</Value>`
	`<CodingSystem>SNOMED CT</CodingSystem>`
	`<Version>20050131</Version>`
	`</Code>`
	`</AttributeValue>`
	`</ObjectAttribute>`
	`</Severity>`
	`<Interventions>`
	`<Intervention>`
	`<CCRDataObjectID>_____</CCRDataObjectID>`
	`<Source><Actor><ActorID>_____</ActorID></Actor></Source>`
	`<CCRDataObjectID>_____</CCRDataObjectID>`
	`<Description>`
	`<Text>Cardiopulmonary Resuscitation</Text>`
	`<Code>`
	`<Value>_____</Value>`
	`<CodingSystem>RxNorm</CodingSystem>`
	`<Version>_____</Version>`
	`</Code>`
	`</Description>`
	`<Source><Actor><ActorID>_____</ActorID></Actor></Source>`
	`</Procedure>`
	`</Procedures>`
	`</Intervention>`
	`</Interventions>`
	`</Reaction>`
	`</Alert>`

Type of Allergy or Adverse Reaction (O)	<Alert><Type> An instance of CodedDescriptionType with **restricted content that must be one of the defined structured text values. Allergy, Adverse Reaction, Alert, Critical Result.** Optional and Bounded to one instance (0..1). Defines what <Type> of <Alert> is being itemized.

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	
Medication product (O)	<Alert><Agent> <Agent> has children <Products>,<EnvironmentalAgents>, <Problems>, <Procedures>, and <Results>. Optional and Unbounded (0..`). If an <Agent> is unknown, then "Unknown" is required content for <Agent> Defines an <Agent> that caused an <Alert>, specifically a <Product> (Penicillin), an EnvironmentalAgent> (dust, bee stings), a <Problem> (G6PD Deficiency), a <Procedure> (IVP, Endoscopy), or a , <Result> (K+, Na+, Dig Level, Mammogram, PAP, Pathology, Cytology). **A2.3.4.3** Products and agents should be coded with RxNorm to as granular a level as possible. In addition, they may be coded with another standard as applicable (NDC, for example) or proprietary code. .. If any coding system is used, however, an RxNorm code must be included, if legally required
Reaction (O)	<Alert><Reaction><Description><Code> Reaction> <Reaction> has children <Description>, <Severity>, and <Interventions>. Optional and Unbounded (0..n). <Description> is used to describe the <Reaction>, if any, that the <Alert> addresses – Rash, Angioedema, Anaphylaxis, Nausea, and so forth <Description> can be a string or can be used to encode the reaction (recommended/preferred). Optional *[No terminology cited specifically for this element. SNOMED cited generally as a preferred code source]*
Reaction Severity (O)	<Alert><Reaction><Severity><Text> An instance of CodedDescriptionType with **restricted content that must be one of the defined structured text values. Minimal, Mild, Moderate, Severe, Life Threatening, Critical**. Optional and Bounded to one instance (0..1). Defines the <Severity> of the <Reaction>.
Problem / Condition	
Problems section (O)	**A2.5.4.5 <Problems>:** At a minimum, a CCR should contain all pertinent current and historical problems relevant to that patient at the point in time a CCR is generated and relative to the <Purpose> of that instance of a CCR.

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	
Imp Guide Example	**Example 28 – Data Object <Problem>** <Problem> <CCRDataObjectID>_____</CCRDataObjectID> <DateTime> <Type> <Text>Date of Onset</Text> </Type> <ExactDateTime>2004-09-01T13:25:34-05:00</ExactDateTime> </DateTime> <Type> <Text>Diagnosis</Text> </Type> <Description> <ObjectAttribute> <Attribute>Diagnosis</Attribute> <AttributeValue> <Value>Myocardial Infarction</Value> <Code> <Value>22298006</Value> <CodingSystem>SNOMED CT</CodingSystem> <Version>20050131</Version> </Code> </AttributeValue> </ObjectAttribute> <ObjectAttribute> <Attribute>Acuity</Attribute> <AttributeValue> <Value>Acute</Value> <Code> <Value>53737009</Value> <CodingSystem>SNOMED CT</CodingSystem> <Version>20050131</Version> </Code> </AttributeValue> </ObjectAttribute> <ObjectAttribute> <Attribute>Site</Attribute> <AttributeValue> <Value>Antereoseptal</Value> <Code> <Value>20706007</Value> <CodingSystem>SNOMED CT</CodingSystem> <Version>20050131</Version> </Code> </AttributeValue> </ObjectAttribute> <Code> <Value>410.1</Value> <CodingSystem>ICD-9 CM</CodingSystem> <Version>2004</Version> </Code> </Description> <Status> <Text>Resolved</Text> </Status> <Source> <Actor> <ActorID>75307</ActorID> <ActorRole> <Text>Primary Care Provider</Text> </ActorRole> </Actor> </Source> <Episodes> <Number>2</Number> <Episode> <CCRDataObjectID>_____</CCRDataObjectID> <DateTime> <Type> <Text>Age At Onset</Text> </Type> <Age> <Value>35</Value> <Units> <Unit>Years</Unit> </Units> </Age> </DateTime> <Status> <Text>Resolved</Text> </Status> <Source> <Actor> <ActorID>75307</ActorID> <ActorRole> <Text>Primary Care Provider</Text> </ActorRole> </Actor> </Source> </Episode> <Source> <Actor> <ActorID>75307</ActorID> <ActorRole> <Text>Primary Care Provider</Text> </ActorRole> </Actor> </Source> </Episodes> </Problem>
Diagnosis Priority	*Not supported*
Problem Type	<Problem><Type><Text> An instance of CodedDescriptionType with restricted content that **must be one of the defined structured text values. Problem, Condition, Diagnosis, Symptom, Finding, Complaint, Functional Limitation**. Optional and Bounded to one instance (0..1).

CCR Guidance Excerpts (ASTM E2369 Implementation Guide)	
Problem Code (O)	<Problem><Description><Code> An instance of CodedDescriptionType that supports a free text string, a structured text string or strings, or a structured and coded text string or strings. **It is recommended that, when possible, all problems be coded (ICD-9CM, ICD-10, or SNOMED, or both).** Optional and Bounded to one instance (0..1). E.g.: Myocardial Infarction, Nausea, Headache, Parkinson's Disease, etc. A2.3.4.1 Problems—Problems should be coded at the highest level using SNOMED CT and the most recent ICD-9 CM codes at the time the CCR is generated to accommodate the need for the various healthcare entities that will be interacting with the CCR data to have accurate coding for reimbursement purposes. These and other controlled vocabularies are integral to the enhancement of data contained within the CCR to support intelligent clinical decision support. It is recommended that problems be categorized with SNOMED CT codes to as granular a level as possible. ***NOTE:*** Meaningful Use rules allow… (from Table 2A, 45 CFR Part 170) *Stage 1: Applicable HIPAA code set required by law (i.e.,ICD-9-CM); or SNOMED CT®* *Stage 2: Applicable HIPAA code set required by law (e.g.,ICD-10-CM) or SNOMED CT®*
Problem Status (O)	<Problem><Status><Text> An instance of CodedDescriptionType with restricted content that **must be one of the defined structured text values. Active, Inactive, Chronic, Intermittent, Recurrent, Rule Out, Ruled Out, Resolved.** Optional and Bounded to one instance (0..1).

C32 CCD Medication-Related Terminology References

Excerpts from HITSP C32 CCD component document and referenced documents (C83, C80, C154)

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td colspan="2">Medication</td></tr>
<tr><td>Medication Section
(R)</td><td>
C83-[CT-112-2] The Medications Section SHALL include entries from the Medication module to provide the relevant medications in coded form

C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements

<table>
<tr><th>CDA Data Location</th><th>HITSP Data Element ID/Name</th><th>Opt</th><th>Constraint</th></tr>
<tr><td>cda:consumable/cda:manufacturedProduct</td><td>Medication Information</td><td>R/Y</td><td>2.2.2.8.10</td></tr>
<tr><td>cda:manufacturedMaterial/cda:code/@code</td><td>8.13 - Coded Product Name</td><td>R2/Y</td><td>2.2.2.8.11</td></tr>
<tr><td>cda:translation/@code</td><td>8.14 - Coded Brand Name</td><td>R2/Y</td><td>2.2.2.8.12</td></tr>
<tr><td>cda:originalText</td><td>8.15 - Free Text Product Name</td><td>R/N</td><td>2.2.2.8.13</td></tr>
<tr><td>cda:manufacturedMaterial/cda:name</td><td>8.16 - Free Text Brand Name</td><td>R2/N</td><td>2.2.2.8.14</td></tr>
</table>

C83-[DE-8-CDA-4] Medication Information data elements SHALL declare conformance to the IHE Product Entry template by including a <templateID> element with the root attribute set to the value 1.3.6.1.4.1.19376.1.5.3.1.4.7.2
C83-[DE-8-CDA-5] A CDA Document SHALL declare conformance for the Medication Information data element by including a <templateID> element with the root attribute set to the value 2.16.840.1.113883.3.88.11.83.8.2
</td></tr>
<tr><td>Generic Medication Name

(Text: R
Coded: R if known)</td><td>
2.2.2.8.11 Coded Product Name Constraints
C83-[DE-8.13-CDA-1] The coded product name SHALL appear in the code attribute of the <code> element.
C83-[DE-8.13-CDA-2] If the code for the generic product is unknown, the code and codeSystem attributes MAY be omitted
C154-[DE-8.13-1] The coded product name SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.8 Medication Clinical Drug Names.
C80 2.2.3.3.8: Shall contain RxNorm normal forms for concepts type of “Ingredient Name” [term type: SCD] or Generic Packs [term type: GPCK]
C154-[DE-8.13-2] When only the class of the drug is known (e.g., Beta Blocker or Sulfa Drug), it SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.9 Medication Drug Class.
C80 2.2.3.3.9: Shall contain a value descending from the NDF-RT concept types of “Mechanism of Action - N0000000223”, “Physiologic Effect - N0000009802” or “Chemical Structure - N0000000002”`. NUI will be used as the concept code
C154-[DE-8.13-3] When only the medication ingredient name is know, the coded product name MAY be coded as specified in HITSP/C80 Section 2.2.3.3.11 Ingredient Name
C80 2.2.3.3.11: Unique identifiers for active drug ingredient [UNII]

2.2.2.8.13 Free Text Product Name Constraints
C83-[DE-8.15-CDA-1] The product (generic) name SHALL appear in the <originalText> element beneath the <code> element
</td></tr>
</table>

CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)				
Brand Name (Text: R Coded: R if known)	**CDA Data Location**		**HITSP Data Element ID/Name**	**Opt Constraint**
	cda:manufacturedMaterial/cda:code/@code		8.13 - Coded Product Name	
	cda:translation/@code		8.14 - Coded Brand Name	R2/Y 2.2.2.8.12
	2.2.2.8.12 Coded Brand Name Constraints C83-[DE-8.14-CDA-1] The code for the specific brand of product SHALL appear in a <translation> element C154-[DE-8.14-1] The brand name SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.7 Medication Brand Name or 2.2.3.3.10 Medication Packaged Product. **C80 2.2.3.3.10:** Shall contain RxNorm normal forms for concepts type of "Brand Name" or Brand Name Packs **C80 2.2.3.3.10:** Shall contain a value from NDC. Each listed drug product listed is assigned a unique 10-digit, 3-segment number 2.2.2.8.14 Free Text Brand Name Constraints C83-[DE-8.14-CDA-1] The coded product name SHALL appear in the code attribute of the <translation> element C83-[DE-8.14-CDA-2] The brand name SHALL appear in the <name> element of the <manufacturedMaterial>			
Dosage Form (Text: n/a: Coded: O)	**C83: 2.2.2.8 MEDICATION.** *Table 2-12 Medication… Data Mapping Table Requirements*			
	CDA Data Location		**HITSP Data Element ID/Name**	**Opt Constraint**
	cda:administrationUnitCode/@code		8.11 - Product Form	O/N 2.2.2.8.8
	2.2.2.8.8 Product Form Constraints C154-[DE-8.11-1] SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.3 Medication Product Form **C80 2.2.3.3.3:** This is the physical form of the product as presented to the individual. For example: tablet, capsule, liquid or ointment. NCI concept code for pharmaceutical dosage form: C42636			
Strength, Strength Unit of Measure (n/a)	*C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements*			
	CDA Data Location		**HITSP Data Element ID/Name**	**Opt Constraint**
	n/a		8.18 - Product Concentration	*n/a* 2.2.2.8.15
	2.2.2.8.15 Product Concentration Constraints The product concentration is determined from the coded product or brand name using knowledge base information in the vocabularies specified for these fields, and therefore this information is not explicitly included.			

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Type of Medication (R if known)</td><td>
C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:entryRelationship[@typeCode='REFR']/ cda:observation[cda:templateId/@root= '2.16.840.1.113883.10.20.1.47']/ cda:value/@code | 8.19 - Type of Medication | R2/N | 2.2.2.8.16

2.2.2.8.16 Type of Medication Constraints
The template identifier for this data element is 2.16.840.1.113883.3.88.11.83.8.1.
C83-[DE-8.19-CDA-1] A CDA Document SHALL declare conformance for the Type of Medication by including a <templateID> element with the root attribute set to the value 2.16.840.1.113883.3.88.11.83.8.1
C83-[DE-8.19-CDA-2] Each <supply> or <substanceAdministration> act MAY reference an <observation> element that describes the type of medication, by including an <entryRelationship typeCode=SUBJ/> element
C83-[DE-8.19-CDA-3] The type of a medication SHALL be represented with an <observation> element in the <entryRelationship>
C83-[DE-8.19-CDA-4] The <observation> element SHALL have a <templateId> with a root attribute set to 2.16.840.1.113883.3.88.11.83.8.1
C83-[DE-8.19-CDA-5] The <observation> SHALL have a <code> element that represents the kind of medication actually or intended to be administered or supplied
C154-[DE-8.19-1] The type of medication SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.5 Medication Type.
C80 2.2.3.3.5: The SNOMED CT® has been limited by HITSP to the value set reproduced below in Table 2-78 Medication Type Value Set Definition

Concept Code | Concept Name (SNOMED Fully Specified Name) | Usage Note
329505003 | Over the counter products (product) | Over the counter products
73639000 | Prescription drug (product) | Prescription Drug
</td></tr>
<tr><td colspan="2">Orders and Status</td></tr>
<tr><td>Prescribed Date (O)</td><td>
C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:author/cda:time | 8.30 - Order Date/Time | O/N
</td></tr>
<tr><td>Quantity Ordered (O)</td><td>
C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:quantity | 8.28 - Quantity Ordered | R2/N | 2.2.2.8.23
</td></tr>
</table>

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Quantity Unit of Measure

(Text: R: Coded: R if other than admin. units)</td><td>
C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:quantity | 8.28 - Quantity Ordered | R2/ | 2.2.2.8.23

2.2.2.8.23 Quantity Ordered Constraints
The units of presentation can be retrieved from www.fda.gov, and include only those terms which have not been mapped to UCUM. Terms with mappings to UCUM are units of administration, rather than units of presentation.
C83-[DE-8.26-CDA-1] The quantity ordered SHALL be recorded in the value attribute of <quantity> element inside a <supply> element used to record order information
C83-[DE-8.26-CDA-2] The unit attribute SHALL be present
C83-[DE-8.26-CDA-3] When the quantity ordered is in other than administration units (e.g., when the quantity ordered is a volume of liquid or mass of substance) units SHALL be coded as specified in HITSP/C80 Section 2.2.3.6.6 Units of Measure
C80 2.2.3.6.6: Units of measure concepts that includes atomic UCUM units as well as UCUM expression. Commonly used UCUM units of measure concepts can be obtained from UCUM Web Site http://aurora.regenstrief.org/~ucum/ucum.html#datyp2apdxatblxmp
C83-[DE-8.26-CDA-4] When the quantity ordered is in administration units, the unit attribute SHOULD contain the preferred name of the presentation units within braces { } using the units of presentation^ as specified in HITSP/C80 Section 2.2.3.3.3 Medication Product Form
C80 2.2.3.3.3: This is the physical form of the product as presented to the individual. For example: tablet, capsule, liquid or ointment. NCI concept code for pharmaceutical dosage form: C42636

[Inconsistency note: The C83 C83-[DE-8.26-CDA-4] and C80 2.2.3.3.3 constraints refer to “units of presentation”, but specify instead the NCI C42636 pharmaceutical dosage form terminology]
</td></tr>
<tr><td>Fills
(O)</td><td>
C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda cda:repeatNumber | 8.27 - Fills | O/N | 2.2.2.8.22
</td></tr>
<tr><td>Ordering Provider
(O)</td><td>
C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:author/cda: assignedAuthor/ cda:assignedPerson/cda:name | 8.31 - Ordering Provider | O/N
</td></tr>
</table>

CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)	

Medication Status (R if known)	*C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements*
	CDA Data Location — **HITSP Data Element ID/Name** — **Opt** — **Constraint**
	cda:entryRelationship[@typeCode='REFR']/ cda:observation[cda:templateId/@root= '2.16.840.1.113883.10.20.1.47']/ cda:value/@code — 8.20 - Status of Medication — R2/N — 2.2.2.8.17
	
	2.2.2.8.17 Status of Medication Constraints
	See Sections 3.9.2.3 and 5.1 of the HL7 Continuity of Care Document Implementation Guide for additional requirements for this data element.
	C154-[DE-8.20-1] The medication status MAY be recorded using the CCD Medication Status observation using the **value set defined in the CCD**
	
	CCD R1 Implementation Guide: 3.9.2.3 Representation of "status" values
	The template identifier for a medication status observation is 2.16.840.1.113883.10.20.1.47.
	CONF-350: A medication activity MAY contain exactly one medication status observation.
	CONF-351: A supply activity MAY contain exactly one medication status observation
	CONF-352: A medication status observation (templateId 2.16.840.1.113883.10.20.1.47) SHALL be a conformant status observation (templateId 2.16.840.1.113883.10.20.1.57) (as defined in section 5.1 "Type" and "Status" values).
	5.1 "Type" and "Status" values: (excerpts)
	ASTM CCR defines restricted Type and Status value sets to further define observations in many of the CCR sections. … A complete mapping between all ASTM CCR Type and Status values and their corresponding RIM (potentially coupled with SNOMED CT, LOINC, etc) representations is beyond the scope of this specification.
	
	[Note: ASTM CCR Imp Guide: Status values: **Active, On Hold, Prior History No Longer Active***]*
	
	CONF-353: The value for "Observation / value" in a medication status observation SHALL be selected from Value Set 2.16.840.1.113883.1.11.20.7 MedicationStatusCode STATIC 20061017.
	
	Figure 2-35 Status of Medication Example
	`<!-- These examples assume the default namespace is 'urn:hl7-org:v3' -->`
	`<substanceAdministration classCode='SBADM' moodCode='INT'>`
	`…`
	`<entryRelationship typeCode='REFR'>`
	`<observation classCode='OBS' moodCode='EVN'>`
	`<code code='33999-4' displayName='Status'`
	`codeSystem='2.16.840.1.113883.6.1' codeSystemName='LOINC'/>`
	`<statusCode code='completed'/>`
	`<value xsi:type='CE' code='55561003' displayName='Active'`
	`codeSystem='2.16.840.1.113883.6.96' codeSystemName='SNOMED CT'/>`
	`</observation>`
	`</entryRelationship>`
	`…`
	`</substanceAdministration>`

CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)	
Potential Interactions	*Potential interaction:* It does not appear that the standard enables capturing of *potential* interactions considered during the prescribing process (drug/drug, drug/adverse reaction, drug/dose, etc.) -------- *Related: CCD enables capturing of actual reactions, or absence of reaction, once the patient has started the medication:* *3.9.2.2.5 Reaction observations and interventions* *A reaction represents an adverse event due to an administered substance. Significant reactions are to be listed in the Alerts section. Reactions in the Medications section can be used to track reactions associated with individual substance administrations or to track routine follow up to an administration (e.g. "no adverse reaction 30 minutes post administration").* *The reaction observation (templateId 2.16.840.1.113883.10.20.1.54) and severity observation (templateID 2.16.840.1.113883.10.20.1.55) templates are defined above, in the Alerts section (see section 3.8.2.4 Reaction observations and interventions).* *CONF-348: A medication activity MAY contain one or more reaction observations (templateId 2.16.840.1.113883.10.20.1.54), each of which MAY contain exactly one severity observation (templateId 2.16.840.1.113883.10.20.1.55) AND/OR one or more reaction interventions.* *CONF-349: The value for "entryRelationship / @typeCode" in a relationship between a medication activity and reaction observation SHALL be "CAUS" "Is etiology for" 2.16.840.1.113883.5.1002 ActRelationshipType STATIC.*
Directions	
Free Text Sig (Text: O: Coded: n/a)	*C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements* **CDA Data Location** — **HITSP Data Element ID/Name** — **Opt** — **Constraint** cda:text — 8.01 - Free Text Sig — O — 2.2.2.8.2 2.2.2.8.2 Free Text Sig Constraints Figure 2-27 Free Text Sig Example

```
<!-- These examples assume the default namespace is 'urn:hl7-org:v3' -->
<section>
    …
  <text>
      …
    <content ID='sig-1'> Acetaminophen 325 mg tablet tid po prn</content>
      …
  </text>
    …
  <entry>
    <substanceAdministration classCode='SBADM' moodCode='INT'>
      <templateId root='2.16.840.1.113883.10.20.1.24'/>
      <templateId root='2.16.840.1.113883.3.88.11.83.8'/>
      <templateId root='1.3.6.1.4.1.19376.1.5.3.1.4.7'/>
        …
      <text><reference value='#sig-1'/></text>
        …
    </substanceAdministration>
  </entry>
</section>
```

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Delivery Method

(Text: O: Coded: O)</td><td>C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:code/@code | 8.12 - Delivery Method | O | 2.2.2.8.9

2.2.2.8.9 Delivery Method Constraints
Please note that HITSP has not specified a vocabulary for Delivery Method because ongoing harmonization work with the NCPDP Industry SIG Task Force and the e-Prescribing pilots has not yet published results.
C83-[DE-8.12-CDA-1] The Delivery Method MAY be recorded in the <cda:code> element
C83-[DE-8.12-CDA-2] The free text description of the delivery method MAY be included within a <cda:originalText> element beneath the <cda:code> element</td></tr>
<tr><td>Delivery Method Modifier (n/a)</td><td>Concept not directly supported in C32 CCD. Potentially could include with free text description of delivery method.</td></tr>
<tr><td>Dose Unit of Administration (O)</td><td>C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:doseQuantity | 8.08 – Dose | O/N | 2.2.2.8.6

2.2.2.8.6 Dose Constraints
The units of presentation can be found at www.fda.gov, and include only those terms that have not been mapped to Unified Code for Units of Measure (UCUM). Terms with mappings to UCUM are units of administration.

C154-[DE-8.08-1] Units MAY be present when needed. If present it SHALL be coded as specified in HITSP/C80 Section 2.2.3.6.6 Units of Measurement
C80 2.2.3.6.6: Units of measure concepts that includes atomic UCUM units as well as UCUM expression. Commonly used UCUM units of measure concepts can be obtained from UCUM Web Site http://aurora.regenstrief.org/~ucum/ucum.html#datyp2apdxatblxmp
C154-[DE-8.08-2] When the coded product or brand name describes the strength or concentration of the medication, and the dosing is in administration units (e.g., 1 tablet, 2 capsules), units SHOULD contain the preferred name of the presentation units within braces { } using the units of presentation from the NCI Thesaurus

Figure 2-30 Dose Examples
<!-- These examples assume the default namespace is 'urn:hl7-org:v3' -->
<!-- example 1, dose is in units of tablets -->
<code code='' displayName='Acetaminophen 325 mg tablet'
codeSystem='2.16.840.1.113883.6.88' codeSystemName='RxNorm'/>
…
<doseQuantity value='1' unit='{TABLET}'/>

<!-- example 2, dose is in measurable units -->
<code code='' displayName='Tylenol'
codeSystem='2.16.840.1.113883.6.88' codeSystemName='RxNorm'/>
…
<doseQuantity value='325' unit='mg'/></td></tr>
</table>

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Maximum Dose Unit of Administration (O)</td><td>C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:maxDoseQuantity | 8.10 - Dose Restriction | O/Y | none

Code as described in DoseQuantity, above</td></tr>
<tr><td>Route of Administration (O)</td><td>C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:routeCode/@code | 8.07 – Route | O/Y | 2.2.2.8.5

2.2.2.8.5 Route of Administration Constraints
C83-[DE-8.07-CDA-1] SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.4.1 Medication Route FDA.
C80 2.2.3.3.4.1: This indicates the method for the medication received by the individual (e.g., by mouth, intravenously, topically, etc). NCI concept code for route of administration: C38114

[Note that the IHE PCC recommends use of the HL7 RouteOfAdministration code set, in conflict with the HITSP recommendation:]
IHE Patient Care Coordination Technical Framework Volume 2 Rev 5.0:
6.3.4.16.13 <routeCode code=' ' displayName=' ' codeSystem='2.16.840.1.113883.5.112' codeSystemName='RouteOfAdministration'>
The <routeCode> element specifies the route of administration using the HL7 RouteOfAdministration vocabulary. A code must be specified if the route is known, and the displayName attribute should be specified. If the route is unknown, this element shall not be sent.

Figure 2-29 Route of Administration Example
…
<routeCode code='C38288' displayName='ORAL'
codeSystem='2.16.840.1.113883.3.26.1.1' codeSystemName='NCI Thesaurus'/>
…</td></tr>
<tr><td>Site of Administration (O)</td><td>C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:approachSiteCode/@code | 8.09 - Site | O/Y | 2.2.2.8.7

2.2.2.8.7 Site Constraints
C154-[DE-8.09-1] The Site SHALL be coded as specified in HITSP/C80 Section 2.2.3.2.1 Body Site
C80 2.2.3.2.1: Shall contain a value descending from the SNOMED CT® Anatomical Structure (91723000) hierarchy or Acquired body structure (body structure) (280115004) or Anatomical site notations for tumor staging (body structure) (258331007) or Body structure, altered from its original anatomical structure (morphologic abnormality) (118956008) or Physical anatomical entity (body structure) (91722005). This indicates the anatomical site</td></tr>
</table>

CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)	
Frequency Time Period (O)	*C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements* **CDA Data Location** **HITSP Data Element ID/Name** **Opt** **Constraint** cda:effectiveTime[2] 8.04 – Frequency O/Y 2.2.2.8.4 2.2.2.8.4 Administrative Timing Constraints The HL7 data type for PIVL_TS uses the institutionSpecified attribute to indicate whether it is the interval (time between dosing), or frequency (number of doses in a time period) that is important. If instititutionSpecified is not present or is set to false, then the time between dosing is important (every 8 hours). If true, then the frequency of administration is important (e.g., 3 times per day). C83-[DE-8-CDA-3] The first <effectiveTime> SHALL use the IVL_TS data type unless for a single administration, in which case, it SHALL use the TS data type C83-[DE-8.04-CDA-1] Medications that are administered at a specified frequency SHALL record the expected interval between doses in the <period> element beneath an <effectiveTime> of type PIVL_TS. The <effectiveTime> element SHALL have an institutionSpecified attribute value of "true" Figure 2-28 Administration Timing Examples <!-- These examples assume the default namespace is 'urn:hl7-org:v3' --> <!-- twice a day for 10 days from 2/1/07 to 2/10/07 --> <effectiveTime xsi:type='IVL_TS'> <low value='20070201'/> <high value='20070210'/> </effectiveTime> <effectiveTime xsi:type='PIVL_TS' institutionSpecified='true' operator='A'> <period value='12' unit='h' /> </effectiveTime> <!-- Once, on 2005-09-01 at 1:18am. --> <effectiveTime value='200509010118'/> <!-- Three times a day, for 10 days from 2/1/07 to 2/10/07 --> <effectiveTime xsi:type='IVL_TS'> <low value='20070201'/> <high value='20070210'/> </effectiveTime> <effectiveTime xsi:type='PIVL_TS' institutionSpecified='true' operator='A'> <period value='8' unit='h' /> </effectiveTime>

CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)	
Interval Time Period (O)	*C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements* **CDA Data Location** **HITSP Data Element ID/Name** **Opt** **Constraint** cda:effectiveTime[2] 8.04 – Frequency O/Y 2.2.2.8.4 *See below for 2.2.2.8.4 content related to administration based on activities of daily living* 2.2.2.8.4 Administrative Timing Constraints The HL7 data type for PIVL_TS uses the institutionSpecified attribute to indicate whether it is the interval (time between dosing), or frequency (number of doses in a time period) that is important. If instititutionSpecified is not present or is set to false, then the time between dosing is important (every 8 hours). If true, then the frequency of administration is important (e.g., 3 times per day). C83-[DE-8.05-CDA-1] Medications that are administered at a specified interval SHALL record interval between doses in the <period> element beneath an <effectiveTime> element of type PIVL_TS. The <effectiveTime> element SHALL have an institutionSpecified attribute value of "false" PIVL_TS definition includes: “Legal values for the unit attribute of <period> are s, min, h, d, wk and mo representing seconds, minutes, hours, days, weeks, and months respectively.” Figure 2-28 Administration Timing Examples <!-- every 12 hours for 10 days from 2/1/07 to 2/10/07 --> <effectiveTime xsi:type='IVL_TS'> <low value='20070201'/> <high value='20070210'/> </effectiveTime> <effectiveTime xsi:type='PIVL_TS' institutionSpecified='false' operator='A'> <period value='12' unit='h' /> </effectiveTime> <!-- every 8 hours for 10 days from 2/1/07 to 2/10/07 --> <effectiveTime xsi:type='IVL_TS'> <low value='20070201'/> <high value='20070210'/> </effectiveTime> <effectiveTime xsi:type='PIVL_TS' institutionSpecified='false' operator='A'> <period value='8' unit='h' /> </effectiveTime>

CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)	
Administration Timing (descriptive or based on activities of daily living) (O)	*C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements* **CDA Data Location** **HITSP Data Element ID/Name** **Opt** **Constraint** cda:effectiveTime[2] 8.03 - Administration Timing O/Y 2.2.2.8.4 *See above for 2.2.2.8.4 content related to frequency, interval, or one-time administration* C83-[DE-8.03-CDA-1] Medications that are administered based on activities of daily living SHALL identify the events that trigger administration in the <event> element beneath the <effectiveTime> element. The <effectiveTime> element SHALL be of type EIVL_TS **IHE Patient Care Coordination Technical Framework Volume 2 Rev 5.0: 6.3.4.16.12.2 Data types used in Frequency Specifications.** An xsi:type of EIVL_TS represents an event based time interval, where the event is not a precise time, but is often used for timing purposes (e.g. with meals, between meals, before breakfast, before sleep). Refer to the ***HL7 TimingEvent vocabulary*** for the codes to use for the <event> element. This interval may specify an <offset> which provides information about the time offset from the specified event (e.g., <offset><low value='-1' unit='h'/><width value='10' unit='min'/></offset> means 1 hour before the event. In that same example, the <width> element indicates the duration for the dose to be given.

TimingEvent					
Lvl	**Type, Domain name and/or Mnemonic code**	**Concept ID**	**Mnemonic**	**Print Name**	**Definition/Description**
1	L: (AC)	10708	AC	AC	before meal (from lat. ante cibus)
1	L: (ACD)	10712	ACD	ACT	before lunch (from lat. ante cibus diurnus)
1	L: (ACM)	10711	ACM	ACM	before breakfast (from lat. ante cibus matutinus)
1	L: (ACV)	10713	ACV	ACV	before dinner (from lat. ante cibus vespertinus)
1	L: (HS)	10707	HS	HS	the hour of sleep
1	L: (IC)	10710	IC	IC	between meals (from lat. inter cibus)
1	L: (ICD)	10718	ICD	ICD	between lunch and dinner
1	L: (ICM)	10717	ICM	ICM	between breakfast and lunch
1	L: (ICV)	10719	ICV	ICV	between dinner and the hour of sleep
1	L: (PC)	10709	PC	PC	after meal (from lat. post cibus)
1	L: (PCD)	10715	PCD	PCD	after lunch (from lat. post cibus diurnus)
1	L: (PCM)	10714	PCM	PCM	after breakfast (from lat. post cibus matutinus)
1	L: (PCV)	10716	PCV	PCV	after dinner (from lat. post cibus vespertinus)

Figure 2-28 Administration Timing Examples

```
<!-- in the morning for 10 days from 2/1/07 to 2/10/07 -->
    <effectiveTime xsi:type='IVL_TS'>
        <low value='20070201'/>
        <high value='20070210'/>
    </effectiveTime>
```

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Duration
Period
(O)</td><td>C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location HITSP Data Element ID/Name Opt Constraint
cda:effectiveTime[2] 8.06 – Duration O/Y 2.2.2.8.4

IHE Patient Care Coordination Technical Framework Volume 2 Rev 5.0: 6.3.4.16.12.2 Data types used in Frequency Specifications:
PIVL_TS. An xsi:type of PIVL_TS is the most commonly used, representing a periodic interval of time. The <low> element of <phase> may be present. If so it specifies the starting point, and only the lower order components of this value are relevant with respect to the <period>. The <width> element represents the duration of the dose administration (e.g., for IV administration). The <period> indicates how often the dose is given. Legal values for the unit attribute of <period> are s, min, h, d, wk and mo representing seconds, minutes, hours, days, weeks, and months respectively.

Figure 2-28 Administration Timing Examples
<!-- Every day at 8 in the morning for 10 minutes for 10 days from 2/1/07 to 2/10/07 -->
<effectiveTime xsi:type='IVL_TS'>
<low value='20070201'/>
<high value='20070210'/>
</effectiveTime>
<effectiveTime xsi:type='PIVL_TS' operator='A'>
<phase>
<low value="198701010800" inclusive="true"/>
<width value="10" unit="min"/>
</phase>
<period value='1' unit='d'/>
</effectiveTime></td></tr>
<tr><td>Rate of
Administration
(O)</td><td>No guidance in C80 or C83

IHE Patient Care Coordination Technical Framework Volume 2 Rev 5.0:
6.3.4.16.17 <rateQuantity><low value=' ' unit=' '/><high value=' ' unit=' '/></rateQuantity>
The rate is specified in the <rateQuantity> element. The rate is given in units that have measure over time. In this case, the units should be specified as a string made up of a unit of measure (see doseQuantity above), followed by a slash (/), followed by a time unit (s, min, h or d). Again, if a range is given, then the <low> and <high> elements contain the lower and upper bound of the range, otherwise, they contain the same value.</td></tr>
<tr><td>Calculated
Dose Time
Period
(unknown)</td><td>No guidance specific to calculated dose in C80, C83 IHE PCC Technical Framework Vol. 2 Rev 5.0
PIVL_TS definition includes: “Legal values for the unit attribute of <period> are s, min, h, d, wk and mo representing seconds, minutes, hours, days, weeks, and months respectively.”</td></tr>
</table>

CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)	
Maximum Dose Time Period	*No guidance specific to max dose time period in C80, C83 IHE PCC Technical Framework Vol. 2 Rev 5.0* *Per HL7 RIM Version: V 02-07 (12/9/2004):* 3.1.17.6 SubstanceAdministration.maxDoseQuantity :: SET<RTO> (0..*) Definition:Identifies the maximum total quantity of a therapeutic substance that may be administered to a subject over the period of time. *Discussion:* This attribute is particularly useful where the allowed dosage is specified as a range or the timing is variable or PRN (as needed). It provides an overall limit on the quantity that may be administered in a period of time. Multiple occurrences of maxDoseQuantity may be used to indicate different limits over different time periods. *Examples:* 500 mg/day; 1200mg/week. *Constraints:* invariant(SubstanceAdministration med, RTO max) where med.maxDoseQuantity.contains(max) {max.numerator.compares(med.doseQuantity); max.denominator.compares(1 s);} Numerator must be in units comparable to doseQuantity and **denominator must be a measurement of time.** PIVL_TS definition includes: “Legal values for the unit attribute of <period> are s, min, h, d, wk and mo representing seconds, minutes, hours, days, weeks, and months respectively.”

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Indication
(O)</td><td>
C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:entryRelationship[@typeCode='RSON']/ cda:observation[cda:templateId/@root= '2.16.840.1.113883.10.20.1.28'] | 8.21 - Indication | O/Y | 2.2.2.8.18

2.2.2.8.18 Indication Constraints
C83-[DE-8.20-CDA-1] The indication SHALL be recorded using the Indication <observation> described in Section 3.9.2.2.1 of the HL7 Continuity of Care Document Implementation Guide, and which conforms
C83-[DE-8.20-CDA-2] The indication <observation> SHALL contain a <text> element that includes a <reference> element whose value attribute points to the narrative text that is the indication for the medication
C154-[DE-8.20-1] The indication SHALL be coded as specified in HITSP/C80 Section 2.2.3.1.1 Problem
C80 2.2.3.1.1: Describes the problem. The SNOMED CT® has been limited by HITSP to terms descending from the Clinical Findings (404684003) or Situation with Explicit Context (243796009) hierarchies.

Figure 2-36 Indication Example
<pre>
<!-- These examples assume the default namespace is 'urn:hl7-org:v3' -->
<substanceAdministration classCode='SBADM' moodCode='INT'>
    …
  <entryRelationship typeCode="RSON">
    <observation classCode="OBS" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.1.28"/>
       <code code='' displayName=''
          codeSystem='2.16.840.1.113883.6.96' codeSystemName='SNOMED CT'/>
      <text><reference value="#indication-1"/></text>
      <statusCode code="completed"/>
      <effectiveTime value="…"/>
    </observation>
  </entryRelationship>
    …
</substanceAdministration>
</pre>
</td></tr>
<tr><td>Indication Precursor Text (unknown)</td><td>No guidance in C80, C83 IHE PCC Technical Framework Vol. 2 Rev 5.0
Unknown whether supported</td></tr>
<tr><td>Indicate Medication Stopped (O)</td><td>
C83: 2.2.2.8 MEDICATION. Table 2-12 Medication… Data Mapping Table Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:effectiveTime[1]/cda:high | 8.02 - Indicate Medication Stopped | O/N | 2.2.2.8.3

2.2.2.8.3 Indicate Medication Stopped Constraints
The time at which the medication was stopped is determined based on the content of the <high> element of the first <effectiveTime> element.
</td></tr>
</table>

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td colspan="2">Adverse Reaction</td></tr>
<tr><td>Section</td><td>2.2.1.2 ALLERGIES AND OTHER ADVERSE REACTIONS SECTION (C32 p22)
The Allergies and Other Adverse Reactions Section contains data on the substance intolerances and the associated adverse reactions suffered by the patient. At a minimum, currently active and any relevant historical allergies and adverse reactions shall be listed. The template identifier for this section is 2.16.840.1.113883.3.88.11.83.102

C83-[CT-102-1] The allergies and other adverse reactions section SHALL include entries from the Allergy/Drug Sensitivity module
C83-[CT-102-2] This section SHALL conform to the IHE Allergies and Other Adverse Reactions Section template, and SHALL contain a templateId element whose root attribute is 1.3.6.1.4.1.19376.1.5.3.1.3.13

2.2.2.6.1 Allergy/Drug Sensitivity Module Constraints (C83 p47)
C83-[DE-6-CDA-1] A CDA Document SHALL declare conformance for the Allergy/Drug Sensitivity Module by including a <templateID> element with the root attribute set to the value 2.16.840.1.113883.3.88.11.83.6
C83-[DE-6-CDA-2] All allergy entries SHALL conform to the IHE PCC Allergy and Intolerance Concern template by including a <templateID> element with the root attribute set to the value 1.3.6.1.4.1.19376.1.5.3.1.4.5.3</td></tr>
<tr><td>Type of Allergy or Adverse Reaction (R)</td><td>C83: Table 2-10 Allergy/Drug Sensitivity Data Mapping Table – Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:code/@code | 6.02 - Adverse Event Type | R/N | 2.2.2.6.2

2.2.2.6.2 Adverse Event Vocabulary Constraints
C154-[DE-6.02-1] Adverse event types SHALL be coded as specified in HITSP/C80 Section 2.2.3.4.2 Allergy/Adverse Event Type
C80 2.2.3.4.2: The SNOMED CT has been limited by HITSP to the value set reproduced below in Table 2-86 Allergy/Adverse Event Type Value Set Definition

Table 2-86 Allergy/Adverse Event Type Value Set Definition
<table>
<tr><th>Concept Code</th><th>Concept Name (SNOMED Fully Specified Name)</th><th>Definition</th><th>Usage Note</th></tr>
<tr><td>420134006</td><td>Propensity to adverse reactions (disorder)</td><td>Not Available</td><td>Propensity to adverse reactions</td></tr>
<tr><td>418038007</td><td>Propensity to adverse reactions to substance (disorder)</td><td>Not Available</td><td>Propensity to adverse reactions to substance</td></tr>
<tr><td>419511003</td><td>Propensity to adverse reactions to drug (disorder)</td><td>Not Available</td><td>Propensity to adverse reactions to drug</td></tr>
<tr><td>418471000</td><td>Propensity to adverse reactions to food (disorder)</td><td>Not Available</td><td>Propensity to adverse reactions to food</td></tr>
<tr><td>419199007</td><td>Allergy to substance (disorder)</td><td>Not Available</td><td>Allergy to substance</td></tr>
<tr><td>416098002</td><td>Drug allergy (disorder)</td><td>Not Available</td><td>Drug allergy</td></tr>
<tr><td>414285001</td><td>Food allergy (disorder)</td><td>Not Available</td><td>Food allergy</td></tr>
<tr><td>59037007</td><td>Drug intolerance (disorder)</td><td>Not Available</td><td>Drug intolerance</td></tr>
<tr><td>235719002</td><td>Food intolerance (disorder)</td><td>Not Available</td><td>Food intolerance</td></tr>
</table></td></tr>
</table>

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Medication product
(R if known)</td><td>C83: Table 2-10 Allergy/Drug Sensitivity Data Mapping Table – Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:participant[@typeCode='CSM']/ cda:code/@code | 6.04 - Product Coded | R2/N | 2.2.2.6.3

2.2.2.6.3 Product Coded Vocabulary Constraints
C154-[DE-6.04-1] Food and substance allergies SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.11 Ingredient Name
C80 2.2.3.3.11: Unique identifiers for active drug ingredient [UNII]
C154-[DE-6.04-2] Allergies to a class of medication SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.9 Medication Drug Class
C80 2.2.3.3.9: Shall contain a value descending from the NDF-RT concept types of “Mechanism of Action - N0000000223”, “Physiologic Effect - N0000009802” or “Chemical Structure - N0000000002”`. NUI will be used as the concept code
C154-[DE-6.04-3] Allergies to a specific medication SHALL be coded as specified in HITSP/C80 Section 2.2.3.3.7 Medication Brand Name or HITSP/C80 Section 2.2.3.3.8 Medication Clinical Drug Names.
C80 2.2.3.3.8: Shall contain RxNorm normal forms for concepts type of “Ingredient Name” [term type: SCD] or Generic Packs [term type: GPCK]</td></tr>
<tr><td>Reaction
(R if known)</td><td>C83: Table 2-10 Allergy/Drug Sensitivity Data Mapping Table – Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:entryRelationship[@typeCode='MFST']/ cda:observation[templateId/@root= '2.16.840.1.113883.10.20.1.54'] cda:value/@code | 6.06 - Reaction Coded | R2/N | 2.2.2.6.4

2.2.2.6.4 Reaction Coded Constraints
C154-[DE-6.06-1] The reaction SHALL be coded as specified in HITSP/C80 Section 2.2.3.4.1 Allergy/Adverse Event (Reaction)
C80 2.2.3.4.1: Allergy/Adverse Event (Reaction). This indicates the reaction that may be caused by the product or agent. See 2.2.3.1.1 Problem
C80 2.2.3.1.1: Describes the problem. The SNOMED CT has been limited by HITSP to terms descending from the Clinical Findings (404684003) or Situation with Explicit Context (243796009) hierarchies.</td></tr>
</table>

<table>
<tr><th colspan="4">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Reaction Severity (R if known)</td><td colspan="3">CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:entryRelationship[@typeCode='SUBJ']/ cda:observation[templateId/@root= '2.16.840.1.113883.10.20.1.55'] cda:value/@code | 6.08 - Severity Coded | R2/N | 2.2.2.6.5

2.2.2.6.5 Severity Coded Constraints
C154-[DE-6.08-1] The severity of the adverse event SHALL be coded as specified in HITSP/C80 Section 2.2.3.4.3 Allergy/Adverse Event Severity
C80 2.2.3.4.3: Allergy/Adverse Event Severity. This is a description of the level of the severity of the allergy or intolerance. See 2.2.3.1.6 Problem Severity
C80 2.2.3.1.6: The SNOMED CT has been limited by HITSP to the value set reproduced below in Table 2-67 Problem Severity Value Set Definition. These terms descend from the severities (272141005) concept</td></tr>
<tr><td>Problem / Condition</td><td colspan="3"></td></tr>
<tr><td>Section</td><td colspan="3">2.2.1.3 PROBLEM LIST SECTION
The Problem List Section contains data on the problems currently being monitored for the patient. The template identifier for this section is 2.16.840.1.113883.3.88.11.83.103
C83-[CT-103-1] The problem list section SHALL include entries from the Condition module
C83-[CT-103-2] This section SHALL conform to the IHE Active Problems Section template, and SHALL contain a templateId element whose root attribute is 1.3.6.1.4.1.19376.1.5.3.1.3.6

Condition Module: The template identifier for this module is 2.16.840.1.113883.3.88.11.83.7
cda:act[cda:templateId/@root= '2.16.840.1.113883.10.20.1.27']/ cda:entryRelationship[@typeCode='SUBJ']/</td></tr>
<tr><td>Diagnosis Priority (R if known)</td><td colspan="3">C83: Table 2-11 Conditions Data Mapping Table – Requirements
CDA Data Location | HITSP Data Element ID/Name | Opt | Constraint
cda:sequenceNumber | 7.10 Diagnosis Priority | R2/N</td></tr>
</table>

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Problem Type
(R if known)</td><td>
C83: Table 2-11 Conditions Data Mapping Table – Requirements
CDA Data Location HITSP Data Element ID/Name Opt Constraint
cda:code/@code 7.02 - Problem Type R2/N 2.2.2.7.3

2.2.2.7.3 Problem Type Constraints
C154-[DE-7.02-1] The problem type SHALL be coded as specified in HITSP/C80 Section 2.2.3.1.2 Problem Type
C80 2.2.3.1.2: The SNOMED CT has been limited by HITSP to the value set reproduced below in Table 2-60 Problem Type Value Set Definition. This indicates the level of medical judgment used to determine the existence of a problem
Table 2-60 Problem Type Value Set Definition
<table>
<tr><th>Concept Code</th><th>Concept Name
(SNOMED Fully Specified Name)</th><th>Definition</th><th>Usage Note</th></tr>
<tr><td>404684003</td><td>Clinical finding (finding)</td><td>Not Available</td><td>Finding</td></tr>
<tr><td>418799008</td><td>Finding reported by subject or history provider (finding)</td><td>Not Available</td><td>Symptom</td></tr>
<tr><td>55607006</td><td>Problem (finding)</td><td>Not Available</td><td>Problem</td></tr>
<tr><td>409586006</td><td>Complaint (finding)</td><td>Not Available</td><td>Complaint</td></tr>
<tr><td>64572001</td><td>Disease (disorder)</td><td>Not Available</td><td>Condition</td></tr>
<tr><td>282291009</td><td>Diagnosis interpretation (observable entity)</td><td>Not Available</td><td>Diagnosis</td></tr>
<tr><td>248536006</td><td>Finding of functional performance and activity (finding)</td><td>Not Available</td><td>Functional limitation</td></tr>
</table>
Figure 2-23 Problem Type Example
<pre>
<!-- These examples assume the default namespace is 'urn:hl7-org:v3' -->
<observation classCode='OBS' moodCode='EVN'>
  <templateId root='2.16.840.1.113883.10.20.1.28'/>
    …
  <code code='404684003' displayName='Finding'
      codeSystem='2.16.840.1.113883.96' codeSystemName='SNOMED CT'/>
    …
</pre>
</td></tr>
</table>

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Problem Name (Name: R Code: O)</td><td>
C83: Table 2-11 Conditions Data Mapping Table – Requirements
CDA Data Location HITSP Data Element ID/Name Opt Constraint
cda:value/@code 7.04 - Problem Code O/N 2.2.2.7.5

2.2.2.7.5 Problem Code Constraints
C154-[DE-7.04-1] If the code attribute is present, the problem SHALL be coded as specified in HITSP/C80 Section 2.2.3.1.1 Problem
C80 2.2.3.1.1: Describes the problem. The SNOMED CT® has been limited by HITSP to terms descending from the Clinical Findings (404684003) or Situation with Explicit Context (243796009) hierarchies.

Figure 2-25 Problem Code Example
<!-- These examples assume the default namespace is 'urn:hl7-org:v3' -->
<observation classCode='OBS' moodCode='EVN'>
<templateId root='2.16.840.1.113883.10.20.1.28'/>
…
<value xsi:type='CD' code='37796009' displayName='Migraine'
codeSystem='2.16.840.1.113883.96' codeSystemName='SNOMED CT'/>
</observation>

NOTE: Meaningful Use rules allow… (from Table 2A, 45 CFR Part 170)
Stage 1: Applicable HIPAA code set required by law (i.e.,ICD-9-CM); or SNOMED CT®
Stage 2: Applicable HIPAA code set required by law (e.g.,ICD-10-CM) or SNOMED CT®
</td></tr>
</table>

<table>
<tr><th colspan="2">CCD Guidance Excerpts (C32, C83, C80, C154, IHE Patient Care Coordination Technical Framework)</th></tr>
<tr><td>Problem Status (O)</td><td>
C83: Table 2-11 Conditions Data Mapping Table – Requirements
CDA Data Location HITSP Data Element ID/Name Opt Constraint
cda:entryRelationship/cda:observation 7.12 - Problem Status O/N 2.2.2.18.17
[cda:templateId/@root = '2.16.840.1.113883.10.20.1.50']/ value/@code

2.2.2.18.17 Family Member Problem Status
The problem status records whether the indicated problem is active, inactive, or resolved.

C83-[DE-18.25-CDA-1] A problem status observation SHALL conform to the CCD Templates 2.16.840.1.113883.10.20.1.50 and 2.16.840.1.113883.10.20.1.57.
C83-[DE-18.25-CDA-2] A problem status observation SHALL conform to the IHE Template 1.3.6.1.4.1.19376.1.5.3.1.4.1.1 for problem status.
C154-[DE-18.23-1] The problem SHALL be coded as specified in HITSP/C80 Section 2.2.3.1.1 Problem Status [typo: Should be 2.2.3.1.8]
C80 2.2.3.1.8: Shall contain a SNOMED Code from Table 2-70 Problem Status Value Set Definition.

Table 2-70 Problem Status Value Set Definition[7]
<table>
<tr><th>Concept Code</th><th>Concept Name</th><th>Definition</th></tr>
<tr><td>55561003</td><td>Active</td><td>The problem is currently active (as of the time reported) – the problem exists and is a current cause for concern</td></tr>
<tr><td>73425007</td><td>Inactive</td><td>The problem is currently inactive (as of the time reported) – the problem no longer exists as a problem for the patient as of the time of recording (it may reoccur, but that would be a new instance)</td></tr>
<tr><td>413322009</td><td>Resolved</td><td>The problem has been resolved (as of the time reported) - the problem is one that still exists for the patient but is not currently a cause for concern (e.g., diabetes that is under control)</td></tr>
</table>
Figure 2-54 Problem Status Example
<pre>
<entryRelationship typeCode='REFR'>
  <observation classCode='OBS' moodCode='EVN'>
    <templateId root='2.16.840.1.113883.10.20.1.50'/>
    <templateId root='2.16.840.1.113883.10.20.1.57'/>
    <templateId root='1.3.6.1.4.1.19376.1.5.3.1.4.1.1'/>
    <code code='33999-4' displayName='Status'
      codeSystem='2.16.840.1.113883.6.1' codeSystemName='LOINC'/>
    <text><reference value='#cstatus-2'/></text>
    <statusCode code='completed'/>
    <value xsi:type='CD' code='55561003' displayName='Active'
      codeSystem='2.16.840.1.113883.6.96' codeSystemName='SNOMED CT'/>
  </observation>
</entryRelationship>
</pre>
</td></tr>
</table>