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**IHE Patient Care Coordination
Technical Framework Supplement**

10

**Reconciliation of Clinical Content and Care
Providers
(RECON)**

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Rev. 3.2 – Trial Implementation

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Please verify you have the most recent version of this document. See [here](#) for Trial Implementation and Final Text versions and [here](#) for Public Comment versions.

Foreword

30 This is a supplement to the IHE PCC Technical Framework V11.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is published on November 11, 2016 for trial implementation and may be available for testing at subsequent IHE Connectathons. The supplement may be amended based on the results of testing. Following successful testing it will be incorporated into the Patient Care
35 Coordination Technical Framework. Comments are invited and may be submitted at http://www.ihe.net/PCC_Public_Comments.

This supplement describes changes to the existing technical framework documents.

“Boxed” instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume.

40 *Amend Section X.X by the following:*

Where the amendment adds text, make the added text **bold underline**. Where the amendment removes text, make the removed text ~~**bold strikethrough**~~. When entire new sections are added, introduce with editor’s instructions to “add new text” or similar, which for readability are not bolded or underlined.

45

General information about IHE can be found at: <http://ihe.net>.

Information about the IHE Patient Care Coordination domain can be found at: http://ihe.net/IHE_Domains.

50 Information about the organization of IHE Technical Frameworks and Supplements and the process used to create them can be found at: http://ihe.net/IHE_Process and <http://ihe.net/Profiles>.

The current version of the IHE IT Infrastructure Technical Framework can be found at: http://ihe.net/Technical_Frameworks.

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Introduction to this Supplement

185 Reconciliation of electronic clinical information from multiple data sources is a difficult task. It involves managing lists of clinical information that are often larger than most people can keep in working memory. This profile enables information contained in Health Information Systems and Exchanges to be used to support automation of these reconciliation tasks and clinical workflows. This profile explains what information can help reconciliation, and how it can be used to assist healthcare providers to automate this complex task.

Open Issues and Questions

190 FHIR^{®1} Open Issues

1. See question about use of Provenance Resource for reconciliation – what is queried? See FHIR Gforge tracker issue 5660. Is support for reverse include necessary?
 2. Provenance entity.type binding is Required, so no current way to cite a non-FHIR resource as the source used for reconciliation. FHIR DSTU 2 ballot comment is submitted to change the binding to Extensible.
- 195

PCC Open Issues

1. Note to commenters – please note the document item template changes in 6.3.1.D.1 and provide comments.
 2. A content creator is grouped with a reconciliation agent. However, it is not clearly documented how or if the reconciliation Agent has to be grouped with other actors.
 3. C-CDA^{®2} and the use of this profile? Remains an open issue.
- 200

Closed Issues

1. (Closed 07/22/2014) Profile authors seek comments regarding Twinlist approach to reconciliation. Twinlist existing work describes steps taken to perform medication reconciliation that can be examined as a means of automating this process. Silva et al Twinlist Project defined a process in which a reconciliation algorithm is used. The algorithm includes string comparison of the medications being reconciled; parsing of the medication components by using a set of predefined regular expressions built from physical drug forms with common administration idioms resulting in measurable match scores that can be used to determine the acceptable percentage of matching ingredients; use of RxNorm for brand to generic drug matching; attempt to match drugs by their
- 205
210

¹ FHIR is the registered trademark of Health Level Seven International.

² C-CDA is the registered trademark of Health Level Seven International.

215 therapeutic intention computing the conditions the drug is used to treat and then
comparing the conditions rather than the drugs³. Twinlist approach to reconciliation uses
a first pass matching on the entire string. Should this profile attempt to include string
matching in the reconciliation process?

220 Discussion: Reconciliation of coded concepts include string comparisons. Implementers
can certainly include string comparisons as part of their reconciliation process. However,
this should not replace reconciliation of the other pertinent information.

225 2. (Closed 04/30/2014) How will this newer profile relate to the current Reconciliation of
Diagnosis, Allergies and Medications Profile? Will the newer profile supersede the
current Reconciliation of Diagnosis, Allergies and Medications Profile? How will we
handle things that are different in the current Reconciliation of Diagnosis, Allergies and
Medications Profile?

Discussion: Reconciliation of Diagnosis, Allergies and Medications Profile is currently in
trial implementation, not yet final text. Need to make changes to Reconciliation of
Diagnosis, Allergies and Medications Profile and put it back out for public comment.

230 3. (Closed 04/29/2014) Need a way to maintain the original or initial identity of an item.
RECON states – “When reconciling information from an external system, the reconciling
application **SHALL** maintain the first identifier provided for the item as the original
identifier”. Is this a viable approach or is there another way to do this?

235 Discussion: One of the issues with RECON uptake is the output of the reconciliation
information. When the data element comes from a document, the ID of the document is
used as the source. When the data element is the result of a query (such as QED), the
query ID is the source. When the data comes directly from a system, providence will be
lost because there is not a source ID from the system. This is a gap. To fix this, the goal is
to start broad and add the “provenance” Option (source of the data).

240 Within a system, when there are multiple identifiers, the first one is the source system ID.
Within a system, when creating (source ID is created) and updating (instance ID is
modified) data, Source ID and Instance ID are both captured. Need to provide guidance
on how to handle for the purpose of reconciliation.

1. Both IDs are exported
2. The ID that doesn't change has to be the first listed. This would be the source ID
- 245 3. Need to ensure the receiver knows what to do when modifications are made to the
imported data.
4. Need to consider what would happen if the list is used by others

³ Silva, P. B., Bernstam, E., Markowitz, E., Johnson, T., Zhang, J., & Herskovic, J. (2013, October 1). Automated medication reconciliation and complexity of care transitions. GitHub. Retrieved April 1, 2014, from <https://github.com/jherskovic/MedRec>

5. Need to discuss the following to support –

- Import match
- Identity Change
- Export stable identity

250

Discussed further at April F2F and review of Section X.4.1.1 completed

4. (Closed 04/29/2014) Would reconciliation of providers be treated differently than reconciliation of entries in sections? Will we be able to associate the reconciliation act with the provider when reconciliation occurs?

255

Discussion: This is part of volume 2. One option would be to create a section that holds the entry which provides the reconciliation action. The section could contain text stating who the provider is, when the provider cared for the patient, provider role, etc. Another option may be not to list the subject – instead may reference the subject in some way.

260

Resolution: Left providers and participants in the header as is. Adding an optional entry to Coded Care Plan Section and provided ability to state that the providers and participants listed has been reconciled.

5. (Closed 04/29/2014) 6.3.4.E.8 Care Providers Reconciliation ACT (see #3 above)

265

Suggestion to create a new care team members section that will contain care providers. Advantage would have a way to “collect” and “reconcile” care providers. Answer: Decision was not to do this because will provide another place for providers and participants which are already defined in the header.

270

What is the end of result of performers that are reconciled - are we reconciling to make them into care team members? Answer: Place and optional reconciliation act in Coded Care Plan Section to state that the listed provider and participants in the header have been reconciled.

275

Why would we want to tag reconciled care team members when we send a document to someone else? Answer: Will assist in providing a longitudinal view of the patient care providers.

280

Discussion and final solution: Use the providers and participants in the header as is today. Do not add anything to them. When reconciliation occurs, provide an entry in the Care Plan Section (C-CDA v1 Plan of Care) which will be the reconciliation act. Provide a reference to text in that entry to document that the providers and participants have been reconciled and the person doing the reconciliation.

285

6. (Closed 02/12/2014) Change the profile title of Reconciliation of Diagnosis, Allergies and Medications to Reconciliation of Clinical Content and Care Provider. Did not change the acronym (RECON).

7. (Closed 02/12/2014) Source of truth (provenance) – who owns the reconciled data? Is this something that should be addressed with this profile?

Resolution: Local policy determines this. This is not a question this profile can answer. Note that the person performing the reconciliation act takes the same function as author. Reconciliation act uses the responsible party as the participant.

290

8. (Closed 02/12/2014) Reconciliation as a service Vs. Reconciliation at the document level. Does reconciliation have to occur from documents only?

Resolution: Reconciliation agent does the reconciliation work and has the responsibility to do a share content transaction. The key is to be able to identify what did the reconciliation so that this is testable. This is similar to consistent presentation of images and how display is accessible. The goal is to be able to pull information from two sources (one of which can be itself) and present it to the user. As an interoperable profile, there can be input from multiple systems. Need to maintain the original identification of the element so there can be convergence to one identifier.

295

9. (Closed 03/14/2014) Reconciliation of structured templates (templates with entries) – IHE goal template is text only. Can we utilize null flavors and point to the text from the recon Act? Resolution: Utilizing IHE Observation request template (templateID: 1.3.6.1.4.1.19376.1.5.3.1.1.20.3.1) which is a structured template with the moodCode of GOL.

300

10. (Closed 03/31/2014) Review Twinlist doc and compare differences between their reconciliation process and RECON. Twinlist reviewed and added Open issue #1 seeking public comment about Twinlist approach.

305

11. (Closed 04/29/2014) 6.3.4.E.10 Reconciliation Clinical Data Sources need technical revision of this section.

a. If reconciling from a document, will know who the custodian is. However, if importing from outside of a document, will not know who the source is. How will we handle provenance? Answer: the reference is used to get to the source of the reconciled information.

310

b. There are a lot of “SHALL”- need to add some “SHOULD” or COULD or MAY
Resolution: conformance revised.

315

c. What goes in the xml structure? See example in Volume 3, appendix A.

12. (Closed 04/29/2014) What happens after reconciliation of the first list and the same list is received again (i.e., Re-reconciliation): Answer: See 6.3.4.3 – re-reconciling should not occur. The Most recently reconciled list is always retained.

320

13. What FHIR construct should we use to communicate reconciliation elements? The following may be possible options:

a. Create a new “Reconciliation” Resource that can be added to any list?

- 325 (Closed 01/20/2015: Recommendation from the FHIR team is to use Provenance Resource. Target element in Provenance Resource will point to the thing that is being reconciled (e.g., List Resource, Care Plan Resource, Family History Resource, etc.)).
- b. Support as an Extension Definition that can be added to any list? Note, reconciliation occurs in >80 of clinical care list management so reconciliation is more of a norm than an anomaly.
- 330 (Closed 01/20/2015: Per the FHIR team, an Extension Definition is not needed. Agreement that reconciliation is a norm in clinical care for content management.)
- c. List Resource attribute that is optional or required?
- 335 (Closed 01/20/2015: Per FHIR Team, List Resource points to each of the “thing” that would make up the list (e.g., for a medication list, the List Resource points to each Medication Resource on the list). The provenance Resource target will point to the applicable List Resource.)
- How can FHIR profiling and profile (see 6.17.2) be used? This will need binding of some of the value sets.
- (Closed 01/20/2015: Per FHIR Team, profiling can be used to profile the Provenance Resource with attributes specific for reconciliation.)
- 340 14. (Closed 02/24/2015 –Removed) Remove implementation specific wording from Considerations for Reconciliation Section (X.4.2) – CDA^{®4}, FHIR and PCC TF.
15. (Closed 02/24/2015 –Removed) Remove references to “entries”, change to “items”– ‘entries’ is CDA specificity.
- 345 16. (Closed 04/27/2015 – Question addressed in X.1.1.3) What requirements do we have for support of this profile but does not support the Share Content Option – what are the content creator requirements? We had a requirement for the text (who and when). We don’t have this requirement unless you declare the Share Content Option (doing the discrete data). We need to deal with this the same for documents as we do for reconciling FHIR lists.
- 350 17. (Closed 02/24/2015 – Done) Does share content as a transaction cover the use of FHIR query and retrieve? If not, we may need to enhance the existing actor/transaction diagrams
18. (Closed 4/28/15) What should we do about the requirement to provide text (see 6.3.1.D1 # 4)
- 355 ‘Narrative content in document sections containing these reconciliation acts SHALL contain a text element that:
Contains who reconciled the reported information in the section
Contains when the information was reconciled

⁴ CDA is the registered trademark of Health Level Seven International.

- 360 Is referenced by the reconciliation act as described in Section 6.3.4.E.1 below.”
Resolution: see 6.4.1, where text is required for reconciled List.
- 365 19. (Closed 4/28/15) Profiles editors are seeking comment on the use of the meta.profile property to contain the url needed for the reconciliation of clinical content and care provider FHIR profile. The meta.profile property will be a component of the applicable base resource property which will be used by the DomainResource Resource to represent the human readable representation of the reconciliation action content (what was reconciled, by whom and when). It will also contain related resources and provide defined data that will be used by the Provenance Resource which will be profiled for the purpose of communicating the reconciliation of clinical content and care provider.
- Resolution: see 6.4.1
- 370 20. (Closed 4/27/15) Steve’s CP (204) issues:
- a. Need expected actions for Content Creator and Content Consumer
 - b. Do something about overwriting PCC-1 transaction
 - c. Need to take this CP up with the larger group

375

General Introduction

380 *Update the following Appendices to the General Introduction as indicated below. Note that these are not appendices to Volume 1.*

Appendix A - Actor Summary Definitions

Add the following actors to the IHE Technical Frameworks General Introduction list of actors:

No new actors

385 Appendix B - Transaction Summary Definitions

Add the following transactions to the IHE Technical Frameworks General Introduction list of Transactions:

390 Share List – this transaction uses the FHIR List resource query capability to query for and retrieve clinical content lists in FHIR List resource format. When this is used with the RECON Profile then there are additional constraints on the List resource.

Glossary

Add the following glossary terms to the IHE Technical Frameworks General Introduction Glossary:

Glossary Term	Definition
Accountable Care Organization (ACO)	Health care entity which supports an organization of health care providers that agrees to be accountable for improving the health and experience of care for individuals and improving the health of populations while reducing the rate of growth in health care spending ⁵ .
Fast Health Interoperability Resources (FHIR)	The interoperability standard from HL7 ^{®6} which builds on HL7 version 2, version 3, the RIM and CDA. It can be used in conjunction with existing data exchange standards as well as a standalone standard. ⁷
FHIR Resources	The basic building block in FHIR. Used to define exchangeable content. ⁸
FHIR Resource List	Collection of resources in a list which is enumerated while providing features for managing the list. ⁹

⁵ Available on the web at https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/ACO_Summary_Factsheet_ICN907404.pdf

⁶ HL7 is the registered trademark of Health Level Seven International

⁷ Available on the web at <http://hl7-fhir.github.io/overview.html>

⁸ Available on the web at <http://hl7-fhir.github.io/overview.html>

⁹ Available on the web at <http://hl7-fhir.github.io/list.html>

IHE Patient Care Coordination Technical Framework Supplement – Reconciliation of Clinical Content and Care Providers (RECON)

Glossary Term	Definition
FHIR Provenance Resource	Describes the activity that led to the creation of a set of resources. This information can be used to help determine their reliability or trace where the information in them came from. The focus of the provenance resource is record keeping, audit and traceability, and not explicit statements of clinical significance. ¹⁰
FHIR Profile	A statement of use of one or more FHIR Resources. It may include constraints on Resources and Data Types, Terminology Binding Statements and Extension Definitions. ¹¹

395

¹⁰ Available on the web at <http://hl7-fhir.github.io/provenance.html>

¹¹ Available on the web at <http://www.hl7.org/implementation/standards/fhir/profile.html>

Volume 1 – Profiles

Copyright Licenses

Add the following to the IHE Technical Frameworks General Introduction Copyright section:

Not applicable

400 Domain-specific additions

Not applicable

Add Section X

405

X Reconciliation of Clinical Content and Care Providers (RECON) Profile

410 The challenge is that clinical capture or documentation of care information can originate or reside from within a single health care facility or from two or more facilities, and can arise from multiple disciplines. The information can span multiple periods of time and different clinical or social/family events. Multiple pieces of information can be confusing, conflicting, and lead to patient safety issue. The process of reconciling and consolidating clinical data/information and associated metadata from multiple sources can be daunting.

415 **World Health Organization (WHO)** World Alliance for Patient Safety and Collaborating Centre identifies the problems, impact, issues and suggested action for reconciliation accuracy at transitions of care¹². In the United States, clinical information reconciliation is needed as a component of Health Information Technology: Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, 2014 Edition final rule¹³.
420 Australia Department of Health Victoria (Australia) Quality Use of Medicine includes reconciliation of medication as a key patient safety effort¹⁴. Nationally, some regulatory and accrediting organizations require healthcare institutions to reconcile clinical information during every transfer of care, discharge or admission.

425 This profile provides the ability to communicate lists of clinical data that were reconciled, when they were reconciled and who did the reconciliation using CDA constructs and FHIR Resource attributes. Figure X-1 shows a CDA Medication Section with the list of reconciled medications, when they were reconciled and who did the reconciliation. Figure X-2 shows the ability to provide the same information using a FHIR List Resource. Reconciliation of clinical content and care providers can be accomplished with any CDA or FHIR constructed list regardless of implementation guide.

430

¹² WHO Collaborating Centre for Patient Safety Solutions. World Health Organization. http://www.who.int/patientsafety/solutions/patientsafety/collaborating_centre/en/. Accessed April 30, 2014.

¹³ Standards and Certification Regulations 2014 Edition. Health IT Regulations, HIT.gov. <http://www.healthit.gov/policy-researchers-implementers/standards-and-certification-regulations> . Accessed April 30, 2014.

¹⁴ Standard 4: Medication Safety, Safety and Quality Improvement Guide. Australian Commission on Safety and Quality in Health Care, October 2012. http://www.safetyandquality.gov.au/wp-content/uploads/2012/10/Standard4_Oct_2012.rtf . Accessed April 30, 2014.

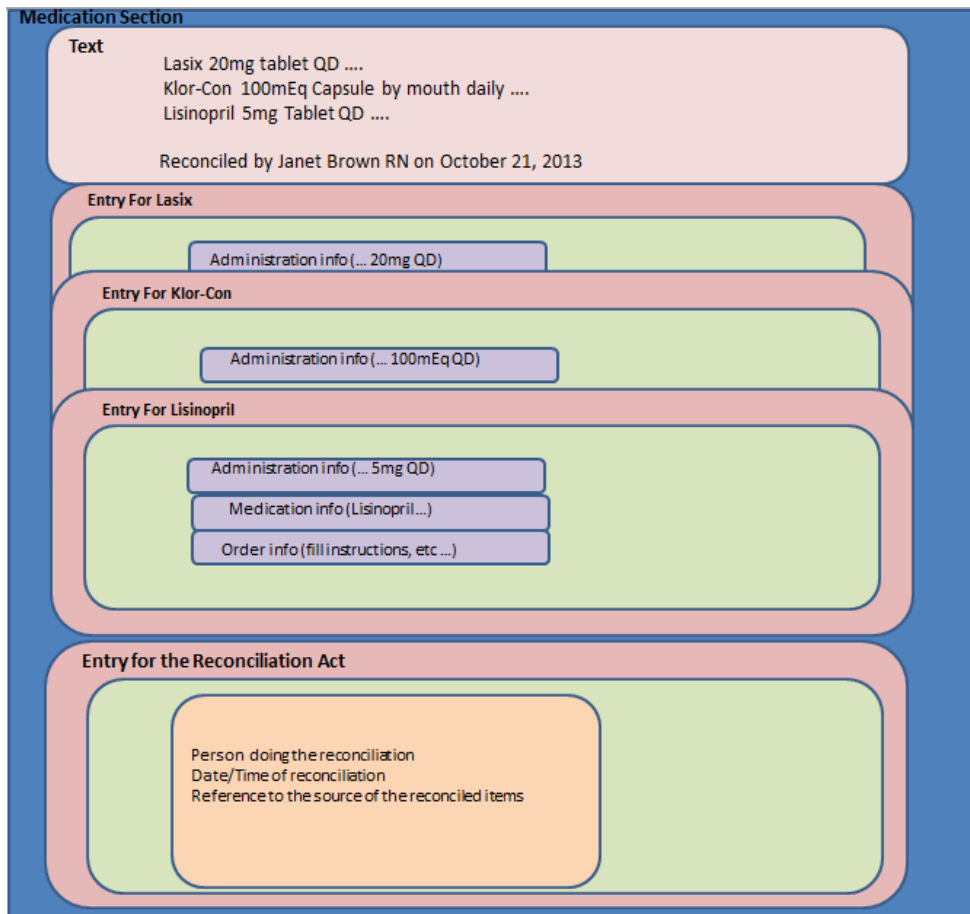


Figure X-1: Example of a Reconciled Medication List

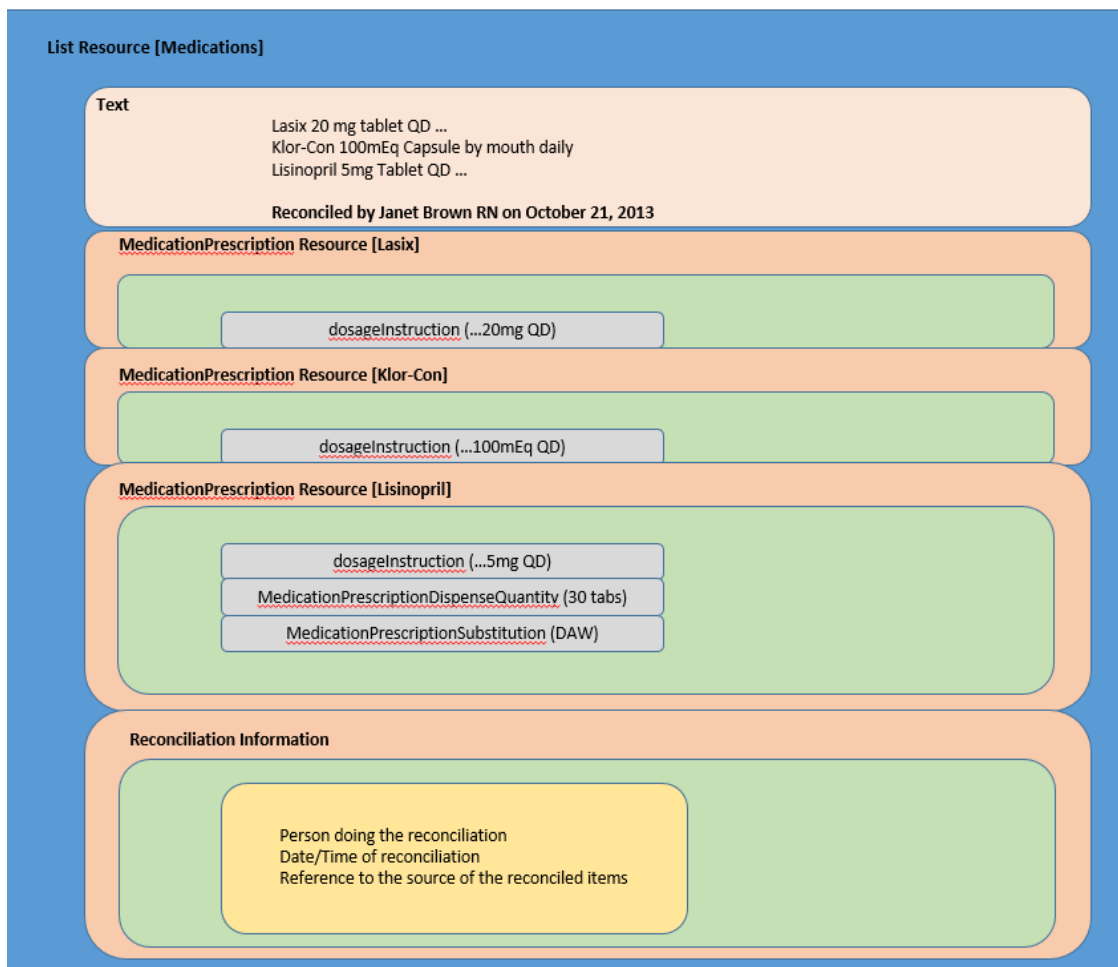


Figure X-2: Example of a FHIR Reconciled Medication List

435

As data is exchanged, the ability to maintain the support of care provision is needed. As an attempt to support the management of care provision, the Reconciliation of Clinical Content and Care Providers Profile (RECON) will identify and examine heuristics that can be used to facilitate identification of duplicated, overlapping, conflicting or superseded items that may be introduced as a result of semantic interoperability.

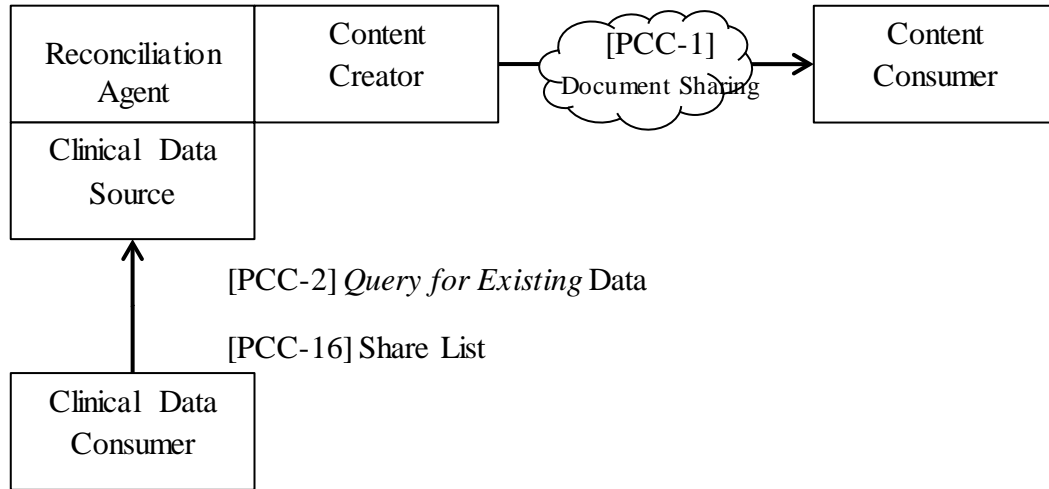
440

X.1 RECON Actors, Transactions, and Content Modules

This section defines the actors, transactions, and/or content modules in this profile. General definitions of actors are given in the Technical Frameworks General Introduction Appendix A at http://www.ihe.net/Technical_Frameworks.

445

Figure X.1-1 shows the actors involved in the Reconciliation Integration Profile and the relevant transactions between them.



450

Figure X.1-1: Reconciliation Actor Diagram

Table X.1-1 lists the transactions for each actor directly involved in the Reconciliation Profile. In order to claim support of this Integration Profile, an implementation must perform the required transactions (labeled “R”). Transactions labeled “O” are optional. A complete list of options defined by this Profile and that implementations may choose to support is listed in Volume 1, Section X.2.

455

Table X.1-1: Reconciliation Integration Profile - Actors and Transactions

Actors	Transactions	Optionality	Section in TF
Reconciliation Agent		N/A	
Content Creator	Share Content [PCC-1]	R	PCC TF-2:3.1
Content Consumer	Share Content [PCC-1]	R	PCC TF-2:3.1
Clinical Data Source	Query Existing Data [PCC-2]	see Note 1	QED :3.2
	Share List [PCC-16]	see Note 2	PCC TF-2:3.16
Clinical Data Consumer	Query Existing Data [PCC-2]	see Note 1	QED :3.2
	Share List [PCC-16]	see Note 2	PCC TF-2:3.16

Note 1 –Support of the QED Option requires support of the Query Existing Data [PCC-2] transaction

460

Note 2 – Support of the FHIR Option requires support of the Share List [PCC-Y] transaction

X.1.1 Actor Descriptions and Actor Profile Requirements

Most requirements are documented in Transactions (Volume 2) and Content Modules (Volume 3). This section documents any additional requirements on profile's actors.

465 Figure X.1-1 shows the actors directly involved in the RECON Profile and the direction that the content is exchanged.

X.1.1.1 Reconciliation Agent

470 The Reconciliation Agent accesses clinical information in structured form. It automatically identifies potentially duplicated, overlapping, conflicting, or superseded information based upon application knowledge and provides that information for presentation to a clinician to complete the reconciliation process.

A Reconciliation Agent shall be able to:

1. Gather clinical data from multiple data sources.
2. Perform reconciliation.
- 475 3. Share the resulting reconciled information with its grouped Content Creator or Clinical Data Source.
4. When matching two entries by universally unique identifier, the reconciling application **SHALL** verify that other details of the reconciled entries are consistent.
- 480 5. More specifically, a reconciling application **SHALL** demonstrate the ability to identify cases where two entries with the same identifier are about the same event, and when they are not, to report it.
6. When reconciling information from an external system, the reconciling application **SHALL** maintain the first identifier provided for the item as the original identifier. It **MAY** provide its own identifiers for the data as well.
- 485 7. When exporting information that came from an external source through reconciliation, the reconciliation application **SHALL** report the original identifier as the first identifier reported for the item.
8. Subsequent identifiers after the first **SHOULD** be retained and reported but are not required by this profile.
- 490 9. The reconciling application **SHALL** report significant inconsistencies between two recorded events that should have the same meaning (e.g., because they have the same identifier) in some way. Reports of these conditions **MAY** be to someone other than the user of the system (e.g., the system administrator, or other appropriate party).
- 495 10. The reconciling application **MAY** require manual reconciliation of the inconsistent entries. It **SHALL** assign a new identifier to each entry containing inconsistent data. The rationale for this requirement is to avoid persisting the conflicting identifiers.

11. When a data item that was added to the system through reconciliation is changed in a way that alters its identity, a new identity **SHALL** be assigned to it.
12. The reconciling application **SHOULD** report the association of the new data item with the reconciled data items that have been superseded since the last reconciliation.
13. When grouped with the Secure Node, the Reconciliation Agent **SHALL**:
 - a. Record reconciliation events from external documents or discrete data as imports in the audit trail.
 - b. Record changes to existing (internal) records as updates in the audit trail.

505 **X.1.1.2 Content Consumer**

The Content Consumer in this profile is similar to content consumers defined in other IHE profiles. It has one requirement, which is that it must be able to consume clinical content and providers as defined in the PCC Technical Framework.

1. The Content Consumer **MAY** implement a content profile supporting a Medical Summary as defined in PCC TF-2:6.3.1.2 Medical Summary.

X.1.1.3 Content Creator

The Content Creator in this profile is similar to content creators defined in other IHE profiles. It has one requirement, which is that it must be able to create content containing, for example, common observations, diagnostic results, problems and allergies, medications, immunizations or professional services as defined in the PCC Technical Framework. This actor should support the Reconciliation Content Option.

1. The Content Creator **SHALL** be grouped with a Reconciliation Agent Actor to obtain reconciled content.
2. The Content Creator **MAY** create content conforming to a profile supporting a Medical Summary as defined in PCC TF-2:6.3.1.2 Medical Summary.
3. The Content Creator **SHOULD** support the Reconciliation Content Option.
4. The Content Creator **SHALL** create a document with at least one reconciled list
5. For every reconciled list within the document, the human readable text **SHALL** contain some indication that the list was reconciled, by whom and when the reconciliation occurred.

X.1.1.4 Clinical Data Source

The Clinical Data Source in this profile is an implementation of the Clinical Data Source in the QED Profile. It has the additional requirement that it must be able to create content containing common observations, diagnostic results, problems and allergies, medications, immunizations or professional services as defined in the Query for Existing Data Profile.

1. The Clinical Data Source SHALL be grouped with a Reconciliation Agent to obtain reconciled content.
- 535 2. If the QED Option is used, the Clinical Data Source SHALL implement either the Common Observations, Diagnostic Results, Problems and Allergies, Medications, Immunizations, Professional Services Options described in IHE PCC Sup-QED: 3.4 or both.
3. The clinical Data Source may support the FHIR Option.
4. The Clinical Data Source SHOULD support the Reconciliation Content Option.
5. The Clinical Data Source SHALL create content with at least one reconciled list
- 540 6. For every reconciled list, the human readable text SHALL contain some indication that the list was reconciled, by whom and when the reconciliation occurred.

X.1.1.5 Clinical Data Consumer

The Clinical Data Consumer in this profile is an implementation of the Clinical Data Consumer in the QED Profile. If the Clinical data consumer implements the QED Option, it has the
 545 additional requirement that it must be able to query for content containing common observations, diagnostic results, problems and allergies, medications, immunizations or professional services using PCC-2, as defined in the Query for Existing Data Profile. If the Clinical Data Consumer implements the FHIR Option, then it has the additional requirement to use PCC-16, Share List.

X.1.2 Content Modules

550 Table X.1.2-1 lists the content module(s) defined in the RECON Profile. To claim support with this profile, an actor shall support all required content modules (labeled “R”) and may support optional content modules (labeled “O”).

Table X.1.2-1: RECON Summary Content Modules

Content Modules	Optionality	PCC Template ID
Reconciliation act	O	1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1
Reconciliation clinical data source	O	1.3.6.1.4.1.19376.1.5.3.1.1.24.3.3
Reconciliation performer	O	1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5.1
RECON Profile Provenance	O	Note1

555 Note 1 – FHIR does not use OIDs or templateId elements. See 6.6.B for Provenance constraints.

X.2 RECON Actor Options

Options that may be selected for this Profile are listed in the Table X.2-1 along with the actors to which they apply. Dependencies between options when applicable are specified in notes.

560

Table X.2-1: RECON - Actors and Options

Actor	Option Name	Reference
Reconciliation Agent	None	N/A
Content Creator	Reconciliation Content Option	PCC TF-1:X.2.1
Content Consumer	None	N/A
Clinical Data Source	Reconciliation Content Option	PCC TF-1:X.2.1
	QED Option	PCC TF-1:X.2.3
	FHIR Option	PCC TF-1:X.2.2
Clinical Data Consumer	QED Option	PCC TF-1:X.2.3
	FHIR Option	PCC TF-1:X.2.2

X.2.1 Reconciliation Content Option

565 A Content Creator or Clinical Data Source supporting the Reconciliation Content Option must include Reconciliation Content (see Section 6.3.1.D) in the document created or query result returned.

X.2.2 FHIR Option

Clinical Data Source and Clinical Data Consumer Actors that implement the FHIR Option implement the Share List [PCC-16] transaction.

570 X.2.3 QED Option

Clinical Data Source and Clinical Data Consumer that implement the QED Option SHALL support the Query Existing Data [PCC-2] transaction.

X.3 RECON Required Actor Groupings

575

Table X.3-1: RECON - Required Actor Groupings

RECON Actor	Actor to be grouped with	Reference	Content Bindings Reference
Content Creator	Reconciliation Agent	PCC TF- 1:X.3.1	None
Clinical Data Source	Reconciliation Agent	PCC TF- 1:X.3.2	None

RECON Actor	Actor to be grouped with	Reference	Content Bindings Reference
Reconciliation Agent	Content Creator Actor or Clinical Data Source	PCC TF- 1:X.3.3	

X.3.1 Content Creator

The Content Creator must be grouped with the Reconciliation Agent.

X.3.2 Clinical Data Source

580 The Clinical Data Source must be grouped with the Reconciliation Agent.

X.3.3 Reconciliation Agent

The Reconciliation Agent must be grouped with either a Content Creator or a Clinical Data Source.

X.4 RECON Overview

585 IHE PCC RECON Profile supports reconciliation of clinical data such as common observations, allergy and intolerances, problems, medications, immunizations, diagnostic results, procedures, encounters, and care providers. A wide variety of systems will need to reconcile clinical data as information is exchanged, stored and maintained in EMR system or other clinical data repository. Reconciled information can prevent information redundancy and can be used to support clinical care, quality reporting, financial transactions, public health reporting, clinical trials, drug interaction checking, and patient qualification for various protocols.

590 This profile builds upon the clinical content templates developed in this IHE PCC Technical Framework. However, it has been designed to work with other clinical content templates developed for producing clinical documents (e.g., the C-CDA in the US, epSOS templates in Europe, and FHIR Resources).

595 The RECON Profile enables information contained in Health Information Systems and Exchanges to be used to support computer assisted reconciliation tasks and clinical workflows. It explains what information can help reconciliation, and how it can be used to assist healthcare providers to automate this complex task.

600 The purpose of this profile is to describe the reconciliation process and identify and examine heuristics that can be used by an application performing reconciliation to facilitate identification of duplicated, overlapping, conflicting or superseded items.

605 RECON provides the ability to reconcile clinical content and care providers that are commonly shared in lists. Clinical content are listed according to things that are of concern (e.g., problem, social history, allergy/reaction, etc.), interventions to address concerns (e.g., medication, plan of care, procedure, encounters, etc.), outcomes of the interventions (e.g., results, goals, etc.) and

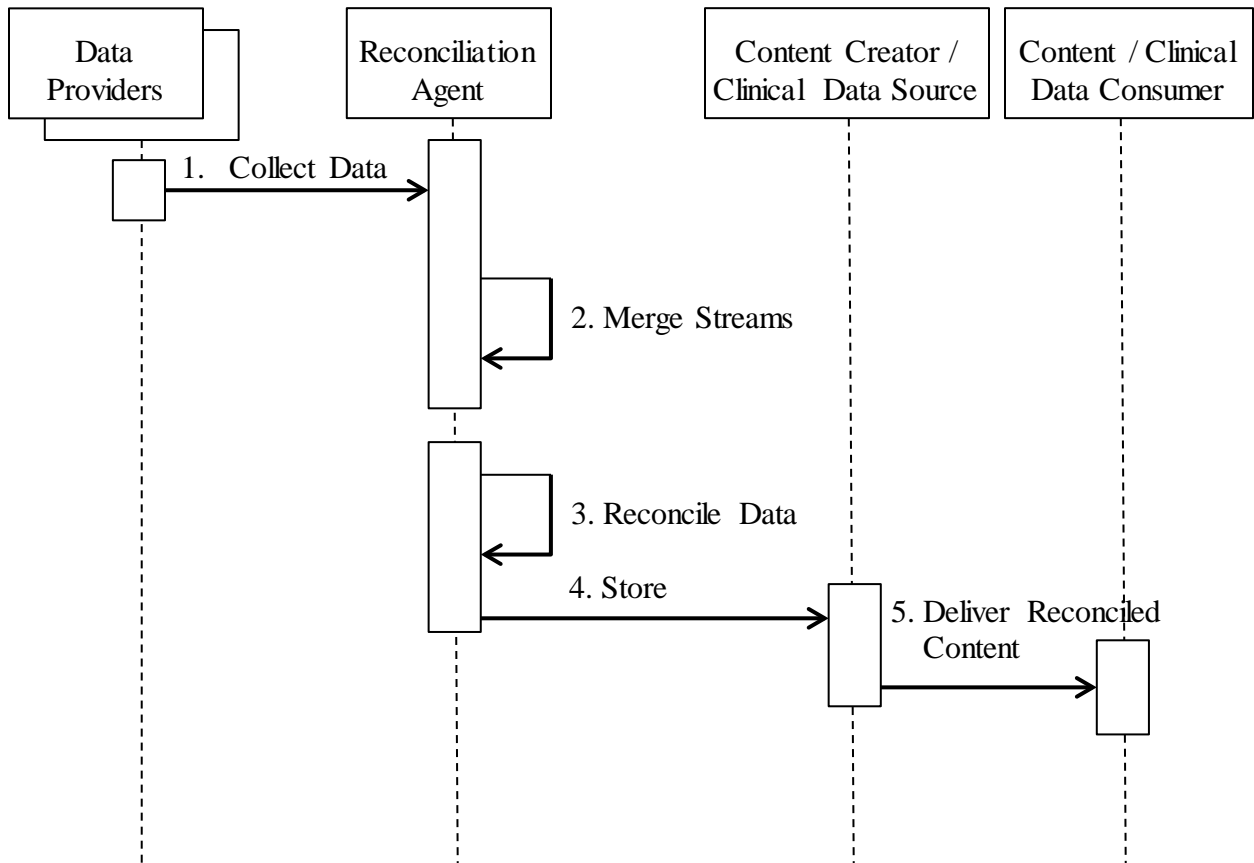
providers that addresses concerns and/or provide interventions (e.g., care team members, pharmacy, etc.).

X.4.1 Process Flow

- 610 There are five steps to the reconciliation process. The numbered steps below correspond to the numbered steps in the diagram that follows.
1. The first step is to gather the information that needs to be reconciled from two or more systems that are providers of data.
 - 615 a. The data in this first step can come from clinical documents created for the patient, including discharge summaries, referral summaries, the history and physical, consultation notes, and Care Plans/Plan of Care documents, et cetera.
 - b. Data may also come from clinical summaries available from the patients’ personal health record or a Health Information Exchange (HIE).
 - 620 c. Data can also be obtained as discrete data from various other clinical data sources, including clinical data repositories, electronic health records and personal health records
 - d. Data might also appear in pharmacy benefit records, and disease/condition specific information registries (e.g., a cancer registry, vaccination repository).
 - e. Provenance data should also be gathered when available.
 - 625 2. The second step automates the identification of any information that has been duplicated, overlaps, conflicts, or has been superseded. This second step identifies and/or produces candidate items to appear into the list of reconciled data that is presented to the healthcare provider as a single merged data stream. The primary purpose of this step is to organize and reduce the quantity of information needing human intervention which includes the
630 consideration of data that is identical, unique or similar. This step is completed by analyzing similarities between the data using clinical knowledge and an understanding of the coding systems and structures used to capture this data.
 - 635 3. The third step involves an interaction with a healthcare provider who confirms, corrects and updates the reconciled list. In this step, the application displays the collection of reconciled data; highlighting issues that need provider attention (e.g., to address ambiguities in interpretation, for example, related but not identical diagnoses, et cetera). At this stage, additional data may be obtained from the patient or their representative to help disambiguate issues identified during the automated process, and add any newly available information.
 - 640 4. The healthcare provider interacts with the application to produce a set of reconciled data that will then be stored for subsequent use.
 5. The resulting lists produced from this process are communicated to an EHR or other Healthcare Information System.

645 It is important to note that during the process of reconciliation, **normalization** of the data may be performed. However, this is out of scope for this profile and provides opportunity for future IHE PCC work.

The diagram below illustrates this process.



650

Figure X.4.1-1: Reconciliation Process Flow

X.4.2 Considerations for Reconciliation

655 This profile does not describe the specific mechanism or algorithm by which the application performing reconciliation identifies duplicated, overlapping, conflicting or superseded items. The RECON automatic reconciliation process should be viewed as an implementation of a clinical decision support service. There are a number of heuristics that can be used to facilitate identification of items that may need attention.

660 There are two risks that require consideration in systems which identify and merge information. If two different systems report the same event and they are not appropriately merged, systems might wind up recording duplicated diagnoses and treatments. In the case of medications, this can result in subsequent over-flagging of the duplicated treatment in the EHR. Negative consequences of over flagging including:

- Overuse of the provider’s time to correct these errors
- Alert fatigue
- 665 • Low morale
- System distrust or minimization of confidence in results of the system
- Implementation of “workarounds” that short-circuit the reconciliation process to avoid consequences.

670 These consequences could lead to the same kinds medical errors that this profile is meant to mitigate.

A second risk is simply the reverse problem. If the system identifies two events as being the same event when they are in fact different, this can result in missed diagnoses or allergies, and failure to identify duplicated treatments which increased toxicity leading to other health complications for the patient.

675 To avoid these risks, we require that systems import the identifiers used in entries, and export these identifiers on output. Using preexisting identifiers consistently enables information systems to identify data that has migrated across systems.

680 There are a number of considerations that implementers should consider when creating these algorithms. The heuristics described below are provided to make implementers aware of the issues and opportunities available within the clinical data provided in IHE profiles to assist in the automation of the reconciliation process. There are a few cases where the RECON Profile mandates a particular behavior of the system implementing the Reconciliation Agent. These are described in numbered conformance requirements in the sections below. We have ordered these heuristics based on the relevance to the reconciliation process.

685 **X.4.2.1 Identity**

Each reconciled item must have at least one universally unique identifier. The identifiers are distinct from the codes which indicate the type of item. The identifier represents that instance of the event and no other, whereas the same code could be applied to two different occurrences of the same event. For example, each prescription ordered for a patient has a universally unique
690 identifier. If two items for a prescription for penicillin contain the same identifier, according to the rules of the standards used, they must represent the same prescription event. That equivalence cannot be assumed when they contain the same drug code (e.g., penicillin).

The identity concept may be approached in multiple ways depending on the source of the data itself.

695 **X.4.2.1.1 Maintenance and Verification of Original Identity**

Universally unique identifiers are the only mechanism by which duplicated items can be reliably located. However, experience has shown that systems cannot rely on the identity alone to ensure consistency. Some cross checks are required.

- 700
1. When matching two items by universally unique identifier, the reconciling application **SHALL** verify that other details of the reconciled items are consistent.
 2. More specifically, a reconciling application **SHALL** demonstrate the ability to identify cases where two items with the same identifier are about the same event, and when they are not, to report it.

705 The best way to ensure consistency when reconciling data across systems is to maintain the identity of items when they are imported into information systems, and to reproduce those identifiers when the items are exported. This ensures that the identifiers used to identify items are maintained as information transitions between information systems.

- 710
1. When reconciling information from an external system, the reconciling application **SHALL** maintain the first identifier provided for the item as the original identifier. It **MAY** provide its own identifiers for the data as well.
 2. Subsequent identifiers after the first **SHOULD** be retained and reported but are not required by this profile.
 3. When exporting information that came from an external source through reconciliation, the reconciliation application **SHALL** report the original identifiers first, and in the same order as presented, before any locally created identifiers.
- 715

Significant differences between two recorded events that should have the same meaning point to an error in implementation somewhere in the systems which contain clinical data for the patient.

- 720
4. The reconciling application **SHALL** report these inconsistencies in some way. Reports of these conditions **MAY** be to someone other than the user of the system (e.g., the system administrator, or other appropriate party).
 5. The reconciling application **MAY** require manual reconciliation of the inconsistent items. It **SHALL** assign a new identifier to each entry containing inconsistent data. The rationale for this requirement is to avoid persisting the conflicting identifiers.

X.4.2.1.2 Transitions in Identity

725 There are often two kinds of identity associated with a data item. This is often done to maintain a record of changes in the EMR or Clinical Data Repository. One identifier is used to identify the data item at a particular point in time, and the other is used to group a set of “point in time” records of the data item together to show its evolution over time. The identity discussed in this profile refers to the latter identity; the one used to identify the data item over all time.

730 To ensure that this identity is maintained, the reconciling system must properly manage the identity of data items. Changes to an existing data item fall into the following general categories:

- Status updates to the data item.
- Addition of new or previously unknown data or relationships to other data items.
- Changes in treatment, diagnosis or related information.
- 735 • Correction of the data item due to it being reported in error.
- Workflow transitions.

X.4.2.1.2.1 Status Updates

740 Changes in the status of a data item often change the identity of the data item in the application **at the particular point in time**. However, these status updates **do not** change the fundamental identity of the item being recorded.

Status updates are changes such as “this medication has been discontinued”, or “this problem is now resolved”. Status updates report on the normal evolution of a data item over time.

Implementers of the Reconciliation Agent will need to examine the `status` to determine if the statuses of two data items are different. The `status` must be reconciled if there are differences.

X.4.2.1.2.2 Addition of New or Previously Unknown Data or Relationships

750 When additional pieces of a data item become known, adding these pieces of data to the original data item does not change its identity. For example, if the dates of a prior illness were previously reported as being unknown, adding those dates does not create a new data item, it simply updates the previous item. Similarly, if codes for a data item recording a diagnosis were previously unreported, but are now added, the data item does not change its identity.

Adding additional pieces of new or previously unknown data or relationships to reconciled items SHALL NOT result in changes to the maintained list of original source identifiers. Local identifiers may be updated, but the list of original source identifiers SHALL remain.

755 Similarly, when a new data item becomes known, it may be related to a pre-existing data item. These relationships may be added without changing the identity of the data item. Thus, a diagnosis that is previously untreated may have a relationship added to indicate what the new treatment is for that item without changing the identity of the data item. An intervention that is previously intended may have relationships added to indicate what the new indication is for that item without changing the identity of the data item. The addition of a new manifestation of an
760 allergy will not change the identity of the previously described allergy. However, the manifestation itself is a new data item with a new identity.

Implementers of the Reconciliation Agent should compare data items to determine if there are differences in new or unknown data, or relationships, and must reconcile discrepancies. In cases where one data item simply has more data or relationships, the new data is often just merged
765 because it does not alter the identity of the original data.

770 Disease progression may also result in new facts and relationships. For example, in the case where a patient started with a diagnosis of “flu”, it is possible for the disease to progress to “Pneumonia”. In this case, the new diagnosis is an additional fact. The previous diagnosis is still true, and is retained. The act representing the concern is also retained, and is related to the new diagnosis.

When a new data item conflicts with a pre-existing data item, this results in a different type of transition. In this case, the new data item might represent a different diagnosis for a concern (e.g., “Lung Cancer” rather than “Bronchitis”). This case is described in the following section.

X.4.2.1.2.3 Changes in Treatment, Diagnosis or Related Information

775 Changes in previously reported content create new “facts” that supplant or replace previous data items. The new data item has new identity, and the old data item is retained (although its status may be changed).

780 Perhaps the most common example is a change in dose for a particular medication, or substitution of a different medication for an existing medication that is being discontinued. In these cases, the new content is a new data item with a new identity, and the previous data item is marked as having been discontinued.

785 Refinements or changes in judgment can also occur, often as a result of new data. An example of refinement is when an initial intervention of low sodium diet is replaced by a more specific intervention of 2 gm sodium diet. Both statements are true. One is simply a refinement of the other. In another case, what was once bed rest is subsequently changed to activity ad lib. In this case, the previous activity is now superseded. However, it was still correctly recorded at the time, and is not subject to the rules about correction below. This is perhaps the best explanation of why a change in content is not treated as a correction. The fact that a patient activity needs changed is correct, and was correctly recorded.

790 Another example of refinement is when an initial diagnosis of ankle sprain is replaced by a more specific diagnosis of a sprain of the deltoid ligament. Both statements are true; one is simply a refinement of the other. Similarly, what was once thought to be “Bronchitis” is subsequently diagnosed as “Lung Cancer”. In this case, the previous diagnosis was incorrect. However, it was still correctly recorded as the diagnosis, and is not subject to the rules about correction below.

795 This is perhaps the best explanation of why a change in diagnosis is not treated as a correction. Thus, the fact that a patient was diagnosed with a particular illness is correct, and was correctly recorded.

In the above cases, the new content is retained with a new identity, and the old content is marked as obsolete. The new data item can indicate that it replaces the old data item.

800 Corrections to data correctly recorded, but incorrectly reported are treated in the same fashion. If a patient indicated in one visit that they are allergic to penicillin, only to later come back and report that they are actually allergic to amoxicillin and not allergic to penicillin, this is a change in reporting, not in recording. The same would occur if a patient reports that they exercise five times a week and later reports that they do not do any form of exercise at all.

805 **X.4.2.1.2.4 Corrections to previously reported Treatment or Diagnosis**

It is only when a data item was incorrectly recorded that this section applies. Data items that were reported inaccurately, but recorded correctly should be treated as a change, rather than a correction.

810 One example of a recording error is when hypotension is incorrectly entered instead into the record, rather than hypertension, which was what was intended. Another example of a recording error is when a data item is recorded on the wrong patient's chart.

In these cases, the data item was not a true statement. However, it may have been acted on and should be retained for audit purposes. The previous data item is marked as being incorrect.

815 The new data item in all cases has a new identity and SHALL NOT retain any identifiers from the original source.

1. When a data item that was added to the system through reconciliation is changed in a way that alters its identity, a new identity **SHALL** be assigned to it.
2. The reconciling application **SHOULD** report the association of the new data item with the reconciled data items that have been superseded since the last reconciliation.

820 **X.4.2.1.2.5 Workflow Transitions**

Workflow transitions occur when activity is proposed to one party, then promised to be completed by another, or ordered by one party and completed by another. In these cases the data items must have a different identity.

X.4.2.2 Coded Concepts

825 To facilitate interoperability and avoid loss of semantics, this profile recommends that coded concepts in imported items be preserved and any mappings to new coding systems be recorded as translations on export.

- Imported Codes **SHOULD** be maintained by the system implementing the Reconciliation Agent.
- 830
- Imported codes **SHOULD** be exported by the Content Creator according to local policy.

This is a recommendation and not a requirement because many EHR systems do not have the capability to store or validate codes from external coding systems. Also, many regional and national interoperability specifications have requirements to use specific coding systems for recording codes for different items, and may not permit the transmission of alternate codes.

835 Another issue to consider is that not all items will be coded. The item will always have text that is associated with it, whether a code is present or not. That text may also be mapped to a code using a number of different well-known techniques, including simple index lookup, string matching, natural language processing, et cetera.

840 The various items use codes from a variety of different coding systems to identify *what is represented*. Two items using the same code are often, but not necessarily referencing the same event. For example, a SNOMED CT code could identify an item that represents the diagnosis of an ankle sprain. It is very likely that two instances of ankle sprain in a 24 hour time period (or even longer) are referring to the same event. More data could help clarify. If both instances of ankle sprain had the same start date, and both referred to the left ankle, then the reconciling application could suggest these two separate instances as being about the same diagnosis/condition.

845 Different conditions require different information to disambiguate or suggest identity. If the diagnosis in both items above had instead been Diabetes Type II, the application could have confirmed these two cases to be the same instance, because it is not possible for a patient to have two different instances of this condition. This is often the case in chronic conditions where the anatomical site is either unique or not applicable.

850 Coding systems provide different levels of detail in describing things. A diagnosis such as Diabetes Type II described above could also be classified more generally as Diabetes in the hierarchy of the coding system. These relationships appear in coding systems like ICD and SNOMED and can be accessed and navigated by applications which use those coding systems. So two items in which one reported that a patient had a certain condition (e.g., Diabetes) and another reported a more specific instance of that disease (e.g., Diabetes Type II with insulin or uncontrolled Type II) could be classified as Diabetes. However, traversing too many levels of a hierarchy could lead to cases where one concept (e.g., Disease of the Endocrinology System) is far too general to assert any sort of equality with a more specialized case (e.g., Diabetes). This clinical knowledge will often need to be separately represented by the reconciling application. While algorithms can be developed, there are few easy answers that can be used in these cases.

855 Care is also needed in determining what code should be used as the most accurate representation of the diagnosis. In the example described above, the best code to report might very well be the more specific one, because it would ensure better clinical treatment. But other cases might demand that the more general code be used. For example, if one provider reports that a patient is allergic to Penicillin, and another provider reports the more general or broad allergy to **β-Lactam antibiotics**, patient safety might demand that the more general code be identified as the candidate for the reconciled result.

860 When dealing with data from multiple systems, items for the same event may be coded in different coding systems at different levels of granularity. In these cases, crosswalks might be used to enable comparison. However, crosswalks between coding systems may be incomplete, costly to produce, and may become outdated. In many cases, the mapping may be inexact or worse. A code in one system may map to multiple codes in another system, or vice versa, or may have no mapping at all.

875 Codes are also used to convey additional meaning such as why an immunization was not administered or which family member had the disorder when capturing a family history element. These codes also need to be considered during the reconciliation process.

X.4.2.3 Timing

880 Timing can often be used to help disambiguate between different events, but this also requires
clinical knowledge to be used effectively. Different occurrences of things are often resolved
within a specific time period (e.g., flu within a few weeks, tests completed within a few hours,
etc.), so an assumption can be made when sufficient time has passed, that instances of the
occurrence being referred to be distinct. In some cases, time can be instant, or short in duration
885 but in other cases can be much longer. In some cases, time doesn't really apply. For example,
chronic diseases such as an instance of Diabetes Type II, in one year are likely the same
diagnosis as a separate instance reported even decades later. Or an appendectomy performed
today, may be the same surgical history item instance reported later. Timing is also used to
indicate recurrence. For example, Otitis Media can recur many times. It is important to be able to
890 reconcile multiple instances of recurring problems.

X.4.2.4 Anatomical Site

Anatomical site can often be used both in conjunction with timing, and without reference to
timing to assist in disambiguation. If two conditions are reported as being in different anatomical
sites, then they are likely different. However, anatomic site also has the same issues of hierarchy
895 as other coded data. A diagnosis reported in one place as a sprain of the left ankle and in another
as a sprain of the left ankle deltoid ligament at the same time is likely the same diagnosis. The
difference is in the specificity of the anatomical site.

X.4.2.5 Source of Information

The source of the information (a subset of provenance), is another datum that may be used when
900 disambiguating items in the reconciled list. The disambiguation process may give more or less
weight to information depending upon the source and type of information provided. This may
depend upon the information source's relationship with the patient, their specialty and degree of
medical and nursing training, the area of diagnosis, et cetera.

Care should be taken when reconciling diagnoses when a second opinion or consultation has
905 been provided. The reconciling physician may keep the first diagnosis, or the diagnosis resulting
from a second opinion, or both diagnoses may be recorded.

The accuracy of any information depends upon education and skills of the source and motivation
for providing the information (e.g., drug seeking behavior). Patient sourced information is one
area where special consideration is needed during the reconciliation process. Applying
910 generalizations about patient's knowledge of their diagnoses, allergies and medications will not
apply equally. Some patients will be quite educated about their conditions, while others may
have only very limited knowledge.

Information from Personal Health Records may not always be sourced by the patient. For
example, a patient's discharge summary may be sent to the patient's PHR. The reconciliation
915 content profile does provide specific guidance about how sources of information should be
recorded to assist in the reconciliation process.

X.4.2.6 Merging of Information

920 When two items describing a concept are merged, they may contain multiple attributes, which may also be duplicated, overlapping, conflicted, or superseded. The reconciling application should merge the two sets of attributes. Examples include multiple adverse reactions associated with an allergen or multiple reactions to a medication.

X.4.2.7 Negation and Null

925 Negation and null attribute is used to convey something that did not occur or that isn't present (e.g., the patient did not receive an immunization, or the patient is not reaching a goal, procedure was not done, etc.). In order to avoid misinterpreting things that did happen from things that did not occur, negation and null should be taken into consideration during the reconciliation process.

X.4.2.8 Data Creation and Update Time

930 Time of data creation and update is represented as author date/time of clinical data. Data creation and update time should be included in the reconciliation process. Date/time provides the ability to determine if the associated data is newer or older than the existing information it is being reconciled with. After other data attributes are considered and a possible duplicate of data may exist, consideration of the author date/time will ascertain which data element is more recent. The data element with the more recent date/time should be considered as the more updated data element.

X.4.2.9 Problem Specific Reconciliation

935 This section describes reconciliation heuristics that are applicable problems which are not limited to health concerns, conditions, diagnosis.

X.4.2.9.1 Degree of Clinical Judgment

940 Items for problems include the degree of clinical judgment used in assessing or reporting the condition.

The levels of clinical judgment include values such as:

- Condition
- Problem
- Complaint
- 945 • Symptom
- Finding
- Diagnosis
- Functional Limitation

950 During reconciliation, two items that are otherwise similar but with different degrees of clinical judgment need to reconcile the level of clinical judgment associated with the issue.

X.4.2.9.2 Severity

955 When two concepts are merged, there may be “conflicting” reports of the severity of the concept. Severity can change over time, and so this result is to be expected. The reconciling application should account for this and select the appropriate value (e.g., the most recently recorded concept) during the merging process. In addition, the method of attaching a clinical severity to reconciled concept may be considered by the reconciliation application in the presentation layer. Note that allergic conditions and reactions can also have severity attributed thus need to be considered during the reconciliation process.

X.4.2.10 Allergy Specific Reconciliation

960 This section describes reconciliation heuristics that are applicable only to allergies and adverse reactions.

X. 4.2.10.1 Allergic Condition and/or allergen

965 The allergies and intolerances may be represented in one or both of two ways: Either by identifying a clinical condition (e.g., allergy to penicillin), or by identification of the agent (e.g., penicillin) that causes the allergy or intolerance. These two methods for coding allergic condition and/or allergens cover two different domains of clinical knowledge, one being the set of allergic conditions, and the other being the set of medications or immunizations (or other substances) that could cause an adverse reaction.

970 Allergies are required to be identified. The allergen may be identified but is not always required. The allergy may be described by a code, or it may just contain text describing the allergic condition. As stipulated in the codeable concepts section above, when dealing with data from multiple systems, items for the same event may be coded in different coding systems at different levels of granularity.

975 Allergies can be represented as a specific condition (e.g., Peanut Allergy), or as an allergy to a specific substance, where the code describing the condition and the code describing the substance are found in different attributes in the information model. Some coding systems such as SNOMED CT provide the ability to navigate from the code for the allergic condition to the code for the causative agent. However, others do not (e.g., ICD-9-CM). In these situations, the mapping from allergy to allergen (or vice versa) must be provided via external clinical
980 knowledge.

X. 4.2.10.2 Allergy/Non Allergy Intolerance/Intolerance

985 During the reconciliation process, different systems may report different statuses with respect to the unknown classification of the allergy. The reconciling application **shall** provide some logic to recommend an appropriate value during the reconciliation process, and **shall** highlight this inconsistency when found.

X. 4.2.10.3 Intolerance to Medication/Food/Environment

During the reconciliation process, different systems may report different statuses with respect to the classification of the allergy. The reconciling application **shall** provide some logic to recommend an appropriate value during the reconciliation process, and **shall** highlight this inconsistency when found.

X. 4.2.10.4 Adverse Reactions

When two items describing an allergy are merged, they may contain multiple adverse reactions, which may also be duplicated, overlapping, conflicted, or superseded. The reconciling application should merge the two sets of adverse reactions.

X.4.2.11 Medication Specific Reconciliation

Medications are perhaps the most challenging items to deal with in this profile, and that is due to the wide variety of information encompassed in medication codes, dosing and frequency information, and the number of different ways the same clinical intent can be met with similar formulations. The first challenge is that the distinction between different brands or suppliers of a medication may not be relevant, but that there may not be a direct relationship between branded drugs and their formulations in some coding systems. Many coding systems (e.g., National Drug Code (NDC) and RxNorm) used to describe medications provide different codes for different brands of the same formulation. NDC doesn't link them by formulation, while RxNorm does.

The second challenge is even more complex. Certain changes in dosing or frequency with the same active ingredients will achieve a similar treatment effect (e.g., take one 60mg tablet once a day, or three 20mg tablets once a day, or one 20mg tablet 3 times a day). These will require more complicated algorithms to determine duplicated, overlapping or conflicting items.

There may be situations where units of measure for a medication or similar observation (e.g., result, vital sign) may differ in a reconciliation scenario. This profile does not provide explicit guidance on how to handle these situations. If the software is not capable of reconciling such data then the recommended approach would be to store as separate observations. However, if the software is capable of handling such a scenario then this profile does not prevent taking such actions.

Medication events are further complicated by the fact that many systems are not able to communicate detailed information about the dose and frequency in a structured fashion. This is certainly true in ePrescribing scenarios in the US where the use of structured medication dosing directions ("sig.") is not required in the electronic prescription. Systems obtaining data from ePrescribing systems would not be able to compute with these results.

These facts would seem to make it difficult to match medication fulfillment events with the original intent of the prescription event when a substitution occurs. This results in matching of fulfillment activity with the original prescribers' intent even in cases where substitutions occur.

X.4.2.12 Care Provider Specific Reconciliation

1025 When reconciling care providers, it is important to identify who the provider is. Providers can be a person or an organization. Identification of a provider includes the provider ID as well as the name and location of the provider. The type of provider also needs to be considered. Provider type includes defining the provider role in relation to the patient. Provider specialty may need to be defined.

X.4.2.13 Immunization Specific Reconciliation

1030 Immunization reconciliation is similar to medication reconciliation and thus inherits some of the specification that applies to medication reconciliation. When reconciling immunization, consideration should be given to immunizations that have actually occurred or are intended to occur. Immunization that has not occurred as well as the reason it did not occur should also be considered. Immunization series number is needed to provide tracking of immunization history. Local policies may require that Immunization lot number is captured. Information such as
1035 reaction to the immunization, route or delivery method, administration site as well as dose also need to be considered during reconciliation.

X.4.2.14 Goals Specific Reconciliation

1040 A goal is a defined outcome or condition to be achieved in the process of patient care. Goals include patient-defined goals (e.g., alleviation of health concerns, positive outcomes from interventions, longevity, function, symptom management, comfort) and clinician-specific goals to achieve desired and agreed upon outcomes.

1045 When reconciling goals it is important to take into consideration if a goal has been met, is being achieved or is planned. Goals can have related components such as concerns, encounters, observations, procedures, substance administration, supplies or acts. Goals can also have components consisting of other goals that demonstrate milestones.

X.4.2.15 Results Specific Reconciliation

1050 When reconciling results it is important to maintain the identifier that comes with the result and if exporting, send the identifier out. The identifier can be used for matching the incoming result with existing results. The importing EHR needs to manage identifiers appropriately when result attributes changes

X.4.2.16 Past Reconciliations

1055 In many cases information will be commonly exchanged between two different systems repeatedly. It is advisable for the Reconciliation Agent to keep track of the results of prior reconciliations so that if there have been no changes in the reconciled items for the patient, the prior actions taken can be applied by the Reconciliation Agent and presented to the end user.

X.4.3 Use Cases

1060 Mr. Jonathan Allan is a 77 year old male ‘snowbird’. He lives in Michigan during the summer and in Florida the rest of the year. He has diabetes and has also undergone multiple open heart surgeries to correct irregular heartbeats and other ailments related to the heart. He is currently planning his return to Michigan. He makes an appointment with his Cardiologist in Michigan. His Cardiologist practice sets up an initial visit with the patient and obtains information about the patient from his care providers in Florida as well as from the Florida State HIE. The Cardiologist would like to reconcile pertinent clinical information and import it into his EHR so he can have updated information about his patient so he can effectively care for his patient.

1065 X.4.3.1 Use Case: Transfer of content with no variances

The first use case demonstrates reconciliation between two care provider systems where no conflicts are identified during the automated reconciliation.

Preconditions:

Mr. Allan has the following data in his PCP EHR.

- 1070
- Hypercholesterolemia SNOMED 13644009; Status Active
 - Diabetes – SNOMED 11530004; ICD9 250.42; Status Active
 - Low cholesterol diet education provided February 12, 2013 – SNOMED 183062005
 - HgbA1c 6.2 on December 10, 2013– LOINC 55454-3
 - Goal is to exercise three to five times a week

1075 Use Case

1080 Reconciliation from PCP to Specialist EHR: Mr. Allan’s Michigan Cardiologist (Dr. Hart) office intake nurse is reconciling clinical content per practice protocol. His pre-existing records are examined and reconciled against this list. Since there are no conflicting entries, the newer list is automatically reconciled and presented to the intake nurse performing the reconciliation. She accepts the reconciled data into the specialist record.

X.4.3.2 Use Case: Transfer of content with variances

The second use case demonstrates reconciliation of clinical content from a state HIE being performed by a PCP EHR. In this case there are issues identified during the reconciliation of clinical content because the PCP EHR is out of date.

1085 Preconditions:

Mr. Allan’s medical records from the state HIE include the following information:

- Blood pressure readings (systolic and diastolic) – LOINC 8480-6, 8462-4 collected during 2013 encounters

- 1090
 - Inderal - RxNorm 151890 prescribed October 19, 2012 status –active; Lopressor RxNorm 218072 prescribed December 10, 2013, status – active)
 - Pneumococcal Vaccine – CVX 133 Administered on December 10, 2013
 - Flu Vaccine – CVX 140 Not Administered on December 10, 2013 due to medical precautions
 - Diabetic care instructions – SNOMED 385805005 planned December 10, 2013
- 1095
 - Social History, Smoking history ½ pack per day started smoking four months ago (August 2013)
 - Cardiac rehab therapy declined – SNOMED 413756001; status - cancelled December 10, 2013

Use Case

1100 Mr. Allan has returned from Florida and is at his Michigan PCP (Dr. Carey) office for a sick visit. He’s complaining of weakness and generalized tiredness with episodes of dizziness and decreased appetite. Mr. Allan informs Dr. Carey that he returned from Florida a month ago and had a visit with Dr. Hart, his cardiologist two weeks ago. Dr. Carey is aware that Mr. Allan’s providers in Florida participate in Florida State HIE. He would like to reconcile his records with

1105 Mr. Allan’s clinical information from the state HIE. The following information is in Dr. Carey’s record:

- Blood pressure readings (systolic and diastolic) – LOINC 8480-6, 8462-4 collected during 2012 encounters
- Inderal - RxNorm 151890 prescribed October 19, 2012 status –active;
- 1110
 - Flu Vaccine – CVX 140 Administered October 2012
 - Diabetic care instructions – SNOMED 385805005 completed October 2012
 - Social history, Non-smoker
 - Cardiac rehab therapy– SNOMED 313395003; status - new October 2012

1115 Dr. Carey performs reconciliation and updates his EHR. He adds the updated blood pressure readings so that he is better able to track vital signs trends. Dr. Carey notices that Mr. Allan’s blood pressure medication was changed from Inderal to Lopressor. He reconciles this information to reflect his agreement with the plan and updates his record with the newer blood pressure medication. He notes that Mr. Allan did not receive a flu vaccine during the last flu season and plans for Mr. Allan to get the flu vaccine during the upcoming season. He updates

1120 Mr. Allan’s social history and provides smoking cessation counseling with Mr. Allan. Dr. Carey also notices that there were previous plans for Mr. Allan to participate in a cardiac rehabilitation program that was later cancelled by another of Mr. Allan’s providers. He discusses the reasons for the cancellation with Mr. Allan. With Mr. Allan permission, he schedules Mr. Allan for cardiac rehab.

1125 **X.4.3.3 Use Case: Transfer of content with overlapping interpretations**

In the third use case, information from care providers EHRs are collected showing variations in information which are detected and reconciled.

Preconditions:

The clinical EHRs contain the following provider information:

- 1130
- Dr. Carey role as primary care provider (in Detroit); Provider type, internal medicine
 - Dr. Hart role as consulting provider (in Detroit); provider type, cardiology
 - Dr. Payne role as consulting provider (in Detroit); provider type, cardiology
 - Dr. Seven role as primary care provider (in Florida); provider type, family practice
 - Dr. Roberts role as consulting provider (in Florida); provider type, cardiology
- 1135
- Dr. Smyth role as consulting provider (in Florida); provider type, podiatry

The clinical EHRs contain the following encounter information:

- Two encounters with Dr. Carey; type of encounter; Dates of encounter
 - Two encounters with Dr. Hart; type of encounter; Dates of encounter
- 1140
- One encounter with Dr. Seven; type of encounter; Dates of encounter
 - Two encounters with Dr. Roberts; type of encounter; Dates of encounter
 - One encounter with Dr. Smyth; type of encounter; Dates of encounter

Use Case

1145 Mr. Allan participates in a care coordination program which includes an Accountable Care Organization (ACO) supported by his providers and payer. Mr. Allan's care is being managed by a care manager who would like to ensure that he is receiving appropriate and timely care due to his chronic disease history. The care manager EHR receives a list of providers and encounters from the various EHRs and HIE containing Mr. Allan's clinical information. During

1150 reconciliation of care providers and encounters there are issues identified due to multiple entries of the same type of care providers as well as care providers who have not provided care. The care manager is also able to determine if Mr. Allan is receiving care from the right types of providers and if the frequency of his interactions with the health care system is adequate to meet his care needs per care protocol.

X.5 RECON Security Considerations

1155

Appendices

No new appendices

Volume 2 – Transactions

1160

3.16 Share List [PCC-16]

3.16.1 Scope

This transaction is used to share lists using the FHIR List query and may use the FHIR Reconciled List content.

1165

3.16.2 Actor Roles

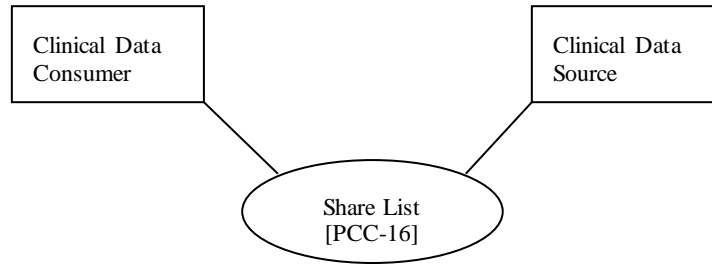


Figure 3.16.2-1: Use Case Diagram

Table 3.16.2-1: Actor Roles

Actor:	Clinical Data Consumer
Role:	Queries for a list of clinical content
Actor:	Clinical Data Source
Role:	Responds to query for clinical content, supplying reconciled lists using FHIR Reconciled List content

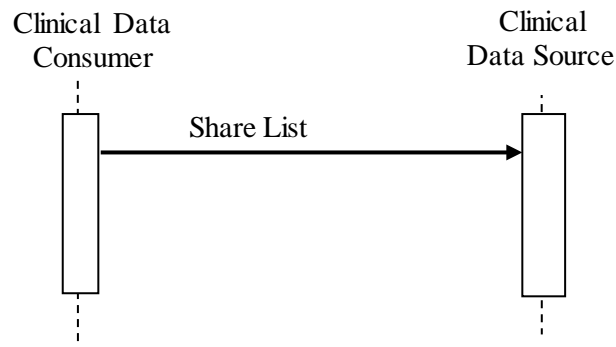
1170

3.16.3 Referenced Standards

HL7 FHIR DSTU 2.0¹⁵.

¹⁵ <http://hl7.org/fhir/DSTU2/index.html> on April 27, 2016

3.16.4 Interaction Diagram



3.16.4.1 Share List

1175 Query for a list of clinical items by type and receive response using FHIR Reconciled List content when the list has been reconciled.

3.16.4.1.1 Trigger Events

The system supporting the Clinical Data Consumer requests content from a Clinical Data Source.

3.16.4.1.2 Message Semantics

1180 See List resource, \$find operation: <http://hl7-fhir.github.io/list-operations.html#find>

The following parameters SHALL be supported:

- name – the coded name of the list to be retrieved
- status – as a value from {current, entered in error}

3.16.4.1.3 Expected Actions

1185 When a List that has been reconciled is returned, that content meets the requirements of FHIR Reconciled List as specified in PCC TF-2:6.6

3.16.5 Security Considerations

The retrieved content contains PHI that SHALL be protected.

3.16.5.1 Security Audit Considerations

1190 Both actors should generate an AuditEvent, which is consistent with ATNA, on the List resource where:

- All required AuditEvent content is provided
 - AuditEvent.type="Query"
 - AuditEvent.action="Execute"
- 1195 • AuditEvent.object.query contains the encoding of the query

3.16.5.1.1 Clinical Data Consumer Specific Security Considerations

The Clinical Data Consumer SHALL create an additional AuditEvent when data are imported, such that:

- All required AuditEvent content is provided
- 1200 • AuditEvent.type = "Import"
- AuditEvent.object.identifiers contains the list of imported item identifiers

Appendices

None

Volume 2 Namespace Additions

1205

<i>Add the following terms to the IHE General Introduction Appendix G:</i>
--

None

Volume 3 – Content Modules

1210 5 Namespaces and Vocabularies

5.1.2 IHEActCode Vocabulary

Add to Section 5.1.2 IHE ActCode Vocabulary

Code	Description
CLINCONREC	Use this code to indicate that entries pertinent to any common observation activity have been reconciled.
MEDREC	Use this code to indicate that entries pertinent to medication activity have been reconciled.
PROBREC	Use this code to indicate that entries pertinent to problem activity have been reconciled.
ALGREC	Use this code to indicate that entries pertinent to allergies and adverse reactions activity have been reconciled.
IMMREC	Use this code to indicate that entries pertinent to immunization activity have been reconciled.
GOALREC	Use this code to indicate that entries pertinent to goal activity have been reconciled.
PROVREC	Use this code to indicate that entries pertinent to care providers and caregiver have been reconciled.

6 Content Modules

1215

Add new Section 6.3.1.D Document Content Modules

6.3.1.D Reconciliation Content

6.3.1.D.1 <ClinicalDocument xmlns='urn:hl7-org:v3'>

1220 Clinical Documents or Messages conforming to this template report data that has been reconciled with one or more information sources

1. A ClinicalDocument or QUPC_IN043100UV SHALL contain templateId/@root containing the value **1.3.6.1.4.1.19376.1.5.3.1.1.24.1** to assert conformance to this template.
- 1225 2. The ClinicalDocument MAY also conform to the Medical Documents (PCC TF-2:6.3.1.1) template (templateId: 1.3.6.1.4.1.19376.1.5.3.1.1.1).
- 1230 3. SHALL contain at least one **[1..*]** Reconciliation Act (6.3.4.E) template (templateId: 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1) to indicate where common observations, diagnostic results, problems, allergies, medications, immunizations, and professional services entries have been reconciled

1235

```
<ClinicalDocument xmlns='urn:hl7-org:v3'> <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.1"/>
< templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.1"/>
...
</ClinicalDocument>
-- OR --
<QUPC_IN043100UV xmlns='urn:hl7-org:v3'>
<templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.1"/>
< templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.1"/>
...
</QUPC_IN043100UV>
```

1240

Add new Section 6.3.4.E ReconciliationAct

1245 6.3.4.E. Reconciliation Act

6.3.4.E.1 Reconciliation Act Entry Content Module

The reconciliation act template is the template used to represent the process of reconciling clinical data. A reconciliation act must identify the performers of the reconciliation process, and the clinical data and sources that were used in that process. A reconciliation act appears in the

1250 container (e.g., a section in a clinical document) whose content has been reconciled. Skeletal xml is in this example and a complete xml example is in Volume 3, Appendix A.

1255 A reconciliation act SHALL be included for each reconciled section containing common observations, diagnostic results, problems, allergies, medications, immunizations, and professional services; or in sections referring to care providers and caregivers. Note, this means that at a minimum, at least one section containing any of these data elements must be reconciled according to the requirements of this profile.

The content in document sections containing these reconciliation acts shall contain a text element that:

- a. Contains who reconciled the reported information in the section
- 1260 b. Contains when the information was reconciled
- c. Is referenced by the reconciliation act as described in Section 6.3.4.E.1 below.

Reconciliation acts for care providers or caregivers SHALL appear in the text element of the Care Plan section

For example:

1265 *Information in this section reconciled by Doctor Smith on September 15, 2013.*

```
1270 <section>
  ...
  <text>
    ...
    <content ID='recon-1'>
      Information in this section reconciled by Doctor Smith on
      September 15, 2013.</content>
    ...
  </text>
  ...
</section>
```

Figure 6.3.4.E.1-1: Reconciled Narrative Example

1280 For example:

Care providers and caregivers reconciled by Doctor Smith on September 15, 2013.


```
1285 <section>
    ...
    <text>
        ...
        <content ID='recon-1'>
            Care providers and caregivers reconciled by Doctor Smith on
1290             September 15, 2013.</content>
        ...
    </text>
    ...
</section>
```

Figure 6.3.4.E.1-2: Reconciled Narrative Example for Care Provider and Caregiver

1295

```
1300 <act classCode="ACT" moodCode="EVN">
    <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1" />
    <id root="..." extension="..." />
    <code code="MEDREC|ALGREC|PROBREC|CLINCONREC|IMMREC|GOALREC|PROVREC"
1305     displayName="(Medications|Alleries|Diagnoses|Common Observation|Immunizations|Goals|Care
Providers) Reconciliation"
        codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActionCode" />
    <text><reference value='...' /></text>
    <statusCode code="completed" />
    <effectiveTime value="" />
    <performer typeCode="PRF">
        ...
1310 </performer>
    <reference typeCode="XCRPT">
        ...
    </reference>
</act>
```

1315 6.3.4.E.1.1 <act classCode="ACT" moodCode="EVN">

An <act> element is used to represent the reconciliation act. This is an act that has already occurred.

1. The reconciliation template SHALL only be used in act elements.
2. The @classCode attribute SHALL be **ACT**.
3. The @moodCode attribute SHALL be **EVN**.

1320

6.3.4.E.1.2 <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1" />

1. The act SHALL contain templateId/@root containing the value 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1 to assert conformance to this template.

1325 6.3.4.E.1.3 <id root="..." extension="..." />

Each reconciliation act will be uniquely identified. Additional constraints on the cardinality of the <id> element ensure that two reconciliation acts will always use the same id if they are representing the same act.

1. The `act` SHALL contain only one [1..1] `id` element.
- 1330 2. The `id` element SHALL not contain an `@nullFlavor` attribute.

6.3.4.E.1.4 `<code`

`code="MEDREC|ALGREC|PROBREC|CLINCONREC|IMMREC|GOALREC|PROVREC"`

- 1335 `displayName="..."`
`codeSystem="1.3.6.1.4.1.19376.1.5.3.2" codeSystemName="IHEActionCode"/>`

A reconciliation `act` is coded to indicate the type of reconciliation performed.

1. The `act` SHALL contain only one [1..1] `code` element.
2. The `code/@code` attribute SHALL be valued (no nulls allowed).
3. The `code/@codeSystem` attribute SHALL be 1.3.5.1.4.1.19376.1.5.3.2.
- 1340 4. The `code/@codeSystemName` attribute SHOULD be `IHEActionCode`.

6.3.4.E.1.5 `<text><reference value='...'/></text>`

The entry will link to the narrative text in the section indicating that the information was reconciled.

1. The reconciliation `act` SHALL contain a link to the narrative text.
- 1345 2. The referenced text SHALL include:
 - a. who performed the reconciliation;
 - b. and, when the reconciliation was performed

6.3.4.E.1.6 `<statusCode code="completed"/>`

1350 The reconciliation `act` is deemed to be completed at the time it is documented in the clinical document.

1. The `act` SHALL contain only one [1..1] `statusCode` element.
2. The `@code` attribute of the `statusCode` element SHALL have a value of `completed`.

6.3.4.E.1.7 `<effectiveTime value="..."/>`

1355 The clinically effective time is the time at when the information was reconciled by the provider. This information will be reported and shall be precise to at least the day.

1. The `act` SHALL contain only one [1..1] `effectiveTime` element.
2. The `effectiveTime` element SHALL NOT use the `@nullFlavor` element.
3. The `effectiveTime/@value` attribute SHALL be precise to at least the day.

6.3.4.E.1.8 <performer typeCode="PRF">

1360 The reconciliation act records the person who performed the reconciliation activity. This represents the performers of the reconciliation process.

1. The act SHALL contain at least [1..*] performer element conforming to the reconciliation performer (6.3.4.E.3) template (templateId: 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5.1).

1365 6.3.4.E.1.9 <reference typeCode="XCRPT">

The reconciliation act records references to all clinical data sources from which data was reconciled. This allows applications to use the information to determine what data may not have yet been reconciled for the patient, and to enable subsequent verification that the reconciliation was performed appropriately where necessary. Only pointers to the data used for reconciliation are required, not the complete set of data used during the reconciliation.

1370

1. The act SHALL contain at least one [1..*] reference element conforming to the Reconciliation Clinical Data Source (6.3.4.E.2) template (templateId: 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.6).
2. The reference/@typeCode attribute SHALL contain the value XCRPT.

1375 6.3.4.E.2 Reconciliation Clinical Data Sources

Skeletal xml is in this example and a complete xml example is in Volume 3, Appendix A

1380

```
<reference typeCode="XCRPT">
  <templateId root='1.3.6.1.4.1.19376.1.5.3.1.1.24.3.6' />
  <externalAct classCode="ACT" moodCode="EVN">
    <id root="" extension="" />
    <code code="" displayName="" codeSystem="" codeSystemName="" />
  </externalAct>
</reference>
```

1385 Every clinical document, query, or individual data elements from other sources that are examined as a source of information during the reconciliation process must be traceable. This data is made available so that systems examining the reconciled results can determine what data elements have already been reconciled.

1390 Recording of data elements and/or their data sources (documents or queries) in the reconciliation act allows subsequent reconciliations to avoid “re-reconciling” data elements which were previously reconciled.

6.3.4.E.2.1 <reference typeCode="XCRPT">

The information that was used during the reconciliation process is identified using the Excerpt relationship.

1. The reference element SHALL contain only one [1..1] @typeCode attribute whose value is XCRPT.

1395

6.3.4.E.2.2 <templateId root='1.3.6.1.4.1.19376.1.5.3.1.1.24.3.6'/>

The reference element will assert conformance to the Reconciliation Clinical Data Sources template.

- 1400 1. The reference SHALL contain a templateId/@root attribute containing the value 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.3 to assert conformance to this template.

6.3.4.E.2.3 <externalAct classCode="ACT" moodCode="EVN">

1405 The data being reconciled is identified in an externalAct element. For each data element being reconciled, there must be a pointer (reference) in the reconciliation act to where the data came from. This does not mean that there are as many references as there are data elements, as a single reference serves for all data elements from that source. Note that a single data element may be referenced by multiple sources.

For each data element being reconciled:

- 1410 1. There SHALL be at least one [1..*] reference element where:
- 1415 a. There is exactly one [1..1] externalAct element where:
- i. The externalAct SHALL contain exactly one [1..1] @classCode attribute whose value is ACT.
 - ii. The externalAct SHALL contain exactly one [1..1] @moodCode attribute whose value is EVN.
- 1415 b. The externalAct SHALL contain at exactly one [1..1] id element
- c. The externalAct/id SHALL NOT contain an @nullFlavor attribute.
- d. The externalAct SHALL contain exactly one [1..1] code element.
- e. The externalAct/code SHALL NOT contain an @nullFlavor attribute.
- f. If the data element came from a document,
- 1420 i. When the external document is a CDA document, externalAct/id = /ClinicalDocument/id. *The value of externalAct/id provides the identifier of the external document.*
- ii. The value of externalAct/code/@code SHALL be DOCCLIN.
- 1425 iii. The value of externalAct/code/@codeSystem shall be 2.16.840.1.113883.5.6
- iv. *The value of externalAct/code describes the content of the document.*
- g. If the data element was returned as a result of a query,

- 1430
- i. The value of `externalAct/id` shall be the identifier of the query that produced the result.
 - 1. When the query is a CDA query, `externalAct/id = /QUPC_IN043100UV/id` (see PCC TF-2: 3.2.4.3 Transmission Wrapper found in the QED supplement).
 - ii. The value of `externalAct/code/@code` SHALL be CACT.
- 1435
- iii. The value of `externalAct/code/@codeSystem` shall be 2.16.840.1.113883.5.6
- 1440
- h. If the data element is stored internally in the EHR performing reconciliation,
 - i. The value of `externalAct/id` SHALL be the identifier of data element.
 - ii. The value of `externalAct/code` SHALL be the code associated with the data element.
 - iii. The value of `externalAct/code/@code` SHALL be ACT.
 - iv. The value of `externalAct/code/@codeSystem` shall be 1.3.6.1.4.1.19376.1.5.3.1.4.4.1

6.3.4.E.3 Reconciliation Performer

- 1445
- The reconciliation performer template is used to identify the healthcare provider who was the primary performer of the reconciliation act. The provider name, address, contact information and identifier are provided to ensure that the performer of reconciliation can be contacted in case there are any questions about the act

Skeletal xml is in this example and a complete xml example is in Volume 3, appendix A.

```
1450 <performer typeCode="PRF">
      <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5"/>
      <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5.1"/>
      <assignedEntity classCode="ASSIGNED">
1455         <id root="" extension=""/>
         <addr></addr>
         <telecom></telecom>
         <assignedPerson>
           <name></name>
1460         </assignedPerson>
         <representedOrganization>
           <name></name>
           <addr></addr>
           <telecom></telecom>
1465         </representedOrganization>
       </assignedEntity>
     </performer>
```

6.3.4.E.3.1 <performer typeCode="PRF">

The performer element identifies a healthcare provider that performed the reconciliation. The performer is distinct from an author, as the performer is the one who does the work, whereas the author is the person who documented or created it.

1. At least one [1..*] performer element SHALL be present.

6.3.4.E.3.2 <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5.1"/>

The performer element asserts conformance to the Reconciliation Performer. The performer SHALL contain a templateId/@root attribute containing the value 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5.1 to assert conformance to this template.

2. The performer SHALL contain a templateId/@root attribute containing the value 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5 to assert conformance to the performer template.

6.3.4.E.3.3 <id root="" extension=""/>

The identifier of the healthcare provider performing the act shall be present.

1. At least one [1..*] id element SHALL be present.
2. The id element SHALL NOT use the @nullFlavor attribute.

6.3.4.E.3.4 <addr></addr>

The mailing address of the healthcare provider performing the act shall be present to enable the provider to be contacted.

1. At least one [1..*] addr element SHALL be present.
2. The addr element SHALL NOT use @nullFlavor.

6.3.4.E.3.5 <telecom></telecom>

1490 The provider telephone number shall be provided to enable the performer of the reconciliation to be contacted.

1. At least one [1..*] telecom element SHALL be present.
2. The telecom element SHALL NOT use @nullFlavor.

6.3.4.E.3.6 <name></name>

1495 The name of the provider performing the act will be provided.

1. At least one [1..*] name element SHALL be present.
2. The name element SHALL NOT use @nullFlavor.

Add new Section 6.6 HL7 FHIR Content Modules

6.6 HL7 FHIR Content Modules

1500 Referencing FHIR since there is not a DSTU Build at the time of this publication there is a snapshot of the FHIR Build in IHE Implementation Materials folder¹⁶.

The results of reconciliation are noted in the FHIR List resource. The requirements for this profile are defined in the following two sections.

6.6.A FHIR Reconciled List

1505 Whenever a List contains reconciled content, whether this be a list of clinical items or a list of healthcare providers, the following constraints shall be met. This table shows only content structure that is constrained by this profile.

For ease of use, the bolded content shows additional constraints.

Name	Cardinality	Type	Description & Constraints
List			
meta	1..1	Meta	Metadata about the list that is reconciled
meta.lastUpdated	1..1	Instant	When the resource version last changed
meta.profile	1..*	uri	SHALL contain the following to indicate conformance to the RECON Profile: urn:ihe:pcc:recon:2015 Additional profile uri values may also be present.

¹⁶ ftp://ftp.ihe.net/TF_Implementation_Material/PCC/fhir/FHIR-08-2015.zip

Name	Cardinality	Type	Description & Constraints
status	1..1	code	current entered-in-error A reconciled list SHALL use ListStatus of current, or in the unusual case entered-in-error
mode	1..1	code	working a reconciled list is a working copy.
emptyReason	0..1	CodeableConcept	an empty reconciled list SHALL use nilknown emptyReason

6.6.A.1 Constraints

1510 recon-1: The text of a reconciled list SHALL contain some indication that the list was reconciled, by whom and when the reconciliation occurred, whether or not the list contains entries or is empty.

6.6.B FHIR Provenance Constraints

1515 The Provenance resource MAY be used in conjunction with reconciled lists, for recording additional detail about who performed reconciliation and when it was performed, and the sources of information.

Whenever the Provenance resource is used for reconciled content, the following constraints shall be met. The Provenance resource contains the content about who reconciled the list, when, and what content was considered. This is akin to the CDA Reconciliation Act.

1520

Name	Cardinality	Type	Description & Constraints
Provenance			
target	1..1	uri	the target SHALL reference a reconciled list
period	1..1	Period	SHALL contain when the reconciliation occurred
agent	1..*		who reconciled the list
agent.role	1..1	Coding	performer The role of the person that reconciled the list SHALL be performer
entity.role	1..1	code	derivation The entity role SHALL be derivation

Appendices

Appendix A – Examples of Reconciled Lists

1525 A.1 CDA Structure of a Reconciled Medication List

```
1530 <?xml version="1.0" encoding="UTF-8"?>
1535 <!-- this example shows a reconciled medication list with 3 medications -->
1540 <component>
1545   <section>
1550     <templateId root="2.16.840.1.113883.10.20.22.2.1.1"/>
1555     <code code="10160-0" codeSystem="2.16.840.1.113883.6.1"
1560       codeSystemName="LOINC" displayName="History of medication use"/>
1565     <title>Medications</title>
1570     <text>
1575       <table>
1580         <thead>
1585           <tr>
1590             <th>Name</th>
1595             <th>Dates</th>
1600             <th>Details</th>
1605           </tr>
1610         </thead>
1615         <tbody>
1620           <tr ID="ID0ECIACA">
1625             <td>Cephalexin 500 MG Oral Tablet; 1 TABLET FOUR TIMES DAILY FOR 10 DAYS</td>
1630             <td>Started 20-Sep-2012</td>
1635             <td>Generic substitution allowed</td>
1640           </tr>
1645           <tr ID="ID0EBIACA">
1650             <td>Fluoxetine 40 MG Oral Capsule; 1 TABLET once daily As Directed</td>
1655             <td>Started 20-Nov-2011</td>
1660             <td/>
1665           </tr>
1670           <tr ID="ID0EAIACA">
1675             <td>Levothyroxine Sodium 0.05 MG Oral Tablet; 1 TABLET once daily As Directed</td>
1680             <td>Started 15-Apr-2010</td>
1685             <td/>
1690           </tr>
1695         </tbody>
1700       </table>
1705       <paragraph ID="KT0ECIACA">The medication list was reconciled on 4/28/2014 by Dr
1710       Who</paragraph>
1715     </text>
```

```

1570     <entry>
1575       <substanceAdministration classCode="SBADM" moodCode="INT">
1580         <templateId root="2.16.840.1.113883.10.20.22.4.16"/>
1585         <!-- this example shows an ID that was imported from another system -->
1590         <id root="635CE0A6-2313-11E0-8784-B035FB0B8100"/>
1595         <id extension="659122500005" root="1.3.6.1.4.1.22812.3.99930.3.4.9"/>
1600         <id extension="659122500007" root="1.3.6.1.4.1.22812.3.99930.3.4.9"/>
1605         <text>
1610           <reference value="#ID0ECIACA"/>
1615         </text>
1620         <statusCode code="completed"/>
1625         <effectiveTime xsi:type="IVL_TS">
1630           <low value="20120920"/>
1635           <high nullFlavor="UNK"/>
1640         </effectiveTime>
1645         <effectiveTime xsi:type="PIVL_TS" institutionSpecified="true" operator="A">
1650           <period value="6" unit="h"/>
1655         </effectiveTime>
1660         <doseQuantity value="1"/>
1665         <administrationUnitCode codeSystemName="NCI Thesaurus"
1670         codeSystem="2.16.840.1.113883.3.26.1.1" code="C42998" displayName="TABLET"/>
1675         <consumable typeCode="CSM">
1680           <manufacturedProduct classCode="MANU">
1685             <templateId root="2.16.840.1.113883.10.20.22.4.23"/>
1690             <manufacturedMaterial>
1695               <code code="309114" codeSystem="2.16.840.1.113883.6.88"
1700               codeSystemName="RxNorm" displayName="Cephalexin 500 MG Oral Tablet">
1705                 <originalText>
1710                   <reference value="#ID0EFCIACA"/>
1715                 </originalText>
1720               </code>
1725               <name>Cephalexin</name>
1730             </manufacturedMaterial>
1735           </manufacturedProduct>
1740         </consumable>
1745         <entryRelationship typeCode="SUBJ" inversionInd="true">
1750           <act classCode="ACT" moodCode="INT">
1755             <templateId root="2.16.840.1.113883.10.20.22.4.20"/>
1760             <code code="423564006" displayName="Provider instructions for treatment"
1765             codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT"/>
1770             <text>
1775               <reference value="#ID0EDCIACA"/>
1780             </text>
1785             <statusCode code="completed"/>
1790           </act>
1795         </entryRelationship>
1800         <entryRelationship typeCode="REFR">
1805           <observation classCode="OBS" moodCode="EVN">
1810             <templateId root="2.16.840.1.113883.10.20.1.57"/>
1815             <templateId root="2.16.840.1.113883.10.20.1.47"/>
1820             <code code="33999-4" displayName="Status" codeSystem="2.16.840.1.113883.6.1"
1825             codeSystemName="LOINC"/>
1830             <statusCode code="completed"/>
1835             <value xsi:type="CE" codeSystem="2.16.840.1.113883.6.96"
1840             codeSystemName="SNOMED CT" code="55561003" displayName="Active"/>
1845           </observation>
1850         </entryRelationship>
1855         <entryRelationship typeCode="REFR">
1860           <supply classCode="SPLY" moodCode="INT">
1865             <templateId root="2.16.840.1.113883.10.20.22.4.17"/>
1870             <id nullFlavor="UNK"/>
1875             <statusCode code="completed"/>
1880           <product>
1885             <manufacturedProduct classCode="MANU">
1890               <templateId root="2.16.840.1.113883.10.20.22.4.23"/>

```

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```

1635         <manufacturedMaterial>
            <code code="309114" codeSystem="2.16.840.1.113883.6.88"
codeSystemName="RxNorm" displayName="Cephalexin 500 MG Oral Tablet">
                <originalText>
                    <reference value="#ID0EFCIACA" />
                </originalText>
            </code>
            <name>Cephalexin</name>
        </manufacturedMaterial>
1640     </manufacturedProduct>
</product>
    <entryRelationship typeCode="SUBJ" inversionInd="true">
1645     <act classCode="ACT" moodCode="INT">
        <templateId root="2.16.840.1.113883.10.20.22.4.20" />
        <code code="423564006" displayName="Provider instructions for
treatment" codeSystem="2.16.840.1.113883.6.96" codeSystemName="SNOMED CT" />
        <text>
1650             <reference value="#ID0ECCIACA" />
        </text>
        <statusCode code="completed" />
    </act>
    </entryRelationship>
</supply>
1655 </entryRelationship>
    <entryRelationship typeCode="SUBJ">
        <encounter classCode="ENC" moodCode="EVN">
            <id extension="5283815" root="1.3.6.1.4.1.22812.3.99930.3.3.4" />
        </encounter>
1660 </entryRelationship>
</substanceAdministration>
</entry>
<entry>
1665     <substanceAdministration classCode="SBADM" moodCode="INT">
        <templateId root="2.16.840.1.113883.10.20.22.4.16" />
        <id extension="637032200035" root="1.3.6.1.4.1.22812.3.99930.3.4.9" />
        <id extension="665471900013" root="1.3.6.1.4.1.22812.3.99930.3.4.9" />
        <text>
1670             <reference value="#ID0EBIACA" />
        </text>
        <statusCode code="completed" />
        <effectiveTime xsi:type="IVL_TS">
            <low value="20111120154300" />
            <high nullFlavor="UNK" />
        </effectiveTime>
1675     <effectiveTime xsi:type="PIVL_TS" institutionSpecified="true" operator="A">
        <period value="24" unit="h" />
    </effectiveTime>
    <routeCode codeSystem="2.16.840.1.113883.3.26.1.1" codeSystemName="NCI Thesaurus"
1680 code="C38288" displayName="ORAL" />
    <doseQuantity value="1" />
    <administrationUnitCode codeSystemName="NCI Thesaurus"
codeSystem="2.16.840.1.113883.3.26.1.1" code="C25158" displayName="CAPSULE" />
    <consumable typeCode="CSM">
1685     <manufacturedProduct classCode="MANU">
        <templateId root="2.16.840.1.113883.10.20.22.4.23" />
        <manufacturedMaterial>
            <code code="313989" codeSystem="2.16.840.1.113883.6.88"
1690 codeSystemName="RxNorm" displayName="Fluoxetine">
                <originalText>
                    <reference value="#ID0EBBIACA" />
                </originalText>
            </code>
            <name>Fluoxetine</name>
        </manufacturedMaterial>
1695 </manufacturedProduct>

```

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```

1700     </consumable>
1700     <author>
1700         <time value="2011111000000-0500"/>
1700         <assignedAuthor>
1700             <id nullFlavor="UNK"/>
1700             <addr nullFlavor="UNK">
1700                 <streetAddressLine nullFlavor="UNK"/>
1705                 <city nullFlavor="UNK"/>
1705                 <state nullFlavor="UNK"/>
1705                 <postalCode nullFlavor="UNK"/>
1705                 <country nullFlavor="UNK"/>
1705             </addr>
1705             <telecom nullFlavor="UNK"/>
1710             <assignedPerson>
1710                 <name nullFlavor="UNK"/>
1710             </assignedPerson>
1710         </assignedAuthor>
1710     </author>
1715     <entryRelationship typeCode="REFR">
1715         <observation classCode="OBS" moodCode="EVN">
1715             <templateId root="2.16.840.1.113883.10.20.1.57"/>
1715             <templateId root="2.16.840.1.113883.10.20.1.47"/>
1715             <code code="33999-4" displayName="Status" codeSystem="2.16.840.1.113883.6.1"
1720 codeSystemName="LOINC"/>
1720             <statusCode code="completed"/>
1720             <value xsi:type="CE" codeSystem="2.16.840.1.113883.6.96"
1720 codeSystemName="SNOMED CT" code="55561003" displayName="Active"/>
1720         </observation>
1725     </entryRelationship>
1725     </substanceAdministration>
1725 </entry>
1725 <entry>
1730     <substanceAdministration classCode="SBADM" moodCode="INT">
1730         <templateId root="2.16.840.1.113883.10.20.22.4.16"/>
1730         <id extension="637032200039" root="1.3.6.14.1.22812.3.99930.3.4.9"/>
1730         <id extension="665471900019" root="1.3.6.1.4.1.22812.3.99930.3.4.9"/>
1730         <text>
1735             <reference value="#ID0EAIACA"/>
1735         </text>
1735         <statusCode code="completed"/>
1735         <effectiveTime xsi:type="IVL_TS">
1735             <low value="20100415154300"/>
1735             <high nullFlavor="UNK"/>
1740         </effectiveTime>
1740         <effectiveTime xsi:type="PIVL_TS" institutionSpecified="true" operator="A">
1740             <period value="24" unit="h"/>
1740         </effectiveTime>
1745         <routeCode codeSystem="2.16.840.1.113883.3.26.1.1" codeSystemName="NCI Thesaurus"
1745 code="C38288" displayName="ORAL"/>
1745         <doseQuantity value="1"/>
1745         <administrationUnitCode codeSystemName="NCI Thesaurus"
1745 codeSystem="2.16.840.1.113883.3.26.1.1" code="C42998" displayName="TABLET"/>
1745         <consumable typeCode="CSM">
1750             <manufacturedProduct classCode="MANU">
1750                 <templateId root="2.16.840.1.113883.10.20.22.4.23"/>
1750                 <manufacturedMaterial>
1750                     <code code="966247" codeSystem="2.16.840.1.113883.6.88"
1755 codeSystemName="RxNorm" displayName="Levothyroxine Sodium">
1755                         <originalText>
1755                             <reference value="#ID0EBAIACA"/>
1755                         </originalText>
1755                     </code>
1755                     <name>Synthroid</name>
1760                 </manufacturedMaterial>
1760             </manufacturedProduct>

```

```

1765     </consumable>
1770     <author>
1775         <time value="20100415010000-0400"/>
1780         <assignedAuthor>
1785             <id nullFlavor="UNK"/>
1790             <addr nullFlavor="UNK">
1795                 <streetAddressLine nullFlavor="UNK"/>
1800                 <city nullFlavor="UNK"/>
1805                 <state nullFlavor="UNK"/>
1810                 <postalCode nullFlavor="UNK"/>
1815                 <country nullFlavor="UNK"/>
1820             </addr>
1825             <telecom nullFlavor="UNK"/>
1830             <assignedPerson>
1835                 <name nullFlavor="UNK"/>
1840             </assignedPerson>
1845         </assignedAuthor>
1850     </author>
1855     <entryRelationship typeCode="REFR">
1860         <observation classCode="OBS" moodCode="EVN">
1865             <templateId root="2.16.840.1.113883.10.20.1.57"/>
1870             <templateId root="2.16.840.1.113883.10.20.1.47"/>
1875             <code code="33999-4" displayName="Status" codeSystem="2.16.840.1.113883.6.1"
1880 codeSystemName="LOINC"/>
1885             <statusCode code="completed"/>
1890             <value xsi:type="CE" codeSystem="2.16.840.1.113883.6.96"
1895 codeSystemName="SNOMED CT" code="55561003" displayName="Active"/>
1900         </observation>
1905     </entryRelationship>
1910 </substanceAdministration>
1915 </entry>
1920 <!-- a reconciliation act for the medication reconciled list of meds -->
1925 <entry>
1930     <act classCode="ACT" moodCode="EVN">
1935         <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1"/>
1940         <!-- the act needs an id -->
1945         <id root="1" extension="2"/>
1950         <!-- the code tells us that this reconciliation act is a medications
1955 reconciliation -->
1960         <text>
1965             <reference value="#KT0ECIACA"/>
1970         </text>
1975         <code code="MEDREC" displayName="Medications Reconciliation"
1980 codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActCode"/>
1985         <statusCode code="completed"/>
1990         <!-- the time when the reconciliation took place -->
1995         <effectiveTime value="20140428151500-0600"/>
2000         <!-- the performer of the reconciliation -->
2005         <performer typeCode="PRF">
2010             <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5"/>
2015             <assignedEntity classCode="ASSIGNED">
2020                 <id root="1" extension="3"/>
2025                 <addr nullFlavor="UNK"/>
2030                 <telecom value="tel:+1(816)276-6909" use="HP"/>
2035                 <assignedPerson>
2040                     <name>Dr Who</name>
2045                 </assignedPerson>
2050                 <representedOrganization>
2055                     <name>Where From</name>
2060                     <telecom value="tel:+1(816)276-6909" use="HP"/>
2065                     <addr nullFlavor="UNK"/>
2070                 </representedOrganization>
2075             </assignedEntity>
2080         </performer>
2085     </act>
2090 <!-- reconciliation data source(s) -->

```

1830

```
<!-- this example shows using a CCD document as the source -->
<reference typeCode="XCRPT">
  <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.6" />
  <externalAct classCode="ACT" moodCode="EVN">
    <id extension="someTTCCDA" root="1.1.1.1.1.1.1.1" />
    <code codeSystem="2.16.840.1.113883.5.6" code="DOCCLIN" />
  </externalAct>
</reference>
```

1835

```
<!-- this example shows using a QED query as the source-->
```

1840

```
<reference typeCode="XCRPT">
  <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.6" />
  <externalAct classCode="ACT" moodCode="EVN">
    <id extension="QUPC_IN043100UV.1" root="1.1.1.1.1.1.1.1" />
    <code codeSystem="2.16.840.1.113883.5.6" code="CACT" />
  </externalAct>
</reference>
```

1845

```
<!-- this example shows using an internal content as the source -->
```

1850

```
<reference typeCode="XCRPT">
  <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.6" />
  <externalAct classCode="ACT" moodCode="EVN">
    <id extension="555" root="1.3.3.3.3.3.3.3.3" />
    <code codeSystem="2.16.840.1.113883.5.6" code="ACT" />
  </externalAct>
</reference>
```

```
</act>
</entry>
</section>
</component>
```

1855

1860

1865

1870 **A.2 FHIR structure of a Reconciled Medication List**

```

1875 <List xmlns="http://hl7.org/fhir">
  <id value="reconciled-med-list"/>
  <meta>
    <lastUpdated value='2015-04-28T21:42:00-04:00' />
    <profile value='urn:ihe:pcc:recon:2015' />
  </meta>
  <text>
    <status value="generated"/>
    <div xmlns="http://www.w3.org/1999/xhtml">
1880      <!-- this reconciled list of medications has 3 medications in the list; note also
the text on when the list was reconciled and by whom. -->
      <table>
        <thead>
1885          <tr>
            <th>Name</th>
            <th>Dates</th>
            <th>Details</th>
          </tr>
1890        </thead>
        <tbody>
          <tr ID="ID0ECIACA">
1895            <td>Cephalexin 500 MG Oral Tablet; 1 TABLET FOUR TIMES DAILY FOR 10
DAYS</td>
            <td>Started 20-Sep-2012</td>
            <td>Generic substitution allowed</td>
          </tr>
          <tr ID="ID0EBIACA">
1900            <td>Fluoxetine 40 MG Oral Capsule; 1 TABLET once daily As
Directed</td>
            <td>Started 20-Nov-2011</td>
            <td></td>
          </tr>
          <tr ID="ID0EAIACA">
1905            <td>Levothyroxine Sodium 0.05 MG Oral Tablet; 1 TABLET once daily
As Directed</td>
            <td>Started 15-Apr-2010</td>
            <td></td>
          </tr>
1910        </tbody>
      </table>
      <paragraph ID="KT0ECIACA">The medication list was reconciled on 4/28/2014 by Dr
Who</paragraph>
    </div>
1915  </text>
  <subject>
    <reference value='Patient/f0001' />
  </subject>
  <source>
1920    <reference value="Practitioner/f007" />
    <display value="Patrick Pump" />
  </source>
  <status value="current" />
  <date value="2015-04-28T21:42:00-04:00" />
  <mode value="working" />
1925  <!--
    in a real medications list, we'd actually have medication resources.
    but in this example we just use entry placeholders, one for each medication -->
  <entry>
1930    <!-- medication # 1 -->
  </entry>
  <entry>
    <!-- medication # 2 -->
  </entry>

```

1935

```
</entry>
<entry>
  <!-- medication # 3 -->
</entry>
</List>
```

A.3 FHIR structure of Provenance with reconciliation details

1940

```
<Provenance xmlns="http://hl7.org/fhir">
  <id value="reconciled-medication-list-details"/>
  <text>
    <status value="generated"/>
    <div xmlns="http://www.w3.org/1999/xhtml">
      <!-- expect some text here -->
    </div>
  </text>
  <target>
    <reference value="reconciled-med-list"/>
  </target>
  <period>
    <start value="2015-04-28T21:42:00-04:00"/>
  </period>
  <recorded value="2015-04-28T21:42:00-04:00"/>
  <reason>
    <text value="details of reconciliation"/>
  </reason>
  <agent>
    <role>
      <system value="http://hl7.org/fhir/provenance-participant-role"/>
      <code value="performer"/>
    </role>
    <referenceUri value="Practitioner/f007"/>
  </agent>
  <!-- several sources were used for reconciliation -->
  <entity>
    <role value='derivation'/>
    <type value='MedicationStatement'/>
    <reference value='MedicationStatement/f402'/>
  </entity>
  <entity>
    <role value='derivation'/>
    <type value='Composition'/>
    <reference value='Composition/f4323'/>
  </entity>
  <entity>
    <role value='derivation'/>
    <type value='DocumentReference'/> <!-- this is an example where the source is a document that
was not a FHIR resource -->
    <reference value='urn:oid:1.2.3.4.5'/>
  </entity></Provenance>
```

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Volume 3 Namespace Additions

1985

Add the following terms to the IHE Namespace:

None

Volume 4 – National Extensions

Add appropriate country section

4 National Extensions

1990 Not applicable