**Integrating the Healthcare Enterprise**



**IHE 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 the already defined actors Clinical Data Consumer and Clinical Data Source, specifies options for them and a transaction to be used for querying a list of specific data elements, persisted as FHIR resources.

## Open Issues and Questions

***QEDm\_010; Which is the best FHIR Implementation Guide to refer?***

* Should we move to (no-US-Core) ? Are they other countries/international efforts?
* Alternative is Argonaut (modified, removing a few US specific).

*Considerations:*

* STU 3 is about to come out: week of March 20. IG will follow (days).

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

Resolution strategy:

* *consider a subset of FHIR 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)*
* *consider the STU3 version of Resources.*

*Comments:*

*Here below a comparison table between the current clinical information classification from QED and alternative classifications from Argonauts and US Core projects/initiatives.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **QED Categories** | **QED Options** | **QEDm Categories** | **QEDm Options** | **Argonauts Resources** | **US Core Profiles** |
|  |  |  |  | **Patient** | [**US Core Patient**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-patient.html) |
| **Common Observations** | **Vital Signs Option** | **Common Observations** | **Vital Signs Option** | **Vital Signs** | [**US Core Vital Signs**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-vitalsigns.html) |
| **Diagnostic Results** | **Diagnostic Results Option** | **Diagnostic Results** | **Diagnostic Results Option** | **Laboratory Results** | [**US Core Diagnostic Report**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-diagnosticreport.html) |
| **Problems and Allergies (see sub-categories)** | **Problems and Allergies Option (see sub-categories)** | **Problems and Allergies** | **Problems and Allergies Option (see sub-categories)** |  |  |
| * **Conditions** | **<omissis>** | * **Conditions** | **<omissis>** | **Problems and Health Concerns**  **Smoking Status** | [**US Core Condition**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-condition.html)  [**US Core Smoking Status Observation**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-smokingstatus.html) |
| * **Risk Factors** | **<omissis>** | * **Intolerances** | **<omissis>** |
| * **Intolerances** | **<omissis>** | * **Risk Factors** | **<omissis>** | **Allergies** | [**US Core Allergies**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-allergyintolerance.html) |
| **Medications** | **Medications Option** | **Medications** | **Medications Option** | **Medications** | [**US Core Medication**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-medication.html)  [**US Core Medication Statement**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-medicationstatement.html)  [**US Core Medication Request**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-medicationrequest.html) |
| **Immunizations** | **Immunizations Option** | **Immunizations** | **Immunizations Option** | **Immunizations** | [**US Core Immunization**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-immunization.html) |
| **Professional Services** | **Professional Services Option** | **Professional Services** | **Professional Services Option** | **Procedures** | [**US Core Procedure**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-procedure.html) |
|  | **QEDm ADDITIONAL FEATURE ? 🡪** | **Goals ?** | **Goals Option ?** | **Goals** | [**US Core Goal**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-goal.html) |
|  | **QEDm ADDITIONAL FEATURE ? 🡪** | **Devices ?** | **Devices Option ?** | **Implantable Devices/UDI** | [**US Core Implanted Device**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-device.html) |
|  |  |  |  | **Assessment and Plan of  🡪** hard to “list”, unreliable | [**US Core CarePlan**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-careplan.html) |
|  |  |  |  | **CareTeam 🡪** hard to “list”, unreliable | [**US Core CareTeam**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-careteam.html) |
|  |  | **???** |  |  | [**US Core Practitioner**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-pract.html) |
|  |  | **???** |  |  | [**US Core Organization**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-organization.html) |
|  |  | **???** |  |  | [**US Core Location**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-location.html) |
|  |  | **???** |  |  | [**US Core Result Observation**](http://hl7.org/fhir/us/core/StructureDefinition-us-core-observationresults.html) |

***QEDm\_009; QED retirement***

*Comments:*

*🡪 it may be considered, but the timing is independent of QEDm completion.*

## Closed Issues

***QEDm\_001: Agree on the list of requirements for QEDm by comparing with QED***

*Considerations:*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Requirements** | **QED** | **QEDm** |
| **1** | **Support listing of Problems, Medications, Allergies, Med-Allergies** | **Yes** | **Yes** |
| **2** | **Supports listing of rest of DE (Data-element) per full QED List** | **Yes** | **Yes** |
| **3** | **Supports listing of additional DE per DAF resources** | **No** | **Yes, almost** |
| **4** | **Supports access to DE across DAF/US Core defined resources** | **No** | **Maybe** |
| **5** | **Identifies source documents from where DE was extracted, if any.** | **Yes  (Confirm if in QED response transaction)** | **Yes** |
| **6** | **Selects source documents for scope of query** | **No** | **Yes** |
| **7** | **Flag in response that auto de-duplication has happen by clinical DE source** | **No** | **No**  **(Open Issue)** |
| **8** | **Shows specific DEs that have been auto de-duplicated** | **No ?  (not with RECON)** | **No, too complex** |

***QEDm\_002: Scope Listing of Data Elements***

*Which is the best approach in specifying the QEDm query transaction and complementary provenance information?   
FHIR allows essentially two approaches (querying strategies in FHIR STU3):*

* *Querying ‘named’ Lists of resources (‘Operations’)*
* *Querying directly the underlying resources*

*Considerations:*

* *Only the support for listing Resources has sense from a clinical point of view (see Issue QEDm:001 - requirements 1,2,3)*
* *FHIR List resource enumerates a flat collection of resources and provides features for managing the collection. While a particular List instance may represent a "snapshot", from a business process perspective the notion of "List" is dynamic – items are added and removed over time. The list resource references other resources. Lists may be curated and have specific business meaning (see* ***[here](https://www.hl7.org/FHIR/2017Jan/list.html" \l "query)*** *for more comments).*

***Resolution*:**

* ***Basic remains the goal and Argonauts doesn’t consider ‘curated lists’ (aka ‘named’ Lists of resources) as a basic function 🡪 start consider querying directly the underlying resources***

***QEDm\_002: Scope Listing of Data Elements***

*Which is the best approach in specifying the QEDm query transaction and complementary provenance information?   
FHIR allows essentially two approaches (querying strategies in FHIR STU3):*

* *Querying ‘named’ Lists of resources (‘Operations’)*
* *Querying directly the underlying resources*

*Considerations:*

* *Only the support for listing Resources has sense from a clinical point of view (see Issue QEDm:001 - requirements 1,2,3)*
* *FHIR List resource enumerates a flat collection of resources and provides features for managing the collection. While a particular List instance may represent a "snapshot", from a business process perspective the notion of "List" is dynamic – items are added and removed over time. The list resource references other resources. Lists may be curated and have specific business meaning (see* [***here***](https://www.hl7.org/FHIR/2017Jan/list.html#query) *for more comments).*

***Resolution*:**

* ***Basic remains the goal and Argonauts doesn’t consider ‘curated lists’ (aka ‘named’ Lists of resources) as a basic function 🡪 start consider querying directly the underlying resources***

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

**Resolution:**

* **try to replicate QED functionalities according to the query strategy adopted.**

**QEDm\_005: Managing reconciliation of Data Elements**

How to record reconciliation performed on the FHIR resources returned by the QEDm query transaction?

*Considerations:   
Reconciliation of clinical data without a manual intervention has no sense.   
An automatic algorithm could work well if limited to the data deduplication.*

*Consequences:*

* *a ‘manual reconciliation’ can be conceived at the Clinical Data Consumer side and it’s necessary when this actor is going to perform multiple query for gathering and merging information from different sources 🡪 the reconciliation is obtained by considering a Reconciliation Agent actor grouped with it.*
* *an ‘automatic deduplication’ can be conceived as option for the Clinical Data Source*

*Reconciliation/decuplication specific content is already defined by RECON. The results of reconciliation are noted in the FHIR List resource by using the FHIR Provenance resource. See 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*
  + *See also considerations about multi-stage import/reconciliation supported by the Provenance Resource:* [*http://hl7.org/fhir/2017Jan/provenance.html#6.2.4.6*](http://hl7.org/fhir/2017Jan/provenance.html)

***Resolution:***

* ***too complex, no reconciliation and no deduplication will be considered by QEDm (no automatic operations specified by RECON profile)***

**QEDm\_006: new name for the [PCC-Y] transaction: “Mobile Query Existing Data”?**

In order to appear more generic it’s proposed to use the name “Mobile Query Existing Data” for the transaction [PCC-Y] to be aligned with the QED [PCC-2] “Query Existing Data” transaction, just like done with PIX/PIXm and PDQ/PDQm

***Resolution*:**

* ***ok to rename.***

***QEDm\_007: How to consider the “Multi-Patient Query Option” in the query transaction?***

***Resolution:***

* ***ok to remove this option from this year scope***

***QEDm\_008: Consistency – How to identify Document Sources of Data Elements***

*Strategy:*

*consider the FHIR Provenance resource as used in PCC-RECON: “When the Data Element comes from a Document, the ID of the document is used as the source. When the Data Element is the result of a query (such as QED), the query ID is the source.   
When the data comes directly from a system, provenance may not exist because there is not a document source ID from the system. The solution is to start broad and add the “provenance” Option (source of the data). …”*

***Resolution:***

* ***The original Document(s) reference(s) can be supported by the Provenance.entity:*** <http://hl7.org/fhir/STU3/provenance.html>*(in general each Provenance object can link N ‘target’ Resources to M ‘entity’ Documents)*
* ***To consider also the available FHIR specifications on FHIR & XDS Documents*** <https://www.hl7.org/FHIR/STU3/usecases.html#xds>
  + ***specifically the DocumentReference FHIR resource:*** <https://www.hl7.org/FHIR/STU3/documentreference.html>
* ***Additional considerations on query for including Provenance:***
  + ***FHIR query on “resource” (e.g. medication), add “\_revinclude” with “Provenance”. GET [base]/MedicationRequest?\_revinclude=Provenance:target&criteria...Always on the GET by client and server must support.***
  + ***For list FHIR is an “operation” (not RESTfull GET). Is it worth exposing “list operations” because may be perfectly reconciled.***
  + ***Use Doc Resource versus and/or provenence resource***

# 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:

***Mobile Query Existing Data*** – this transaction uses RESTful API to query clinical data elements and retrieve them as lists of FHIR resources.

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 Resource | The basic building block in FHIR. Used to define exchangeable content.[[3]](#footnote-3) |
| 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. [[4]](#footnote-4) |

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 elements, 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 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 leverages the data elements concepts from the QED information classification, but simplifies the technology requirements for access by mobile applications.

The QED information classification consists of the major different categories shown by the table below, for the purpose of determining where it might be found.

**Table X.Y – Information Classification**

|  |  |
| --- | --- |
| **QED Category** | **Description** |
| **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. |
| **Diagnostic Results** | These are a collection of observations made or performed using laboratory testing equipment, imaging procedures, vision examinations, et cetera. |
| **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.   * **Conditions**: collection of disease conditions for the patient. * **Intolerances**: collection of observations made or performed using laboratory testing equipment, imaging procedures, vision examinations, et cetera. * **Risk Factors**: 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. |
| **Medications** | This is a collection of the medications that a patient is or has been taking for treatment of one or more conditions. |
| **Immunizations** | This is a collection of immunizations that have been given, or which are planned to be given to the patient. |
| **Professional Services** | This is a collection of procedures and/or encounters which the patient has participated in, or is expected to participate in. |
| **Goals** | This is a collection of goals, that describe the intended objective(s) for the patient (e.g., weight loss, restoring an activity of daily living, obtaining herd immunity via immunization, meeting a process improvement objective, etc). |
| **Devices** | This is a collection of devices items that are used in the provision of healthcare without being substantially changed through that activity. The device may be a medical or non-medical device. Medical devices include durable (reusable) medical equipment, implantable devices, as well as disposable equipment used for diagnostic, treatment, and research for healthcare and public health. Non-medical devices may include items such as a machine, cellphone, computer, application, etc |
| **???** | ????? |

## 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 transaction between them.

**Clinical Data**

**Consumer**

**Clinical Data**

**Source**

Mobile Query Existing Data [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 | Mobile Query Existing Data [PCC-Y] | R | PCC TF-2: 3.Y |
| Clinical Data Consumer | Mobile Query Existing Data [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 Consumer | [Vital Signs Option](#Vital_Signs_Option) (1) | PCC TF-X.2.1.1 |
| [Problems and Allergies Option](#Problems_and_Allergies_Option) (1) | PCC TF-X.2.1.2 |
| [Diagnostic Results Option](#Lab_Results_Option) (1) | PCC TF-X.2.1.3 |
| [Medications Option](#Medications_Option) (1) | PCC TF-X.2.1.4 |
| [Immunizations Option](#Immunizations_Option) (1) | PCC TF-X.2.1.5 |
| [Procedures Option](#Professional_Services_Option) (1) | PCC TF-X.2.1.6 |
| Encounters Option (1) | PCC TF-X.2.1.7 |
| ???? | ???? |
| Clinical Data Source | [Vital Signs Option](#Vital_Signs_Option) (1) | PCC TF-X.2.2.1 |
| [Problems and Allergies Option](#Problems_and_Allergies_Option) (1) | PCC TF-X.2.2.2 |
| [Diagnostic Results Option](#Lab_Results_Option) (1) | PCC TF-X.2.2.3 |
| [Medications Option](#Medications_Option) (1) | PCC TF-X.2.2.4 |
| [Immunizations Option](#Immunizations_Option) (1) | PCC TF-X.2.2.5 |
| [Procedures Option](#Professional_Services_Option) (1) | PCC TF-X.2.2.6 |
| Encounters Option (1) | PCC TF-X.2.2.7 |
| ???? | ???? |

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

### X.2.1 Clinical Data Consumer Options

#### X.2.1.1 Vital Signs Option

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

#### X.2.1.2 Problems and Allergies Option

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

#### X.2.1.3 Diagnostic Results Option

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

#### X.2.1.4 Medications Option

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

#### X.2.1.5 Immunizations Option

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

#### X.2.1.6 Procedures Option

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

#### X.2.1.7 Encounters Option

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

#### X.2.1.8 Goals Option

*<TBD>*

#### X.2.1.9 Devices Option

*<TBD>*

#### X.2.2.10 ???? Option

*<TBD>*

### X.2.2 Clinical Data Source Options

#### X.2.2.1 Vital Signs Option

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.2.2.2 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.2.2.3 Diagnostic Results Option

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.2.2.4 Medications Option

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

#### X.2.2.5 Immunizations Option

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

#### X.2.2.6 Procedures Option

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

#### X.2.2.7 Encounters Option

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

#### X.2.1.8 Goals Option

*<TBD>*

#### X.2.1.9 Devices Option

*<TBD>*

#### X.2.2.10 ???? Option

*<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 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 Use Case #1 Description

In this use case, the patient, by using his mobile device, needs access to existing data elements.   
For example, a mobile application involved in a workflow needs to discover all the current Vital Signs and Medications.

##### X.4.2.1.2 Use Case #1 Process Flow

The Mobile Query Existing Data transaction is used to provide parameterized queries that result in a list of returned data elements.

Mobile Query Existing Data  
 Request [PCC-Y]

Message 1

Clinical Data  
Source

Actor D

Clinical Data Consumer

Actor A

Mobile Query Existing Data

Response [PCC-Y]

Figure X.4.2.1-1: Use Case #1 Process Flow in QEDm Profile

#### X.4.2.2 Use Case #2: Discovery and Retrieval of existing data elements with source document links

##### X.4.2.2.1 Use Case #2 Description

In this use case, the patient, by using his mobile device, needs to access all existing data elements and eventually to retrieve and consume the source documents if any.   
For example, a mobile application involved in a workflow needs to discover all Encounters which the patient has participated in and, for those of interest, it needs to retrieve and show the related document where the Encounter was originally specified,

##### X.4.2.2.2 Use Case #2 Process Flow

The Query for Existing Data for Mobile transaction is used to provide parameterized queries that result in a list of returned data elements. One of the query option specifies that the provenance information must be included in the result to obtain the links to source documents, if any.

The Clinical Data Consumer perform the query   
If necessary, the mobile application, implementing also a MHD Document Consumer, will retrieve the document form the MHD Document Responder by using the related returned document link.

Mobile Query Existing Data  
 Request [PCC-Y]

Message 1

Clinical Data Source /  
MHD Doc. Responder / XDS Doc. Repository

Clinical Data Consumer /  
MHD Document Consumer

Actor A

Mobile Query Existing Data  
Response [PCC-Y]

Adding Provenance Information

Retrieve Document   
 Request [ITI-68]

Message 1

Retrieve Document

Response [ITI-68]

Figure X.4.2.2-1: Use Case #2 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.

**ITI PDLS – Consistency of Clinical Content**

A Clinical Data Source Actor may be grouped with a Data Element Provenance Recorder Actor which requires to add the necessary provenance information to each returned data element.

This grouping ensures the necessary consistency to the returned information, by allowing the addition of the all references to data origins (e.g.: Documents) used in generating the result, if any.

A Clinical Data Consumer Actor may be grouped with a Data Element Provenance Consumer Actor to provide it the identifiers (provenance information) that consistently link the returned data elements to the related data origin, if any. In order to do that it shall parse the provenance information part of the query response, when present.

**PCC RECON - Reconciliation of Clinical Content**

A Clinical Data Source Actor may be grouped with a Reconciliation Agent Actor when it's necessary to provide reconciled clinical data gathered from multiple data sources.

A Clinical Data Consumer Actor may be grouped with a Reconciliation Agent Actor to provide reconciled clinical data after having gathered contents by querying multiple Clinical Data Sources.

**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 may include references to all documents used in generating the results, by using the FHIR Provenance Resource.

**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

Add section 3.Y

## 3.Y Mobile Query Existing Data [PCC-Y]

This section corresponds to Transaction PCC-Y of the IHE PCC Technical Framework. Transaction PCC-Y is used by the Clinical Data Consumer and Clinical Data Source Actors

### 3.Y.1 Scope

The Mobile Query Existing Data transaction is used to query for clinical fine grained data elements that satisfy a set of parameters by using the FHIR framework. It is functionally equivalent to the Query Existing Data [PCC-2] transaction. The result of the query is a FHIR Bundle containing FHIR clinical data Resources that match the query parameters.

### 3.Y.2 Actor Roles

Clinical Data Consumer

Clinical Data Source

Actor DEF

Figure 3.Y.2-1: Use Case Diagram

Table 3.Y.2-1: Actor Roles

|  |  |
| --- | --- |
| **Actor:** | Clinical Data Consumer |
| **Role:** | Queries for clinical data content, matching the supplied set of options, the Clinical Data Source. |
| **Actor:** | Clinical Data Source |
| **Role:** | Responds to query, supplying the FHIR Resources representing the clinical data content that match the search criteria provided by the Clinical Data Consumer. |

### 3.Y.3 Referenced Standards

|  |  |
| --- | --- |
| HL7 FHIR | HL7® FHIR® standard STU3: <http://www.hl7.org/fhir/STU3/index.html> |
| IETF RFC 2616 | Hypertext Transfer Protocol – HTTP/1.1 |
| IETF RFC 7540 | Hypertext Transfer Protocol – HTTP/2 |
| IETF RFC 3986 | Uniform Resource Identifier (URI): Generic Syntax |
| IETF RFC 4627 | The application/json Media Type for JavaScript Object Notation (JSON) |
| IETF RFC 6585 | Additional HTTP Status Codes |

### 3.Y.4 Interaction Diagram

Mobile Query Existing Data

Request

Clinical Data Source

Actor D

Clinical Data Consumer

Actor A

Mobile Query Existing Data

Response

Message 1

#### 3.Y.4.1 Mobile Query Existing Data Request message

This message uses the HTTP GET method parameterized query to obtain the FHIR Resources, representing the searched clinical data content, from the Clinical Data Source.

##### 3.Y.4.1.1 Trigger Events

When the Clinical Data Consumer needs to discover clinical data Resources matching various search parameters it issues a Mobile Query Existing Data Request message.

##### 3.Y.4.1.2 Message Semantics

The Clinical Data Consumer executes an HTTP GET against the proper Clinical Data Source’s QEDm URL.

The search target follows the FHIR http specification (<http://hl7.org/fhir/STU3/http.html>), addressing the proper FHIR Resource, according to the supported query options:

[base]/<Resource>?<query>

This URL is configurable by the Clinical Data Source and is subject to the following constraints.

* The <query> represents a series of encoded name-value pairs representing the filter for the query, as specified in Section 3.Y.4.1.2.1, as well as control parameters to modify the behavior of the Clinical Data Source such as response format, or pagination.

###### 3.Y.4.1.2.1 Query Search Parameters

The message supports specification of the data items listed in the table below as query parameters. The first column of this table provides the name of the parameter. The next column indicates the number of times it may occur in the query. The last two columns indicate whether the Clinical Data Consumer must send this parameter and whether the Clinical Data Source must support this parameter.

A Clinical Data Consumer may supply parameters other than those required by this profile, but must appropriately handle any detected issue alert raised by the Clinical Data Source in its response.

See QED parameters from [PCC-2]

QED Supplement Table 3.2-1: Query Parameters for [PCC-2]

| Parameter Name | Cardinality | Clinical Data Consumer | Clinical Data Source |
| --- | --- | --- | --- |
| [careProvisionCode](" \l "careProvisionCode" \o ") | 0..1 | O | R |
| [careProvisionReason](#careProvisionReason) | 0..\* | O | O |
| [careRecordTimePeriod](#careRecordTimePeriod) | 0..1 | O | R |
| [clinicalStatementTimePeriod](#clinicalStatementTimePeriod) | 0..1 | O | R |
| [includeCarePlanAttachment](#includeCarePlanAttachment) | 0..1 | R | R |
| [maximumHistoryStatements](#maximumHistoryStatements) | 0..1 | O | R |
| [patientAdministrativeGender](#patientAdministrativeGender) | 0..1 | O | R |
| [patientBirthTime](#patientBirthTime) | 0..1 | O | R |
| [patientId](#patientId) | 1..1 | R | R |
| [patientName](#patientName) | 0..1 | O | R |

A Clinical Data Consumer may supply parameters other than those required by this profile, but must appropriately handle any detected issue alert raised by the Clinical Data Source in its response.

This <careProvisionCode> may be present. This element describes the information that is being looked for in the <value> element. When the <careProvisionCode> element is not present, it indicates that all relevant results are to be reported up to the maximum number specified in *maximumHistoryStatements* for each result.

A Clinical Data Consumer can restrict the results returned in the query by setting the value attribute of <value> element in the <careProvisionCode> element to a code identifying the clinical data to be returned. A Clinical Data Source can use the codes specified in the sections below to obtain different kinds of clinical data.

A Clinical Data Consumer implementing one of the options for that actor shall be able to issue a query using at least one of the codes listed for that option as specified in the table below. A Clinical Data Source implementing one of these options must support all codes listed in the table below for that option.

|  |  |  |  |
| --- | --- | --- | --- |
| Actor Option | Code | Returns | Resource (Data Element) |
| Vital Signs Option | COBSCAT | All Vital Signs | Vital Signs Observation |
| Any Code from the Vital Signs Table below | The vital sign identified by the code | Vital Signs Observation |
| Problems and Allergies Option | MEDCCAT | All problem entries | Problem Entry |
| CONDLIST | All Concern Entries | Concern Entry |
| PROBLIST | All Problem Concerns | Problem Concern |
| INTOLIST | All Allergy Concerns | Allergy and Intolerance Concern |
| RISKLIST | All Risks | Concern Entry |
| Diagnostic Results Option | LABCAT | All Lab Results | Simple Observations |
| DICAT | All Imaging Results | Simple Observations |
| Medications Option | RXCAT | All Medications | Medications |
| MEDLIST | All Medications | Medications |
| CURMEDLIST | All active medications | Medications |
| DISCHMEDLIST | Discharge Medications | Medications |
| HISTMEDLIST | All Historical Medications | Medications |
| Immunizations Option | IMMUCAT | All Immunizations | Immunizations |
| Professional Services Option | PSVCCAT | All professional service entries | Encounters  Procedures Entry |

A Clinical Data Consumer Actor may make requests using other codes not specified above to obtain other clinical data, but these are not guaranteed to be supported by the Clinical Data Source Actor.

##### 3.Y.4.1.3 Expected Actions

The Clinical Data Source shall process the query to discover the clinical data FHIR Resource entries (the fine-grained data elements) that match the search parameters given and shall use a FHIR Bundle resource to collect the matching entries to be returned.

When the Provenance option is specified, the response Bundle shall contain also FHIR Provenance Resource entries that grants consistency of the returned fine-grained data elements with the coarse-grained data origin (e.g.: Document), if any.

#### 3.Y.4.2 Mobile Query Existing Data Response message

The Clinical Data Source Actor returns a HTTP Status code appropriate to the processing as well as a list of the matching clinical data FHIR Resources.

##### 3.Y.4.2.1 Trigger Events

The Clinical Data Source Actor completed processing of the Mobile Query Existing Data message.

##### 3.Y.4.2.2 Message Semantics

Based on the query results, the Clinical Data Source Actor will either return an error or success. Guidance on handling Access Denied related to use of 200, 403 and 404 can be found in ITI TF-2x: Appendix Z.7 (reproduced here for readability).

When the Clinical Data Source Actor needs to report an error, it shall use HTTP error response codes and should include a FHIR OperationOutcome with more details on the failure. See FHIR <http://hl7.org/fhir/STU3/http.html> and <http://hl7.org/fhir/STU3/operationoutcome.html>

If the Mobile Query Existing Data message is processed successfully, whether or not clinical data Resources are found, the HTTP status code shall be 200.   
The Mobile Query Existing Data Response message shall be a Bundle Resource containing zero or more clinical data Resources plus eventual Provenance Resources. If the Clinical Data Source is sending warnings, the Bundle Resource shall also contain an OperationOutcome Resource that contains those warnings.

The response shall adhere to the FHIR Bundle constraints specified in ITI TF-2x: Appendix Z.1.

###### 3.Y.4.2.2.1 Resource Specific Contents

**Provenance Resource**

<TBD>

**DocumentReference Resource**

The DocumentReference Resource is defined in the FHIR specification <http://hl7.org/fhir/STU3/documentreference.html>

See ITI TF-3: 5.4.1.1 for the IHE restrictions on DocumentReference Resource and for a mapping from IHE Document Sharing Profiles (e.g., XDS) to FHIR.

###### 3.Y.4.2.2.2 Resource Bundling

Resource Bundling shall comply with the guidelines in ITI TF-2x: Appendix Z.1.

The Clinical Data Source shall include any resources referenced by the metadata listed in Table 3.Y.4.2.2.1-1 as a contained resource. This means that references to these resources shall point to resource data contained in the bundle as entries.

3.Y.4.2.2.2.1 Document location

The Clinical Data Source shall place into the DocumentReference.content.attachment.url element a URI that can be used by the Clinical Data Consumer wen grouped with a Document Consumer to retrieve the document using the Retrieve Document [ITI-68] transaction or a Retrieve Document Set [ITI-43]. IHE does not specify the format of the URL.

Note to implementer: The Clinical Data Source might encode into the URL all the necessary parameters the Document Consumer would need to perform a Retrieve Document Set [ITI-43] transaction. The Clinical Data Source might maintain a cache of parameters and encode the URL with simply unique identifiers. The URL is completely in the control of the Clinical Data Source, so it is up to that implementation to assure that when the Document Consumer executes the URL, the document content can be returned to the Document Consumer.

##### 3.67.4.2.3 Expected Actions

The Clinical Data Consumer the shall process the results according to application-defined rules. The Clinical Data Consumer grouped with the Document Consumer should be robust as the response may contain DocumentReference Resources that match the query parameters but are not compliant with this transaction on DocumentReference.

If a Clinical Data Consumer cannot automatically recover from an error condition, it should, at a minimum, display the error to the user.

### 3.Y.5 Security Considerations

The retrieved content contains PHI that SHALL be protected.  
See the general Security Considerations in PCC TF-1: Y.5

#### 3.Y.5.1 Security Audit Considerations

The security audit criteria are similar to those for the Query Existing Data [PCC-2] transaction. Grouping a Clinical Data Consumer or Clinical Data Source with an ATNA Secure Node or Secure Application is recommended, but not mandated. The Clinical Data Consumer may be considered overburdened to fully implement the requirements of Secure Node or Secure Application. The Clinical Data Source is more full featured and should generate the audit message.

Both actors should generate a ”Query” AuditEvent, which is consistent with ATNA, such that:

* All required AuditEvent content is provided
* AuditEvent.type = ”Query”
* AuditEvent.action = ”Execute”
* AuditEvent.object.query 🡪 contains the encoding of the query

##### 3.Y.5.1.1 Clinical Data Consumer Specific Security Considerations

The Clinical Data Consumer SHALL create an additional “Import” AuditEvent when data are imported, such that:

* All required AuditEvent content is provided
* AuditEvent.type = “Import”
* AuditEvent.object.identifiers 🡪 contains the list of imported item identifiers

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*<add specifications about the Provenance content in order to grants consistency between the returned fine-grained data elements and their data origin (e.g.: Documents), if any>*

1. HL7 is the registered trademark of Health Level Seven International [↑](#footnote-ref-1)
2. Available on the web at <http://hl7.org/fhir/STU3/overview.html> [↑](#footnote-ref-2)
3. Available on the web at <http://hl7.org/fhir/STU3/resourcelist.html> [↑](#footnote-ref-3)
4. Available on the web at <http://www.hl7.org/implement/standards/fhir/profile.html> [↑](#footnote-ref-4)