Integrating the Healthcare Enterprise



IHE IT Infrastructure

Technical Framework Supplement

Patient Identifier Cross-reference for Mobile

(PIXm)

HL7® FHIR® Release 4

Using Resources at Normative Level

Rev. 2.0 – Public Comment

Date: June 14, 2019

Author: IHE ITI Technical Committee

Email: iti@ihe.net

**Please verify you have the most recent version of this document.** See [here](http://ihe.net/Technical_Frameworks/) for Trial Implementation and Final Text versions and [here](http://ihe.net/Public_Comment/) for Public Comment versions.

**Foreword**

This is a supplement to the IHE IT Infrastructure Technical Framework V15.0. 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 July 24, 2018 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](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://ihe.net](http://ihe.net/).

Information about the IHE IT Infrastructure domain can be found at [http://ihe.net/IHE\_Domains](http://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://ihe.net/IHE\_Process](http://ihe.net/IHE_Process/) and [http://ihe.net/Profiles](http://ihe.net/Profiles/).

The current version of the IHE IT Infrastructure Technical Framework can be found at[http://ihe.net/Technical\_Frameworks](http://ihe.net/Technical_Frameworks/)*.*

**CONTENTS**

[Introduction to this Supplement 5](#_Toc520113368)

[Open Issues and Questions 6](#_Toc520113369)

[Closed Issues 6](#_Toc520113370)

[General Introduction 9](#_Toc520113371)

[Appendix A – Actor Summary Definitions 9](#_Toc520113372)

[Appendix B – Transaction Summary Definitions 9](#_Toc520113373)

[Glossary 9](#_Toc520113374)

[**Volume 1 – Profiles 10**](#_Toc520113375)

[Copyright Licenses 10](#_Toc520113376)

[5.5 Cross Profile Considerations 10](#_Toc520113377)

[23.7 Cross Profile Considerations 10](#_Toc520113378)

[41 Patient Identifier Cross-reference for Mobile Profile (PIXm) 11](#_Toc520113379)

[41.1 PIXm Actors, Transactions, and Content Modules 11](#_Toc520113380)

[41.1.1 Actor Descriptions and Actor Profile Requirements 12](#_Toc520113381)

[41.2 PIXm Actor Options 12](#_Toc520113382)

[41.3 PIXm Required Actor Groupings 12](#_Toc520113383)

[41.4 PIXm Overview 13](#_Toc520113384)

[41.4.1 Concepts 13](#_Toc520113385)

[41.4.2 Use Cases 14](#_Toc520113386)

[41.4.2.1 Use Case: Multiple Identifier Domains within a Single Facility/Enterprise 14](#_Toc520113387)

[41.4.2.1.1 Multiple Identifier Domains with a Single Facility/Enterprise Use Case Description 14](#_Toc520113388)

[41.4.2.1.2 Multiple Identifier Domains with a Single Facility/Enterprise Process Flow 14](#_Toc520113389)

[41.5 Security Considerations 15](#_Toc520113390)

[41.6 PIXm Cross Profile Considerations 15](#_Toc520113391)

[41.6.1 Proxy Model 15](#_Toc520113392)

[41.6.2 Manager group 15](#_Toc520113393)

[**Volume 2 – Transactions 16**](#_Toc520113394)

[3.83 Mobile Patient Identifier Cross-reference Query [ITI-83] 16](#_Toc520113395)

[3.83.1 Scope 16](#_Toc520113396)

[3.83.2 Actor Roles 16](#_Toc520113397)

[3.83.3 Referenced Standards 16](#_Toc520113398)

[3.83.4 Interaction Diagram 17](#_Toc520113399)

[3.83.4.1 Get Corresponding Identifiers message 17](#_Toc520113400)

[3.83.4.1.1 Trigger Events 17](#_Toc520113401)

[3.83.4.1.2 Message Semantics 17](#_Toc520113402)

[3.83.4.1.2.1 Source Patient Identifier Parameter 18](#_Toc520113403)

[3.83.4.1.2.2 Populating Which Patient Identity Domain is Returned 18](#_Toc520113404)

[3.83.4.1.3 Expected Actions 19](#_Toc520113405)

[3.83.4.2 Query Return Corresponding Identifiers message 21](#_Toc520113406)

[3.83.4.2.1 Trigger Events 21](#_Toc520113407)

[3.83.4.2.2 Message Semantics 21](#_Toc520113408)

[3.83.5 Security Considerations 23](#_Toc520113409)

[3.83.5.1 Security Audit Considerations 23](#_Toc520113410)

# Introduction to this Supplement

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Whenever possible, IHE profiles are based on established and stable underlying standards. However, if an IHE committee determines that an emerging standard offers significant benefits for the use cases it is attempting to address and has a high likelihood of industry adoption, it may develop IHE profiles and related specifications based on such a standard.  The IHE committee will take care to update and republish the IHE profile in question as the underlying standard evolves. Updates to the profile or its underlying standards may necessitate changes to product implementations and site deployments in order for them to remain interoperable and conformant with the profile in question.  This PIXm Profile uses the emerging HL7®[[1]](#footnote-1) FHIR®[[2]](#footnote-2) specification. The FHIR release profiled in this supplement is Release4. HL7 describes the lifecycle standardization state at <https://www.hl7.org/fhir/versions.html>.  In addition, HL7 provides a rating of the maturity of FHIR content based on the FHIR Maturity Model (FMM): level 0 (draft) through 5 (normative ballot ready). The FHIR Maturity Model is described at <http://hl7.org/fhir/versions.html#maturity>.  Key FHIR Release 4 content, such as Resources or ValueSets, used in this profile, and their FMM levels are:   |  |  | | --- | --- | | FHIR Resource Name | FMM Level | | Bundle | Normative | | Patient | Normative | | Parameters | Normative | | OperationOutcome | Normative | |

The Patient Identifier Cross-reference for Mobile (PIXm) Profile defines a lightweight RESTful interface to a Patient Identifier Cross-reference Manager, leveraging technologies readily available to mobile applications and lightweight browser based applications.

The functionality is based on the PIX Profile described in the ITI TF-1:5. The primary differences are transport and messaging format of messages and queries. The profile leverages HTTP transport, and the JavaScript Object Notation (JSON), Simple-XML, and Representational State Transfer (REST). The payload format is defined by the HL7 FHIR standard. Unlike the PIX Profile, this PIXm Profile does not describe the transmission of patient identity information from a Patient Identity Source to the Patient Identifier Cross-reference Manager.

The PIXm Profile exposes the functionality of a Patient Identifier Cross-reference Manager to mobile applications and lightweight browser applications.

This supplement is intended to be fully compliant with the HL7 FHIR specification, providing only use-case driven constraints to aid with interoperability, deterministic results, and compatibility with existing PIX and PIXV3 Profiles.

## Open Issues and Questions

**PIXm\_007**

Mobile Patient Identifier Cross-reference Query response <assigner> resource will be required, for cases where the Assigning authority is not an OID or UUID or URI

Do we want to use Assigner as an alternative field?

**PIXm\_010**

Is using FHIR operations the right approach for this profile? If it is correct, did we document it properly?

**PIXm\_014**

Should IHE have just used the $match operator defined in the FHIR specification? It seems to be very similar function. BUT $match uses Patient resources and not just identifiers/Reference. That is to say that PIXm operation will expose identifiers but not other demographics about the patient, where as $match exposes the full content of the Patient resource on query and on returned result. -- <http://hl7.org/fhir/R4/patient-operation-match.html>

Thus should $match be an alternative, or another transaction, or ignored by IHE?

**PIXm\_015**

Should we simplify the Parameters given that a Reference datatype can now carry a Reference.identifier or a Reference.reference?

## Closed Issues

**CP-ITI-1118** - asks if the return behavior is well aligned with PDQm. Seems they both should handle similar conditions similarly. 🡪 The return codes were reviewed in PIXm, and found to be appropriate for PIXm as originally documented.

# 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

No change to Appendix A (no new actors)

# Appendix B – Transaction Summary Definitions

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

|  |  |
| --- | --- |
| Transaction | Definition |
| Mobile Patient Identifier Cross-reference Query [ITI-83] | Performs a query for a cross-reference of a Patient Identity. |

Glossary

No updates to the Glossary.

Volume 1 – Profiles

## Copyright Licenses

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

The FHIR License can be found at <http://hl7.org/implement/standards/fhir/license.html>.

Add the following new Section 5.5

## 5.5 Cross Profile Considerations

There are two other profiles, PIXV3 (Patient Identifier Cross-reference HL7 V3) and PIXm (Patient Identifier Cross-reference for Mobile), which provide similar functionality to the Patient Identifier Cross-reference Query [ITI-9] transaction.

A PIX Patient Identifier Cross-reference Manager may choose to group with the PIXm Patient Identifier Cross-reference Manager to provide an HTTP RESTful query method.

Add the following new Section 23.7

## 23.7 Cross Profile Considerations

There are two other profiles, PIX (Patient Identifier Cross-reference) and PIXm (Patient Identifier Cross-reference for Mobile), which provide similar functionality to the PIXV3 Query [ITI-45] transaction.

A PIXV3 Patient Identifier Cross-reference Manager may choose to group with the PIXm Patient Identifier Cross-reference Manager to provide an HTTP RESTful query method.

Add Section 41

# 41 Patient Identifier Cross-reference for Mobile Profile (PIXm)

The **Patient Identifier Cross-reference for Mobile** **Integration Profile** provides a transaction for mobile and lightweight browser based applications to query a Patient Identifier Cross-reference Manager for a list of patient identifiers based on the patient identifier in a different domain and retrieve a patient’s cross-domain identifiers information into the application.

This profile provides a lightweight alternative to PIX Query [ITI-9] or PIXV3 Query [ITI-45] transactions, using a HTTP RESTful Query. This profile depends upon the implementation of the PRIM, PIX, or PIXV3 Profile or equivalent for the patient identity feed and update notifications. Two example groupings are shown in TF-1: 41.6.

This profile does not assume Patient Identifier Cross-reference Manager has the ability to act as a full-fledged HL7 FHIR standard server, other than for the profiled transaction. PIXm can be used to provide a RESTful interface to a PIX or PIXV3 Patient Identifier Cross-reference Manager without providing other FHIR services.

## 41.1 PIXm Actors, Transactions, and Content Modules

Figure 41.1-1 shows the actors directly involved in the Patient Identifier Cross-reference for Mobile (PIXm) Profile relevant transactions between them.

Patient Identifier Cross-reference Manager

Patient Identifier Cross-reference Consumer

↑ Mobile Patient Identifier Cross-reference Query [ITI-83]

Figure 41.1-1: PIXm Actor Diagram

Table 41.1-1 lists the transactions for each actor directly involved in the PIXm Profile. To claim compliance with this profile, an actor shall support all required transactions (labeled “R”) and may support the optional transactions (labeled “O”).

Table 41.1-1: PIXm Profile - Actors and Transactions

| Actors | Transactions | Optionality | Reference |
| --- | --- | --- | --- |
| Patient Identifier Cross-reference Consumer | Mobile Patient Identifier Cross-Reference Query [ITI-83] | R | ITI TF-2c: 3.83 |
| Patient Identifier Cross-reference Manager | Mobile Patient Identifier Cross-Reference Query [ITI-83] | R | ITI TF-2c: 3.83 |

The transaction defined in this profile corresponds to one of the transactions used in the PIX and PIXV3 Profiles (ITI TF-1: 5 and 23) and provides similar functionality. Note that equivalent transactions to the PIX Update Notification ([ITI-10] and [ITI-46]) or Patient Identity Feed ([ITI-8] or [ITI-44]) transactions in the PIX and PIXV3 Profiles are outside the scope of this profile, and can be found in the Patient Resource Identity Management (PRIM) Profile.

### 41.1.1 Actor Descriptions and Actor Profile Requirements

There are no additional requirements above those in Volume 2 for the [ITI-83] transaction.

## 41.2 PIXm Actor Options

Options that may be selected for each actor in this profile, if any, are listed in the Table 41.2-1. Dependencies between options when applicable are specified in notes.

Table 41.2-1: PIXm Actors and Options

| Actor | Option Name | Reference |
| --- | --- | --- |
| Patient Identifier Cross-reference Consumer | No options defined | -- |
| Patient Identifier Cross-reference Manager | No options defined | -- |

## 41.3 PIXm Required Actor Groupings

Table 41.3-1: PIXm - Required Actor Groupings

| PIXm Actor | Actor to be grouped with | Reference | Content Bindings Reference |
| --- | --- | --- | --- |
| Patient Identifier Cross-reference Consumer | None |  |  |
| Patient Identifier Cross-reference Manager | None |  |  |

## 41.4 PIXm Overview

The ***Patient Identifier Cross-reference for Mobile Profile*** is intended to be used by lightweight applications and mobile devices present in a broad range of healthcare enterprises (hospital, a clinic, a physician office, etc.). It supports the cross-reference query of patient identifiers from multiple Patient Identifier Domains via the following interaction:

* The ability to access the list(s) of cross-referenced patient identifiers via a query/response.

The following use case and descriptions assume familiarity with the profiles in ITI TF-1:5 and ITI TF-1:23, and only describe the RESTful actors and transaction alternatives.

Other  
IHE Actor

Patient Identifier Domain C

PIX Patient Identifier Cross-reference Manager

Patient Identity Source

PIXm Patient Identifier Cross-reference Consumer

Mobile Patient Identifier Cross-reference Query [ITI-83]

Patient Identifier Domain B

*Internal Domain Transactions*

Patient Identity Feed

[ITI-8] or [ITI-44]

Other  
IHE Actor

Patient Identity Source

PIX Patient Identifier Cross-reference Consumer

PIX Query [ITI-9]

Patient Identifier Domain A

*Internal Domain Transactions*

Patient Identity Feed

[ITI-8] or [ITI-44]

Patient Identity Feed &  
 Patient Identity References

PIXm Patient Identifier Cross-reference Manager

Figure 41.4-1: Process Flow with PIXm

This diagram shows how PIXm actors (in solid outlined, white boxes) can integrate into a PIX environment (gray boxes; described in ITI TF-1: 5.2). For a discussion of the relationship between this Integration Profile and an enterprise master patient index (eMPI) see ITI TF-1: 5.4.

### 41.4.1 Concepts

The Patient Identifier Cross-reference Consumer fits into the combination of actors and transactions defined for PIX, see ITI TF-1:5. It adds the alternative of using the Mobile Patient Identifier Cross-reference Query [ITI-83] instead of the PIX Query [ITI-9], or PIXV3 Query [ITI-45] transactions.

The PIXm Patient Identifier Cross-reference Consumer uses a query for sets of cross-referenced patient identifiers.

### 41.4.2 Use Cases

#### 41.4.2.1 Use Case: Multiple Identifier Domains within a Single Facility/Enterprise

##### 41.4.2.1.1 Multiple Identifier Domains with a Single Facility/Enterprise Use Case Description

A patient is in an ambulance on his way to the hospital after an accident. The mobile Care system in the ambulance wants to get allergy information (e.g., using the MHD Profile) for the patient. The mobile Care system uses the patient’s driver’s license number ‘E-123’ as their patient ID. Before requesting the allergy information from the hospital, it must translate the known patient identity (driver’s license) to the patient’s identity known by the hospital (MRN). To achieve this correlation, the mobile Care system issues a Mobile Patient Identifier Cross-reference Query to the Patient Identifier Cross-reference Manager and retrieves the corresponding patient identity. It requests a list of patient ID aliases corresponding to patient ID = ‘E-123’ (within the “mobile Care domain”) from the Patient Identifier Cross-reference Manager. Having linked this patient with a patient known by medical record number = ‘007’ in the ‘ADT Domain’, the Patient Identifier Cross-reference Manager returns this list to the mobile Care system so that it may retrieve the allergies information for the desired patient.

The mobile Care system can now request the allergy information from the hospital allergy system using the allergy system’s own patient ID (MRN-007) including the domain identifier/assigning authority.

In this scenario, the hospital’s main ADT system (acting as a Patient Identity Source) would provide a Patient Identity Feed (using the patient’s MRN as the identifier) to the Patient Identifier Cross-reference Manager. Similarly, the mobile Care system or the external assigning authority would also provide a Patient Identity Feed to the Patient Identifier Cross-reference Manager using the patient driver’s license as the patient identifier and providing its own unique identifier domain identifier.

##### 41.4.2.1.2 Multiple Identifier Domains with a Single Facility/Enterprise Process Flow

The PIXm Profile is intended to provide a different transport mechanism for the cross-identifier Query functionality described in the PIX Profile. Hence, the Mobile Patient Identifier Cross-reference Query [ITI-83] transaction can be used where the PIX Query [ITI-9] (or equivalent) transaction is used. The following diagram describes only Patient Cross-Identity for Mobile Process Flow.

Mobile Care System (Patient Identifier Cross-reference Consumer)

Patient Identifier Cross-reference Manager

Mobile Patient Identifier Cross-reference Query  
[ITI-83]

Figure 41.4.2.1.2-1: Basic Process Flow in Multiple ID Domains in a Single Facility Process Flow in PIXm Profile

## 41.5 Security Considerations

See ITI TF-2X: Appendix Z.8 “Mobile Security Considerations”

## 41.6 PIXm Cross Profile Considerations

### 41.6.1 Proxy Model

The Patient Identifier Cross-reference Manager from PIXm can be grouped with either PIX or PIXV3 Patient Identifier Cross-reference Consumer to proxy the Mobile Patient Identifier Cross-reference Query [ITI-83] to the more traditional PIX Query [ITI-9] and PIXV3 Query [ITI-45] transactions, thus acting as a proxy to the Patient Identifier Cross-reference Manager that wants to enable RESTful query to its data.

### 41.6.2 Manager group

The Patient Identifier Cross-reference Manager from PIXm does not implement any Patient Identity Feed transactions. A grouping with Patient Identifier Cross-reference Manager from PIX or PIXV3 enables the traditional IHE mechanism to obtain patient demographics for cross-referencing via Patient Identity Feed transactions [ITI-8] and/or [ITI-44]. Grouping of the PIXm Manager with the PIX or PIXV3 Consumer or Manager is not required if the implementation is able to obtain cross-reference information in another manner.

For example, a PIXm Manager could be grouped with an enterprise’s main FHIR server. See the Patient Reference Identity Manager (PRIM) profile for more details on this configuration.

Volume 2c – Transactions

Add Section 3.83

## 3.83 Mobile Patient Identifier Cross-reference Query [ITI-83]

This section corresponds to Transaction ITI-83 of the IHE IT Infrastructure Technical Framework.

### 3.83.1 Scope

This transaction is used by the Patient Identifier Cross-reference Consumer to solicit information about patients whose Patient Identifiers cross-match with Patient Identifiers provided in the query parameters of the request message. The request is received by the Patient Identifier Cross-reference Manager. The Patient Identifier Cross-reference Manager processes the request and returns a response in the form of zero or more Patient Identifiers for the matching patient.

### 3.83.2 Actor Roles

The roles in this transaction are defined in the following table and may be played by the actors shown here:

Table 3.83.2-1: Actor Roles

|  |  |
| --- | --- |
| **Actor:** | Patient Identifier Cross-reference Consumer |
| **Role:** | Requests, from the Patient Identifier Cross-reference Manager, a list of patient identifiers matching the supplied Patient Identifier. |
| **Actor:** | Patient Identifier Cross-reference Manager |
| **Role:** | Returns Cross-referenced Patient Identifiers for the patient that cross-matches the Patient Identifier criteria provided by the Patient Identifier Cross-reference Consumer. |

### 3.83.3 Referenced Standards

|  |  |
| --- | --- |
| HL7 FHIR | HL7 FHIR standard <http://hl7.org/fhir/R4/index.html> |
| RFC2616 | Hypertext Transfer Protocol – HTTP/1.1 |
| RFC7540 | Hypertext Transfer Protocol – HTTP/2 |
| RFC3986 | Uniform Resource Identifier (URI): Generic Syntax |
| RFC4627 | The application/json Media Type for JavaScript Object Notation (JSON) |
| RFC6585 | Additional HTTP Status Codes |

### 3.83.4 Messages

Get Corresponding Identifiers

Response

Patient Identifier Cross-reference Consumer

Patient Identifier Cross-reference Manager

#### 3.83.4.1 Get Corresponding Identifiers message

This message is implemented as an HTTP GET operation from the Patient Identifier Cross-reference Consumer to the Patient Identifier Cross-reference Manager using the FHIR $ihe-pix operation described in Section 3.83.4.1.2 Message Semantics.

##### 3.83.4.1.1 Trigger Events

A Patient Identifier Cross-reference Consumer needs to obtain, or determine the existence of, alternate patient identifiers.

##### 3.83.4.1.2 Message Semantics

The Get Corresponding Identifiers message is a FHIR operation request as defined in FHIR (<http://hl7.org/fhir/R4/operations.html>) with the input parameters shown in Table 3.83.4.1.2-1. Given that the parameters are not complex types, the HTTP GET operation shall be used as defined in FHIR ([http://hl7.org/fhir/R4/operations.html#request](http://hl7.org/fhir/R4/operations.html" \l "request)).

The name of the operation is $ihe-pix, and it is applied to FHIR Patient Resource type.

The Get Corresponding Identifiers message is conducted by the Patient Identifier Cross-reference Consumer by executing an HTTP GET against the Patient Identifier Cross-reference Manager’s Patient Resource URL.

The URL for this operation is: [base]/Patient/$ihe-pix

Where **[base]** is the URL of Patient Identifier Cross-reference Manager Service provider.

The Get Corresponding Identifiers message is performed by an HTTP GET command shown below:

GET [base]/Patient/$ihe-pix?sourceIdentifier=[token]{&targetSystem=[uri]}{&\_format=[token]}

Table 3.83.4.1.2-1: $ihe-pix Message HTTP query Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Query parameter Name | Cardinality | Search Type | Description |
| Input Parameters | | | |
| sourceIdentifier | 1..1 | token | The Patient identifier search parameter that will be used by the Patient Identifier Cross-reference Manager to find cross matching identifiers associated with the Patient Resource. See Section 3.83.4.1.2.1. |
| targetSystem | 0..\* | uri | The Assigning Authorities for the Patient Identity Domains from which the returned identifiers shall be selected. See Section 3.83.4.1.2.2. |
| \_format | 0..1 | token | The requested format of the response from the mime-type value set. See ITI TF-2x: Appendix Z.6 |

###### 3.83.4.1.2.1 Source Patient Identifier Parameter

The required HTTP query parameter sourceIdentifier is a tokenthat specifies a patient identifier associated with the patient whose information is being queried (e.g., a local identifier, account identifier, etc.). Its value shall include both the Patient Identity Domain (i.e. Assigning Authority) and the identifier value, separated by a "|".

See ITI TF-2x: Appendix Z.2.2 for use of the token search parameter type for patient identifiers.

The Patient Identity Cross-reference Consumer shall provide exactly one (1) instance of this parameter in the query.

For example, a query searching for all patient Identifiers, for a patient with identifier NA5404 assigned by authority “1.3.6.1.4.1.21367.2010.1.2.300&ISO” would be represented as:

sourceIdentifier=urn:oid:1.3.6.1.4.1.21367.2010.1.2.300|NA5404

###### 3.83.4.1.2.2 Requesting Patient Identity Domains to be Returned

If the requesting system wishes to select the domains from which they wish to receive Patient Identifiers, it does so by populating the targetSystem parameter with as many domains for which it wants to receive Patient Identifiers. The responding system shall return the Patient Identifiers for each requested domain if a value is known. The targetSystem parameter uses this format:

targetSystem=<patient ID Assigning Authority domain>

Examples:

targetSystem=urn:oid:1.3.6.1.4.1.21367.2010.1.2.100

targetSystem=http://fhir.mydomain.com

When included, the Identifier Cross-reference Consumer shall populate the targetSystem search parameter with values as described in FHIR Identifier datatype ([http://hl7.org/fhir/R4/datatypes.html#Identifier](http://hl7.org/fhir/R4/datatypes.html" \l "Identifier)).

##### 3.83.4.1.3 Expected Actions

The Patient Identifier Cross-reference Manager shall use the sourceIdentifier and the targetSystem(s) to determine the Patient Identities available. Where Patient Identities include business Identifier(s) and FHIR Patient Resource(s). The Patient Identities returned may be a subset based on policies that might restrict accessibility of the knowledge.

For guidance on handling Access Denied, see ITI TF-2x: Appendix Z.7.

##### 3.83.4.1.3.1 Source Identifier not found

When the Patient Identifier Cross-reference Manager recognizes the specified Patient Identity Domain in the, but the identifier sent in sourceIdentifier for that patient does not exist, then the following failure shall be returned:

**HTTP 404** (Not Found) is returned as the HTTP status code.

An OperationOutcome Resource is returned indicating that the patient identity is not recognized in an issue having:

| Attribute | Value |
| --- | --- |
| severity | error |
| code | http://hl7.org/fhir/issue-type#not-found |
| diagnostics | “sourceIdentifier Patient Identifier not found” |

##### 3.83.4.1.3.2 Source Domain not recognized

When the Manager does not recognize the Patient Identity Domain in the sourceIdentifier , then the following failure shall be returned:

**HTTP 400** (Bad Request) is returned as the HTTP status code.

An OperationOutcome Resource is returned indicating that the Patient Assigning Authority domain is not recognized in an issue having:

| Attribute | Value |
| --- | --- |
| severity | error |
| code | http://hl7.org/fhir/issue-type#code-invalid |
| diagnostics | “sourceIdentifier Assigning Authority not found” |

##### 3.83.4.1.3.1 Target Domain not recognized

When the Manager does not recognize the specified Patient Identity Domain in the targetSystem , then the following failure shall be returned:

**HTTP 403** (Forbidden) is returned as the HTTP status code.

An OperationOutcome Resource is returned indicating that the Patient Identity Domain is not recognized in an issue having:

| Attribute | Value |
| --- | --- |
| severity | error |
| code | http://hl7.org/fhir/issue-type#code-invalid |
| diagnostics | “targetSystem not found” |

#### 3.83.4.2 Response message

##### 3.83.4.2.1 Trigger Events

The Patient Identifier Cross-reference Manager needs to return failure, or success with zero to many results to the Patient Identifier Cross-reference Consumer.

##### 3.83.4.2.2 Message Semantics

See ITI TF-2x: Appendix Z.6 for more details on response format handling.

The response message is a FHIR operation response ([http://hl7.org/fhir/R4/operations.html#response](http://hl7.org/fhir/R4/operations.html" \l "response))

On Failure, the response message is an HTTP status code of 4xx or 5xx indicates an error, and an OperationOutcome shall be returned with details.

On Success, the response message is an HTTP status code of 200 with a single Parameters Resource as shown in Table 3.83.4.2.2-1. For each matching business Identifier, the Parameters Resource shall include one parameter element with name="targetIdentifier". For each matching Patient Resource, the Parameters Resource shall include one parameter element with name="targetId". The values may be returned in any order. The identifier value given in sourceIdentifier is not to be included in the returned Response.

Table 3.83.4.2.2-1: $ihe-pix Message Response

| Parameter | Card. | Data Type | Description |
| --- | --- | --- | --- |
| FHIR Parameters Resource | | | |
| targetIdentifier | 0..\* | Identifier | The identifier found. Constraints to include the assigning authority as specified in ITI TF-2x: Appendix E.3 |
| targetId | 0..\* | Reference(Patient) | The URL of the Patient Resource |

<Parameters xmlns="http://hl7.org/fhir">

<parameter>

<name value="targetIdentifier"/>

<valueIdentifier>

<use value="official" />

<system value="urn:oid:2.16.840.1.113883.16.4.3.2.5" />

<value value="123" />

</valueIdentifier>

</parameter>

<parameter>

<name value="targetIdentifier"/>

<valueIdentifier>

<use value="official" />

<system value="urn:oid:1.16.7435.2.315381.13.4.1.2.3" />

<value value="474" />

</valueIdentifier>

</parameter>

<parameter>

<name value="targetId"/>

<valueReference value="http://xyz-server/xxx/Patient/7536642">

</valueReference>

</parameter>

<parameter>

<name value="targetIdentifier"/>

<valueIdentifier>

<use value="official"/>

<system value="http://www.acmehosp.com/patients"/>

<value value="44552"/>

<period>

<start value="2003-05-03"/>

</period>

</valueIdentifier>

</parameter>

<parameter>

<name value="targetId"/>

<valueReference value="http://pas-server/xxx/Patient/443556">

</valueReference>

</parameter>

</Parameters>

### 3.83.5 Security Considerations

See the general Security Consideration in ITI TF-1: 38.5

#### 3.83.5.1 Security Audit Considerations

The Security audit criteria are similar to those for the PIX Query [ITI-9] as this transaction discloses the same type of patient information. The Mobile Patient Identifier Cross-reference Query is a Query Information event as defined in ITI TF-2a: Table 3.20.4.1.1.1-1. The audit message shall comply with the requirements in ITI TF-2a: 3.9.5.1, with the following differences:

* EventTypeCode = EV(“ITI-83”, “IHE Transactions”, “Mobile Patient Identifier Cross-reference Query”)
* Query Parameters (AuditMessage/ParticipantObjectIdentification)
* ParticipantObjectIdTypeCode = EV(“ITI-83”, “IHE Transactions”, “Mobile Patient Identifier Cross-reference Query”)
* ParticipantObjectQuery = Requested URL including query parameters
* ParticipantObjectDetail = HTTP Request Headers contained in the query (e.g., Accept header)

1. HL7 is the registered trademark of Health Level Seven International. [↑](#footnote-ref-1)
2. FHIR is the registered trademark of Health Level Seven International. [↑](#footnote-ref-2)