

Integrating the Healthcare Enterprise



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**IHE IT Infrastructure
Technical Framework Supplement**

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**Patient Demographics Query for Mobile
(PDQm)**

HL7[®] FHIR[®] STU 3

Using Resources at FMM Level 5

15

Rev. 1.4 – Trial Implementation

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Please verify you have the most recent version of this document. See [here](#) for Trial Implementation and Final Text versions and [here](#) for Public Comment versions.

Foreword

30 This is a supplement to the IHE IT Infrastructure Technical Framework V14.0. 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 21, 2017 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
35 Technical Framework. Comments are invited and can be submitted at http://www.ihe.net/ITI_Public_Comments.

This supplement describes changes to the existing technical framework documents.

“Boxed” instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume.

40

<i>Amend Section X.X by the following:</i>
--

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.

45

General information about IHE can be found at <http://ihe.net>.

Information about the IHE IT Infrastructure domain can be found at 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 and <http://ihe.net/Profiles>.

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

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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 PDQm Profile uses the emerging HL7^{®1} FHIR^{®2} specification. The FHIR release profiled in this supplement is STU 3. HL7 describes the STU (Standard for Trial Use) 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 STU 3 content, such as Resources or ValueSets, used in this profile, and their FMM levels are:

FHIR Resource Name	FMM Level
Patient	5
OperationOutcome	5
Bundle	5

135

The Patient Demographics Query for Mobile (PDQm) Profile defines a lightweight RESTful interface to a patient demographics supplier leveraging technologies readily available to mobile applications and lightweight browser based applications.

140

The functionality is identical to the PDQ Profile described in the ITI TF-1:8. The differences are transport and messaging format of messages and queries. The profile leverages HTTP transport,

¹ HL7 is the registered trademark of Health Level Seven International.

² FHIR is the registered trademark of Health Level Seven International.

and the JavaScript Object Notation (JSON), Simple-XML, and Representational State Transfer (REST). The payload format is defined by the HL7 FHIR draft standard.

Using these patterns, the PDQm Profile exposes the functionality of a patient demographics supplier to mobile applications and lightweight browser applications.

145 The following list provides a few examples of how PDQm might be leveraged by implementers:

- A health portal securely exposing demographics data to browser based plugins
- Medical devices which need to access patient demographic information
- Mobile devices used by physicians (example bedside eCharts) which need to establish patient context by scanning a bracelet

150 • Web based EHR/EMR applications which wish to provide dynamic updates of patient demographic information such as a non-postback search, additional demographic detail, etc.

- Any low resource application which exposes patient demographic search functionality

155 • Any application using the MHD Profile to access documents may use PDQm to find an appropriate patient identifier

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 PDQ and PDQv3 Profiles.

160 Currently the HL7 FHIR standard is in “Standard for Test Use” (STU) and may experience a large amount of change during this phase. Readers are advised that, while the profiled components in this supplement may not accurately reflect the most recent version of the FHIR standard, implementations of PDQm will be tested as specified in this supplement. Changes to the FHIR STU will be integrated into this supplement via the formal IHE Change Proposal (CP) process.

165

Open Issues and Questions

- PDQm_100: Currently no way to query on mothersMaidenName. This may become a new capability as FHIR matures. The mothersMaidenName is an element carried in the Resource.

170 Closed Issues

- PDQm_002: Should Patient Visit Query be included in scope? Being a RESTful transaction, wouldn't a visit be considered a separate resource? Would we want to include this in scope for this work item?
 - Exclude until asked to include. Perhaps as a different profile.

175 **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

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

Transaction	Definition
Mobile Patient Demographics Query [ITI-78]	Performs a query against a patient demographics supplier using HTTP, REST, and JSON/XML message encoding.

Glossary

No additions to the Glossary.

185

Volume 1 – Profiles

Copyright Licenses

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

190 The HL7 FHIR standard License can be found at <http://hl7.org/fhir/STU3/license.html>.

Add the following section as 8.6

8.6 PDQ Cross Profile Considerations

195 **There are two additional profiles: PDQv3 (Patient Demographics Query HL7v3) and PDQm (Patient Demographics Query for Mobile), which provide similar functionality to Patient Demographics Query. These profiles adapt the Patient Demographics Query transaction of the Patient Demographics Supplier and Patient Demographics Consumer Actors for HL7v3 and HL7 FHIR standard. ITI TF-2x: Appendix M.4 provides additional details about these Patient Demographics Query Profiles and their relationship with one another.**

200

Add the following section as 24.6

24.6 PDQv3 Cross Profile Considerations

205 **There are two additional profiles: PDQ (Patient Demographics Query) and PDQm (Patient Demographics Query for Mobile), which provide similar functionality to Patient Demographics Query. These profiles adapt the Patient Demographics Query transaction of the Patient Demographics Supplier and Patient Demographics Consumer Actors for HL7v2 and HL7 FHIR standard. ITI TF-2x: Appendix M.4 provides additional details about these Patient Demographics Query Profiles and their relationship with one another.**

210 *Add new Section 38*

38 PDQm –Patient Demographics Query for Mobile

The Patient Demographics for Mobile (PDQm) Profile provides a transaction for mobile and lightweight browser based applications to query a patient demographics supplier for a list of patients based on user-defined search criteria and retrieve a patient’s demographic information.

215 This profile provides a lightweight alternative to PDQ Patient Demographics Query [ITI-21] or PDQV3 Patient Demographics Query V3 [ITI-47].

38.1 PDQm Actors, Transactions, and Content Modules

220 Figure 38.1-1 shows the actors directly involved in the Patient Demographics Query for Mobile Profile and the relevant transactions between them. Note that the actors in this profile are the same as the actors defined in the PDQ Profile (ITI TF-1: 8.1).

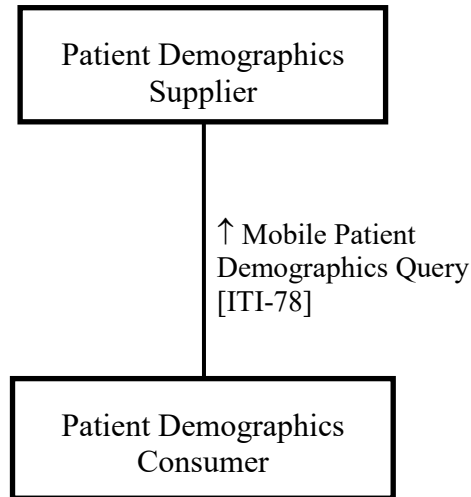


Figure 38.1-1: PDQm Actor Diagram

225 Table 38.1-1 lists the transactions for each actor directly involved in the Patient Demographics Query for Mobile Profile. To claim compliance with this profile, an actor shall support all required transactions (labeled “R”).

Table 38.1-1: PDQm Profile - Actors and Transactions

Actors	Transactions	Optionality	Reference
Patient Demographics Supplier	Mobile Patient Demographics Query	R	ITI TF-2c: 3.78
Patient Demographics Consumer	Mobile Patient Demographics Query	R	ITI TF-2c: 3.78

230 The transaction defined in this profile corresponds to Patient Demographics Query [ITI-21] in the PDQ Profile (ITI TF-1: 8) and provides similar functionality. Note that there is no transaction which corresponds to the Patient Demographics and Visit Query.

38.1.1 Actor Descriptions and Actor Profile Requirements

No additional requirements.

235 38.2 PDQm Actor Options

Options that may be selected for each actor in this profile, if any, are listed in Table 38.2-1. Dependencies between options when applicable are specified in notes.

Table 38.2-1: Patient Demographics Query for Mobile - Actors and Options

Actor	Option Name	Reference
Patient Demographics Consumer	Pediatric Demographics Option	ITI TF-1:38.2.1

240 38.2.1 Pediatric Demographics Option

The experience of immunization registries and other public health population databases has shown that retrieving patient records for an individual person in environments with large proportions of pediatric records requires additional demographic data.

245 Information about the mother of the patient or a household telephone number is helpful in retrieving records in large population databases where data quality may be uneven.

Certain other demographics fields are important to include in the query response as they may be used by the Patient Demographics Consumer in verifying the identity of the patient; in particular, they aid in distinguishing records for twins, triplets, and so forth.

250 Pediatric Demographics makes use of the following six additional demographic fields to aid record matching in databases with many pediatric records.

Field	Reason for Inclusion	Value
Mother's Maiden Name	Any information about the mother is helpful in making a match	Helps create true positive matches
Patient Home Telephone	A telecom helps match into the right household	Helps create true positive matches
Patient Multiple Birth Indicator	Indicates this person is a multiple – twin, triplet, etc.	Helps avoid false positive matches of multiples
Patient Birth Order	Distinguishes among those multiples.	Helps avoid false positive matches of multiples
Last Update Date/Time, Last Update Facility	These fields, although not strictly demographic, can effectively substitute when multiple birth indicator and birth order are not collected. They indirectly provide visit information. Provider visits on the same day may likely indicate two children brought to a doctor together.	Helps avoid false positive matches of multiples

255 Patient Demographics Consumers which support the Pediatric Demographics Option shall be able to provide the below listed Pediatric Demographics query parameter fields in the Patient Demographics Query transaction [ITI-78], and shall be able to receive and process any values returned for the fields identified as Pediatric Demographics.

Pediatric Demographics query parameter fields are:

- Mother’s Maiden Name
- Patient Home Telephone

Pediatric Demographics fields are defined as all of the following:

- 260
- Mother’s Maiden Name
 - Patient Home Telephone
 - Patient Multiple Birth Indicator
 - Patient Birth Order
 - Last Update Date/Time
- 265
- Last Update Facility

38.3 PDQm 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).

270 Section 38.5 describes some optional groupings that may be of interest for security considerations and Section 38.6 describes some optional groupings in other related profiles.

Table 38.3-1: Patient Demographics Query for Mobile - Required Actor Groupings

PDQm Actor	Actor to be grouped with	Reference	Content Bindings Reference
Patient Demographics Supplier	None		
Patient Demographics Consumer	None		

38.4 PDQm Overview

275 38.4.1 Concepts

The PDQm Profile supports all of the use cases of PDQ while keeping the technology as lightweight as possible. Example uses include:

- Mobile devices used by physicians (for example: a mobile app for electronic patient charts) which need to establish patient context by scanning a bracelet,
- 280 • Web based EHR/EMR applications which wish to provide dynamic updates of patient demographic information such as a non-postback search, additional demographic detail, etc.
- A document source/consumer wishing to perform an operation in the IHE Mobile access to Health Documents (MHD) Profile, where patient ID in the appropriate patient ID domain needs to be resolved by the source/consumer,
- 285 • A health portal securely exposing demographics data to browser based plugins,
- Medical devices which need to access patient demographic information.

Each of these specific use cases is generalized into two general use cases. The first is one where a system must obtain patient demographics to populate a user interface via a known demographic field (such as bracelet ID) or search parameters provided by a user. The second is as a prerequisite step whereby an application must obtain an identifier from another patient ID domain in order to complete another workflow.

290

This profile is applicable for use by any application which requires access to patient demographics where lightweight REST/JSON or REST/XML is a more suitable technology than traditional PDQ or PDQv3 Profiles.

295

38.4.2 Use Cases

38.4.2.1 Use Case #1: Patient Information Entering at Bedside

In this use case an admitted patient is assigned a bed, and may not be able to provide positive ID information. The nurse uses the PDQm Profile to establish patient context.

300 38.4.2.1.1 Patient Information Entering at Bedside Use Case Description

An admitted patient is assigned to a bed. The patient may or may not be able to provide positive ID information. The nurse needs to enter patient identity information into some bedside equipment to establish the relationship of the assigned bed to the patient. The equipment issues a query for a patient pick list to a patient demographics supplier that provides data for a patient pick list. Search criteria entered by the nurse might include one or more of the following:

305

- Partial or complete patient name (printed on the patient record or told by the patient)
- Patient ID (this may be obtained from printed barcode, a bed-side chart, etc.)
- Patient ID entry or scan.
- Date of birth / age range

310 The system returns a list of patients showing Patient ID, full name, age, sex and displays the list to the nurse. The nurse then selects the appropriate record to enter the patient identity information into the bedside equipment application.

38.4.2.2 Use Case #2: Patient Identity Information Entering in Physician Offices

315 In this use case a patient visits a physician for the first time. The physician system will use the PDQm Profile to import demographics information into the local application.

38.4.2.2.1 Patient Identity Information Entering in Physician Offices Use Case Description

320 A patient visits a physician office for the first time. The nurse needs to register the patient; in doing so, it is desired to record the patient's demographic data in the practice management information system (PMIS). The physician office is connected to a hospital enterprise's central patient registry. The nurse issues a patient query request to the central patient registry acting as a Patient Demographics Supplier, with some basic patient demographics data as search criteria. In the returned patient list, she picks an appropriate record for the patient, including the hospital's Patient ID, to enter into the PMIS. (Note the PMIS uses a different Patient ID domain than that of the central patient registry.)

38.4.2.3 Use Case #3: Patient Demographics Query in an Enterprise with Multiple Patient ID Domains

In this use case a lab system obtains identities from multiple Patient ID domains for the purpose of reporting results.

38.4.2.3.1 Patient Demographics Query in an Enterprise with Multiple Patient ID Domains Use Case Description

335 A lab technician enters some basic demographics data (e.g., patient name) into a lab application to query a patient demographics supplier to identify a patient for his lab exams. As the application also needs the patient identifier in another Patient ID Domain in the enterprise for results delivery, the application is configured to query for Patient IDs from other domains in the query response.

38.4.3 Basic Process Flow in Patient Demographics Query for Mobile Profile

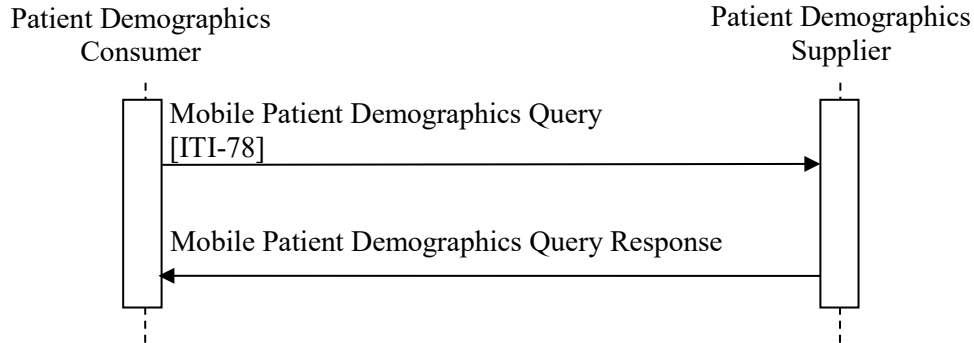


Figure 38.4.3-1: Basic Process Flow in PDQm Profile

340 38.5 PDQm Security Considerations

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

38.6 PDQm Cross Profile Considerations

When the Patient Demographics Supplier is grouped with actors in other IHE profiles that perform patient information reconciliation activities (e.g., the ADT Actor in the IHE Radiology Scheduled Workflow.b Profile), the Patient Demographics Supplier may use the updated information to respond to PDQm Queries. In addition the Patient Demographics Query for Mobile Profile may play an integral workflow role in conjunction with other IHE profiles.

Those systems that manage patient demographics could implement the Patient Demographics Supplier in all three profiles: PDQ, PDQv3, and PDQm. In this way the Patient Demographics Consumer can choose the technology stack that best fits. ITI TF-2x: Appendix M.4 provides additional details about Patient Demographics Query Profiles and their relationship with one another.

The Patient Demographics Supplier may act as a proxy to an existing PDQ or PDQv3 environment as shown in Figures 38.6-1 and 38.6-2.

355

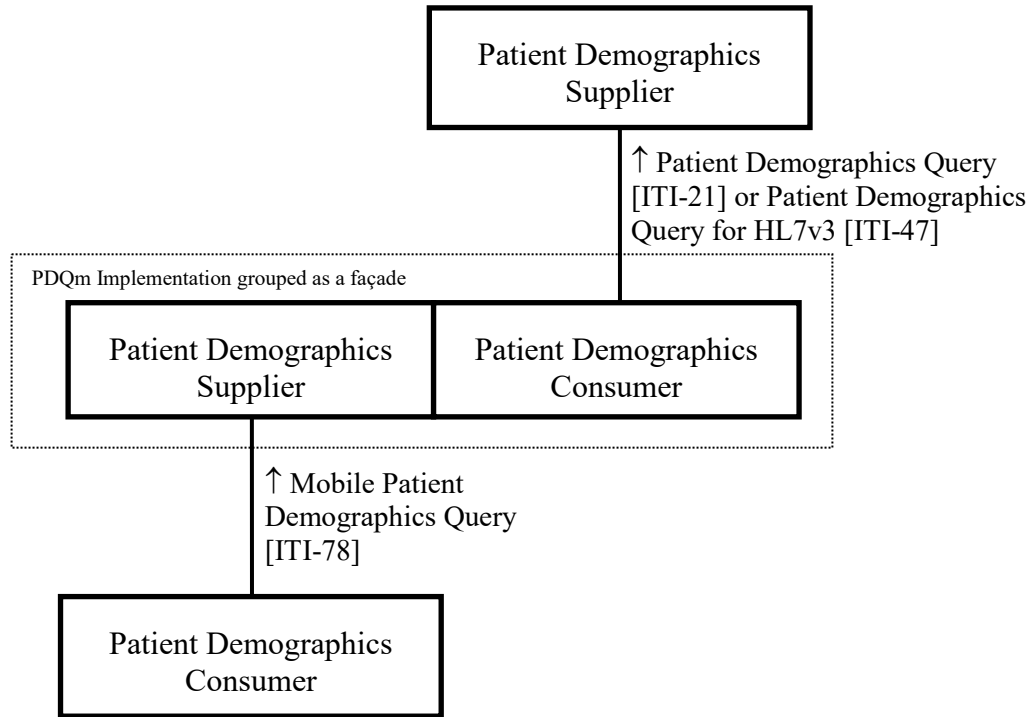


Figure 38.6-1: Implementing PDQm as a gateway

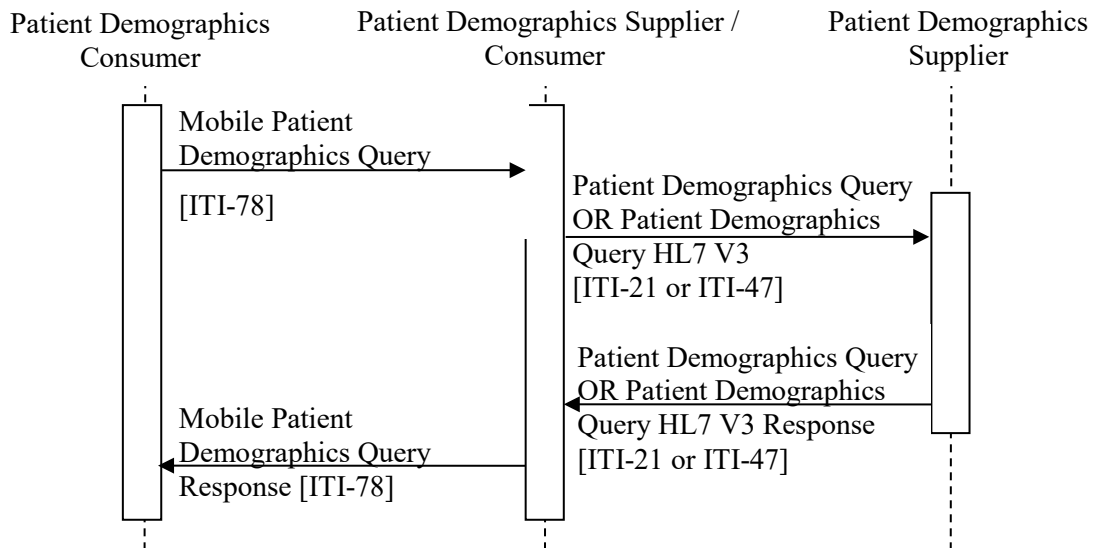


Figure 38.6-2: Sample PDQm gateway process flow

Volume 2 – Transactions

Add Section 3.78

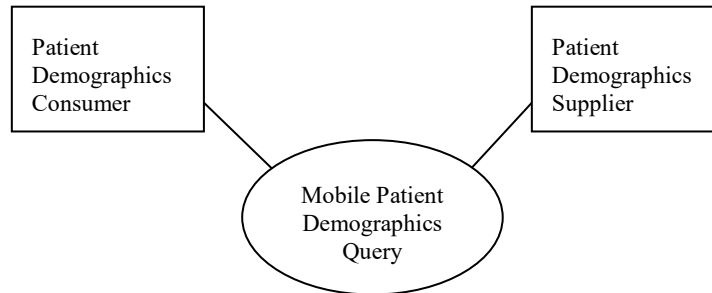
3.78 Mobile Patient Demographics Query [ITI-78]

365 This section corresponds to Transaction ITI-78 of the IHE IT Infrastructure Technical Framework. Transaction ITI-78 is used by the Patient Demographics Consumer and Patient Demographics Supplier Actors.

3.78.1 Scope

370 This transaction is used by the Patient Demographics Consumer to solicit information about patients whose demographics data match data provided in the query parameters on the request message. The request is received by the Patient Demographics Supplier. The Patient Demographics Supplier processes the request and returns a response in the form of demographics information for the matching patients.

3.78.2 Actor Roles



375

Figure 3.78.2-1: Use Case Diagram

Table 3.78.2-1: Actor Roles

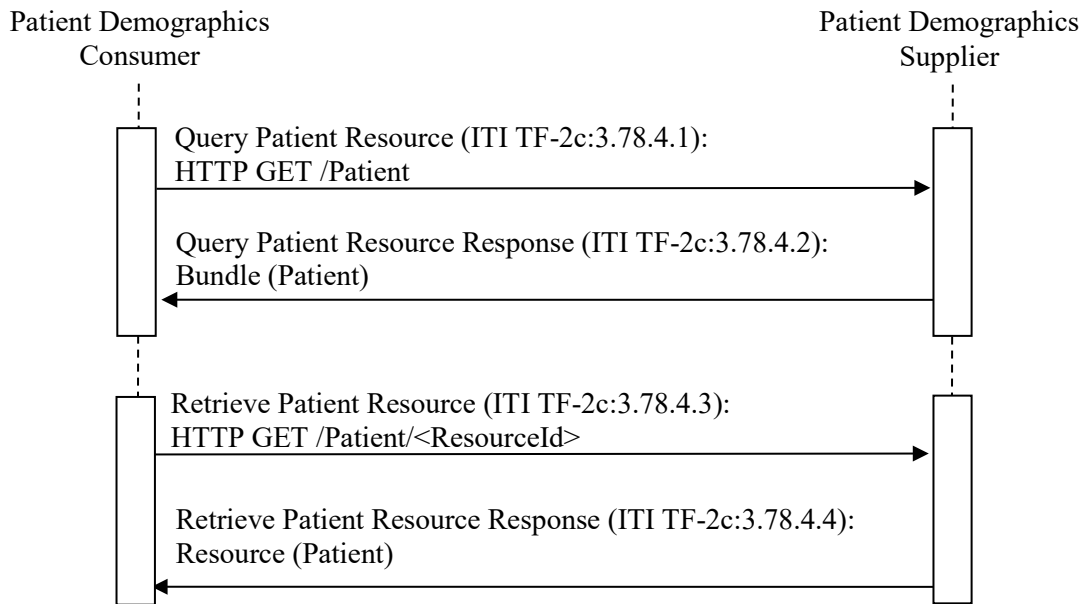
Actor:	Patient Demographics Consumer
Role:	Requests a list of patients matching the supplied set of demographics criteria (example: ID or Name) from the Patient Demographics Supplier. The Patient Demographics Consumer populates its attributes with demographic information received from the Patient Demographics Supplier.
Actor:	Patient Demographics Supplier
Role:	Returns demographic information for all patients matching the demographics criteria provided by the Patient Demographics Consumer.

3.78.3 Referenced Standards

HL7 FHIR	HL7 FHIR standard STU3 http://hl7.org/fhir/STU3/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

380

3.78.4 Interaction Diagram



3.78.4.1 Query Patient Resource message

385 This message represents an HTTP GET parameterized query from the Patient Demographics Consumer to the Patient Demographics Supplier.

3.78.4.1.1 Trigger Events

When a Patient Demographics Consumer needs to select a patient based on demographic information about patients whose information matches a minimal set of known data, it issues a Query Patient Resource.

390 **3.78.4.1.2 Message Semantics**

The Query Patient Resource is conducted by the Patient Demographics Consumer by executing an HTTP GET against the Patient Demographics Supplier’s Patient Resource URL.

The search target follows the FHIR http specification, addressing the Patient Resource type <http://hl7.org/fhir/STU3/http.html>:

395

```
GET [base]/Patient?<query>
```

This URL is configurable by the Patient Demographics Supplier and is subject to the following constraints.

400 The <query> represents a series of encoded name-value pairs representing the filter for the query specified in Section 3.78.4.1.2.1, as well as control parameters to modify the behavior of the Patient Demographics Supplier such as response format, or pagination.

3.78.4.1.2.1 Query Search Parameters

405 The Patient Demographics Consumer may supply and the Patient Demographics Supplier shall be capable of processing all query parameters listed below. All query parameter values shall be appropriately encoded per RFC3986 “percent” encoding rules. Note that percent encoding does restrict the character set to a subset of ASCII characters which is used for encoding all other characters used in the URL.

410 Patient Demographics Suppliers may choose to support additional query parameters beyond the subset listed below. Any additional query parameters supported shall be supported according to the core FHIR specification. Such additional parameters are considered out of scope for this transaction. Any additional parameters not supported should be ignored, See <http://hl7.org/fhir/STU3/search.html#errors>.

`_id`

415 This parameter of type `string`, when supplied, represents the resource identifier for the Patient Resource being queried. See ITI TF-2x: Appendix Z.2.3 for use of the `string` data type. Note: A search using `_id` is always an exact match search.

`active`

This parameter of type `token`, when supplied, specifies the active state. The active state indicates whether the patient record is active. Note: use `active=true`

420

`identifier`

This repeating parameter of type `token`, when supplied, specifies an identifier associated with the patient whose information is being queried (e.g., a local identifier, account identifier, etc.). See ITI TF-2x: Appendix Z.2.2 for use of the `token` data type.

425 If multiple instances of this parameter are provided in the query, the query represents a logical AND condition (i.e., all of the associated identifiers must match). For example, a

query searching for patients having identifier145 assigned by authority “1.2.3.4” and SSN 123456789 would be represented as:

```
?identifier=urn:oid:1.2.3.4|145&identifier=urn:oid:2.16.840.1.113883.4.1|123456789
```

- 430 If no `system` portion of the identifier parameter is specified, then the matching would be performed on any identifier regardless of issuing system. The identifier specified in this parameter is expressed using the `token` search parameter type. Please see ITI TF-2x: Appendix Z.2.2 for use of the `token` data type for patient identifiers.

`family` and `given`

- 435 These parameters of type `string`, when supplied, specify the name of the person whose information is being queried. For this parameter the Patient Demographics Consumer may use either family name, given name or a combination of both names to filter by family, given or family and given names respectively. See ITI TF-2x: Appendix Z.2.3 for use of the `string` data type.

- 440 Matching on these parameters is performed on a single name. Repetitions of each of the `family` or `given` parameters are interpreted to mean multiple parts of the same name. For example, a query for John Jacob Jingleheimer Schmidt would be represented as:

```
?family=Schmidt&given=John&given=Jacob&given=Jingleheimer
```

- 445 The specific mechanics of name matching such as phonetic matches, synonyms (i.e., John matches Johnny) or partial name matches are not specified here and may be configured to match site specific rules surrounding partial name matching.

`telecom`

This parameter of type `token`, when supplied, specifies the telecommunications details

`birthdate`

- 450 This parameter of type `date`, when supplied, specifies the birth date and time of the person whose information is being queried.

The Patient Demographics Consumer shall use the date and interval mechanism to indicate a specific date of birth or a date that lies within the range specified by the parameter. See <http://hl7.org/fhir/STU3/search.html#date>

- 455 `address`

This parameter of type `string`, when supplied, specifies one or more address parts associated with the person whose information is being queried. For details on matching rules see ITI TF-2x: Appendix Z.2.3.

`address-city`, `address-country`, `address-postalcode`, `address-state`

- 460 These parameters of type `string`, when supplied, specifies exact match against the specified address part associated with the person whose information is being queried. Note that national conventions for addresses may affect utility of these fields.

gender

465 This parameter of type `token`, when supplied, specifies the administrative gender of the person whose information is being queried. For this parameter item, a single administrative gender code from value set <http://hl7.org/fhir/STU3/valueset-administrative-gender.html> shall be specified as the only value of the token. See ITI TF-2x: Appendix Z.2.2 for use of the `token` data type.

3.78.4.1.2.2 Pediatric Demographics Option

470 Additional notes are available in FHIR on Mother and newborn relationship, see <http://hl7.org/fhir/STU3/patient.html#maternity>

Patient Demographics Suppliers supporting the Pediatric Demographics Option have no special query parameters.

475 Patient Demographics Consumers supporting the Pediatric Demographics Option may use the additional elements returned by the Patient Demographics Suppliers. See ITI TF 1:38.2.1 Pediatric Demographics Option.

3.78.4.1.2.3 Parameter Modifiers

480 Patient Demographics Suppliers shall support the “:exact” parameter modifier on all query parameters of type `string`. When supplied by the Patient Demographics Consumer, the “:exact” parameter modifier instructs the Patient Demographics Supplier that exact matching should be performed.

The Patient Demographics Consumer should not use and Patient Demographics Supplier may ignore any additional parameter modifiers listed in the FHIR standard, which are considered out of scope in the context of this transaction.

485 3.78.4.1.2.4 Populating Which Domains are Returned

The Patient Demographics Consumer may constrain the domains from which patient identifiers are returned from the Patient Demographics Supplier in the resulting bundle. The Patient Demographics Consumer shall convey this by specifying the patient identity domains in the system component of repeating `identifier` parameters using the OR format:

490 `&identifier=urn:oid:1.2.3|,urn:oid:4.5.6|`

For example, a Patient Demographics Consumer wishing to filter for patients with a last name of SMITH having identifiers from an identity domain with OID 1.2.3.4.5 would convey this search as:

`?family=SMITH&identifier=urn:oid:1.2.3.4.5|`

495 The Patient Demographics Consumer shall populate the patient identity domain portion of the token with values described in ITI TF-2x: Appendix E.3.

3.78.4.1.2.5 Populating Expected Response Format

500 The FHIR standard provides encodings for responses as either XML or JSON. Patient Demographics Suppliers shall support both message encodings, whilst Patient Demographics Consumers shall support one and may support both.

See ITI TF-2x: Appendix Z.6 for details.

3.78.4.1.3 Expected Actions

505 The Patient Demographics Supplier shall return demographic records that reflect the match to all of the search criteria provided by the Patient Demographics Consumer. The Patient Demographics Supplier shall respond with a Query Patient Resource Response synchronously (i.e., on the same connection as was used to initiate the request).

510 The handling of phonetic issues, alternate spellings, upper and lower case, partial matching and accented characters, etc. if deemed appropriate shall be supported by the Patient Demographics Supplier rather than by the Patient Demographics Consumer. At minimum, the Patient Demographics Supplier shall return all exact matches to the query parameters sent by the Patient Demographics Consumer; IHE does not further specify matching requirements. If the Patient Demographics Supplier is unable to perform, case insensitive, partial matches, it shall indicate this in its Conformance Resource (see ITI TF-2x: Appendix Z.4).

515 The information provided by the Patient Demographics Supplier to the Patient Demographics Consumer is a list of matching patients from the Patient Demographics Supplier's information source. The mechanics of the matching algorithms used are internal to the Patient Demographics Supplier and are outside the scope of this framework.

520 The Patient Demographics Supplier shall support at least one patient identifier domain and may support multiple identifier domains. Section 3.78.4.1.2.4 describes how the Patient Demographics Consumer may filter results based on identifiers from one or more patient identifier domains. Query responses may return patient identifiers from one or multiple patient identifier domains.

525 If the Patient Demographics Consumer supplied a query parameter, or used a query parameter modifier which the Patient Demographics Supplier is not capable of utilizing, then the Patient Demographics Supplier shall respond with an **HTTP 400** (Bad request) status code and an `OperationOutcome` resource indicating the parameters in error.

See ITI TF-2x: Appendix Z.6 for more details on response format handling. See ITI TF-2x: Appendix Z.7 for handling guidance for Access Denied.

530 The Patient Demographics Supplier shall respond to the query request as described by the following cases with a Query Patient Resource Response message described in Section 3.78.4.2, and shall behave according to the cases listed below:

535 **Case 1:** The Patient Demographics Supplier finds in its information source, at least one patient record matching the criteria sent as HTTP query parameters. No patient identifier domains are requested via the mechanism specified as specified in Section 3.78.4.1.2.4.

HTTP 200 (OK) is returned as the HTTP status code.

A Resource Bundle is returned representing the result set. The Patient Demographics Supplier populates the `total` property of the bundle with the total number of matching results. One `entry` is returned from the Patient Demographics Supplier for each Patient Resource found.

540 **Case 2:** The Patient Demographics Supplier finds at least one patient record matching the criteria sent in the query parameters. One or more patient identifier domains are requested via the mechanism specified in Section 3.78.4.1.2.4, and Patient Demographics Supplier recognizes all domains. **HTTP 200** (OK) is returned as the HTTP status code.

545 The Patient Demographics Supplier performs its matching and returns a bundle as described in Case 1. The Patient Demographics Supplier eliminates identifiers from the result set which do not exist in the list specified per Section 3.78.4.1.2.4 (domains to be returned). If all entries in the list of patient identifiers are eliminated, which would leave the patient identifiers list empty, then the entry shall not be present in the response bundle at all.

550 **Case 3:** The Patient Demographics Supplier fails to find in its information source, any patient record matching the criteria sent as HTTP query parameters.

HTTP 200 (OK) is returned as the HTTP status code.

A Resource Bundle is returned representing the zero result set. The Patient Demographics Supplier populates the `total` with a value of 0 indicating no results were found. No `entry` attributes are provided in the result.

555 **Case 4:** The Patient Demographics Supplier does not recognize one or more of the domains specified per Section 3.78.4.1.2.4.

HTTP 404 (Not Found) 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:

560

Attribute	Value
severity	error
code	{ http://hl7.org/fhir/issue-type , value}
diagnostics	“targetSystem not found”

The `OperationOutcome` Resource may indicate the query parameter used and the domain in error within the `diagnostics` attribute. See FHIR STU3 discussion of search error handling <http://hl7.org/fhir/STU3/search.html#errors>

565 **Case 5:** The Patient Demographics Supplier is not capable of producing a response in the requested format specified by `_format` parameter (specified in Section 3.78.4.1.2.5).

HTTP 406 (Not Acceptable) is returned as the HTTP status code.

An `OperationOutcome` Resource is returned indicating that the requested response format is not supported in an `issue` having:

570

Attribute	Value
severity	error
code	http://hl7.org/fhir/issue-type#not-supported

The Patient Demographics Supplier may be capable of servicing requests for response formats not listed in Section 3.78.4.1.2.5, but shall, at minimum, be capable of producing XML and JSON encodings.

575 The Patient Demographics Supplier may return other HTTP status codes to represent specific error conditions. When HTTP error status codes are returned by the Patient Demographics Supplier, they shall conform to the HTTP standard RFC2616. Their use is not further constrained or specified by this transaction.

3.78.4.2 Query Patient Resource Response message

580 3.78.4.2.1 Trigger Events

The Patient Demographics Supplier found patient demographics matching the query parameters specified by the Patient Demographics Consumer as a result of a Query Patient Resource Request.

3.78.4.2.2 Message Semantics

585 The Query Patient Resource Response is sent from the Patient Demographics Supplier to the Patient Demographics Consumer as a Bundle of Patient Resources. The “content-type” of the response will depend upon the requested response format indicated by the Patient Demographics Consumer.

590 See ITI TF-2x: Appendix Z.6 for more details on response format handling. See ITI TF-2x: Appendix Z.7 for handling guidance for Access Denied.

3.78.4.2.2.1 Patient Resource Definition in the Context of Query Patient Resource Response

595 The components of the Patient Resource with cardinality greater than 0 (as shown below) are required, and the detailed description of the message is provided here. All other attributes of the response are optional.

The Patient Resource contained within the Query Patient Resource Response message is described at <http://hl7.org/fhir/STU3/patient.html> and is not further constrained by this transaction.

3.78.4.2.2.2 Mother's Maiden Name

600 Patient Demographics Suppliers shall include the mother's maiden name, if known, in an extension named mothers MaidenName. See <http://hl7.org/fhir/STU3/extension-patient-mothersmaidenname.html>

3.78.4.2.2.3 Resource Bundling

605 Please see ITI TF-2x: Appendix Z.1 for details on the IHE guidelines for implementing FHIR bundles.

3.78.4.2.2.4 Incremental Response Processing - Paging of Resource Bundle

The Patient Demographics Supplier shall represent these incremental responses as specified FHIR Paging <http://hl7.org/fhir/STU3/http.html#paging>

3.78.4.2.2.5 Quality of Match

610 The Patient Demographics Supplier may convey the quality of each match based on strength of the particular result to the supplied query parameters. The mechanism for determining the confidence of match is considered a product specific feature, and is not specified in this transaction.

615 If the Patient Demographics Supplier wishes to convey the quality of match, it shall represent the confidence of a particular match within the bundle as a `score` attribute. See FHIR Relevance section <http://hl7.org/fhir/STU3/search.html#score>

3.78.4.2.3 Expected Actions

620 The constraints specified in Section 3.78.4.2.2 represent the minimum set of demographics information that must be implemented by a Patient Demographics Supplier. This does not prevent the Patient Demographics Supplier from sending additional FHIR attributes in a response; such as extensions, text, etc. The Patient Demographics Consumer shall ignore additional attributes and extensions if not understood.

The consumer shall process the response in some manner specific to its application function (for example: displaying on a user interface). This application behavior is not specified by IHE.

3.78.4.2.4 Conformance Resource

625 Patient Demographics Suppliers implementing [ITI-78] should provide a Conformance Resource as described in ITI TF-2x: Appendix Z.4 indicating the query operation for the Patient Resource has been implemented and shall include all query parameters implemented for the Patient Resource.

630 **3.78.4.3 Retrieve Patient Resource message**

This message represents an HTTP GET from the Patient Demographics Consumer to the Patient Demographics Supplier and provides a mechanism for retrieving a single Patient Resource with a known resource identifier.

3.78.4.3.1 Trigger Events

635 When the Patient Demographics Consumer possesses a Patient Resource’s identifier (either through query, database lookup, or other mechanism) for which it requires additional or new information, it issues a Retrieve Patient Resource operation.

3.78.4.3.2 Message Semantics

640 The Retrieve Patient Resource is conducted by executing an HTTP GET against the Patient Demographics Supplier’s Patient Resource URL, providing the resource id of the patient being retrieved. The target is formatted as:

```
GET [base]/Patient/[resourceId]
```

The Patient Demographics Supplier shall respond to this query by sending a single Patient Resource instance. The specification for [base] is identified in ITI TF-2c: 3.78.4.1.2.

645 The resource identifier included in the request always represents the unique identifier for the Resource within the scope of the URL. For example, while `http://example1.org/ihe/Patient/1` `http://example2.com/ihe/Patient/1` both contain the same [resourceId], they reference two different resource instances.

650 Note: The use of "http" or "https" in URL does not override requirements to use TLS for security purposes.

3.78.4.3.3 Expected Actions

655 The Patient Demographics Supplier shall retrieve the demographic record indicated by the Resource identifier on the HTTP GET supplied by the Patient Demographics Consumer. The Patient Demographics Supplier shall respond to the retrieve request as described by the following cases:

Case 1: The Patient Demographics Supplier finds in its information source the patient demographics record matching the `resourceId` sent in the HTTP request.

HTTP 200 (OK) is returned as the HTTP status code.

A Patient Resource is returned representing the result.

660 **Case 2:** The Patient Demographics Supplier fails to find in its information source the patient demographics record matching the `resourceId` sent in the HTTP request.

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

An `OperationOutcome` Resource is returned indicating that the Patient Resource could not be found:

665

Attribute	Value
severity	error
type	{http://hl7.org/fhir/vs/issue-type}not-found

670

The Patient Demographics Supplier may return other HTTP status codes to represent specific error conditions. When HTTP error status codes are returned by the Patient Demographics Supplier, they shall conform to the HTTP standard RFC2616. Their use is not further constrained or specified by this transaction.

3.78.4.4 Retrieve Patient Resource Response message

The Patient Demographics Supplier's response to a successful Retrieve Patient Resource message shall be an **HTTP 200** (OK) Status code with a FHIR Patient Resource, or an appropriate error code as defined in Section 3.78.4.2.2.1.

675

3.78.4.4.1 Trigger Events

The Patient Demographics Supplier found patient demographic record matching the Resource identifier specified by the Patient Demographics Consumer.

3.78.4.4.2 Message Semantics

680

The Retrieve Patient Resource response is sent from the Patient Demographics Supplier to the Patient Demographics Consumer as a single Patient Resource. See <http://hl7.org/fhir/STU3/patient.html> for details on this resource.

See ITI TF-2x: Appendix Z.6 for more details on response format handling. See ITI TF-2x: Appendix Z.7 for handling guidance for Access Denied.

685

If the Patient Demographics Supplier is unable to produce a response in the requested format, it shall respond with an **HTTP 400** error indicating that it was unable to fulfill the request. The Patient Demographics Supplier may be capable of servicing requests for response formats not listed, but shall, at minimum, be capable of producing XML and JSON encodings.

3.78.4.4.2.1 Patient Resource Definition in the Context of Retrieve Patient Resource Response

690

The Patient Resource definition in the context of a retrieve operation is identical to the constraints placed on the Patient Resource for a search (see Section 3.78.4.2.2.1)

For the complete FHIR definition of this Resource, see <http://hl7.org/fhir/STU3/patient.html>.

3.78.5 Security Considerations

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

695 3.78.5.1 Security Audit Considerations

The Security audit criteria are similar to those for the Patient Demographics Query [ITI-21] as this transaction discloses the same type of patient information. The Mobile Patient Demographics Query is a Query Information event as defined in Table 3.20.4.1.1.1-1. The message shall comply with the requirements in ITI TF-2a: 3.21.5.1 following differences:

- 700 • EventTypeCode = EV(“ITI-78”, “IHE Transactions”, “Mobile Patient Demographics Query”)
- Query Parameters (AuditMessage/ParticipantObjectIdentification)
 - ParticipantObjectIdTypeCode = EV(“ITI-78”, “IHE Transactions”, “Mobile Patient Demographics Query”)
- 705 • ParticipantObjectQuery = Requested URL including query parameters
- ParticipantObjectDetail = HTTP Request Headers contained in the query (e.g., Accept header)

Appendices

Rename appendix M as follows in the Volume 2x Appendices

710 **Appendix M Using Patient Demographics Query in a Multi-Domain Environment**

Appendix M Patient Demographics Query Implementation Guidance

Add the following section to the end of Volume 2x Appendix M:

715 **M.4 Data Elements Patient Demographics Query Profiles**

This section describes the data elements that are used in IHE profiles designed for the querying of patient demographics (Patient Demographics Query Profiles) including PDQ, PDQv3, and PDQm.

720 While the semantic representation of the data elements differs across the transaction in the PDQ Profiles, the common set of elements and query parameters can be described using abstract terminology. This section explains the data elements and query parameters used in PDQ Profiles from an abstract definition standpoint, and then it provides a map between the three profiles' implementation specific concept.

725 Note, more data elements may be known by the Patient Demographics Supplier, and may be returned. Elements beyond those profiled are encouraged but not required of the profile. Patient Demographics Consumer Actors should be robust to receiving more data than is profiled.

M.4.1 Patient Demographics Query Data Fields

Table M.4.1-1 outlines the abstract demographics fields which are common to all Patient Demographics Query Profiles.

730 **Table M.4.1-1: Patient Demographics Data Elements (abstract)**

Field	Purpose
Identifier List	Provides one or more identifiers that can be used to uniquely identify the patient within a medical system.
Name(s)	Identifies the patient's preferred, legal, or alias names.
Date / Time of Birth	Identifies the date on which the patient was born.
Gender	Identifies the patient's gender used for administrative purposes.
Address(es)	Identifies the patient's associated addresses (home, work, etc.)
Telecommunications Address(es)	Identifies the patient's phone number, fax number, email addresses and other means of telecommunicating with the patient.
Language(s) of communication	Identifies languages which can be used when communicating with the patient.

Field	Purpose
Marital Status	Identifies the patient’s marital status at time of last update (married, divorced, etc.)
Non-Medical Identifiers	Identifies additional identifiers associated with the patient which are not used for medical purposes (ex: driver’s license, social insurance number, etc.)
Death Date/Time	Identifies the time at which the patient died.

Table M.4.1-2 provides a mapping between these abstract data elements and their transaction specific fields.

Table M.4.1-2: Patient Demographics Data Elements (concrete)

Abstract Field	PDQ	PDQ HL7v3	PDQm
Identifier List	PID.3 and PID.18	id	identifier
Name(s)	PID.5 and PID.9	name	name
Date / Time of Birth	PID.7	birthTime	birthdate
Gender	PID.8	administrativeGenderCode	gender
Address(es)	PID.11	addr	address
Telecommunications Address(es)	PID.13 and PID.14	telecom	telecom
Language(s) of communication	PID.15	languageCommunication	communication.language
Marital Status	PID.16	maritalStatusCode	maritalStatus
Non-Medical Identifiers	PID.19 and PID.20	asOtherIds	identifier
Death Date/Time	PID.29	deceasedTime	deceasedDateTime
Mother’s Maiden Name	PID.6	personalRelationship.name	See ITI TF-2c: 3.78.4.2.2.2
Patient Birth Order	PID.25	multipleBirthOrderNumber	multipleBirthInteger

735

M.4.2 Patient Demographics Query Parameters

Table M.4.2-1 outlines the demographics query parameters which are common to all Patient Demographics Query Profiles.

740

Table M.4.2-1: Patient Demographics Query Parameters (abstract)

Field	Purpose
Identifier List	Filters the result set to a list of patients whose identifiers match the provided identifiers.
Name	Filters the result set to a list of patients whose name (legal, maiden, alias, etc.) matches the provided value. The mechanisms for match are not specified but can include: exact match, pattern match, phonetic match, variant match, etc.
Date / Time of Birth	Filters the result set to patients whose date/time of birth match the provided value.
Gender	Filters the result set to patients whose administrative gender matches the provided value.
Address	Filters the result set to patients whose address (home, business, etc.) matches the provided value.
Domains to be Returned	Filters the result set to include only identifiers which have been assigned by the specified domains.
Mother's Maiden Name	Filters the result set to include only those patients which whose mother's maiden name matches the specified name.
Patient Telecommunications Addresses	Filters the result set to include only those which have the specified telecommunications addresses.

Table M.4.2-2 provides a mapping between these abstract query parameters and their transaction specific implementation.

745

Table M.4.2-2: Patient Demographics Query Parameters (concrete)

Abstract Parameter	PDQ	PDQ HL7v3	PDQm
Identifier List	@PID.3 and @PID.18	livingSubjectId	identifier
Name	@PID.5	livingSubjectName	given and family
Date / Time of Birth	@PID.7	livingSubjectBirthTime	birthdate
Gender	@PID.8	livingSubjectAdministrativeGender	gender
Address	@PID.11	patientAddress	address
Domains to be Returned	QPD-8	otherIDsScopingOrganization	See ITI TF-2c: 3.78.4.1.2.4
Mother's Maiden Name	@PID.6	mothersMaidenName	mothersMaidenName.given and mothersMaidenName.family
Patient Telecommunications Addresses	@PID.13	patientTelecom	telecom