**Integrating the Healthcare Enterprise**



**IHE ITI/PCC**

**Technical Framework Supplement**

**Query for Existing Data for Mobile   
(QEDm)**

**Draft in preparation for Public Comment**

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**Foreword**

This is a supplement to the IHE PCC Technical Framework <VX.X>. 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 <Month XX, 201x> for Public Comment. Comments are invited and may be submitted at [http://www.ihe.net/<domain>/<domain>comments.cfm](http://www.ihe.net/Technical_Framework/public_comment.cfm). In order to be considered in development of the Trial Implementation version of the supplement, comments must be received by <Month XX, 201X>.

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](http://www.ihe.net).

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

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/About/process.cfm> and <http://www.ihe.net/profiles/index.cfm>.

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

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# Introduction to this Supplement

The Query for Existing Data for Mobile Profile (QEDm) supports dynamic queries for clinical data, including vital signs, problems, medications, immunizations, diagnostic results, procedures and visit history, by making the information widely available to other systems within and across enterprises to support provision of better clinical care.

It’s functionally equivalent to QED Profile, but it’s conceived to be implemented by application specific to mobile devices. The term “mobile” must be intended in a wider sense: it identifies not only mobile application, but the whole class of systems that are resource- and platform-constrained. (e.g.: tablets, smartphones, and embedded devices including home-health devices, but also larger systems where needs are simple, such as pulling the latest summary for display).

These constraints may drive the implementer to use simpler network interface technology for data elements sharing. The critical aspects of the ‘mobile device’ are that it is resource-constrained, has a simple programming environment (e.g., JSON, JavaScript), simple protocol stack (e.g., HTTP), and simple display functionality (e.g., HTML browser).

The goal is to limit required additional libraries to those that are necessary to process SOAP, WSSE, MIME-Multipart, MTOM/XOP, ebRIM, and multi-depth XML.

The Query for Existing Data for Mobile Profile (QEDm) Profile defines one standardized interface to health (HTTP-based RESTful APIs) for use by ‘mobile devices’ so that deployment of mobile applications is more consistent and reusable.

The Query for Existing Data for Mobile Profile (QEDm) Profile, by considering a pair of existing actors, defines options for them and a transaction used to query a list of specific data elements, persisted as FHIR resources.

## Open Issues and Questions

***QEDm\_001: Which is the best approach in specifying the QEDm query transaction and complementary reconciliation information?***

Two possible strategies for defining the QEDm query transaction has been identified:

* 1. Querying for Lists of Resources

Alternatives:

* + 1. To define a completely new [PCC-Y] transaction specific for QEDm that uses the FHIR List specs (see above) and the “RECON Option” already defined for [PCC-16] in RECON (how to convey recon activities performed by the Reconciliation Agent when grouped with the Clinical Data Source).
    2. To reuse the existing [PCC-16] transaction but move it’s definition to QEDm scope and evaluate possible enhancements basing on FHIR List STU3.
  1. Querying for underlying Resources

Main alternative:

* + 1. To define a completely new [PCC-Y] transaction specific for QEDm that uses the Argonaut specs (see above) and the “RECON Option” already defined for in RECON.

Common to ALL alternatives:

* + - Possibly review RECON profile, by considering the QEDm profile functionalities as done for QED
    - The definition of “RECON Option” on FHIR could remain in RECON profile just like done for QED
    - Possibly name the QEDm transaction “Mobile Query for Existing Data” to align it with the QED [PCC-2] “Query for Existing Data” transaction, just like done with PIX/PIXm and PDQ/PDQm

Resolution: Approach A.2 seems cleaner so it’s preferred

In case, consider to evolve the existing [PCC-16] in order to enhance its query capabilities to be better aligned with [PCC-2] functionalities

**QEDm\_003: which are the QEDm query parameters to consider for accessing Data Elements (Resources)?**

Resolution: to replicate QED functionalities according to the query strategy adopted.

**QEDm\_004: to define the core set of FHIR resources that align with QED**

*Consider a subset of Resources: the stable ones.  
(keep in the Supplement the complete table to make evident all open issues about Resources until the final review: see “Classification of Information” section for more details)*

*To consider that the Resources listed in the table are based on DSTU2 standard 🡪 refer STU3.*

## Closed Issues

**QEDm\_002: How to record reconciliation performed on the FHIR resources returned by the QEDm query transaction?**

*Resolution: reconciliation specific content is already defined by RECON (FHIR Reconciled List)   
Currently the results of reconciliation are noted in the FHIR List resource. The requirements for this profile are defined in the following two sections:*

* *PCC Vol.3: 6.6.A - FHIR Reconciled List*
* *PCC Vol.3: 6.6.B - FHIR Provenance Constraints*

*But RECON specifications must be updated to FHIR STU3*

***QEDm\_005: How to consider the “Multi-Patient Query Option” in the query transaction?***

*Resolution: to remove this option from this year scope*

# 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:

Not applicable

Appendix B - Transaction Summary Definitions

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

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

Glossary

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

|  |  |
| --- | --- |
| Glossary Term | Definition |
| Fast Health Interoperability Resources (FHIR) | The interoperability standard from HL7®[[1]](#footnote-1) which builds on HL7 version 2, version 3, the RIM and CDA. It can be used in conjunction with existing data exchange standards as well as a standalone standard.[[2]](#footnote-2) |
| FHIR Resources | The basic building block in FHIR. Used to define exchangeable content.[[3]](#footnote-3) |
| FHIR Resource List | Collection of resources in a list which is enumerated while providing features for managing the list.[[4]](#footnote-4) |
| FHIR Profile | A statement of use of one or more FHIR Resources. It may include constraints on Resources and Data Types, Terminology Binding Statements and Extension Definitions. [[5]](#footnote-5) |

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 Section X

# X Query for Existing Data for Mobile (QEDm) Profile

The Query for Existing Data for Mobile Profile (QEDm) supports dynamic queries for clinical data, including vital signs, problems, medications, immunizations, diagnostic results, procedures and visit history, by making the information widely available to other systems within and across enterprises to support provision of better clinical care. It defines a transaction used to query a list of specific data elements, persisted as FHIR resources.

It’s functionally equivalent to QED Profile, but it’s conceived to be implemented by application specific to mobile devices. The term “mobile” must be intended in a wider sense: it identifies not only mobile application, but the whole class of systems that are resource- and platform-constrained. (e.g.: tablets, smartphones, and embedded devices including home-health devices, but also larger systems where needs are simple, such as pulling the latest summary for display).

These constraints may drive the implementer to use simpler network interface technology for data elements sharing. The critical aspects of the ‘mobile device’ are that it is resource-constrained, has a simple programming environment (e.g., JSON, JavaScript), simple protocol stack (e.g., HTTP), and simple display functionality (e.g., HTML browser).

The goal is to limit required additional libraries to those that are necessary to process SOAP, WSSE, MIME-Multipart, MTOM/XOP, ebRIM, and multi-depth XML.

The Query for Existing Data for Mobile Profile (QEDm) Profile defines one standardized interface to health (HTTP-based RESTful APIs) for use by ‘mobile devices’ so that deployment of mobile applications is more consistent and reusable.

## Classification of Information

QEDm Profile leverage the data elements concepts from the QED classification, but simplifies the technology requirements for access by mobile devices.

The information classification consists of six main different categories (see table below) for the purpose of determining where it might be found. In the last column is the correspondence with Argonauts/DAF Profile FHIR resources to be used for mobile access purposes.

**Table X.Y – QED information categories and FHIR resources**

|  |  |  |  |
| --- | --- | --- | --- |
| **QED Category** | | **Description** | **FHIR Resource** |
| **Common Observations** | | These are a collection of simple measurements or reported values that can be determined using simple measuring devices (e.g., Height, Weight), or which can be reported by the patient (date of last menstrual period). These measurements do NOT include anything that might be recorded as a problem, allergy, risk, or which requires interpretation, clinical decision making, or diagnostic quality equipment or procedures for performing the measurement. | Argonauts:  [**Vital Signs**](http://argonautwiki.hl7.org/index.php?title=Vital_Signs)  *based on:*  [**DAF Vital Signs**](http://hl7.org/fhir/daf/observation-daf-vitalsigns.html) |
| **Diagnostic Results** | | These are a collection of observations made or performed using laboratory testing equipment, imaging procedures, vision examinations, et cetera. | Argonauts:  [**Laboratory Results**](http://argonautwiki.hl7.org/index.php?title=Laboratory_Results)  *based on:*  [**DAF Results**](https://www.hl7.org/fhir/daf/observation-daf-results.html) |
| **Problems and Allergies** | | These are a collection of diagnoses, clinical findings, allergies, or other risk factors that are recorded for the patient. The information may be obtained from patient reports, or through clinical decision making. It includes such information as would be found in social and family history sections of clinical reports. This classification can be further subdivided into three groups. | *See the following three sub-categories* |
| **Conditions** | This is a collection of disease conditions for the patient. | Argonauts:  [**Problems and Health Concerns**](http://argonautwiki.hl7.org/index.php?title=Problems_and_Health_Concerns)  *based on:*  [**DAF-Condition (aka Problem)**](https://www.hl7.org/fhir/daf/condition-daf.html) |
| **Intolerances** | This is a collection of the patient's allergies and other intolerances. | Argonauts:  [**Allergies**](http://argonautwiki.hl7.org/index.php?title=Allergies)  *based on:*  [**DAF AllergyIntolerance**](https://www.hl7.org/fhir/daf/allergyintolerance-daf.html) |
| **Risk Factors** | This is a collection of the patients significant risk factors, as might be established based on a review of family history, social history, occupational exposures, et cetera. By themselves, they may not be indicative of a disease condition, but could contribute to one. | Argonauts:  [**Smoking Status**](http://argonautwiki.hl7.org/index.php?title=Smoking_Status)  *based on:*  **Observation** |
| **Medications** | | This is a collection of the medications that a patient is or has been taking for treatment of one or more conditions. | Argonauts:  [**Medication**](http://argonautwiki.hl7.org/index.php?title=Medications)  *based on:*  **[DAF Medication Statement DAF Medication Order](http://hl7.org/fhir/daf/medicationstatement-daf.html)**  *To consider also:*  [**DAF Medication**](http://hl7.org/fhir/daf/medication-daf.html) |
| **Immunizations** | | This is a collection of immunizations that have been given, or which are planned to be given to the patient. | Argonauts:  [**Immunizations**](http://argonautwiki.hl7.org/index.php?title=Immunizations)  *based on:*  [**DAF Immunization**](http://hl7.org/fhir/daf/daf-immunization.html) |
| **Professional Services** | | This is a collection of procedures and/or encounters which the patient has participated in, or is expected to participate in. | Argonauts:  [**Procedures**](http://argonautwiki.hl7.org/index.php?title=Procedures)  *based on:*  [**DAF Procedure**](http://hl7.org/fhir/daf/Procedure-daf.html)  *To consider also:*  [**DAF-Encounter**](https://www.hl7.org/fhir/daf/encounter-daf.html) |

**REFERENCES:**

<http://argonautwiki.hl7.org/index.php?title=Implementation_Guide#Data_Element_Query>

<https://www.hl7.org/fhir/daf/daf.html>

## X.1 QEDm Actors, Transactions and Content Modules

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

Figure X.1-1 shows the actors directly involved in the QEDm Profile and the relevant transactions between them. If needed for context, other actors that may be indirectly involved due to their participation in other related profiles are shown in dotted lines. Actors which have a mandatory grouping are shown in conjoined boxes.

**Clinical Data**

**Consumer**

**Clinical Data**

**Source**

Query for List [PCC-Y]

Figure X.1-1: QEDm Actor Diagram

Table X.1-1 lists the transactions for each actor directly involved in the QEDm 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 X.1-1: QEDm Integration Profile - Actors and Transactions

|  |  |  |  |
| --- | --- | --- | --- |
| Actors | Transactions | Optionality | Reference |
| Clinical Data Source | Query for List [PCC-Y] | R | PCC TF-2: 3.Y |
| Clinical Data Consumer | Query for List [PCC-Y] | R | PCC TF-2: 3.Y |

### X.1.1 Actor Descriptions and Actor Profile Requirements

The Clinical Data Source and Clinical Data Consumer Actors are designed so that they can be implemented on a mobile device, and yet have sufficient functionality to support a wide range of applications and use cases. The goal is also to make easier the configuration of mobile health application and mobile health application deployment, and to reduce the overall solution complexity.

## X.2 QEDm Actor Options

Options that may be selected for each actor in this profile, if any, are listed in the table X.2-1. Dependencies between options when applicable are specified in notes.

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

| Actor | Option Name | Reference |
| --- | --- | --- |
| Clinical Data Source | [Vital Signs Option](#Vital_Signs_Option) (1) | PCC TF-X.2.1 |
| [Problems and Allergies Option](#Problems_and_Allergies_Option) (1) | PCC TF-X.2.2 |
| [Diagnostic Results Option](#Lab_Results_Option) (1) | PCC TF-X.2.3 |
| [Medications Option](#Medications_Option) (1) | PCC TF-X.2.4 |
| [Immunizations Option](#Immunizations_Option) (1) | PCC TF-X.2.5 |
| [Professional Services Option](#Professional_Services_Option) (1) | PCC TF-X.2.6 |
| Clinical Data Consumer | [Vital Signs Option](#Vital_Signs_Option) (1) | PCC TF-X.2.7 |
| [Problems and Allergies Option](#Problems_and_Allergies_Option) (1) | PCC TF-X.2.8 |
| [Diagnostic Results Option](#Lab_Results_Option) (1) | PCC TF-X.2.9 |
| [Medications Option](#Medications_Option) (1) | PCC TF-X.2.10 |
| [Immunizations Option](#Immunizations_Option) (1) | PCC TF-X.2.11 |
| [Professional Services Option](#Professional_Services_Option) (1) | PCC TF-X.2.12 |

1. Note: At least one of these options shall be supported by the Actor

### X.2.1 Vital Signs Option for Clinical Data Consumer

A Clinical Data Consumer that implements the Vital Signs Option performs the Query for List transaction using the specified vocabulary to query for Vital Signs FHIR resources.

### X.2.2 Problems and Allergies Option for Clinical Data Consumer

A Clinical Data Consumer that implements the Allergies Option performs the Query for List transaction using the specified vocabulary to query for Allergies FHIR resources.

### X.2.3 Diagnostic Results Option for Clinical Data Consumer

A Clinical Data Consumer that implements the Diagnostic Results Option performs the Query for List transaction using the specified vocabulary to query for Diagnostic Results FHIR resources.

### X.2.4 Medications Option for Clinical Data Consumer

A Clinical Data Consumer that implements the Medications Option performs the Query for List transaction using the specified vocabulary to query for Medications FHIR resources.

### X.2.5 Immunizations Option for Clinical Consumer

A Clinical Data Consumer that implements the Immunizations Option performs the Query for List transaction using the specified vocabulary to query for Immunizations FHIR resources.

### X.2.6 Professional Services Option for Clinical Data Consumer

A Clinical Data Consumer that implements the Professional Services Option performs the Query for List transaction using the specified vocabulary to query for Professional Services FHIR resources.

### X.2.1 Vital Signs Option for Clinical Data Source

A Clinical Data Source that implements the Vital Signs Option responds to all vocabulary specified for Vital Signs in PCC-Y in section <TBD>.

### X.2.2 Problems and Allergies Option for Clinical Data Source

A Clinical Data Source that implements the Allergies Option responds to all vocabulary specified for Problems and Allergies in PCC-Y in section <TBD>.

### X.2.3 Diagnostic Results Option for Clinical Data Source

A Clinical Data Source that implements the Diagnostic Results Option responds to all vocabulary specified for Diagnostic Results in PCC-Y in section <TBD>.

### X.2.4 Medications Option for Clinical Data Source

A Clinical Data Source that implements the Medications Option responds to all vocabulary specified for Medications in PCC-Y in section <TBD>.

### X.2.5 Immunizations Option for Clinical Data Source

A Clinical Data Source that implements the Immunizations Option responds to all vocabulary specified for Immunizations in PCC-Y in section <TBD>.

### X.2.6 Professional Services Option for Clinical Data Consumer

A Clinical Data Source that implements the Vital Signs Option responds to all vocabulary specified for Professional Services in PCC-Y in section <TBD>.

## X.3 QEDm Required Actor Groupings

An Actor from this profile (Column 1) shall implement all of the required transactions and/or content modules in this profile ***in addition to*** all of the transactions required for the grouped actor (Column 2).

If this is a content profile, and actors from this profile are grouped with actors from a workflow or transport profile, the Content Bindings reference column references any specifications for mapping data from the content module into data elements from the workflow or transport transactions.

In some cases, required groupings are defined as at least one of an enumerated set of possible actors; this is designated by merging column one into a single cell spanning multiple potential grouped actors. Notes are used to highlight this situation.

Section X.5 describes some optional groupings that may be of interest for security considerations and section X.6 describes some optional groupings in other related profiles.

Table X.3-1: QED for Mobile - Required Actor Groupings

| QEDm Actor | Actor to be grouped with | Reference |
| --- | --- | --- |
| Clinical Data Consumer | None | PCC TF-1: <TBD> |
| Clinical Data Source | None | PCC TF-1: <TBD> |

## X.4 QEDm Overview

### X.4.1 Concepts

The QEDm Profile supports a broad set of the QED use cases and functionality while keeping the implementation as simple as possible, but it does not try to reproduce the full privacy, or security supported by QED infrastructure.

### X.4.2 Use Cases

#### X.4.2.1 Use Case #1: Discovery and Retrieval of existing data elements

##### X.4.2.1.1 Discovery and Retrieval of existing data elements Use Case Description

In this use case, the mobile device needs access to existing data elements. For example, a mobile device involved in a workflow needs to determine the current state of the workflow, or the mobile device needs to discover the most current Vital Signs and Medications.

##### X.4.2.1.2 Discovery and Retrieval of existing data elements Process Flow

The Query for List transaction is used to provide parameterized queries that result in a list of data elements (FHIR Resources) query results.

Query for List [PCC-Y]

Message 1

Clinical Data Source

Actor D

Clinical Data Consumer

Actor A

Figure X.4.2.2-1: Basic Process Flow in QEDm Profile

### 

## X.5 QEDm Security Considerations

There are many security and privacy concerns with mobile devices, including lack of physical control. Many common information technology uses of HTTP, including REST, are accessing far less sensitive information than health documents. These factors present an especially difficult challenge for the security model. It is recommended that application developers perform a Risk Assessment in the design of the applications, and that Organization responsible for the operational environment using QEDm perform Risk Assessments in the design and deployment of the operational environment (see [FHIR STU3 Security](http://hl7.org/fhir/2017Jan/security.html)). Also, the resource server should not return any information unless proper authentication and communications security have been proven and necessary privacy and security provision must be in place for searching and fetching this information. The [FHIR STU3 Security and Privacy module](https://www.hl7.org/FHIR/2017Jan/secpriv-module.html) describes how to protect a FHIR server, also if FHIR does not mandate a single technical approach to security and privacy.

There are many reasonable methods of securing interoperability transactions. These security models can be layered in without modifying the characteristics of the QEDm Profile transaction. The use of TLS is encouraged, specifically the use of the ATNA Profile. User authentication on mobile devices is encouraged using Internet User Authorization (IUA) Profile. The network communication security and user authentication are layered in at the HTTP transport layer and do not modify the interoperability characteristics defined in the QEDm Profile.

The Security Audit logging (e.g., ATNA) is recommended. Support for ATNA-based audit logging on the mobile health device may be beyond the ability of this constrained environment. For example, the client (Clinical Data Source or Clinical Data Consumer) need only support http interactions using JSON encoding, while ATNA Audit Message transaction requires SYSLOG protocol and QED encoding. However, when grouped with QED actors, the whole system must comply with the ATNA requirement mandated in QED. For this reason, the use of ATNA Audit Logging is not mandated. This would mean that the Organization responsible for the operational environment must choose how to mitigate the risk of relying only on the service side audit logging.

The PCC-Y transaction include the Patient ID (patient.identifier) as a mandatory query parameter on the Resource URL. This URL pattern does present a risk when using typical web server audit logging of URL requests, and browser history. In both of these cases the URL with the patient identity is clearly visible. These risks should be mitigated in system or operational design.

## X.6 QEDm Cross Profile Considerations

This profile provides similar functionality to QED (Query for Existing Data), by using HTTP-based RESTful APIs instead of HL7v3 based transactions.

**PCC RECON - Reconciliation of Clinical Content and Care Providers**

A Clinical Data Source Actor in RECON shall be grouped with the Reconciliation Agent Actor when it's necessary to provide reconciled clinical data after having gathered contents from multiple data sources (e.g.: in PDLS and RECON profiles).

**ITI PIX - Patient Identity Cross Referencing** and **ITI PDQ - Patient Demographics Query**

A Clinical Data Consumer may be grouped with a Patient Identifier Cross-reference Consumer or a Patient Demographics Consumer Actor to resolve patient identifiers prior to submitting queries to a Repository.   
Within an enterprise, the need to cross-reference patient identifiers may not be necessary. However, once enterprise boundaries are crossed, these identifiers will need to be resolved. In that case either PIX or PDQ shall be used.

**ITI XDS - Cross Enterprise Document Sharing**

A Clinical Data Source Actor may be grouped with a XDS Document Repository Actor. Data gathered from clinical documents submitted to the Document Repository can be a source of information returned by the Clinical Data Source Actor. Information returned by the Clinical Data Source shall include references to all documents used in generating the results.

**Content Integration Profiles**

A Content Creator may be grouped with a Clinical Data Consumer to obtain some or all of the information necessary to create a Medical Summary based on information found in a Clinical Data Source.   
A Content Creator may be grouped with a Clinical Data Source. When grouped with a Content Creator, the Clinical Data Source Actor shall respond to queries containing the relevant vocabulary codes used by the Content Creator.

Volume 2 – Transactions

*<omissis>*

Volume 3 – Content Modules

*<omissis>*

1. HL7 is the registered trademark of Health Level Seven International [↑](#footnote-ref-1)
2. Available on the web at <http://hl7-fhir.github.io/overview.html> [↑](#footnote-ref-2)
3. Available on the web at <http://hl7-fhir.github.io/overview.html> [↑](#footnote-ref-3)
4. Available on the web at <http://hl7-fhir.github.io/list.html> [↑](#footnote-ref-4)
5. Available on the web at <http://www.hl7.org/implement/standards/fhir/profile.html> [↑](#footnote-ref-5)