IHE Patient Care Coordination
Technical Framework Supplement

Referral/Order Linking (ROL)

Trial Implementation

Date: October 4, 2013
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Foreword

This is a supplement to the IHE Patient Care Coordination Technical Framework V9.0. 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 October 4, 2013 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 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.

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.

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

Information about the IHE Patient Care Coordination domain can be found at:

http://www.ihe.net/IHE_Domains.

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

The current version of the IHE Patient Care Coordination Technical Framework can be found at:

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<th>Title</th>
<th>Page</th>
</tr>
</thead>
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<td>28</td>
</tr>
<tr>
<td>6.3.2</td>
<td>CDA Header Content Modules</td>
<td>28</td>
</tr>
<tr>
<td>6.3.2.H</td>
<td>Order Fulfillment Header Content Module</td>
<td>28</td>
</tr>
<tr>
<td>6.3.2.H.1</td>
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<td>6.3.3</td>
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<td>28</td>
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<td>6.4</td>
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<td>4</td>
<td>National Extensions</td>
<td>31</td>
</tr>
</tbody>
</table>
Introduction to this Supplement

This supplement provides new content for the PCC Technical Framework. A new actor is introduced and new groupings to existing actors are defined supporting existing transactions. Three Use Cases illustrate several different uses of the profile. In volume 2, new bindings are defined and in volume 3, a new CDA Header Content module is defined.

Open Issues and Questions

- (03/20/2013) Groupings: we want to group to Any PCC Content Creator and any PCC Content Consumer. Do the references in section X.3, table X.3-1: Referral/Order Linking - Required Actor Groupings, work?
  - Or, would we need to add Content Creator and Content Consumer to this supplement and copy/paste the list of requirements (and additional groupings) from some profile, such as from PCC TF-3: 3.9 Requirements for XDS-MS Actors?
- (04/24/2013) The new template itself has an issue where there is no style on “Volume 2 Namespace Additions”

Closed Issues

- (01/22/2013) What is the Profile Name and Acronym
  - <Order/Referral Linking (Profile Acronym )
  - Closed 03/19/2013 with proposed Referral/Order Linking (ROL)
- (Closed on 04/17/2013) close of two open issues on where to write Order Placer Shall logic and Binding details
  - (04/10/2013) How do we express what at first appeared to be a Content Module (as in row one of table X.1-1: ROL Profile – Actors and Content Modules), which is really just a Required Binding as defined in section 4.2?
  - (04/10/2013) How do we express what at first appeared to be a Content Module (as in row two of table X.1-1: ROL Profile – Actors and Content Modules), which defines these constraints: the Order Placer:
  - as Content Creator:
    - May use any content that may be included in an XDS SubmissionSet, for example
      - any PCC Content Module (Referral Summary, Discharge Summary, … ),
      - or ITI Scanned Document (XDS-SD)
• SHALL use the Bindings as specified in 4.2 (which adds a requirement to use the ReferralIdList)
  (04/17/2013) see in Vol 2, 4.2 where these are written as conformance statements
• (closed 04/17/2003) see this in Vol 2:4.2
  • (1/9/2013) Where to document additional constraints on the ITI Change Proposal for Accession Number?
• As 3.Y.3 Referenced Standards
• As an entry in 5. Namespaces and Vocabularies
• As a was done for new CRD Transaction, which is a constraint on an RFD transaction
• A binding from Structured Document to the Metadata. What happened to the Vol 2 Section 4? This exists in previous versions of PCC Framework (genc todo for next meeting – bring something forward into this document)
• (closed 04/30/2013) (04/10/2013) Need assignment of a templateId root value for the Order Fulfillment Header Module (6.3.2.H.1) 1.3.6.1.4.1.19376.1.5.3.1.2.6
• (closed 05/01/2013) (01/23/2013) Binding to WorkflowDocument in an XDW profile, e.g., XBER XDSR? When there is an Order Number known at the initiation of Workflow, where is the binding of that number into a WorkflowDocument (task) specified. This is resolved by EDHI. Additionally, based upon discussion with ITI, it was decided to use the workflow document uniqueId as the value for the referralIdList, and type it as a uniqueId.
• (closed 07/22/13) (04/29/2013) ITI CP 659 passed with the additional URN values we requested.
  Dependent upon CP 659 passing ballot. Also, regarding XDS metadata, referencedIdList and CX.5: is it sufficient to use the ITI defined uniqueId type? Is there reason, or value, to have PCC create urn:ihe:pcc:2013:rol:ref – CX.1 is a Referral number?
• (05/01/2013) Discussed with ITI; upon seeing that this profile has a Referral and an Order use case it was suggested that these be added to the ITI defined list of Types. Request for this change submitted to ITI, but CP is already in ballot. Will need to submit comment text:
  • Referral/Order Linking (ROL) profile, soon to be submitted for public comment, has a Use Case for Referral and another for Order number linking. Specific CX.5 identifier Type Code values for each would be useful from the ROL profile perspective but also these concepts of linking Referrals and linking Orders would be more widely recognized as valuable. Please add to the list of IHE-XDS “Identifier Type Codes”
  • urn:ihe:iti:xds:2013:referral
Referral number and assigning authority shall be present. For Example

201300001^^^1.2.3.4.5.6^urn:ihe:iti:xds:2013:referral

urn:ihe:iti:xds:2013:order

Order number and assigning authority shall be present. For Example

134467653^^^1.2.3.4.5.42.1^urn:ihe:iti:xds:2013:order

Close this issue when ITI adds Referral and Order to the list of ITI designated types, and 659 has passed ballot.
General Introduction

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:

<table>
<thead>
<tr>
<th>Actor</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Filler</td>
<td>The Order Filler actor represents an information system that receives and process orders for services.</td>
</tr>
</tbody>
</table>

Appendix B - Transaction Summary Definitions

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

No new transactions.

Glossary

No new glossary terms.
Volume 1 – Profiles

Copyright Licenses
Section not applicable

Domain-specific additions

200  Section not applicable

Add Section X
X Referral/Order Linking (ROL) Profile

This profile describes what is necessary to communicate and link the referral and/or order number in documentation and metadata associated with services requested by an order placer. It does not describe where orders are placed when the referral and/or order is communicated using CDA documents. It can be used within the context of profiles using the Cross Enterprise Document Workflow, or it can be used outside of those contexts.

This profile is intended to support care coordination. There are a number of situations where outstanding requests for referrals, consultations, studies, lab tests or other services may need to be tracked or followed. These requests can be tracked using identifiers, often referred to as referral numbers or order numbers depending upon the type of service requested. The distinction between an order and a referral is based on jurisdictional policy. From a technical perspective, referral numbers and order numbers are tracked and communicated in the same way, so to save space, we will refer to them simply as orders (and order numbers) in the remainder of this document, but where we have used the term order, it could also be understood as referral.

X.1 ROL Actors, Transactions, and Content Modules

The Referral/Order Linking (ROL) profile describes the content and bindings used to convey order numbers between systems. The matching of content to order numbers happens in two directions. For example:

1. submitted content in support of a healthcare referral needs to be matched and or linked by receiving systems
2. content in response to a referral needs to be matched and or linked by receiving systems

The Order Placer and the Order Filler are each grouped with both Content Creator and Content Consumer.
Table X.1-1 lists the content module(s) defined in the ROL 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.1-1: ROL Profile - Actors and Content Modules

<table>
<thead>
<tr>
<th>Actors</th>
<th>Content Modules</th>
<th>Optionality</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Placer</td>
<td>Order Fulfillment Header Content</td>
<td>R</td>
<td>6.3.2.H</td>
</tr>
<tr>
<td></td>
<td>module</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order Filler</td>
<td>Order Fulfillment Header Content</td>
<td>R</td>
<td>6.3.2.H</td>
</tr>
<tr>
<td></td>
<td>module</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

X.1.1 Actor Descriptions and Actor Profile Requirements

X.1.1.1 Order Placer

The Order Placer in the Referral/Order Linking ROL profile:

1. provides the order number for every set of documents shared over time about a patient order;
2. may construct structured CDA content containing order numbers;
3. consumes referral responses, retrieving the order number from the fulfillment content

X.1.1.2 Order Filler

The Order Filler in the Referral/Order Linking ROL profile:

1. consumes one or more documents about a patient order, linking or associating all documents for the same patient and order number;
2. creates one or more referral response documents about a patient order, providing the order number for which this response fulfills

X.2 ROL Actor Options

Section not applicable

X.3 ROL Required Actor Groupings

Table X.3-1: Referral/Order Linking - Required Actor Groupings

<table>
<thead>
<tr>
<th>ROL Actor</th>
<th>Actor to be grouped with</th>
<th>Reference</th>
<th>Content Bindings Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Placer</td>
<td>Content Creator</td>
<td>PCC TF-1.A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Content Consumer</td>
<td>PCC TF-1.A</td>
<td></td>
</tr>
</tbody>
</table>
X.4 ROL Overview

X.4.1 Concepts

One of the challenges for users of XD* based exchanges is that there is no profiled mechanism to indicate the order numbers associated with the outstanding orders. To further complicate the situation, the order may be tracked through the number assigned by the placer of the order or through the number assigned by the filler of the order. Finally, each order may result in one or more documents that represent complete or partial fulfillment of the requested services. Some examples where no profiling exists to convey order or referral numbers using XD* transactions are:

1. Submission of referral documents and supporting documents
2. Consultation Notes, or other documents, in fulfillment of referral requests
3. Place orders using XD*
4. Respond to orders using XD*

This makes it difficult to manage inbound and outbound referral, and/or order transactions for the same patient to and from the same providers exchanging information related to a referral or order.

Today, these transactions are manually managed.

The problem can be solved by documenting specific locations and formats, which will facilitate programmatic matching and/or linking of related documents for both outbound and inbound transactions for the same patient to and/or from the same provider. XD* provides metadata, and CDA provides discrete elements when structured documents are used; both can be constrained for defining order and referral number locations.

The referral, and/or order number sent with one or more documents in an XD* submission set can be managed by receiving systems and returned in response fulfillments. This profile defines where these numbers are placed in XDS metadata for submissions and where fulfillments of orders are conveyed in CDA documents.

Three Use Cases are used to illustrate some of the subtle differences:

1. Referral Linking illustrates what is often called the Closed Loop Referral.
2. Order Linking illustrates the use of this profile for orders related to a transfer of care.
3. Early Hearing Detection and Intervention (EHDI) illustrates how this may be combined with workflow.

X.4.2 Use Cases

X.4.2.1 Use Case #1: Referral Linking

290 Provide a standard method to convey referral numbers during XD* transactions that is used for Referrals and reply to referrals. This makes it easier to manage inbound and outbound referral transactions for the same patient to and from the same providers exchanging information related to the referral.

X.4.2.1.1 Referral Linking Use Case Description

295 Anna Smith is in her PCP office complaining of exhaustion and slight mid-sternum tenderness which started after she fell off her bike two days ago. Dr. Primari, a family care provider, documents the encounter in his EMR and generates a cardiology referral for evaluation of chest pain. He sends the referral message to Dr. Chester Payne (cardiologist) ❶. Dr. Primari orders routine labs and a chest CT scan for Anna. The day after Anna’s visit, Dr. Primari receives the lab results and forwards it to Dr. Payne ❷. Dr. Primari also forwards a copy of Anna’s baseline EKG report ❷. Two days later, he receives the CT scan results and forwards a copy to Dr. Payne ❸. After reviewing the chest CT scan, Dr. Primari changes his reason for referral to rule out internal chest wall injury. He forwards an updated referral message to Dr. Payne ❹. Each message sent to Dr. Payne from Dr. Primari results in a separate message transaction.

300 Anna is seen by Dr. Payne for her consultation visit. Dr. Payne documents the visit and schedules Anna an initial cardiac echo. His preliminary consultation report is sent to Dr. Primari making him aware that Anna is being followed by Dr. Payne ❺. A follow-up consultation report is sent notifying Dr. Primari of Dr. Payne’s consultation findings and Anna’s plan of care ❻. Anna is later seen for a follow-up visit with Dr. Payne. Dr. Payne schedules a follow-up cardiac echo and EKG. Both reports are forwarded to Dr. Primari ❼. Each message sent to Dr. Primari from Dr. Payne results in a separate message transaction.

Referral linking provides the ability to link/match each transaction relating to Anna’s referral and response between Dr. Primari and Dr. Payne.
X.4.2.1.2 Referral Linking Process Flow

![Diagram of the referral linking process flow]

**Pre-conditions:**
Content is collected by one provider that is associated with a referral to be sent to another provider.

**Main Flow:**
Content is packaged and shared, along with the Referral ID, by the Order Placer.

The Order Filler links all documents for the same patient/ReferralID together.

The consultation visit happens.
The Order Filler sends a Referral Response, and the Order Placer matches the order number of the fulfillment to the supporting documents of the original referral.

**Post-conditions:**

All documents with the same patient/Referral ID are linked together by both systems. The Order Placer has noted the fulfillment of the referral.

**X.4.2.2 Use Case #2: Order Linking**

Provide a standard method to convey referral numbers during XD* transactions that are used for orders and reply to orders. This makes it easier to manage inbound and outbound order transactions for the same patient to and from providers exchanging information related to the order.

**X.4.2.2.1 Order Linking Use Case Description**

Lillian Charles is discharged from the hospital post C-section with orders for home health services to evaluate and treat a slow healing incision. Initial home health assessment includes a request to the provider of record (Dr. Woods) for approval of the initial home health plan of care. The plan of care includes an order for daily wet-to-dry dressing changes for her incision. Home health assessment and plan of care is documented in the home health system. A copy of the assessment and plan of care as well as the initial order request transaction is sent to Dr. Woods EMR. Approval of the plan of care is sent from Dr. Woods to the home health agency. Lillian’s incision worsens. The home health nurse sends an updated order request to increase dressing changes from daily to twice a day. She includes an image of the wound and scanned nursing notes describing the incision as well as wound measurements. Dr. Woods receives the information and decides to order wound vac therapy instead of wet to dry dressing changes. The order for wound vac therapy is forwarded to the home health nursing system.

The home health nurse sends a message to Dr. Woods with a request for Dr. Woods to obtain pre-authorization from Lillian’s payer. This is needed prior to starting wound vac therapy. Dr. Woods obtains the pre-authorization and forwards the information to the home health nurse system. The home health nurse obtains the wound vac and initiates the ordered therapy. Each message sent between Dr. Woods and the home health nurse results in a separate message transaction.

Order linking provides the ability to link/match each transaction relating to Lillian’s initial order from the hospital and subsequent related communication about the order between the home health agency and Dr. Woods.
**X.4.2.2.2 Order Linking Process Flow**

**Figure X.4.2.2.2-1: Use Case 2, Order Linking Process Flow in ROL Profile**

**Pre-conditions:**
Patient has been discharged with orders for home health.

**Main Flow:**
Content is shared about wound care, including order numbers.
Post-conditions:

All documents shared have been linked by the order numbers.

X.4.2.3 Use Case #3: Early Hearing Detection and Intervention (EHDI)

Provide the ability to link/match each transaction relating to EHDI components that would result in an order transaction between care providers.

X.4.2.3.1 EHDI Use Case Description

Information flows among providers (birthing facilities, pediatricians and specialists) and public health agencies concerning early hearing detection and intervention (EHDI) have been inconsistent and unreliable. Communicating hearing screening and follow-up information including important next steps for an infant is not done effectively leading to data errors, missed information and missed services.

Newborn hearing screening (NHS) is initiated based on public health (PH) guidelines. NHS commonly occurs during the birth admission (24-72 hours of age) or before 30 days of age. Children who do not pass the initial hearing screening have short term follow-up with care providers which includes audiologic diagnosis and early intervention up to the 3rd birthday. The Primary Care Provider performs further clinical surveillance which recognizes children at risk for delayed onset or progressive hearing loss.

At birth, the birthing center provider initiates the NHS so that the screening is performed. The screening result is submitted to the Public Health EHDI program which calculates the NHS outcomes. The NHS outcome is presented in the Early Hearing Care Plan (EHCP) including follow-up activity. The typical communication flow is as follows:

1. PH notifies Birthing Center of NHS guidelines (generates initial protocol).
2. Birthing center notifies PH of new birth demographic information.
3. PH sends request for NB hearing screening (generates initial order).
4. NHS performed at birth and result is reported to PH EHDI program of which the NHS outcome is calculated and presented in EHCP. EHCP contains the follow-up orders.
5. EHCP is shared with PCP/Specialist (e.g., audiologist) (generates initial order).
6. PCP/Specialist shares audiology evaluation (generates referral response) with PH.
7. PCP/Specialist shares appropriate follow-ups (generates subsequent referral response).

If the risk assessment is positive, the PCP/Specialist has to perform follow-up hearing screening risk assessments as recommended with appropriate action to follow by 1 mo, 2 mo, 4 mo, 6 mo, 9 mo, 12 mo, 15 mo, 18 mo, 24 mo, 30 mo, and 3 years and “to be performed” at 4 years of age (generates notification/orders).
8. PCP/Specialist gets HS and diagnostic evaluation surveillance reports and quality assessment reports from public health IS to EHRs.
X.4.2.3.2 EHDI Process Flow

Figure X.4.2.3.2-1: Basic Process Flow in ROL Profile
Pre-conditions:
Screening Guidelines define conditions for NHS.

Main Flow:
Workflow documents are shared.

Post-conditions:
Content on a NHS are shared and workflow is tracked.

X.5 ROL Security Considerations
The only new asset introduced by this profile is the order number, which may appear in the CDA Content, and shall be transferred in XD* metadata, or into an XDW Workflow. This content is already protected by existing mitigations in other IHE profiles used to secure content and metadata.

The security considerations for a content module are dependent upon the security provisions defined by the grouped actor(s).

X.6 ROL Cross Profile Considerations
Section not applicable
Appendices
Volume 2 – Transactions

Add new section 4.2 into Vol. 2.

4.2 Referral/Order Linking Binding

In order to support the Referral/Order Linking profile, the following binding is required.

Order Placer grouped with Content Creator:

- MAY use any content that may be included in an XDS SubmissionSet
- SHALL use the binding specified in 4.2.1 (which adds a requirement to use the referralIdList) for every Document Entry in the XDS SubmissionSet that is associated with an order.

Order Placer grouped with Content Consumer:

- SHALL retrieve the order numbers communicated from the Order Filler as specified in 6.3.2.H, and SHALL mark those order numbers known to this actor as fulfilled.

Order Filler grouped with Content Consumer:

- SHALL use the binding specified in 4.2.1 to discover order numbers communicated from Order Placers.
- SHALL link together all documents for the same patient, order number. The linking may be further defined by profiles using this mechanism.
  SHALL persist these numbers for use in fulfillment transactions

Order Filler grouped with Content Creator:

- SHALL return the values of the orders, as specified in 6.3.2.H, which are fulfilled.

4.2.1 XDSDocumentEntry Metadata

In addition to the binding defined for Medical Documents in 4.1, Order Placer and Order Filler actors shall incorporate the following binding in order to support the Referral/Order Linking (ROL) profile.
<table>
<thead>
<tr>
<th>XDSDocumentEntry Attribute</th>
<th>Optional?</th>
<th>Source Type</th>
<th>Source/ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>referenceIdList</td>
<td>R</td>
<td>DS</td>
<td>The list of order numbers are Required. This is defined as HL7 V2 Identifier, typed as CXi. (ITI TF-3: Table 4.2.3.1.6-2 &quot;Data Types&quot;). This list contains zero or more Identifiers. These Identifiers may be internal or external identifiers (e.g., Identifiers may be Accession Numbers, Order Numbers, Referral Request Identifiers, XDS Workflow Instance Identifiers, etc.). The referenceIdList contains Identifiers CXi encoded, as specified in ITI TF -3: Table 4.2.3.1.6-2 &quot;Data Types&quot;.</td>
</tr>
</tbody>
</table>

```xml
<rim:Slot name="urn:ihe:iti:xds:2013:referenceIdList">
  <rim:ValueList>
    <rim:Value>
      201300001^^^1.2.3.4.5.6^urn:ihe:iti:xds:2013:referral
    </rim:Value>
  </rim:ValueList>
</rim:Slot>
```
Appendices

None

Volume 2 Namespace Additions

None
Volume 3 – Content Modules
5 Namespaces and Vocabularies

Section not applicable
6 Content Modules

6.3.1 CDA Document Content Modules
Section 6.3.1 not applicable

Add to section 6.3.2 Header Content Modules

6.3.2 CDA Header Content Modules

6.3.2.H Order Fulfillment Header Content Module
The fulfillment of an order, referral, or uniquely numbered request for service shall be indicated in a CDA response document with use of the CDA Header inFulfillmentOf element. The order/id values supplied upon response shall be values that were previously received as a part of the request.

6.3.2.H.1 Conformance Specification

```
<inFulfillmentOf typeCode="FLFS">
  <templateId root="1.3.6.1.4.1.19376.1.5.3.1.2.6"/>
  <order>
    <id root="1.2.3.4.5" extension="424242" />
  </order>
</inFulfillmentOf>
```

1. SHALL contain one or more [1..*] inFulfillmentOf.
   a. SHALL contain a templateId with the value 1.3.6.1.4.1.19376.1.5.3.1.2.6
   b. SHOULD have an order/code element.
      i. The code SHALL come from the HL7 ActOrderCode or HL7 ActCareProvisionType concept domain

6.3.3 CDA Section Content Modules
Section 6.3.3 not applicable

6.3.4 CDA Entry Content Modules
Section 6.3.4 not applicable

6.4 Section not applicable
Section not applicable
6.5 PCC Value Sets
Section not applicable
Appendices

Section not applicable

Volume 3 Namespace Additions

Section not applicable
Volume 4 – National Extensions

Section not applicable

4 National Extensions

Section not applicable