Integrating the Healthcare Enterprise

IHE Patient Care Coordination (PCC)
Technical Framework Supplement

Reconciliation of Diagnoses, Allergies and Medications (RECON)

Trial Implementation

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Foreword

This is a supplement to the IHE Patient Care Coordination Technical Framework V7.0. Each
supplement undergoes a process of public comment and trial implementation before being
incorporated into the volumes of the Technical Frameworks.

This supplement is submitted for Trial Implementation as of September 9, 2011 and will 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 PCC
Technical Framework. Comments are invited and can be submitted at
http://www.ihe.net/pcc/pcccomments.cfm or by email to pcc@ihe.net.

This supplement describes changes to the existing technical framework documents and where
indicated amends text by addition (**<u>bold underline</u>**) or removal (**~~bold strikethrough~~**), as well as
addition of large new sections introduced by editor's instructions to "add new text" or similar,
which for readability are not bolded or underlined.

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

> *Replace Section X.X by the following:*

General information about IHE can be found at: www.ihe.net

Information about the IHE QRPH domain can be found at:
http://www.ihe.net/Domains/index.cfm

Information about the structure of IHE Technical Frameworks and Supplements can be found at:
http://www.ihe.net/About/process.cfm and http://www.ihe.net/profiles/index.cfm

The current version of the IHE Technical Framework can be found at:
http://www.ihe.net/Technical_Framework/index.cfm

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Introduction

This supplement is written for Trial Implementation. It is written as changes to the documents listed below. The reader should have already read and understood these documents:

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1. PCC Technical Framework Volume 1, Revision 7.0

2. PCC Technical Framework Volume 2, Revision 7.0

This supplement also references other documents[1]. The reader should have already read and understood these documents:

1. IT Infrastructure Technical Framework Volume 1, Revision 8.0

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2. IT Infrastructure Technical Framework Volume 2, Revision 8.0

3. The Patient Identifier Cross-Reference (PIX) and Patient Demographic Query (PDQ) HL7 v3 Supplement to the IT Infrastructure Technical Framework.

4. HL7 and other standards documents referenced in Volume 1 and Volume 2

This supplement defines the Reconciliation profile provided for Trial Implementation.

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[1] The first three documents can be located on the IHE Website at http://www.ihe.net/Technical_Framework/index.cfm#IT. The remaining documents can be obtained from their respective publishers.

Open Issues and Questions

Closed Issues

Reconciliation has two components: Technical and clinical. We must be careful to ensure that this profile does not attempt to place restrictions on how healthcare providers practice but should instead focus on the needs. For example, it may be useful to prioritize diagnoses for reconciliation, but the profile should NOT specify an algorithm to use for prioritization though may offer methods for consideration" with a focus on the data needed to prioritize diagnoses in a reconciled list.

1. Will this provide an algorithm for reconciliation or simply support a workflow? This will not provide an algorithm (e.g., how to implement), but will have certain functional requirements about results.

2. How do we address the integration of diagnosis lists across disciplines? We should probably support classification, but let implementers use as they see fit.

3. How does reconciliation of information in face-to-face interactions with the patient or their representative incorporated into this profile? Need to be able to include patient interaction of a source of information (patient states). Family member report (e.g., mother of infant). Recording individual has responsibility for accuracy of information.

4. What does reconciliation mean? Reconciliation is the process of merging and adjudicating conflicts between electronically accessed clinical information from multiple sources. It occurs during transfers or transitions of care from one healthcare practice setting or level of care to another, and can occur at other times as needed.

5. What information will be reconciled? Diagnoses, Medications, and Allergies

6. For Diagnoses: Acuity, Onset, Duration, Name/Concept, Method of Determination (Finding, Signs/Symptoms), Priority, Severity (i.e., health status data).

7. In reconciliation, one of the outcomes should be a prioritized list of issues. How is this determined?

8. What information is needed to support prioritization? You want to be able to present issues in a way that is helpful to the provider, what are those details?

Volume 1 – Profiles

Add the following to section 1.5

1.5 Copyright Permissions

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Add the following to section 2.5

2.4 Dependencies of the PCC Integration Profiles

Reconciliation	None		

Add the following to section 2.5

225 ## 2.5 History of Annual Changes

In the 2011-2012 cycle of the IHE Patient Care Coordination initiative, the following integration profiles were added as supplements to the technical framework.

- Reconciliation of Diagnoses, Allergies and Medications Profile (RECON) – Supports the automation of reconciliation tasks.

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Add Section X

X Reconciliation of Diagnoses, Allergies and Medications Profile

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 235 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.

X.1 Purpose and Scope

240 Reconciliation of electronically available clinical information during any transfer or transition of care from one healthcare practice setting to another is challenging and may involve the exchange of patient care information between or across systems. Patients with complex medical history can have dozens of diagnoses, medications, allergies and healthcare providers in various care settings. These complex histories and findings are often reported by a variety of different 245 healthcare providers with duplicated, overlapping and superseded information. The task of identifying the status of diagnoses, allergies and medications requires a great deal of time and precision.

In the Magic Number Seven, Plus or Minus Two[2], George Miller argues that the average human memory can hold seven plus or minus two units of information. Subsequent studies reduce this 250 figure when the units of information are words. Numerous research studies indicate that the average number of medications taken by high risk populations (elders, patients with chronic conditions, et cetera) approaches or exceeds seven. For complex cases, the task would then exceed the average capacity of human working memory.

Regulatory and accrediting organizations require healthcare institutions to reconcile clinical 255 information during every transfer of care, discharge or admission. This profile supports the electronic reconciliation when diagnoses, allergies and medications are transferred across system boundaries. It may also be used when transfers occur within the same information system. Typical inpatient and outpatient workflows include the review of a patient's list of diagnoses, allergies, and medications to support reconciliation of these data.

260 This profile provides the support necessary to automate this complex, repetitive and high risk task that every healthcare provider performs as part of inpatient and outpatient workflows.

The scope of this profile is limited to diagnoses, allergies or medications. We note a distinction between diagnoses and problems. A diagnosis encompasses problems, symptoms, complaints and other health status inputs. During the reconciliation process, clinicians most commonly need 265 to reconcile the diagnoses produced by other providers, not the inputs they used to generate a

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[2] Available on the web at http://psychclassics.yorku.ca/Miller/

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diagnosis. These diagnoses are then used to determine the appropriate patient plan of care
(PPOC). Nursing diagnoses are used to identify the diagnostic condition that requires nursing
care based on the analysis and synthesis of the patient signs and symptoms[3].

X.2 Process Flow

270   There are five steps to the reconciliation process. The numbered steps below correspond to the
numbered steps in the drawing that follows.

1. The first step is to gather the information that needs to be reconciled.

   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,
   275   consultation notes, and the patient's nursing plan of care, et cetera.

   b. Data may also come from clinical summaries available from the patients personal
   health record or a Health Information Exchange (HIE).

   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
   280   records

   d. Data might also appear in pharmacy benefit records, and disease/condition specific
   information registries (e.g., a cancer registry, vaccination repository).

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
285   candidate entries 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. 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.

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3. The third and final 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
295   representative to help disambiguate issues identified during the automated process, and
add any newly available information.

4. The healthcare provider interacts with the application to produce a set of reconciled data
that will then be stored for subsequent use.

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[3] *Clinical Care Classification (CCC) System manual: A guide to nursing documentation* (p.153), by V. K. Saba.
Saba, 2007, New York: Springer Publishing. Copyright (2006) by Saba. Reprinted with permission.

5. The resulting lists produced from this process are stored in an EHR or other Healthcare Information System.

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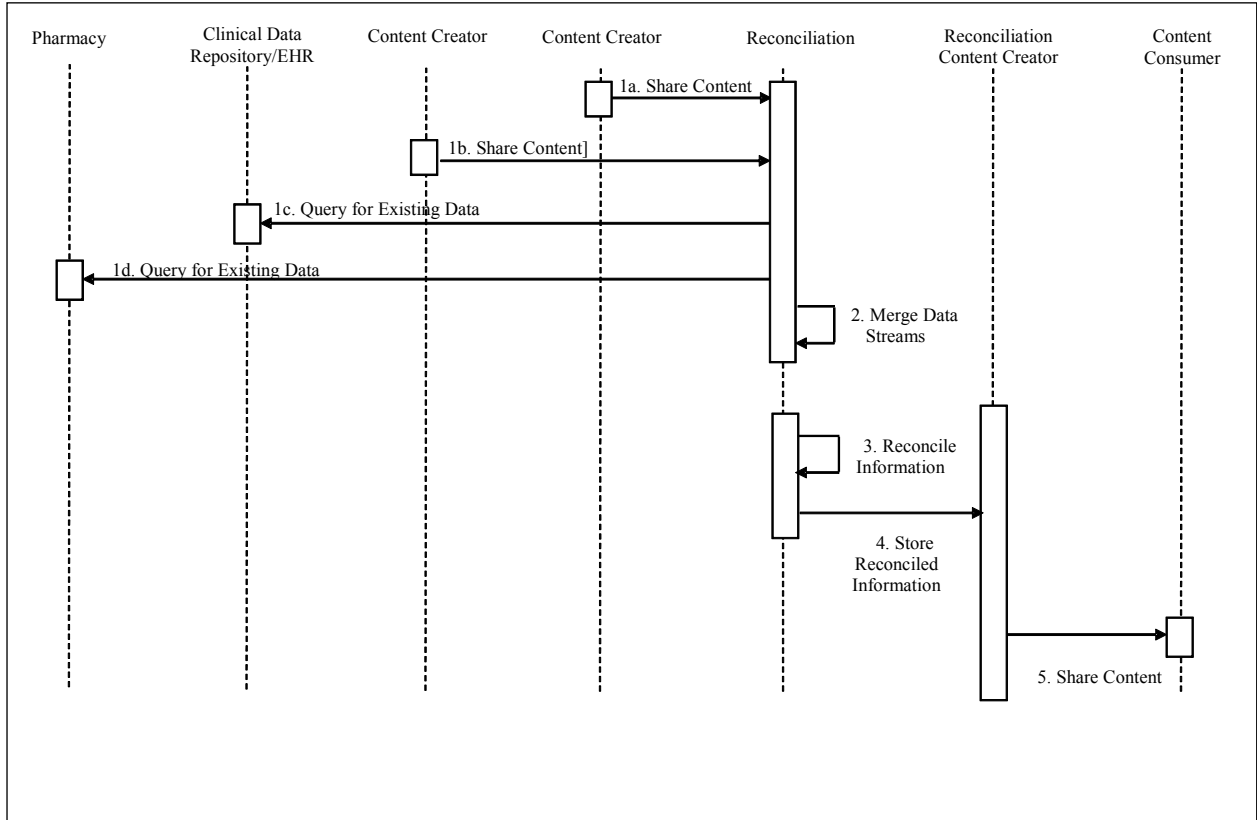
Figure X.2-1 Reconciliation Process Flow

The 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

305 identification of similar entries (diagnoses, allergies or medications). These are described in further detail below.

The purpose of this profile is not to describe the specific mechanism or algorithm by which the application performing reconciliation identifies duplicated, overlapping, conflicting or superseded entries. The heuristics described below are provided to make developers aware of

310 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 profile mandates a particular behavior of the system implementing the actor. These are described in each of the following sections as numbered conformance requirements in the sections below.

X.2.1 Identity

Each entry appearing in an IHE content profile in the PCC Technical Framework has a universally unique identifier (c.f., PCC TF-2: 6.3.4.11.5, 6.3.4.14.6 and 6.3.4.16.6). The identifiers are distinct from the codes which indicate the type of entry. 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 identifier. If two entries 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).

X.2.1.1 Maintenance and Verification of Original Identity

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

1. When matching two entries by universally unique identifier, the reconciling application SHALL verify that other details of the reconciled entries are consistent.

2. 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.

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

3. When reconciling information from an external system, the reconciling application SHALL maintain the <u>first</u> identifier provided for the item as the original identifier. It MAY provide its own identifier for the data as well.

4. When exporting information that came from an external source through reconciliation, the reconciliation application SHALL report the original identifier as the <u>first</u> identifier reported for the item.

5. Subsequent identifiers after the first MAY be retained and reported but are not required by this profile.

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

6. The reconciling application SHALL report these inconcistencies 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).

7. The reconciling application **MAY** require manual reconciliation of the inconsistent entries.

8. 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.2.1.2 Transitions in Identity

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

*   Status updates to the data item.

*   Addition of new or previously unknown data or relationships to other data items.

*   Changes in the treatment or diagnosis.

360 •   Correction of the data item due to it being reported in error.

Transitions in identity are often accompanied by changes in the status of a data item. These are recorded in the `statusCode` element of entries in the document. Table X.2.1.2-1 below shows the meaning of these different status values from the HL7 ActStatus vocabulary.

365   **Table X.2.1.2-1 ActStatus values**

ActStatus	Description
active	The activity represented by the data item is currently active.
completed	The activity represented by the data item transitioned to a normal state of completion.
suspended	The activity represented by the data item was put on hold after it was initiatiated.
aborted	The activity represented by the data item was terminated prior to the normal completion.
obsolete	The activity represented by the data item has been replaced by a new data item.
nullified	The activity represented by the data item was incorrectly reported.

X.2.1.2.1 Status Updates

Status updates are changes such as "this medication has been discontinued", or "this problem is now resolved". Status updates do not change the identity of the data item whose status is being
370 updated, or the facts in it as they were reported at a previous point in time. Status updates report on the normal evolution of an data item over time.

One issue that implementors may need to address is the temporary suspenstion of medications during treatment. In these cases the orginal intention may have been to keep a patient on a medication for a certain time period, but due to treatment, that medication may need to be
375 temporarily held. This profile does not require temporary holds to be reported, nor does it

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prevent them from being so reported. The decision to report or not report these holds is left to local policy.

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

X.2.1.2.2 Addition of New or Previously Unknown Data or Relationships

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 diagnoses were previously unreported, but are now added, the data item does not change its identity.

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 (using an `entryRelationship` element) to indicate what the new treatment is for that item without changing the identity of the data item. Similarly, the addition of a new manifestion of an allergy will not change the identity of the previously described allergy. However, the manifestation itself is a new data item with a new identity.

Implementors of the Reconciliation Agent actor 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.

When a disease progresses, this 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.1.2.2.3 Changes in Treatment, Diagnosis or Related Information

Changes in treatment or diagnosis create new "facts" that supplant or replace previous data items. The new data item has new a identity, and the old data item is retained (although its status may be changed).

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

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these cases, the new diagnosis or treatment is a new data item with a new identity, and the previous data item is marked as being `aborted` (stopped before a normal termination).

415   Refinements or changes in judgement can also occur, often as a result of new data. An 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. In another case, 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 <u>correctly recorded</u> as the diagnosis, and is not subject to the rules about correction below. This is
420   perhaps the best explanation of why a change in diagnosis is not treated as a correction. The fact that a patient was diagnosed with a particular illness is correct, and was correctly recorded.

In both cases, the new diagnosis is retained with a new identity, and the old diagnosis is marked as `obsolete`. The new data item can indicate that it replaces the old data item through the addition of an `entryRelationship` element showing the replacement.

425   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.

X.2.1.2.3 Corrections to previously reported Treatment or Diagnosis

430   It is only when 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.

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
435   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 `nullified`. If there is a new data item, it may be replaced by the data item that contains the corrected data.

The new data item in all cases has a new identity.

440   1. When an 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 the association of the new data item with the reconciled data items that have been superceded since the last reconciliation.

X.2.2 Codes

445   The various entries use codes from a variety of different coding systems to identify what is represented. Two entries using the same code are often, but not necessarily referencing the same

event. For example, a SNOMED CT code could identify an entry 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
450 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.

Different conditions require different information to disambiguate or suggest identity. If the
diagnosis in both entries above had instead been Diabetes Type II, the application could have
455 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.

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
460 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 entries 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
465 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 used in these cases.

Care is also needed in determining what code should be used as the most accurate representation
470 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
475 candidate for the reconciled result.

When dealing with data from multiple systems, entries for the same event may be coded in
different coding systems. In these cases, crosswalks might be used to enable comparision.
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
480 may map to multiple codes in another system, or vice versa, or may have no mapping at all.

To faciliate interoperability and avoid loss of data, this profile recommends that codes in
imported entries be preserved and any mappings to new coding systems be recorded as
translations on export. 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.
485 Also, many regional and national interoperability specifications have requirements to use

specific coding systems for recording codes for different entries, and may not permit the transmission of alternate codes.

490
Another issue to consider is that not all entries will be coded. The PCC Technical Framework requires the presence of the <code> element, but permits the code to be null (not present). The entry will always have text that is associated with that element, 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.

X.2.3 Timing

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Timing can often be used to help disambiguate between different events, but this also requires clinical knowledge to be used effectively. Different conditions are often resolved within a specific time period (e.g., flu within a few weeks), so an assumption can be made when sufficient time has passed, that instances of the diagnoses being referred to are distinct. In some cases, time can be short (e.g., flu), but in other cases can be much longer lived (e.g., cancer). Many diagnoses are chronic, and time doesn't really apply. For example, an instance of Diabetes Type
500
II in one year is likely the same diagnosis as a separate instance reported even decades later. The same may also apply to nursing diagnosis.

X.2.4 Anatomical Site

Anatomical site can often be used both in conjuction with timing, and without reference to timing to assist in disambiguation. If two conditions are reported as being in different
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anatomical sites, then they are likely different. However, anatomic site also has the same issues of hieararchy 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 are likely the same diagnosis. The difference is in the specificity of the anatomical site.

X.2.5 Source of Information

510
The source of the information is another datum that may be used when 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.

515
Care should be taken when reconciling diagnoses when a second opinion or consultation has 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
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area where special consideration is needed during the reconciliation process. Applying generalizations about patient's knowledge of their diagnoses, allergies and medications will not

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apply equally. Some patients will be quite educated about their conditions, while others may have only very limited knowledge.

525 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 content profile does provide specific guidance about how sources of information should be recorded to assist in the reconciliation process.

X.2.6 Disease Specific Reconciliation

This section describes reconciliation heuristics that are applicable only to diagnosis.

530 ### X.2.6.1 Degree of Clinical Judgement

Entries for diagnoses include the degree of clinical judgement used in assessing or reporting the condition. The levels of clinical judgement found in the HL7 Continuity of Care Document include:

- Condition
535 - Problem
- Complaint
- Symptom
- Finding
- Diagnosis
540 - Functional Limitation

Two entries that are otherwise similar but with different degrees of clinical judgement need to reconcile the level of clinical judgement associated with the issue.

X.2.6.2 Severity

When two diagnoses are merged, the diagnoses may have "conflicting" reports of the severity of
545 the diagnoses. Severity of a diagnosis 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 diagnosis) during the merging process. The same principal applies below to severity that would be recorded for allergies. In addition, the method of attaching a clinical severity to reconciled diagnoses may be considered by the reconciliation application in the
550 presentation layer.

X.2.7 Allergy Specific Reconciliation

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

X.2.7.1 Allergic Condition and/or allergen

555   The allergies and intolerances may be represented in one or both of two ways: Either by
identifing 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
560   substances) that could cause an adverse reaction.

Allergies are required to be identified in PCC-TF 2:6.3.4.15 Allergies and Interolerances, and
allows the allergen to be identified but does not require it. The allergy may be described by a
code, or it may just contain text describing the allergic condition.

Some coding systems that provide codes to record allergies, such as SNOMED CT, also provide
565   the ability to navigate to the code for the causative agent. This provides a limited means by
which mapping from allergy to allergen can be accomplished for systems which use that
vocabulary.

Other coding systems (e.g., ICD-9-CM) do not provide such navigational capabilities, and so
mapping from allergy to allergen must be provided by auxilliary clinical knowledge.

570   ### X.2.7.2 Allergy/Non Allergy Intolerance/Intolerance

PCC-TF 2:6.3.4.15.4 requires that some indication be given as to whether the entry reports an
allergic condition, a non-allergy intolerance, or an adverse reaction otherwise unknown as to
whether the allergic reaction results from an allergic condition or non-allergic intolerance.
During the reconciliation process, different systems may report different statuses with respect to
575   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.2.7.3 Intolerance to Medication/Food/Environment

PCC-TF 2:6.3.4.15.4 requires that some indication be given as to whether the entry describes an
580   intolerance to a medication (including vaccines), food, or an environmental agent. During the
reconciliation process, different systems may report different statuses with respect to this
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.

585   ### X.2.7.4 Adverse Reactions

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

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X.2.8 Medication Specific Reconciliation

590   Medications are perhaps the most challenging entries 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

595   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

600   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 entries.

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 a structured medication dosing

605   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 fullfilment events with the original intent of the prescription event when a substitution occurs. The PCC Technical Framework assumes that fullfilment activities occur with knowledge of the original intent of the

610   prescription, and requires that fullfilment events to be recorded in a `<supply>` entry that appears inside the original `<substanceAdminstration>` intent. So, matching of fullfilment activity with the original prescribers intent is possible even in cases where subsitutions occur.

X.2.9 Use Cases

615   ### X.2.9.1 Transfer of diagnoses with no variances

The first use case demonstrates reconciliation of dignoses between an ED system and an ambulatory EHR where no conflicts are identified during the automated reconciliation.

Preconditions:

Patient has the following ICD-9, LOINC, SNOMED and Clinical Care Classification System

620   (CCC) diagnoses recorded in her primary physicians EHR.

- Anxiety (300.00 ICD-9, 52910006 SNOMED , P40.0 CCC, 28135-2 LOINC), Jan. 2010
- Hypercholesterolemia (272.0 ICD-9, 13644009 SNOMED) June 1999 managed by diet.
- Caregiver Role Strain (M27.4 CCC; 42821-9 LOINC)

625 **Use Case**

Reconciliation in the ED: 56 year old woman arrives in the Emergency Department complaining of palpitations and lightheadedness. She is evaluated and the following new diagnoses are added to her list of diagnoses:

- Hypotension (458.9 ICD-9, 45007003 SNOMED)

630 - Tachycardia (427.89 ICD-9, 11092001 SNOMED)

Her pre-existing records are examined and reconciled against this list. Since there are no conflicting entries the new list of diagnosis is automatically reconciled and presented to the ED caregivers performing the reconciliation. They accept the reconciled data into the ED record.

An ECG is performed and the patient is diagnosed with supraventricular tachycardia. Heart rate:
635 136, RR: 24. The patient is hemodynamically stable but distressed with the palpitations. Standard cardiac maneuvers were attempted and successfully terminated the tachycardia with a return to normal sinus rhythm (NSR). The patient developed hypotension BP 70/40 post-procedure and was admitted observation. No known allergies. No routine medications. Patient is alert and oriented. Patient was transferred via stretcher with cardiac monitor to Telemetry unit. IV ½ NS at
640 Keep Vein Open infusing in right hand without difficulty.

The Emergency Department Encounter Summary (See EDES in IHE PCC TF-1) is completed by the ED physician, and the reconciled information is included in the resulting document.

X.2.9.2 Transfer of diagnoses and medications with variances

The second use case demonstrates reconciliation of diagnoses from an ambulatory EHR, and a
645 patient's PHR being performed by the Hospital EHR. In this use case, there are issues identified during the reconciliation of the diagnoses and medications because the patient's PHR is out of date.

Preconditions:

Patient's medical records from primary care include the following ICD-9, SNOMED, CCC and
650 LOINC diagnoses:

- Hypertension (401.1 ICD-9, 38341003 SNOMED)
- Hypercholesterolemia (272.0 ICD-9, 13644009 SNOMED)
- Hyperglycemia (790.6 ICD-9, 80394007 SNOMED)
- Nutrition Alteration (J24.0 CCC, 28181-6 LOINC)

655 - Endocrine Alteration (I22.0 CCC, 28097-4 LOINC)

Medications include:

- Hydrochlorothiazide 25 mg 1/per day

- Simvastatin 10mg 1 /per day
- Metformin 1000 mg 2/ per day

660 Patient has a new PHR which includes the following diagnoses:

- Diabetes (250.0 ICD-9, 44054006 SNOMED)
- Shingles (053.9 ICD-9, 4740000 SNOMED)

And medications:

- Multivitamin 1/per day
665 - Hydrochlorothiazide 12.5 mg 1/per day

Use Case

A 68-year-old man is seen in the office for the routine follow-up of hypertension and is initially interviewed and assessed by a nurse, then seen by the primary care provider (PCP), who finds the patient to have Atrial Fibrillation of unknown duration. The PCP sends the patient to the Hospital
670 by ambulance for monitoring with an admitting diagnosis of Atrial Fibrillation.

In the hospital, the patient's EHR and PHR data are reconciled. The hospital EHR recognizes a potential overlap between the diagnosis of Hyperglycemia and Diabetes. The admitting physician discusses this with the patient and uses the hyperglycemia diagnoses after the patient admits that he is "pre-diabetic". The hospital EHR also identifies the variation in dosage for
675 Hydrochlorothiazide. The patient remembers that his provider changed his dosage, but that he had not updated the dosage in his PHR.

The new information is added to the Hospital EHR.

The physician orders heparin for the patient and the hospital EHR alerts the physician to a risk of adverse event due to the patient's home use of multi-vitamins containing Vitamin K. Patient is
680 advised to discontinue the multivitamins while under treatment.

X.2.9.3 Transfer of diagnoses with overlapping interpretations

In the third use case, information from a clinic EHR and another ambulatory EHR show slight variations in information which are detected and reconciled.

Preconditions:

685 The Clinical EHR contains:

- Upper Respiratory Infection (465.9 ICD-9, 5415009 SNOMED) September 2010
- Streptococcal Sore Throat (034.0 ICD-9, 43878008 SNOMED) September 2010

Primary Physician's EHR contains:

- Pharyngitis (462 ICD-9, 405737000 SNOMED) September 2010 with a negative Rapid Strep
690   Test

- Sinusitis (461.9 ICD-9, 36971009 SNOMED) February 2010
- Respiratory Alteration (L26.0 CCC, 28199-8 LOINC)
- No Known Allergies

695 **Use Case**

20 year old male student seen by the Student Health Center with fever, chills, productive cough, acute rib pain, increased effort to breath with use of accessory muscles and tachypnea, loss of appetite, and fatigue x 2 days. The nursing assessment is respiratory alteration. The clinic Patient Plan of Care is exchanged with the Hospital EHR upon transfer for treatment.

700 Healthcare provider reviews patient history from clinic EHR and patient's primary care provider EHR. The reconciling system reports an overlap between Upper Respiratory Infection, Streptococcal Sore Throat and Pharyngitis between 9/10 and 9/13. After investigation, the patient's physician accepts Streptococcal Sore Throat and Upper Respiratory Infection. During investigation patient also reports past history of asthma, which the health care provider evaluates
705 and subsequently adds to the record during the reconciliation process.

Chest x-ray shows bilateral lower lobe infiltrates. Patient diagnosed with Pneumonia and is admitted to the medical unit for IV antibiotics.

A referral note (XDS-MS) is generated documenting the encounter and containing the reconciled information and is forwarded to a Pulmonologist for consultation.

710 ## X.2.9.4 Transfer of allergies with overlapping interpretations

In this final use case, information from two ambulatory EHRs are compared and reconciliation data flows forward into the next EHR.

Preconditions:

Pediatrician's EHR indicates that the patient is allergic to amoxicillin.

715 The Ear, Nose and Throat specialist's EHR indicates the patient is allergic to penicillin.

Use Case

The patient, a 9-year-old female is being referred to a specialist for a persistent ear infection by her pediatrician. The pediatrician had previously recorded an allergy to amoxicillin after the patient reported a rash in response to being treated with the drug. On a prior visit the specialist
720 had been told by the patient's parent that the patient was allergic to penicillin. During review of the patient's history her pediatrician reconciles the patient's diagnoses, allergies and medications with information from the specialist's EHR which has recently become accessible.

During the reconciliation process the pediatrician's EHR notices allergies to both penicillin and amoxicillin and proposes a general –cillin allergy. On investigation with the parent, the

725 specialist determines that the report of allergy to penicillin was inaccurate. The pediatrician removes penicillin from the patient's allergy list and adds amoxicillin. The pediatrician creates a referral note and shares it with the specialist (see XDS-MS).

During the specialist visit, the specialist reconciles the information in her EHR with that provided in the physician's referral note. The specialist's EHR notes that the allergy information
730 previously generated by the specialist was used in the reconciliation, but that the penicillin allergy no longer appears in the referral note that was used in the reconciliation. The specialist's EHR suggests that the penicillin allergy be removed as it had been removed by another healthcare provider during reconciliation. On investigation, the patient's parent recalls the discussion they had with the pediatrician and the specialist removes the penicillin allergy, and
735 adds an amoxicillin allergy for the patient.

X.3 Actors/Transactions

Figure X.3-1 shows the actors directly involved in the Reconcilliation Integration Profile and the relevant transactions between them. Other actors that may be indirectly involved due to their participation in Query for Existing Data or PCC Content Profiles are shaded in the diagram
740 below.
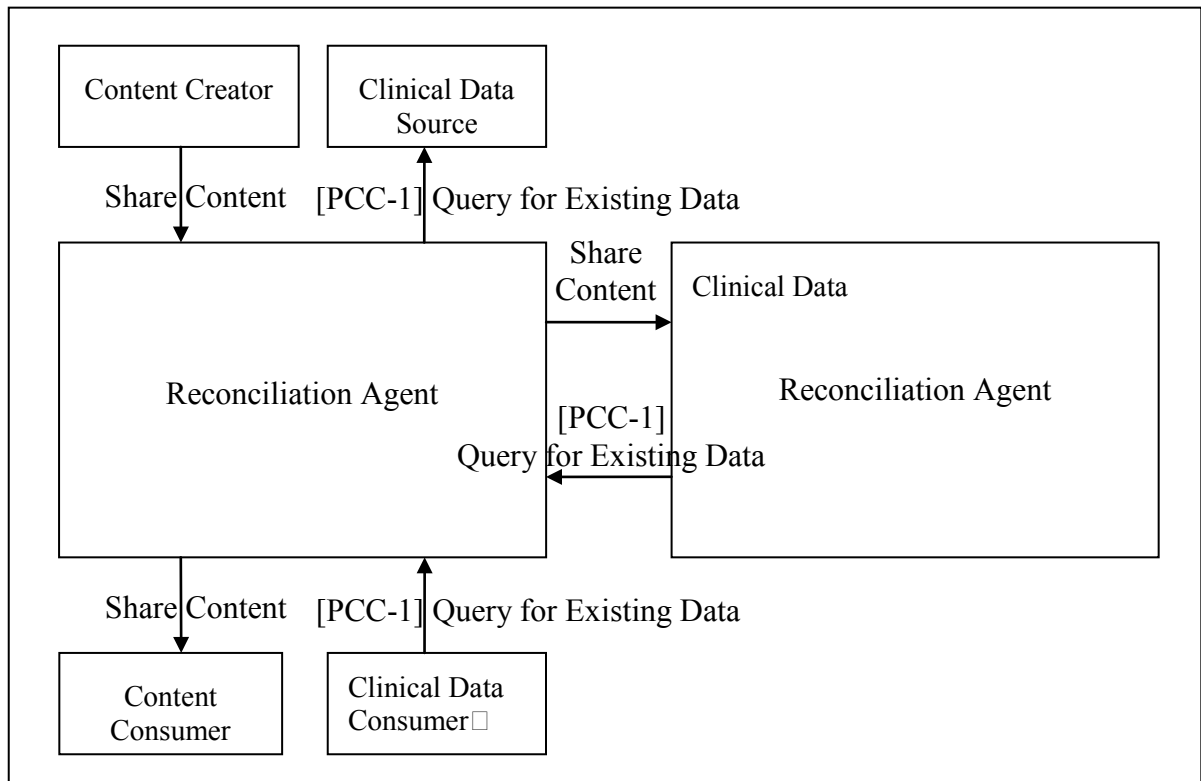
Figure X.3-1. Reconciliation Actor Diagram

Table X.3-1 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 I, Section X.4.

Table X.3-1. Reconciliation Integration Profile - Actors and Transactions

Actors	Transactions	Optionality	Section in TF
Reconciliation Agent	Share Content	R	PCC TF-1 :2.1
	Query Existing Data [PCC-1]	O	QED :3.1
Content Creator	Share Content	R	PCC TF-1 :2.1
Content Consumer	Share Content	R	PCC TF-1 :2.1
Clinical Data Source	Query Existing Data [PCC-1]	R	QED :3.1
Clinical Data Consumer	Query Existing Data [PCC-1]	R	QED :3.1

X.3.1 Requirements of Actors

X.3.1.1 Reconciliation Agent

The Reconciliation Agent actor 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.

1. It SHALL present the demographics used identify the patient provided by each separate source of clinical information to the end user.

2. It SHALL highlight inconsistencies found during the automated reconciliation process and provides the clinician with mechanisms to adjust or correct the input.

3. It SHALL provide a mechanism for a clinician to add new information to the reconciled results.

4. It SHALL authenticate the clinician prior to storage of the reconciled data (this step may be combined with other authentication steps used to finalize the record).

5. It SHALL store the resulting data for future use by other actors as described below.

X.3.1.2 Content Consumer

The Content Consumer actor 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 content containing problems, medications and allergies as defined in the PCC Technical Framework.

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

X.3.1.3 Content Creator

The Content Creator actor 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 problems, medications and allergies as defined in the PCC Technical Framework.

1. The Content Creator actor SHALL create content conforming to a profile supporting a Medical Summary as defined in PCC TF-2:6.3.1.2 Medical Summary.

X.3.1.4 Clinical Data Source

The Clinical Data Source actor in this profile is an implementation of the Clinical Data Source actor in the QED profiles. It has the additional requirement that it must be able to create content containing problems, medications or allergies as defined in the Query for Existing Data profile.

1. The Clinical Data Source SHALL implement either the Problems and Allergies Option described in QED: 3.4.2 or the Medications Option described in QED:3.4.4 or both.

X.3.1.5 Clinical Data Consumer

The Clinical Data Consumer actor in this profile is an implementation of the Clinical Data Consumer actor in the QED profile. It has the additional requirement that it must be able to query for content containing problems, medications or allergies as defined in the Query for Existing Data profile.

1. The Clinical Data Consumer SHALL implement either the Problems and Allergies Option described in QED: 3.4.2 or the Medications Option described in QED:3.4.4 or both.

X.4 Options

Options that may be selected for this Profile are listed in the table X.4-1 along with the Actors to which they apply. Dependencies between options when applicable are specified in notes.

Table X.4-1 Reconciliation - Actors and Options

Actor	Options	Vol & Section
Reconciliation Agent	*Clinical Data Option*	PCC TF-1:X.4.1
Content Creator	*None*	N/A
Content Consumer	*None*	N/A
Clinical Data Source	*None*	N/A
Clinical Data Consumer	*None*	N/A

X.4.1 Clincial Data Option

A reconciliation agent implementing the clinical data option SHALL support the PCC-1 Query for Existing Data transaction to query one or more Clinical Data Source actors and to respond to 800 queries from Clinical Data Consumer actors.

X.5 Groupings

X.5.1 Content Consumer

The Reconciliation Agent Actor must be grouped with an eligble Content Consumer actor supporting the Discrete Data Import Option to obtain data about diagnoses, allergies and 805 medications from clinical documents. Eligible Content Consumer actors are those that support content containing diagnoses, allergies or medications. Any content profile that derives from the IHE Medical Summary template qualifies. Other content profiles may also qualify. The content used for Basic Patient Privacy Consents, and for Sharing of Laboratory Reports does not qualify.

X.5.2 Clinical Data Consumer

810 A Reconciliation Agent actor implementing the Clinical Data Option must be grouped with a Clinical Data Consumer Actor that supports the Diagnoses and Allergies Option and the Medications Option defined in the Query for Existing Data (QED) Profile. This actor is used to obtain information about diagnoses, allergies and medications from one or more clinical data sources.

815 ### X.5.2 Content Creator

The Reconciliation Content Creator is grouped with at least one other Content Creator actor from another IHE Content Profile. That actor must implement the Reconciliation Content option.

X.6 Security Considerations

Risks specific to reconciliation:

820 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 overflagging including:

825 • Overuse of the provider's time to correct these errors

• Alert fatigue

• Low morale

• System distrust or minimization of confidence in results of the system

830 • Implementation of "workarounds" that short-circuit the reconciliation process to avoid
consequences.

These consensquences 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
835 failure to identify duplicated treatments which increased toxicity leading to other health
complications for the patient.

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.

840 ## X.7 Content Modules

The Reconciliation content profile defines content modules that must be included in the
Diagnoses, Allergies or Medication List sections of a CDA Document or in response to queries
for diagnoses, allergies or medication lists using the QED profile.

Reconciliation Data	CDA Entries	Section in PCC TF
Allergies	Allergy and Intolerance Concern	PCC TF-2: 6.3.4.13
Diagnoses	Problem Concern Entry	PCC TF-2: 6.3.4.12
Medication List	Medications Entry	PCC TF-2: 6.3.4.16

845 # Appendix A Actor Summary Definitions

Reconciliation Agent

The Reconciliation Agent actor accesses clinical information in structured form, automatically
identifies potentially duplicated information based upon application knowledge, presents it to a
clinician and accepts clinician input to finalize the reconciliation, and stores the resulting data for
850 future use.

Appendix B Transaction Summary Definitions

Glossary

855 *Add the following terms to the Glossary:*

Assessment	Collection of clinical health data
Diagnoses	Analysis of the patient assessment data
Transfer of Care	Any transfer of care involving the exchange of patient care information between or across systems.
Reconciliation	The process of merging and adjudicating conflicts between electronically accessed clinical information from multiple sources. It occurs during transfers or transitions of care from one healthcare practice setting or level of care to another, and can occur at other times as needed.

860

865

Volume 2 – Transactions and Content Modules

5.0 Namespaces and Vocabularies

870 ### 5.1.2 IHEActCode Vocabulary

Add the following to the table of codes

Code	Description
MEDREC	Reconciliation of Medications
DIAGREC	Reconciliation of Diagnoses
ALGREC	Reconciliaiton of Allergies
QUERY	The act of querying for clinical data.

6.0 PCC Content Modules

875 ## 6.3 HL7 Version 3.0 Content Modules

6.3.1 CDA Document Content Modules

Add section 6.3.1.C

6.3.1.C Reconciliation Content

Clinical Documents or Messages conforming to this template make use of the Reconciliation
880 profile (PCC TF-1: X) to report data that has been reconciled with one or more information
sources.

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

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

This profile applies to medical and nursing documents created using the IHE PCC Technical
895 Framework. The content of a `ClinicalDocument` or `QUPC_IN043100UV` element
conforming to this profile will assert conformance to the profile. It must include a reconciliation
act for each section containing diagnoses, allergies and medications. Note, this means that all
sections containing any of these data elements must be reconciled according to the requirements
of this profile. For example, it would be an error to use this profile to reconcile medications
900 alone, without reconciling allergies and diagnoses.

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.

2. The `ClinicalDocument` SHALL also conform to the Medical Documents (PCC TF-
905 2:6.3.1.1) template (templateId: 1.3.6.1.4.1.19376.1.5.3.1.1.1).

3. The `ClinicalDocument` or `QUPC_IN043100UV` element SHALL contain at least one
   [1..*] Reconciliation Act (6.3.4.D) template (templateId:
   1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1) to indicate where diagnoses ,
   allergies and medications have been reconciled in the Active Problems (PCC TF-2:

32

910   6.3.3.2.3), Medications (PCC TF-2:6.3.3.3.1 to PCC TF-2:6.3.3.3.4) or Allergies and
Other Adverse Reactions (PCC TF-2:6.3.3.2.11) sections.

4. Narrative content in document sections containing reconciliation acts SHALL contain a
narrative indication of who reconciled the reported information in the section and when.

      a. The narrative SHALL appear in the `text` element of the `section` in which the
915   reconciled data appears.

      b. This narrative SHALL be referenced by the reconciliation act as described in
           section 6.3.4.D.5 below.

For example:

Information in this section reconciled by Doctor Smith on September 15, 1965.

920

```
<section>
    …
    <text>
        …
        <content ID='recon-1'>
            Information in this section reconciled by Doctor Smith on
            September 15, 1965.</content>
        …
    </text>
    …
</section>
```

925

930

Figure 6.3.1.C.1-1 Reconciled Narrative Example

6.3.4 CDA Entry Content Modules

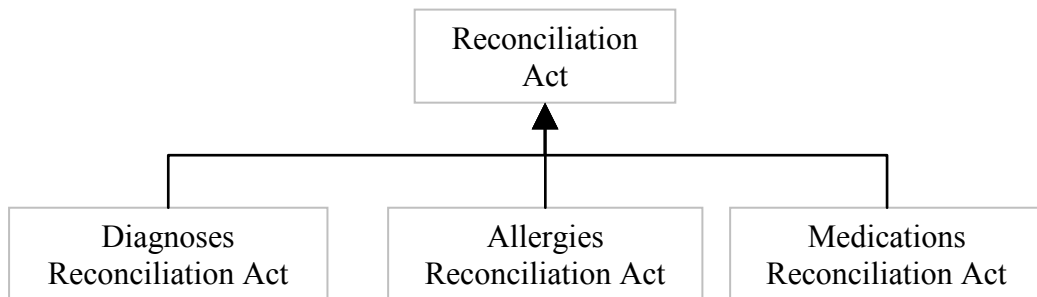*Add section 6.3.4.D*

935 **6.3.4.D Reconciliation Act**

Figure 6.3.4.D-1 Reconciliation Acts

33

The reconciliation act template is an abstract template used to represent the process of
reconciling clinical data. It is the basis for the Diagnoses Reconciliation Act, the Allergies
Reconciliation Act and the Medications Reconciliation Act. This template contains the
requirements common to the more specific reconciliation acts. A reconciliation act must identify
the performers of the reconciliation process, and the clinical data and soures that were used in
that process. The results of the reconciliation act are recorded as the subjects of the act.

940

```
<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|DIAGREC
        displayName="(Medication|Allergy|Diagnosis) Reconciliation"
        codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActCode"/>
    <statusCode code="completed"/>
    <text><reference value='…'/></text>
    <effectiveTime value=""/>
    <performer typeCode="PRF">
        …
    </performer>
    <reference typeCode="XRCPT">
        …
    </reference>
</act>
```

945

950

955

960

6.3.4.D.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.

965
2. The @classCode attribute SHALL be **ACT**.

3. The @moodCode attribute SHALL be **EVN**.

6.3.4.D.2 <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1.1"/>

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
970   template.

6.3.4.D.3 <id root="…" extension="…"/>

Each reconciliation act will be uniquely identified. Additional contraints 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.

975
1. The act SHALL contain only one **[1..1]** id element.

2. The id element SHALL not contain an @nullFlavor attribute.

6.3.4.D.4 <code code="MEDREC|ALGREC|DIAGREC" displayName="…" codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActCode"/>

980

A reconciliation act is coded (in concrete templates defined in sections 6.3.4.E-G) 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).

985   3. The code/@codeSystem attribute SHALL be 1.3.5.1.4.1.19376.1.5.3.2.

4. The code/@codeSystemName attribiute SHOULD be IHEActCode

6.3.4.D.5 <text><reference value='…'/></text>

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

990   1. The reconciliation act SHALL contain a link to the narrative text indicating that the information in this section was reconciled.

6.3.4.D.6 <statusCode code="completed"/>

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

995   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.D.7 <effectiveTime value="…"/>

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

1000   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.D.8 <performer typeCode="PRF">

The reconciliation act records the person who performed the reconciliation activity. This
1005   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.J) template (templateId:
   1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5.1).

6.3.4.D.9 <reference typeCode="XRCPT">

1010   The reconciliation act records all clinical data sources from which data was reconciled. This
allow applications to use the information to determine what data may not have yet been
reconcilied 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.

1015   1. The act SHALL contain at least one **[1..*]** reference element conforming to the
   Reconciliation Clinical Data Source (6.3.4.I) 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 **XRCPT**.

6.3.4.E Diagnoses Reconciliation Act

1020   The diagnosis reconciliation act template is used to represent the process of reconciling clinical
diagnoses. It follows the general rules described above for reconciliation acts and includes more
specific rules about the content. The results of the diagnosis reconciliation act are recorded as
the subjects of the act.

```
1025    <act classCode="ACT" moodCode="EVN">
            <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1"/>
            <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.2"/>
            <id root="" extension=""/>
            <code code="DIAGREC" displayName="Diagnoses Reconciliation"
1030            codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActCode"/>
            <statusCode code="completed"/>
            <effectiveTime value=""/>
            <performer typeCode="PRF">
                …
1035        </performer>
            <entryRelationship typeCode="XRCPT">
                …
            </entryRelationship>
            <entryRelationship typeCode="SUBJ">
1040            …
            </entryRelationship>
        </act>
```

6.3.4.E.1 <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1.1"/>
1045 ### <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1.2"/>

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 reconciliation act template.

2. The act SHALL contain templateId/@root containing the value
1050 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.2 to assert conformance to this template.

6.3.4.E.2 <code code="DIAGREC" displayName="Diagnoses Reconciliation" codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActCode"/>

A diagnosis reconciliation act is coded to indicate that it represents the process of reconciling
1055 diagnoses for the patient.

1. The code/@code attribute SHALL be DIAGREC.

2. The code/@codeSystem attribute SHALL be 1.3.5.1.4.1.19376.1.5.3.2.

3. The code/@codeSystemName attribiute SHOULD be IHEActCode

6.3.4.E.3 <entryRelationship typeCode="SUBJ">

1060 The diagnoses reconciliation act contains the results of the diagnoses reconciliation process as subjects of that act. At least one subject is required to indicate the results of the reconciliation.

1. The act SHALL contain at least one **[1..*]** entryRelationship.

2. The entryRelatioship/@typeCode SHALL contain the value **SUBJ**.

3. The `entryRelationship` SHALL contain only one **[1..1]** act conforming to the
Problem Concern Entry template defined in PCC TF-2: 6.3.4.12 (templateId:
1.3.6.1.4.1.19376.1.5.3.1.4.5.2).

6.3.4.F Allergies Reconciliation Act

The allergies reconciliation act template is used to represent the process of reconciling allergies.
It follows the general rules described above for reconciliation acts and includes more specific
rules about the content. The results of the allergies reconciliation act are recorded as the subjects
of the act..

```
<act classCode="ACT" moodCode="EVN">
    <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1"/>
    <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.3"/>
    <id root="" extension=""/>
    <code code="ALGREC" displayName="Allergies Reconciliation"
        codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActCode"/>
    <statusCode code="completed"/>
    <effectiveTime value=""/>
    <performer typeCode="PRF">
        …
    </performer>
    <entryRelationship typeCode="XRCPT">
        …
    </entryRelationship>
    <entryRelationship typeCode="SUBJ">
        …
    </entryRelationship>
</act>
```

6.3.4.F.1 <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1.1"/>
<templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1.3"/>

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
reconciliation act template.

2. The `act` SHALL contain `templateId/@root` 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.F.2 <code code="ALGREC" displayName="Allergies Reconciliation"
codeSystem="1.3.5.1.4.1.19376.1.5.3.2"
codeSystemName="IHEActCode"/>

An allergies reconciliation act is coded to indicate that it represents the process of reconciling
allergies and adverse reactions for the patient.

1. The `code/@code` attribute SHALL be ALGREC.

2. The `code/@codeSystem` attribute SHALL be 1.3.5.1.4.1.19376.1.5.3.2.

3. The `code/@codeSystemName` attribiute SHOULD be IHEActCode

6.3.4.F.3 <entryRelationship typeCode="SUBJ">

The allergies reconciliation act contains the results of the allergy reconciliation process as
subjects of that act. At least one subject is required to indicate the results of the reconciliation.

1. The `act` SHALL contain at least one **[1..*]** `entryRelationship`.

2. The `entryRelatioship/@typeCode` SHALL contain the value `SUBJ`.

3. The `entryRelationship` SHALL contain only one [1..1] act conforming to the
   Allergy Concern Entry template defined in PCC TF-2: 6.3.4.13 (templateId:
   1.3.6.1.4.1.19376.1.5.3.1.4.5.3).

6.3.4.G Medications Reconciliation Act

The Medications reconciliation act template is used to represent the process of reconciling
medications. It follows the general rules described above for reconciliation acts and includes
more specific rules about the content. The results of the medications reconciliation act are
recorded as the subjects of the act.

```
<act classCode="ACT" moodCode="EVN">
    <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1"/>
    <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.4"/>
    <id root="" extension=""/>
    <code code="ALGREC" displayName="Allergies Reconciliation"
        codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActCode"/>
    <statusCode code="completed"/>
    <effectiveTime value=""/>
    <performer typeCode="PRF">
        …
    </performer>
    <entryRelationship typeCode="XRCPT">
        …
    </entryRelationship>
    <entryRelationship typeCode="SUBJ">
        …
    </entryRelationship>
</act>
```

6.3.4.G.1 <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1.1"/>
<templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.1.4"/>

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 reconciliation act
   template.

39

2. The act SHALL contain templateId/@root containing the value
   1.3.6.1.4.1.19376.1.5.3.1.1.24.3.4 to assert conformance to this template.

6.3.4.G.2 <code code="MEDREC" displayName="Medications Reconciliation" codeSystem="1.3.5.1.4.1.19376.1.5.3.2" codeSystemName="IHEActCode"/>

A Medications reconciliation act is coded to indicate that it represents the process of reconciling
allergies and adverse reactions for the patient.

1. The code/@code attribute SHALL be MEDREC.

2. The code/@codeSystem attribute SHALL be 1.3.5.1.4.1.19376.1.5.3.2.

3. The code/@codeSystemName attribiute SHOULD be IHEActCode

6.3.4.G.3 <entryRelationship typeCode="SUBJ">

The medications reconciliation act contains the results of the medications reconciliation process
as subjects of that act. At least one subject is required to indicate the results of the reconciliation.

1. The act SHALL contain at least one **[1..*]** entryRelationship.

2. The entryRelatioship/@typeCode SHALL contain the value SUBJ.

3. The entryRelationship SHALL contain only one [1..1] act conforming to the
   Medication template defined in PCC TF-2: 6.3.4.16 (templateId:
   1.3.6.1.4.1.19376.1.5.3.1.4.7).

6.3.4.H Performer

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

```
1170    <performer typeCode="PRF">
            <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5"/>
            <assignedEntity classCode="ASSIGNED">
                <id root="" extension=""/>
                <addr></addr>
1175            <telecom></telecom>
                <assignedPerson>
                    <name></name>
                </assignedPerson>
                <representedOrganization>
1180                <name></name>
                    <addr></addr>
                    <telecom></telecom>
                </representedOrganization>
            </assignedEntity>
1185    </performer>
```

6.3.4.H.1 <performer typeCode="PRF">

The `performer` element identifies a healthcare provider that performed any activity. A 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.

1190   1. This template SHALL be used only in `performer` elements inside any CDA (V3) act.

   2. The `@typeCode` attribute of the `performer` element SHALL use the value **PRF**.

6.3.4.H.2 <templateId root="1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5"/>

The `performer` element asserts conformance to the Performer template.

   1. The `performer` SHALL contain a `templateId/@root` attribute containing the value
1195   **1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5** to assert conformance to this template.

6.3.4.H.3 <assignedEntity classCode="ASSIGNED">

An `assignedEntity` element appears to identify the performer.

   1. The `performer` SHALL contain only one **[1..1]** `assignedEntity` element.

1200   2. The `assignedEntity/@classCode` value in the `performer` element SHALL be
   ASSIGNED.

6.3.4.H.4 <id root="" extension=""/>

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

   1. The `performer` element SHALL contain at least one **[1..*]** `id` element.

1205   2. The `id` element MAY use the `@nullFlavor` attribute when the information is
   unknown. (clarify that there SHOULD be an id/@root)

41

6.3.4.H.5

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

1. The `performer` element SHALL contain at least one **[1..*]** `addr` element.

2. The `addr` element MAY use `@nullFlavor` if the information is unknown.

6.3.4.H.6

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

1. The `performer` element SHALL contain at least one **[1..1]** `telecom` element.

2. The `telecom` element MAY use `@nullFlavor` to indicate that information is unknown.

6.3.4.H.7 <assignedPerson>

1. The `performer` element SHALL contain only one **[1..1]** `assignedPerson` elements further identifying the person.

6.3.4.H.8

The name of the provider performing the act should be provided.

1. The `performer` SHALL contain at least one **[1..*]** `assignedPerson/name` element.

2. The `name` element MAY use `@nullFlavor` to indicate that the information is unknown.

6.3.4.H.9 <representedOrganization>

The name and identifier of the organization represented by the performer should be provided.

1. The `performer` SHALL contain only one **[1..1]** `representedOrganization` element.

6.3.4.H.10 <id root='…' extension='…'/>

The identifier of the organization represented must appear.

1. The `representedOrganization` element SHALL contain at least one **[1..*]** `representedOrganization/id` element.

2. The `id` element MAY use `@nullFlavor` to indicate that the identifier is unknown.

1210

1215

1220

1225

1230

6.3.4.H.11

1235 The name of the organization represented must appear.

1. The `representedOrganization` element SHALL contain at least one **[1..*]**
`representedOrganization/name` element.

2. The `name` element SHALL NOT use `@nullFlavor` to indicate that information is
unknown.

1240 ### 6.3.4.H.12

The mailing address of the represented organization should be present to allow the organization
to be contacted when the performer is not available.

1. The `performer` element shall contain at least one **[1..*]**
`representedOrganization/addr` element.

1245 2. The `addr` element MAY use `@nullFlavor` attribute to indicate that information is
unknown.

6.3.4.H.13

The telephone number of the represented organization should be present to allow the
organization to be contacted when the performer is not available.

1250 1. The `performer` element SHALL contain at least one **[1..*]** `telecom` element.

2. The `telecom` element MAY use `@nullFlavor` to indicate that the information is
unknown.

6.3.4.I Reconciliation Clinical Data Sources

1255

```
<reference typeCode="XRCPT">
    <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>
```

1260

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.

1265 Support to identify individual data elements is provided to enable data elements that are imported
into a system supporting the Discrete Data Import option (PCC TF-2:3.1.4 Discrete Data
Import). When a Reconciliation Agent actor performs reconciliation against a data element that
was imported via Discrete Data Import, it shall not record the document as the data source

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against which reconciliation was performed. In this case, it is only the imported data element, not the entire document which was reconciled.

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. The use of this Entry in the RECON profile does not require the Reconciliation Agent actor to use this information during the reconciliation process, but does require it to make it be made available for downstream use.

6.3.4.I.1 <reference typeCode="XRCPT">

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 XRCPT.

6.3.4.I.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.

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.I.3 <externalAct classCode="ACT" moodCode="EVN">

The data being reconciled is identified in an `externalAct` element.

For each data element being reconciled:

1. Their SHALL be at least one **[1..*]** `reference` element where:

    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.

    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.

1300   f.   If the data element came from a document,

               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.*

1305   ii.   When that document is a CDA document, `externalAct/code =` `/ClinicalDocument/code`. *The value of* `externalAct/code` *describes the content of the document.*

                  1.

          g.   If the data element was returned as a result of a query,

1310   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: 3.1.4.3 Transmission Wrapper found in the QED supplement).

1315   ii.   The value of `externalAct/code/@code` SHALL be QUERY.

               iii.   The value of `externalAct/code/@codeSystem` shall be 1.3.5.1.4.1.19376.1.5.3.2.

          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.

1320   ii.   The value of `externalAct/code` SHALL be the code associated with the data element.

6.3.4.J Reconciliation Performer

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

1325 and identifier are provided to ensure that the performer of reconciliation can be contacted in case there are any questions about the act. Unlike the performer template in 6.3.4.H, which allows certain details of the performer to be omitted when unknown, the Reconciliation Performer requires those details to be provided.

```
1330   <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">
               <id root="" extension=""/>
1335           <addr></addr>
               <telecom></telecom>
               <assignedPerson>
                   <name></name>
               </assignedPerson>
1340           <representedOrganization>
                   <name></name>
                   <addr></addr>
                   <telecom></telecom>
               </representedOrganization>
1345       </assignedEntity>
       </performer>
```

6.3.4.J.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.

1350

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

6.3.4.J.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 template and
also conforms to the performer template (templateId: 1.3.6.1.4.1.19376.1.5.3.1.1.24.3.5) defined
in section 6.3.4.H above.

1355

   1. 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
1360   **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.J.4 <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.

1365   2. The `id` element SHALL NOT use the `@nullFlavor` attribute.

6.3.4.J.5

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.

1370
2. The `addr` element SHALL NOT use `@nullFlavor`.

6.3.4.J.6

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.

1375
2. The `telecom` element SHALL NOT use `@nullFlavor`.

6.3.4.J.7

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`.

1380