Integrating the Healthcare Enterprise

IHE IT Infrastructure
Technical Framework Supplement

Cross-Community Patient Discovery (XCPD)
Health Data Locator and Revoke Option

Trial Implementation

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Foreword

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

This supplement is published on August 31, 2015 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 IT Infrastructure
Technical Framework. Comments are invited and may be submitted at
http://www.ihe.net/ITI_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: http://www.ihe.net.

Information about the IHE IT Infrastructure domain can be found at:
http://www.ihe.net/IHE_Domains.

Information about the structure of IHE Technical Frameworks and Supplements can be found at:
http://www.ihe.net/IHE_Process and http://www.ihe.net/Profiles.

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

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Introduction to this Supplement

This document adds two optional capabilities to the Cross-Community Patient Discovery Profile
by adding new material to ITI TF Volumes 1 and 2b describing these options. These two options
were extracted from the XCPD Profile prior to the XCPD Profile being moved from Trial
Implementation to Final Text status due to these options not meeting the criteria for being
promoted to final text.

Open Issues and Questions

- **X021:** Use of revoke when Initiating Gateway does not choose to send a patient identifier
  in the Patient Discovery request. This is only allowed when the Initiating Gateway is not
  grouped with a Responding Gateway. The Patient Discovery request receiver can also not
  send a revoke unless grouped with an Initiating Gateway. Assuming that both sides
  contain a grouping of Initiating and Responding, and the rule regarding specification of a
  patient identifier in the request is ignored, the responder to the Patient Discovery request
  has no patient identifier to create a correlation with, so will have difficulty, and no real
  purpose, for saving any information about the request. So it will most likely have no
  reason to send a revoke. So this function is not supported, the initiating side must supply
  a patient identifier in order to receive a revoke.

Closed Issues

- **X004:** During the development of this profile we considered an environment where a
  Health Data Locator existed external to any community. This is slightly more
  complicated an environment than this capability within a community. Because of the lack
  of a clear requirement this environment is not currently addressed in the profile.

- **X005:** Should the QD and QDLA be merged? After review of the details of each it was
  agreed that only one transaction was needed, with an optional return attribute indicating
  support for the QIL transaction for this patient identifier.

- **X007:** Consider other names for Location Authority. Agreed to use Health Data Locator
  – all references to Location Authority replaced with Health Data Locator.

- **X010:** Need names for the transactions.

    a. **QIL -** Patient Location Query

- **X015:** Should the Patient Location Query re-use the XDS error codes as described in
  Section 3.56.4.1.3 or should it create new error codes that are specific to the cross-
  community environment. Resolution: Create new error codes for the transaction. Error
  codes are delivered a SOAP faults, so no dependency on XDS in this transaction.

- **X016:** Should the Cross Gateway Patient Discovery transaction provide coded values to
  describe events like:
  - I know the person but I have no data for them and I don't have an identifier to share

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with you (in this case should respond as if you don't know this person)

145   - I know the person but I'm not willing to share data with you unless you follow a manual procedure (in this case respond either way, and manual process is out of scope)

- I can't give you that answer (all of the above generically?)

The above can be coded within DetectedIssueManagement code value. Resolution: All the cases listed are reflected in one coded value "AnswerNotAvailable" – since they

150   require human intervention it was felt that separate error codes were not necessary.

- **X018:** What standard should the Patient Location Query be based on? The following were considered: ebXML, HL7® V3, PIXV3. These were discarded because they did not directly address the need, which is very simple. By convoluting PIXV3 or any other HL7® V3 message we could carry the right information needed for the transaction, but it

155   would have been extremely complicated and confusing. There would be significant excess baggage (meaning XML elements) carried on the transaction for no reason. For these reasons the implementation challenges were felt to be too great. ebXML was also considered, and while it does carry the data in a reasonable way, it seemed also too heavy handed for the simple transaction. So the transaction uses Web Services and an IHE

160   defined schema to accomplish the need.

- **X019:** Patient Location Query support for multiple health data locators for different kinds of data. This requirement was not addressed because of the desire to keep the Patient Location Query strictly focused on location of potential data and not bleed into the transaction information beyond the location – like types of data at a location. It is felt that

165   the XCA Query supports the ability to search for types of data and that function should be addressed at that layer of the workflow.

170 # Volume 1 – Integration Profiles

Glossary

Add the following term to the Glossary:

Health Data Locator: Health Data Locator is a function provided by a community or external entity that manages the locations of patient health data for a selected set of patients. A Health
175 Data Locator keeps track of communities that know a patient and provides a list of these communities to a requesting community.

1.7 History of Annual Changes

Add the following bullet to the end of the bullet list in Section 1.7

- Added XCPD Profile options that support the means to indicate a patient match should be
180 revoked and added the option to locate communities which hold patient relevant health data.

Replace existing XCPD Actor Diagram 27.1-1 with the following diagram:
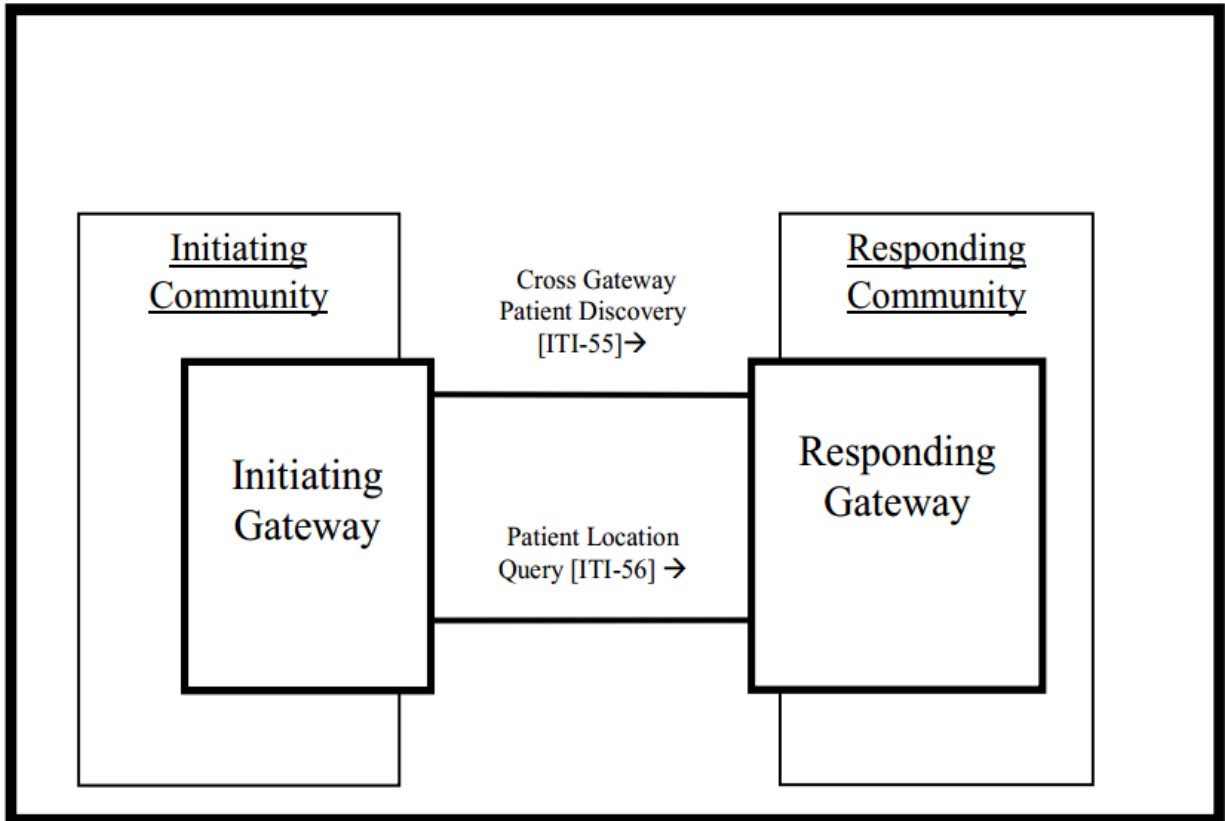
185

Figure 27.1-1: XCPD Actor Diagram

Update Table 27.1-1 as shown:

190

Table 27.1-1: XCPD Integration Profile - Actors and Transactions

Actors	Transactions	Optionality	Section
Initiating Gateway	Cross Gateway Patient Discovery [ITI-55]	R	ITI TF-2b:3.55
	Patient Location Query [ITI-56]	**O**	**ITI TF-2b:3.56**
Responding Gateway	Cross Gateway Patient Discovery [ITI-55]	R	ITI TF-2b:3.55
	Patient Location Query [ITI-56]	**O**	**ITI TF-2b:3.56**

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27.1.1 Actors

27.1.1.1 Initiating Gateway

200   The Initiating Gateway supports all outgoing inter-community communications. XCPD uses this actor to initiate the Cross Gateway Patient Discovery [ITI-55] **and, optionally, the Patient Location Query [ITI-56] transactions**. The Initiating Gateway is required to support synchronous transaction messaging and may declare an option to support Asynchronous Web Services Exchange. Choosing Asynchronous Web Services Exchange will allow the Initiating
205   Gateway to support workflows which scale to large numbers of communities because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale.

27.1.1.2 Responding Gateway

The Responding Gateway supports all incoming inter-community communications. XCPD uses this actor to receive the Cross Gateway Patient Discovery [ITI-55] **and, optionally, the Patient**
210   **Location Query [ITI-56] transactions**. The Responding Gateway is required to support Asynchronous Web Services Exchange on all implemented transactions. This allows the Initiating Gateway to choose the best of the two messaging patterns (synchronous or asynchronous) that fit the needs of the workflow. Support for Asynchronous Web Services Exchange allows for workflows which scale to large numbers of communities because it can
215   handle latency and scale more efficiently.

27.1.2.1 Cross Gateway Patient Discovery [ITI-55]

220   The Cross Gateway Patient Discovery transaction supports the ability for Initiating Gateways and Responding Gateways to discover mutually known patients. This transaction assumes an environment where patient data is well described and high quality demographic data is available.

Because the transaction supports the mutual discovery of patients it can be seen as having dual purposes.

225
- To support a query by the Initiating Gateway requesting a demographically matching patient from within the Responding Gateway's community.

- To support a feed to Responding Gateway announcing that the patient is known by the Initiating Gateway's community.

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230   This dual nature of the transaction is chosen for scalability purposes, as demographic matching
        algorithms are expensive on a large scale and once a match is identified it is important that both
        the initiating and responding sides of the transaction can use the results of that successful match.

        The Cross Gateway Patient Discovery transaction has several modes, useful in different
        environments:

235   • Demographic Query only mode – in this mode only the demographics of the patient are
          included in the request. The initiating community does not have, or does not choose to
          specify, a patient identifier for use by the Responding Gateway.

        • Demographic Query and Feed – in this mode both the demographic and initiating
          community identifier are included in the request.

240   • Shared/national Patient Identifier Query and Feed – in this mode only a shared/national
          identifier is specified. Demographics are not necessary because matching can be done on
          the identifier alone.

        **The Cross Gateway Patient Discovery transaction also supports the ability for Initiating
        Gateways to send a revoke message to Responding Gateways when a prior patient
        identifier correlation may no longer be valid. The revoke message is used when Responding**
245   **Gateways and Initiating Gateways may have cached the correlation identified as part of a
        Cross Gateway Patient Discovery transaction.**

        This transaction can be used synchronously and asynchronously.

        Add Section 27.1.2.2

250   **27.1.2.2 Patient Location Query [ITI-56]**

        The Patient Location Query supports the ability for an Initiating Gateway to query the
        Responding Gateway for a list of communities which may have relevant health data about
        particular patients. This transaction can be used synchronously and asynchronously.

255   *Update Section 27.2 as shown:*

        ## 27.2 XCPD Integration Profile Options

        Options that may be selected for this Integration Profile are listed in Table 27.2-1 along with the
        Actors to which they apply. Dependencies between options when applicable are specified in
260   notes.

Table 27.2-1: XCPD - Actors and Options

Actor	Options	Vol & Section
Initiating Gateway	*Asynchronous Web Services Exchange*	ITI TF-1: 27.2.1
	Deferred Response	ITI TF-1:27.2.2
	Health Data Locator Option	**ITI TF-1: 27.2.3**
	Revoke Option	**ITI TF-1: 27.2.4**
Responding Gateway	*Deferred Response*	ITI TF-1:27.2.2
	Health Data Locator Option	**ITI TF-1: 27.2.3**
	Revoke Option	**ITI TF-1: 27.2.4**

27.2.1 Asynchronous Web Services Exchange Option

265 Initiating Gateways which support Asynchronous Web Services Exchange shall support Asynchronous Web Services Exchange on the Cross Gateway Patient Discovery [ITI-55]**and Patient Location Query [ITI-56] transactions**. Asynchronous processing is necessary to support scaling to large numbers of communities because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale.

270 ### 27.2.2 Deferred Response Option

Responding Gateways which support the Deferred Response Option shall support Deferred Response as described in ITI TF-2b: 3.55.6.2 on the Cross Gateway Patient Discovery [ITI-55] transaction.

Initiating Gateways which support the Deferred Response Option shall support Deferred
275 Response as described in ITI TF-2b: 3.55.6.2 on the Cross Gateway Patient Discovery [ITI-55] transaction.

The Deferred Response Option reflects the more detailed understanding and feedback from implementers regarding processing that may result in significant delay. The existing Asynchronous Web Services Exchange Option can support some scenarios with delayed
280 response but not environments where the delay in responding may be as much as days or weeks. These cases require a mechanism that is managed by the application and which supports recovery through system restart. Deferred Response mode provides applications with such capability. In doing so it also adds responsibilities to the application, in particular for managing message correlation, creating application level acknowledgements and determining where to
285 send a Deferred Response message. The new flexibility allowed by the Deferred Response Option is deemed worthy of these additional requirements on the application. For more information about Deferred Response and Asynchronous messaging in general see http://wiki.ihe.net/index.php?title=Asynchronous_Messaging.

27.2.3 Health Data Locator Option

290 **Initiating Gateways which support the Health Data Locator Option shall support the Patient Location Query [ITI-56] transaction to request the location of a patient (or set of patients) health data.**

Responding Gateways which support the Health Data Locator Option shall collect locations of health data for selected patients and make that information available to
295 **Initiating Gateways from other communities via the Patient Location Query [ITI-56] transaction.**

27.2.4 Revoke Option

XCPD allows for the caching of correlations resulting from the Cross Gateway Patient Discovery transaction. This caching is not required of any XCPD implementation but when
300 **used may be combined with use of the revoke message of the Cross Gateway Patient Discovery [ITI-55] transaction to invalidate cached correlations.**

Initiating Gateways which support the Revoke Option shall be able to use the revoke message of the Cross Gateway Patient Discovery [ITI-55] transaction to notify a Responding Gateway that a patient identifier correlation may no longer be valid.

305 **Responding Gateways which support the Revoke Option shall be able to receive the revoke message of the Cross Gateway Patient Discovery [ITI-55] transaction to be notified by an Initiating Gateway that a patient identifier correlation is no longer valid.**

Add the following text to the end of Section 27.3.2.1

310 ### 27.3.2.1 Illustration of use of Transactions (Informative)

(all existing text goes here)

Scenario # 2: Use of Health Data Locator (Informative)

Figure 27.3.2.1-2 shows the transactions involved in sharing healthcare data for one patient
315 **among three communities. In this scenario community C is a Health Data Locator for the patient. Details on each interaction follow the diagram.**
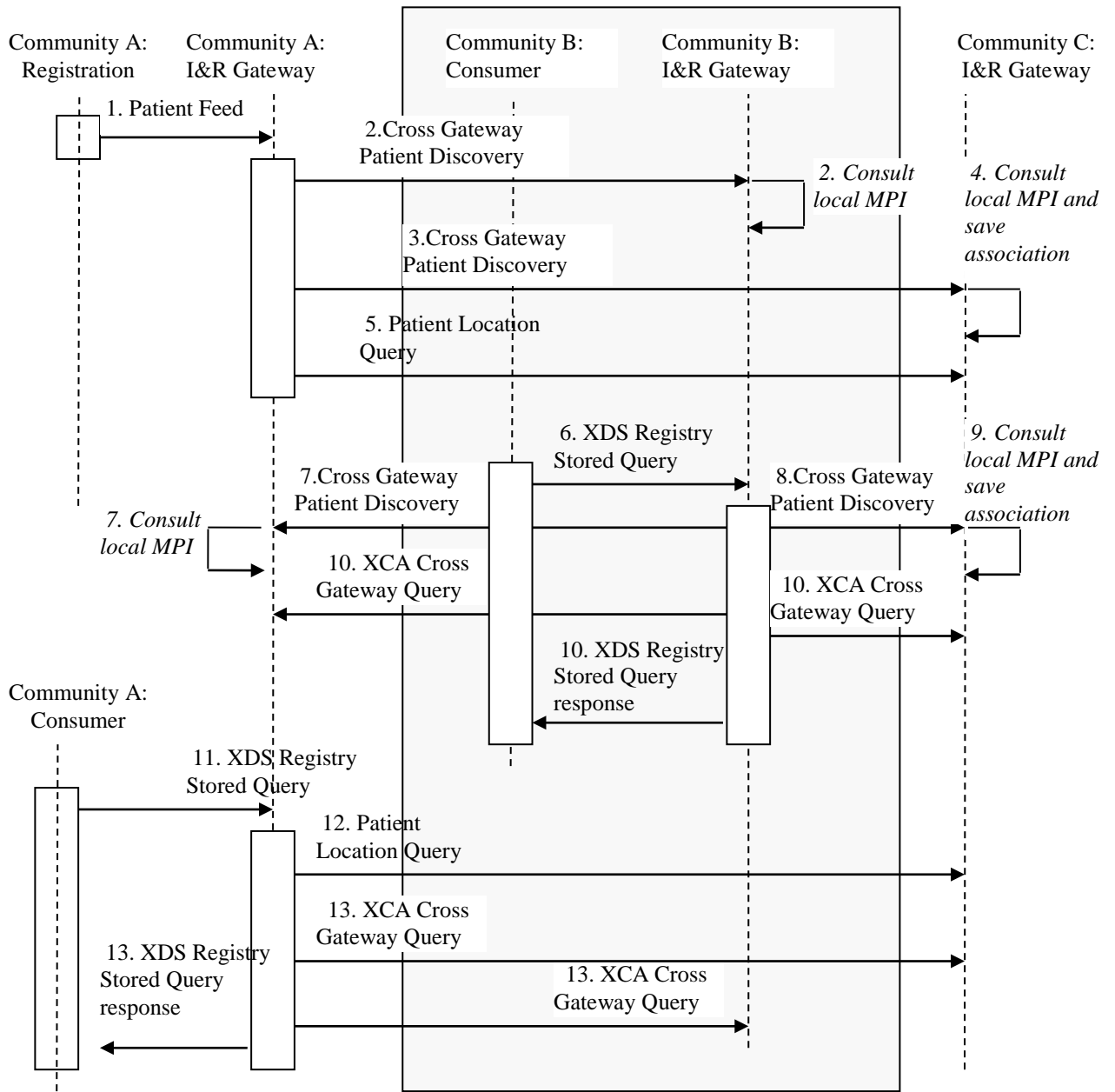
320   **Figure 27.3.2.1-2: Detailed Interactions Health Data Locator (Informative)**

- **[1] The patient registers within Community A and a Patient Feed is sent to the Gateway.**

13

- **[2] The Gateway uses the Cross Gateway Patient Discovery transaction to determine if this patient is known in community B. Community B consults with its local MPI and responds with no matches, indicating the patient is not known in community B.**

325

- **[3] The Gateway uses the Cross Gateway Patient Discovery transaction to determine if this patient is known in community C. Community C responds with one match including the patient identifier in C and the indication that community C is a Health Data Locator for this patient.**

330

- **[4] Community C consults with its local MPI and finds a match. It saves the association that the identifier designated on the Cross Gateway Patient Discovery transaction is community A's identifier for this patient.**

- **[5] Community A pre-loads locations for this patient by sending a Patient Location Query to community C which has identified itself as a Health Data Locator.**

335

- **[6] This patient is seen, for the first time, within an organization in community B which subsequently requests data about this patient and sends an XDS Registry Stored Query to its local Gateway.**

- **[7] The Gateway uses the Cross Gateway Patient Discovery transaction to determine if this patient is known in community A. Community A consults with its local MPI and responds with one match including the patient identifier in A.**

340

- **[8] The Gateway uses the Cross Gateway Patient Discovery transaction to determine if this patient is known in community C. Community C responds with one match including the patient identifier in C and the indication that community C is a Health Data Locator for this patient.**

345

- **[9] Community C consults with its local MPI and finds a match. It saves the association that the identifier designated on the Cross Gateway Patient Discovery transaction is community B's identifier for this patient.**

- **[10] The community B gateway sends a XCA Cross Gateway Query to both Community A and C because both responded positively to the Cross Gateway Patient Discovery transaction. Both responses are combined by the community B gateway and returned to the organization which originated the XDS Registry Stored Query in step [6].**

350

- **[11] An organization in community A requests data about this patient and sends an XDS Registry Stored Query to its local Gateway.**

355

- **[12] The Gateway has saved the locations retrieve from community C in step [5] but this query may happen days or weeks or years later. To get a fresh copy of the locations for this patient, community A's gateway sends another Patient Location Query to C. By doing so it discovers that B also knows this patient.**

14

360
- **[13] Community A sends an XCA Cross Gateway Query to both community B and C and combines the responses in order to respond to the XDS Registry Stored Query**

Add the following new definition to Appendix B

365

Appendix B: Transaction Summary Definitions

Patient Location Query – supports the ability to query for a list of communities which may have relevant health data about particular patients.

Volume 2b - Transactions

370

Update Section 3.55.1 the second from last paragraph to add to the end of the paragraph as shown:

375   In the case of a match, the Responding Gateway may further update its own cache to indicate that the initiating community knows this patient and should be queried if data for this patient is desired. **The Cross Gateway Patient Discovery transaction also supports the ability for Initiating Gateways to send a revoke message to Responding Gateways when prior patient identifier correlation may no longer be valid. The revoke message is used when Responding Gateways and Initiating Gateways may have cached the correlation identified as part of a**
380   **Cross Gateway Patient Discovery transaction.**

The criteria used for demographic matching is defined by policy and not specified here, but fully enabled by the transaction.

Update the existing interaction diagram in Section 3.55.4 to add the Revoke message as shown:

385

3.55.4 Interaction Diagram
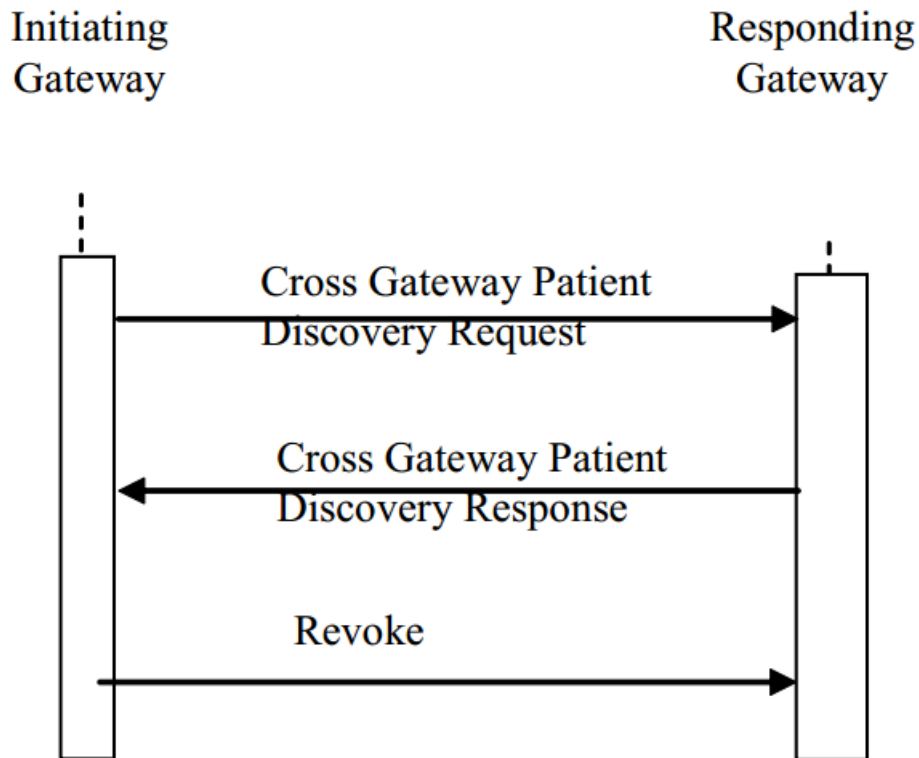
> *Update Section 3.55.4.1.2 the second to last paragraph to add a sentence to the end of it as shown:*

390

The Initiating Gateway may specify a duration value in the SOAP Header element of the request. This value suggests to the Responding Gateway a length of time that the Initiating Gateway recommends caching any correlation resulting from the interaction. The duration value is specified in the SOAP Header using the CorrelationTimeToLive element and contains a value 395 conformant with the xs:duration type defined in http://www.w3.org/TR/xmlschema-2/#duration. If no CorrelationTimeToLive element is specified in the SOAP Header the Responding Gateway shall interpret this as a recommendation against caching, unless a mutually agreed policy states otherwise. **Mutually agreed policies may also be used to bind an Initiating Gateway to a specific timeframe for use of the Revoke message**.

400

> *Update Section 3.55.4.1.2.4 the third paragraph to add a sentence to the end of the paragraph as shown:*

_____

405 The Responding Gateway uses the homeCommunityId to obtain the Web Services endpoint of
services that provide access to data in the Initiating Gateway's community. **The Responding
Gateway may also use the specified value as an entry in its response to a Patient Location
Query transaction.**

410 *Update Section 3.55.4.1.2.4 a middle paragraph to add a sentence to the end of the paragraph as
shown:*

The Responding Gateway may use the specified assigning authority to identify which of the
LivingSubjectID values to use in a reverse Cross Gateway Query. **The Responding Gateway
may also use the identified LivingSubjectID value as an entry in its response to a Patient**
415 **Location Query transaction.**

*Update Section 3.55.4.1.3 the last paragraphs, adding text as shown and adding an additional
paragraph to the end of the section.*

420 The community associated with the Responding Gateway may make use of the
homeCommunityId and community patient identifier assigning authority by initiating a Cross
Gateway Query **and/or saving the information for use in a Patient Location Query response**.
See ITI TF-2b: 3.55.4.1.2.4 for more information. This provisioning of the Responding Gateway
community may be cached indefinitely, but efforts are needed to ensure that changes are
425 properly reflected. For more detail about this issue refer to ITI TF-2b: 3.55.4.2.3.1 **and the
Revoke Message**.

**The Responding Gateway shall indicate in the response to the Cross Gateway Patient
Discovery transaction whether it is acting as a Health Data Locator for this patient. See
Section 3.55.4.2.2 for more information.**

430

Update Section 3.55.4.2.2 to the 2nd to last paragraph adding the sentence at the end.

The Responding Gateway may specify a duration value in the SOAP Header element of the
request. This value suggests to the Initiating Gateway a length of time that the Responding
435 Gateway recommends caching any correlation resulting from the interaction. The duration value
is specified in the SOAP Header using the CorrelationTimeToLive element and contains a value
conformant with the xs:duration type defined in http://www.w3.org/TR/xmlschema-2/#duration.
If no CorrelationTimeToLive element is specified in the SOAP Header the Initiating Gateway
shall interpret this as a recommendation against caching, unless a mutually agreed policy states

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440   otherwise. **Mutually agreed policies may also be used to bind a Responding Gateway to a
specific timeframe for use of the Revoke message**.

Update Section 3.55.4.2.2.5 as shown

3.55.4.2.2.5 Specifying support as a Health Data Locator

445   The Responding Gateway shall specify its support for this patient as a Health Data Locator. This
specification is a coded value within the assignedEntity of the custodian of the
RegistrationEvent. The valid codes for this designation are described in Table 3.55.4.4.2-3. The
codeSystem for these code elements is 1.3.6.1.4.1.19376.1.2.27.2.

**If the response contains multiple RegistrationEvent elements with different
450   homeCommunityId values this indicates that there may be multiple Health Data Locators
operating within the community. To access all locations for the patient the Initiating
Gateway is encouraged to send multiple Patient Location Query transactions, one for each
RegistrationEvent with a unique homeCommunityId and declaring
SupportsHealthDataLocator.**

455

Table 3.55.4.4.2-3: Coded values for codeSystem=1.3.6.1.4.1.19376.1.2.27.2

Value for code	Meaning of code
NotHealthDataLocator	This community does not maintain externally available location information about this patient and will respond with no data to a Patient Location Query transaction related to this patient.
SupportsHealthDataLocator	**This community maintains location information about this patient and makes it available to other communities via the Patient Location Query transaction.**

Add the identified text to the end of Case 1 in Section 3.55.4.2.3

3.55.4.2.3 Expected Actions

460   **Case 1:** The Responding Gateway finds exactly one patient record matching the criteria sent in
the query parameters.

AA (application accept) is returned in Acknowledgement.typeCode (transmission wrapper).

OK (data found, no errors) is returned in QueryAck.queryResponseCode (control act wrapper)

465   One RegistrationEvent (and the associated Patient role, subject of that event) is returned from the
patient information source for the patient record found. The community associated with the
Initiating Gateway may use the patient demographics and identifiers to: a) run an independent
matching algorithm to ensure the quality of the match b) use the designated patient identifier in a

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470 Cross Gateway Query to get information about records related to the patient c) cache the
correlation for future use (see ITI TF-2b: 3.55.4.2.3.1 for more information about caching) **d)
use a Patient Location Query transaction to get a list of patient data locations**.

> *Add the identified text to the second paragraph of Section 3.55.4.2.3.1*

475 Both the requesting and responding side of the Cross Gateway Patient Discovery transaction gain
knowledge through this transaction. That knowledge may be used immediately, by sending a
Patient Location Query or Cross Gateway Query transaction, or may be cached for use at some
other time (or both). This section addresses caching considerations when the Cross Gateway
Patient Discovery transaction is used in the Demographic Query and Feed mode. Other modes
480 are a simplification of this mode with corresponding simplifications of the considerations
presented.

> *Add the identified text to the this paragraph of Section 3.55.4.2.3.1*

Local changes in demographics, merge/link

When a local change in demographics or a merge/link event affects the LocalPid, the community
485 may initiate a Cross Gateway Patient Discovery request to validate the correlation **or use the
Revoke message to remove any correlation previously identified**.

> *Add the identified text to the this paragraph of Section 3.55.4.2.3.1*

490 **External changes in demographics, merge/link**

When an external change in demographics or merge/link event occurs, the external community
may initiate a Cross Gateway Patient Discovery request which, when received, can be used to re-
assess the correlation and adjust accordingly. **Alternately, the external community may
initiate a Revoke. If the external community chooses not to initiate a Cross Gateway
495 Patient Discovery request or Revoke the local community cannot know about changes**.
Mutually agreed policies for use of the CorrelationTimeToLive SOAP header may enable greater
assurance that changes are reflected when needed.

> *Add the following Section 3.55.4.3*

500 **3.55.4.3 Revoke Message**

The Revoke Message is implemented using the HL7® Patient Registry Record Nullified
(PRPA_IN201303UV02) message.

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3.55.4.3.1 Trigger Events

The initiating community has cached a correlation between a local patient identifier and an external patient identifier. A significant change has occurred related to the local identifier which suggests that the cached correlation may no longer be valid. The Initiating Gateway sends this message to notify the responding community that the previously identified correlation may no longer be valid.

3.55.4.3.2 Message Semantics

The Responding Gateway shall support Asynchronous Web Services Exchange as described in ITI TF-2x: V.5, Synchronous and Asynchronous Web Services Exchange. If the Initiating Gateway declares the Asynchronous Web Services Exchange Option it shall also support Asynchronous Web Services Exchange as described in ITI TF-2x: V.5. Use of Asynchronous Web Services Exchange is necessary when transactions scale to large numbers of communities because it allows for more efficient handling of latency and scale.

3.55.4.3.2.1 Message Information Model of the Patient Nullify Message

Below is the Message Information Model for the Patient Nullify message, as restricted for this transaction. The purpose of the model is to describe the data elements relevant for this transaction. It is a strict common subset of the Patient Nullify Message (PRPA_RM201305UV) RMIM.

The base RMIM can be found on the HL7® V3 2008 Edition CD at: Edition2008/domains/uvpa/editable/PRPA_RM201305UV.htm. The following restrictions were made on the original RMIMs to arrive at the restricted model:

- The focal entity choice is restricted to be only a person

- The Patient shall have exactly two patient identifiers

- Person.name shall be null and all other optional elements shall be omitted, i.e.,:

  - administrativeGender

  - birthTime

  - birthplace

530
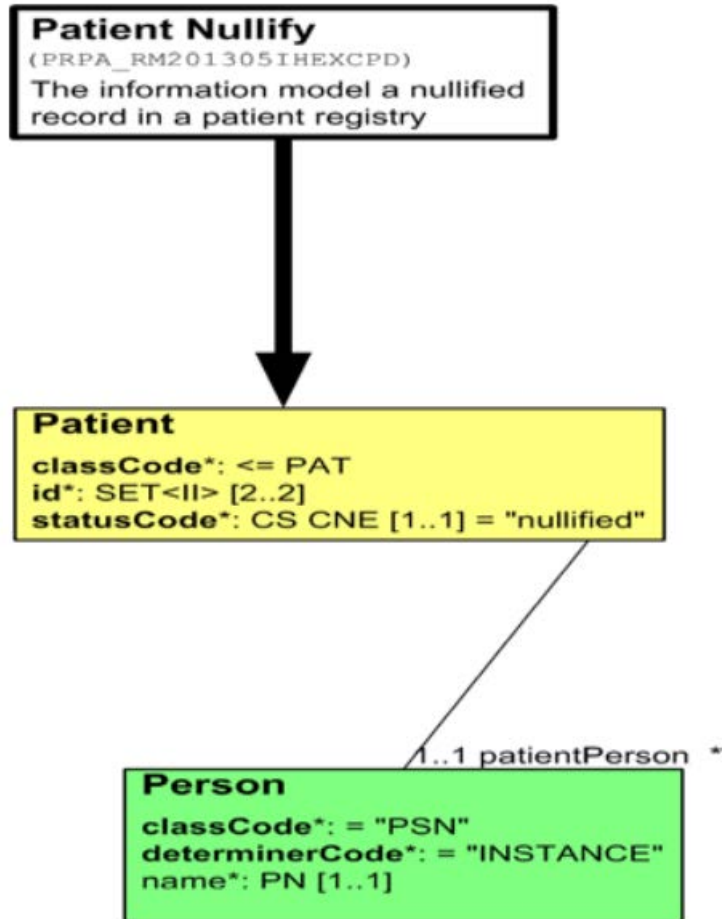
Figure 3.55.4.3-1: Patient Nullify Message

The attributes of this model are described in the following table. Note that CMETs are not
535   discussed, as the HL7® definitions for them are being used.

PRPA_HD201305IHE Patient Registry Record Nullified	This HMD extract defines the message used to ... Derived from Figure 3.55.4.3-1 (PRPA_RM201305IHEXCPD)
Patient	The primary record for the focal person
classCode [1..1] (M) Patient (CS) {CNE:PAT}	Structural attribute; this is a "patient" role
id [2..2] (M) Patient (SET<II>)	Shall contain two elements reflecting the correlation that is no longer valid. One of the identifiers is the patient identifier from the Initiating Gateway domain, the other is the identifier from the Responding Gateway domain.

statusCode [1..1] Patient (CS) {CNE:active, fixed value= "nullified"}	A value specifying the state of this record in a patient registry (based on the RIM role class state-machine). This record is nullified.
Person	A subtype of LivingSubject representing a human being Either Person.name or Patient.id must be non-null
classCode [1..1] (M) Person (CS) {CNE:PSN, fixed value= "PSN"}	Structural attribute; this is a "person" entity
determinerCode [1..1] (M) Person (CS) {CNE:INSTANCE, fixed value= "INSTANCE"}	Structural attribute; this is a specific person
name [1..1] Person (BAG<PN>)	Name(s) for this person Shall contain null i.e., <name nullFlavor="NA"/>

3.55.4.3.2.2 Control Act and Transmission Wrappers

540 Please see ITI TF-2x: Appendix O for details on the IHE guidelines for implementing the wrappers. Table 3.55.4.3-2 contains the Transmission and Control Act wrappers used for this interaction, and the associated constraints.

Table 3.55.4.3-2: Wrappers and Constraints

Transmission Wrapper	Trigger Event Control Act Wrapper
MCCI_MT000100UV01 – Send Message Payload	MFMI_MT700701UV01 – Master File / Registry Notification Control Act, Role Subject
The value of interactionId shall be set to PRPA_IN201303UV02 The value of processingModeCode shall be set to T The acceptAckCode shall be set to AL There shall be only one receiver Device	The trigger event code in ControlActProcess.code shall be set to PRPA_TE201303UV02 RegistrationEvent.statusCode shall be set to "active" There shall be no InReplacementOf act relationship for these interactions.

545 The composite message schemas which describe the full payload of these interactions, including the wrappers, can be found online on the IHE FTP site, see ITI TF-2x: Appendix W (the HL7® V3 2008 Normative Edition schemas are at: Edition2008/processable/multicacheschemas/PRPA_IN201303UV02.xsd).

3.55.4.3.3 Expected Actions

550 The Responding Gateway shall send an accept acknowledgement for any properly formatted Patient Nullify Message. The Responding Gateway may update its cached patient correlations and/or initiate a workflow to update the cache.

555 **3.55.5.1 Security Audit Considerations**

The Cross Gateway Patient Discovery Transaction is a Query Information event as defined in Table ITI TF-2a: 3.20.6-1.

There are no specific auditing requirements for the Revoke Message.

560

3.56 Patient Location Query

This section corresponds to Transaction 56 of the IHE Technical Framework. Transaction 56 is used by the Initiating Gateway and Responding Gateway actors.

565 **3.56.1 Scope**

The Patient Location Query transaction supports a query that retrieves a list of communities which may have healthcare data for a patient referenced by patient identifier.

3.56.2 Use Case Roles
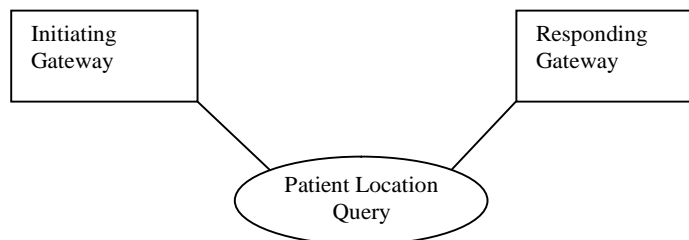
570

Actor: Initiating Gateway

Role: Requests the Responding Gateway to provide patient data locations in the form of a list of community identifiers (homeCommunityId) that reference communities that may have healthcare records for the patient identifier specified in the request.

575 **Actor**: Responding Gateway

Role: Responds with a list of patient data locations.

3.56.3 Referenced Standard

Implementers of this transaction shall comply with all requirements described in ITI TF-2x: Appendix V: Web Services for IHE Transactions.

580   HL7® V3 Datatypes 2008 Normative Edition

Appendix V   ITI TF-2x: Appendix V: Web Services for IHE Transactions
          Contains references to all Web Services standards and requirements of use

3.56.4 Interaction Diagram

585   **3.56.4.1 Patient Location Query Request**

This message carries a request for a list of communities which may have healthcare data about the identified patient.

3.56.4.1.1 Trigger Events

A new patient arrives at a medical provider and medical records for this patient are desired from
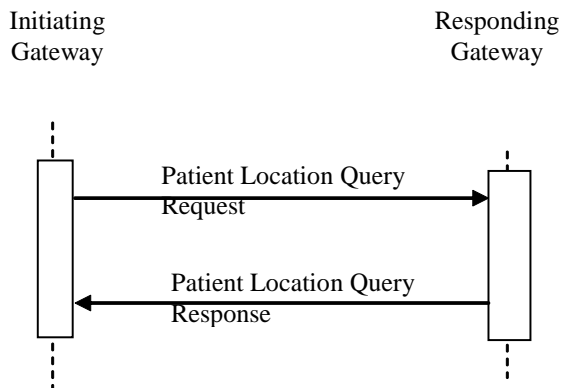590   outside the medical provider's community. In cases of an existing patient, this transaction may be used to determine if there is new data available outside the community.

3.56.4.1.2 Message Semantics

The Patient Location Query request is a Web Service request complying with all requirements in ITI TF-2x: Appendix V: Web Services for IHE Transactions. The content of the message is a
595   single <xcpd:PatientLocationQueryRequest/> element which contains a single <xcpd:RequestedPatientId/> element. The <xcpd:RequestedPatientId/> contains the patient identifier which shall be coded consistent with the HL7® V3 II Data Type.

The Responding Gateway shall support Asynchronous Web Services Exchange as described in ITI TF-2x: V.5 Synchronous and Asynchronous Web Services Exchange. If the Initiating
600   Gateway declares the Asynchronous Web Services Exchange Option it shall also support Asynchronous Web Services Exchange as described in ITI TF-2x: V.5. Use of Asynchronous

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25

Web Services Exchange is necessary when transactions scale to large numbers of communities
because it allows for more efficient handling of latency and scale.

605 The Initiating Gateway has acquired the correct patient identifier to use in this transaction
through some other interactions outside the scope of this transaction. One approach is to use the
Cross Gateway Patient Discovery transaction, which returns the identifier associated with a set of
demographics.

An example of the Patient Location Query request:

610
```
<xcpd:PatientLocationQueryRequest xmlns:xcpd="urn:ihe:iti:xcpd:2009
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:ihe:iti:xcpd:2009>
  <xcpd:RequestedPatientId
      root="1.2.840.114350.1.13.99997.2.3412" extension="38273N237"/>
</xcpd:PatientLocationQueryRequest>
```

615 ### 3.56.4.1.2.1 Web Services Transport

See ITI TF-2b: 3.56.6 below.

3.56.4.1.2.2 Example request message

A complete example of the request message is:

620
```
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:a="http://www.w3.org/2005/08/addressing">
<s:Header>
<a:Action s:mustUnderstand="1">urn:ihe:iti:2009:PatientLocationQuery</a:Action>
<a:MessageID>urn:uuid:a02ca8cd-86fa-4afc-a27c-16c183b2055</a:MessageID>
<a:ReplyTo>
  <a:Address>http://www.w3.org/2005/08/addressing/anonymous</a:Address>
</a:ReplyTo>
<a:To s:mustUnderstand="1">http://localhost:2647/Service/IHERespondingGateway.svc</a:To>
</s:Header>
  <s:Body>
<xcpd:PatientLocationQueryRequest xmlns:xcpd="urn:ihe:iti:xcpd:2009
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:ihe:iti:xcpd:2009>
<xcpd:RequestedPatientId
    root="1.2.840.114350.1.13.99997.2.3412" extension="38273N237"/>
</xcpd:PatientLocationQueryRequest>
</s:Body>
</s:Envelope>
```

640 ### 3.56.4.1.3 Expected Actions

The Responding Gateway shall respond with the Patient Location Query Response Message
indicating the data it has related to the specified patient identifier.

26

The Responding Gateway shall use the SOAP Faults defined in Table 3.56.4.1.3-1 when appropriate. Initiating Gateways shall be capable of accepting other values beyond the ones specified here.

Table 3.56.4.1.3-1: SOAP Faults

Description of error	Code	Reason Text
The Responding Gateway is too busy to respond to the request	Receiver	Busy
The Responding Gateway resources are too low to respond to the request	Receiver	Resources Low
The Responding Gateway is not a Health Data Locator for the patient specified in the request.	Sender	Not a Health Data Locator for the specified patient identifier

An example of a SOAP Fault is:

650

```
<env:Envelope xmlns:env="http://www.w3.org/2003/05/soap-envelope"
              xmlns:xml="http://www.w3.org/XML/1998/namespace">
 <env:Body>
  <env:Fault>
   <env:Code>
     <env:Value>env:Receiver</env:Value>
   </env:Code>
   <env:Reason>
     <env:Text xml:lang="en">Busy</env:Text>
   </env:Reason>
  </env:Fault>
 </env:Body>
</env:Envelope>
```

3.56.4.2 Patient Location Query Response

This message carries a response to a request for a list of communities which may have healthcare data about the identified patient.

3.56.4.2.1 Trigger Events

A Patient Location Query Request Message is received.

3.56.4.2.2 Message Semantics

The Patient Location Query response is a Web Services response complying with all requirements in ITI TF-2x: Appendix V: Web Services for IHE Transactions.

27

The Responding Gateway shall support Asynchronous Web Services Exchange as described in
ITI TF-2x: V.5 Synchronous and Asynchronous Web Services Exchange. If the Initiating
675 Gateway declares the Asynchronous Web Services Exchange Option it shall also support
Asynchronous Web Services Exchange as described in ITI TF-2x: V.5. Use of Asynchronous
Web Services Exchange is necessary when transactions scale to large numbers of communities
because it allows for more efficient handling of latency and scale.

The Responding Gateway has acquired the data returned in this transaction through some other
680 interactions outside the scope of this transaction. One approach is to use the Cross Gateway
Patient Discovery transaction.

The content of the message is a single <ihe:PatientLocationQueryResponse/> element which is
defined as:

- An optional sequence of <xcpd:PatientLocationResponse/> elements which contain:

685 - A required <xcpd:HomeCommunityId/> element. The value of this element shall be
the identifier of a community which might have data about the patient identified in
the request. Shall be coded consistent with the anyURI Data Type.

- A required <xcpd:CorrespondingPatientId/> element that contains the patient
identifier that the requested patient is known by within the community identified by
690 the ihe:HomeCommunityId element. Shall be coded consistent with the HL7® V3 II
Data Type.

- A required <xcpd:RequestedPatientId/> that is the same identifier specified in the
query request. Shall be coded consistent with the HL7® V3 II Data Type

The <xcpd:PatientLocationResponse> element in the schema may have additional sub-elements
695 defined by national committees. Initiating Gateways shall accept extra sub-elements and may
ignore them. National committees are responsible for providing an extended schema if the
schema is extended. The schema shall not be extended outside of IHE national/regional
committees.

If the Responding Gateway is not managing patient data locations for the identified patient, or
700 does not know the patient identifier, it shall respond with a SOAP Fault see ITI TF-2b:
3.56.4.1.3.

3.56.4.2.2.1 Web Services Transport

See ITI TF-2b: 3.56.6.

3.56.4.2.2.2 Example response message

705 A complete example of the response message is:

```
<xcpd:PatientLocationQueryResponse
 xmlns:xcpd="urn:ihe:iti:xcpd:2009"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="urn:ihe:iti:xcpd:2009">
```

```
710        <xcpd:PatientLocationResponse>
              <xcpd:HomeCommunityId>urn:oid:1.2.333495.30291</xcpd:HomeCommunityId>
              <xcpd:CorrespondingPatientId
                root="1.2.840.114350.1.13.99997.12" extension="38273N237"/>
              <xcpd:RequestedPatientId
715             root="1.2.840.114350.1.13.99997.2.3412"
                     extension="38273N237"/>
           </xcpd:PatientLocationResponse>
           <xcpd:PatientLocationResponse>
              <xcpd:HomeCommunityId>urn:oid:555.324.1.2.3</xcpd:HomeCommunityId>
720           <xcpd:CorrespondingPatientId
                root="555.324.1.2.3.12" extension="7382931"/>
              <xcpd:RequestedPatientId
                root="1.2.840.114350.1.13.99997.2.3412" extension="38273N237"/>
           </xcpd:PatientLocationResponse>
725 </xcpd:PatientLocationQueryResponse>
```

3.56.4.2.3 Expected Actions

The Initiating Gateway may use the list of communities to send a XCA Cross Gateway Query
transaction to each, using the value of the CorrespondingPatientId, to find all data about the
730 patient. The Initiating Gateway may also cache the information, maintaining its cache through
repeated polling of the original responder, or through receipt of subsequent Cross Gateway
Patient Discovery transactions. Support for subscription to updates to the list is not profiled by
IHE.

3.56.5 Security Considerations

735 ### 3.56.5.1 Security Audit Considerations

The Patient Location Query Transaction is a Query Information event as defined in ITI TF-2a:
Table 3.20.6-1. The actors involved shall record audit events according to the following:

740

745

_____

3.56.5.1.1 Initiating Gateway audit message:

	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"E" (Execute)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-56", "IHE Transactions", "Patient Location Query")
Source (Initiating Gateway) (1)			
Human Requestor (0..n)			
Destination (Responding Gateway) (1)			
Audit Source (Initiating Gateway) (1)			
Patient (1..n)			
Query Parameters(1)			

Where:

	Field Name	Opt	Value Constraints
Source **AuditMessage/** **ActiveParticipant**	UserID	M	If Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. Otherwise, not specialized.
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address.

	Field Name	Opt	Value Constraints
Human **Requestor** **(if known)** **AuditMessage/** **ActiveParticipant**	UserID	M	Identity of the human that initiated the transaction.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

	Field Name	Opt	Value Constraints
Destination **AuditMessage/** **ActiveParticipant**	UserID	M	SOAP endpoint URI.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	M	"false"
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

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Audit Source **AuditMessage/ AuditSourceIdentification**	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

Patient **AuditMessage/ ParticipantObjectIdenti fication**	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*M*	*not specialized*
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

Query Parameters **AuditMessage/ ParticipantObjectIdenti fication**	ParticipantObjectTypeCode	M	"2" (system object)
	ParticipantObjectTypeCodeRole	M	"24" (query)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("ITI-56", "IHE Transactions", "Patient Location Query")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	"PatientLocationQueryRequest"
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	M	the PatientLocationQueryRequest, base64 encoded.
	ParticipantObjectDetail	*U*	*not specialized*

755 ### 3.56.5.1.2 Responding Gateway audit message:

	Field Name	**Opt**	**Value Constraints**
Event **AuditMessage/ EventIdentification**	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"E" (Execute)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-56", "IHE Transactions", "Patient Location Query")
Source (Initiating Gateway) (1)			
Destination (Responding Gateway) (1)			
Audit Source (Initiating Gateway) (1)			
Patient (0..n)			
Query Parameters(1)			

_____

_____

Where:

Source AuditMessage/ ActiveParticipant	UserID	M	If Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. Otherwise, not specialized.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

760

Destination AuditMessage/ ActiveParticipant	UserID	M	SOAP endpoint URI.
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	M	"false"
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

Audit Source AuditMessage/ AuditSourceIdentification	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

Patient AuditMessage/ ParticipantObjectIdentification	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*M*	*not specialized*
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

Query Parameters AuditMessage/ ParticipantObjectIdentification	ParticipantObjectTypeCode	M	"2" (system object)
	ParticipantObjectTypeCodeRole	M	"24" (query)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("ITI-56", "IHE Transactions", "Patient Location Query")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	"PatientLocationQueryRequest"
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	M	The PatientLocationQueryRequest, base64 encoded.
	ParticipantObjectDetail	*U*	*not specialized*

_____

The Patient Location Query transaction does not require auditing of the returned result because
765 the result contains only opaque identifiers. Implementers are free to audit more extensively if it is
desired.

3.56.6 Protocol Requirements

The Patient Location Query request and response will be transmitted using Web Services,
according to the requirements specified in ITI TF-2x: Appendix V. The specific values for the
770 WSDL describing the Patient Location Query transaction are described in this section.

The Responding Gateway shall accept a Patient Location Query Request formatted as a SIMPLE
SOAP message and respond with a Patient Location Query Response formatted as a SIMPLE
SOAP message. The Initiating Gateway shall generate the Patient Location Query Request
formatted as a SIMPLE SOAP message and accept a Patient Location Query Response formatted
775 as a SIMPLE SOAP message.

IHE-WSP201) The attribute /wsdl:definitions/@name shall be "RespondingGateway".

The following WSDL naming conventions shall apply:

wsdl:definitions/@name="RespondingGateway":

query message   -> "PatientLocationQuery_Message"

780   query response   -> "PatientLocationQueryResponse_Message"

portType   -> "RespondingGateway_PortType"

operation   -> "PatientLocationQuery"

SOAP 1.2 binding -> "RespondingGateway_Binding_Soap12"

SOAP 1.2 port   -> "RespondingGateway_Port_Soap12"

785

 IHE-WSP202) The targetNamespace of the WSDL shall be "urn:ihe:iti:xcpd:2009"

These are the requirements for the Patient Location Query transaction presented in the order in
which they would appear in the WSDL definition:

- The following types shall be imported (xsd:import) in the /definitions/types section:

790   - namespace=" urn:ihe:iti:xcpd:2009"

- The /definitions/message/part/@element attribute of the Patient Location Query Request
  message shall be defined as "xcpd: PatientLocationQueryRequest"

- The /definitions/message/part/@element attribute of the Patient Location Query
  Response message shall be defined as "xcpd: PatientLocationQueryResponse"

795
- The /definitions/portType/operation/input/@wsaw:Action attribute for the Patient Location QueryRequest message shall be defined as "urn:ihe:iti:2009:PatientLocationQuery"

- The /definitions/portType/operation/output/@wsaw:Action attribute for the Patient Location Query Response message shall be defined as
800 "urn:ihe:iti:2009:PatientLocationQueryResponse"

- The /definitions/binding/operation/soap12:operation/@soapAction attribute should be defined as "urn:ihe:iti:2009:PatientLocationQuery"

A full WSDL for the Initiating and Responding Gateway Actors is found in ITI TF-2x: Appendix W.