ACC, HIMSS and RSNA

Integrating the Healthcare Enterprise

IHE Cardiology Technical Framework

Supplement 2006-2007

Patient Demographics Query - Urgent Implantable Device Cardiac Identification Content Profile (PDQ-IDC)

Public Comment Version

Comments due May 19, 2006

1 Foreword

Integrating the Healthcare Enterprise (IHE) is an initiative designed to stimulate the integration of the information systems that support modern healthcare institutions. Its fundamental objective is to ensure that in the care of patients all required information for medical decisions is both correct and available to healthcare professionals. The IHE initiative is both a process and a forum for encouraging integration efforts. It defines a technical framework for the implementation of established messaging standards to achieve specific clinical goals. It includes a rigorous testing process for the implementation of this framework. In addition, it organizes educational sessions and exhibits at major meetings of medical professionals to demonstrate the benefits of this framework and encourage its adoption by industry and users.

The approach employed in the IHE initiative is not to define new integration standards, but rather to support the use of existing standards, HL7, DICOM, IETF, and others, as appropriate in their respective domains in an integrated manner, defining configuration choices when necessary. IHE maintain formal relationships with several standards bodies including HL7, DICOM and refers recommendations to them when clarifications or extensions to existing standards are necessary.

This initiative has numerous sponsors and supporting organizations in different medical specialty domains and geographical regions. In North America the primary sponsors are the American College of Cardiology (ACC), the Healthcare Information and Management Systems Society (HIMSS) and the Radiological Society of North America (RSNA). IHE Canada has also been formed. IHE Europe (IHE-EUR) is supported by a large coalition of organizations including the European Association of Radiology (EAR) and European Congress of Radiologists (ECR), the Coordination Committee of the Radiological and Electromedical Industries (COCIR), Deutsche Röntgengesellschaft (DRG), the EuroPACS Association, Groupement pour la Modernisation du Système d'Information Hospitalier (GMSIH), Société Francaise de Radiologie (SFR), Società Italiana di Radiologia Medica (SIRM), the European Institute for health Records (EuroRec), and the European Society of Cardiology (ESC). In Japan IHE-J is sponsored by the Ministry of Economy, Trade, and Industry (METI); the Ministry of Health, Labor, and Welfare; and MEDIS-DC; cooperating organizations include the Japan Industries Association of Radiological Systems (JIRA), the Japan Association of Healthcare Information Systems Industry (JAHIS), Japan Radiological Society (JRS), Japan Society of Radiological Technology (JSRT), and the Japan Association of Medical Informatics (JAMI). Other organizations representing healthcare professionals are invited to join in the expansion of the IHE process across disciplinary and geographic boundaries.

The IHE Technical Frameworks for the various domains (IT Infrastructure, Cardiology, Laboratory, Radiology, etc.) defines specific implementations of established standards to achieve integration goals that promote appropriate sharing of medical information to support optimal patient care. It is expanded annually, after a period of public review, and maintained regularly through the identification and correction of errata. The current version for these Technical Frameworks may be found at www.ihe.net/Technical_Framework.

The IHE Technical Framework identifies a subset of the functional components of the healthcare enterprise, called IHE Actors, and specifies their interactions in terms of a set of coordinated, standards-based transactions. It describes this body of transactions in progressively greater depth. The volume I provides a high-level view of IHE functionality, showing the transactions organized into functional units called Integration Profiles that highlight their capacity to address specific clinical needs. The subsequent volumes provide detailed technical descriptions of each IHE transaction.

This supplement to the IHE Cardiology Technical Framework v2 is submitted for Public Comment between April 17, 2006 and May 19, 2006.

Comments shall be submitted before May 19, 2006 to:

http://forums.rsna.org

Under the "*IHE*" forum, select the "*IHE Cardiology Technical Framework Supplements 2006*" sub-forum.

The IHE Cardiology Technical Committee will address these comments and publish the Trial Implementation version in June 2006.

2 Introduction

This Supplement adds a new profile to the IHE Cardiology Technical Framework. The profile describes an efficient means to identify Implanted Devices Cardiac (IDCs) in emergent and urgent situations. This profile is designed to enable access to information about IDCs in a variety of national and international contexts.

This profile is a content profile of Patient Demographic Query (PDQ) from the IT Infrastructure domain.

2.1 Open Issues and Questions

- This profile includes an IHE defined ZTS segment in the query response for a technical specification hyperlink
    - Is it OK to define and add it in RSP message? According to HL7 v2.5 rules, it should be OK, but will this affect other uses of the PDQ profile?
    - Should the ZTS-1 hyperlink be RP data type, or is it OK to have a simple ST type?
- Question to all Vendors! Check Section 4.12 for completeness against your Patient Tracking Database.
- Should PIX transactions be specified for submitting implantation/explantation records to a Patient Demographics Supplier? It is the opinion of the IHE Cardiology Technical Committee that such submissions will be handled with substantial considerations beyond the technical specification, and that standardizing the use of PIX is not likely to be useful.
- Should race be included as a query key, i.e. PID-10? If so, what is the proper way to encode race? There is no international standard.

3 Profile Abstract

Patients with implantable cardiac devices (e.g.., pacemakers and implantable cardioverter defibrillators, and referred to as “IDC”) often present in emergency situations to physicians who have no knowledge of the patient or of the specific device implanted (pacemaker or ICD, manufacturer, model number, etc). Frequently, the patient cannot identify the specific device either. This is a problem, particularly in cases where the nature of the emergency presentation requires immediate reprogramming of the IDC. Only the appropriate programmer from the appropriate device manufacturer can communicate with the IDC.

At present, the clinician has three alternative ways to attempt to identify the IDC:

- X-ray the device, locate and decipher the ID tag
- Contact technical services at each manufacturer of IDCs and request that they query their patient registry to see if the patient has one of their devices
- Attempt to interrogate the IDC with each of the available programmers until one is found that will successfully communicate with the IDC

Each of these alternatives is time-consuming, and a faster, simpler way to identify and program the IDC in an emergency is highly desirable.

This profile specifies the use of a centralized information system that would allow clinicians, in an emergency, to submit patient information and retrieve device identification information that would allow the correct programmer to be identified without trial and error.

Volume I – Integration Profiles

Add to Section 1.7

- Added the PDQ-IDC Profile, which specifies the use of a centralized information system that would allow clinicians, in an emergency, to submit patient information and retrieve device identification information that would allow the correct programmer to be identified without trial and error.

Add to Section 2.1

Table 2-1 Integration Profile Dependencies

Integration Profile	Depends on	Dependency type	Purpose
PDQ-IDC	PDQ	Reuse of actors from PDQ profile	Constraining and specializing the content of PDQ messages
PDQ-IDC	ATNA	Each system that implements actors from PDQ-IDC must implement Secure Node	PHI confidentiality and security compliance

Add to Section 2.2

2.2.x Urgent Implantable Device Cardiac Identification Content Profile

The Urgent Implantable Device Cardiac Identification Content Profile is a specialization of the Patient Demographics Query (PDQ) Integration Profile. It specifies transactions supporting the identification of the implantable device of the patient and access to vital information about the device that may be significant in the emergency situation.

Add to Section 2.3

Patient Demographics Consumer This actor allows a user to associate information with a patient at the point of care.

Patient Demographics Supplier A repository of patient information that can be searched on demographic or visit-related fields.

Actor \ Integration Profile	CATH	ECHO	ECG	DRPT	ED	PDQ-IDC
Acquisition Modality	X	X			X	
ADT Patient Registration	X	X				
Department System Scheduler/Order Filler	X	X				
Evidence Creator	X	X			X	
Image Archive	X	X			X	
Image Display	X	X			X	
Image Manager	X	X			X	
Order Placer	X	X				
Performed Procedure Step Manager	X	X				
Report Creator				X	X	
Report Manager				X		
Report Reader				X		
Report Repository				X		
Enterprise Report Repository				X		
Time Client	(note 1)					
Display			X			
Information Source			X	(note 2)		
Patient Demographics Consumer						**X**
Patient Demographics Supplier						**X**

Add to Section 2.4

Patient Demographics Query - Look up and return patient demographic information in a single patient demographics source, based upon matches with full or partial demographic information entered by the user. [ITI-21]

Transaction \ Integration Profile	CATH	ECHO	ECG	DRPT	ED	PDQ-IDC
Patient Registration [RAD-1]	X	X				
Placer Order Management [RAD-2]	X	X				
Filler Order Management [RAD-3]	X	X				
Procedure Scheduled [RAD-4]	X	X				
Query Modality Worklist [RAD-5]	X	X				

Integration Profile / Transaction	CATH	ECHO	ECG	DRPT	ED	PDQ-IDC
Modality Procedure Step In Progress [CARD-1]	X	X				
Modality Procedure Step Completed [RAD-7]	X	X				
Modality Images/Evidence Stored [CARD-2]	X	X			X	
Storage Commitment [CARD-3]	X	X		X	X	
Patient Update [RAD-12]	X	X				
Procedure Update [RAD-13]	X	X				
Query Images [RAD-14]	X	X				
Query Evidence Documents [RAD-44]					X	
Retrieve Images/Evidence [CARD-4]	X	X				
Instance Availability Notification [RAD-49]	X	X				
Maintain Time [ITI-1]	(note 1)					
Retrieve Specific Info for Display [ITI-11]			X	(note 2)		
Retrieve ECG List [CARD-5]			X			
Retrieve ECG Document for Display [CARD-6]			X			
Encapsulated Report Submission [CARD-7]				X		
Report Reference Submission [CARD-8]				X		
Encapsulated Report Storage [CARD-9]				X		
Encapsulated Report Query [CARD-10]				X		
Encapsulated Report Retrieve [CARD-11]				X		
Retrieve Document for Display [ITI-12]				(note 2)		
Patient Demographics Query [ITI-21]						**X**

Add the following new profile section

10 Urgent Implantable Device Cardiac Identification Content Profile (PDQ-IDC)

Patients with implantable cardiac devices (IDCs, e.g., pacemakers and implantable cardioverter defibrillators) often present in emergency situations to physicians who have no knowledge of the patient or of the specific device implanted (pacemaker or ICD, manufacturer, model number, etc). Frequently, the patient cannot identify the specific device either. This is a problem, particularly in cases where the nature of the emergency presentation requires immediate reprogramming of the IDC. Only the appropriate programmer from the appropriate device manufacturer can communicate with the IDC.

Note: The acronym "IDC", for Implantable Devices – Cardiac, is used because it is the acronym used to designate the nomenclature developed under IEEE Standard 1073 for all implantable cardiac devices. "ICD" is the ACC-designated acronym for implantable cardioverter defibrillator, which is just one type of implantable cardiac device.

The Urgent Implantable Device Cardiac Identification Content Profile is a specialization of the Patient Demographics Query (PDQ) Integration Profile, specified in the IHE IT Infrastructure Technical Framework. It specifies transactions supporting the identification of the IDC of the patient and access to vital information about the device that may be significant in the emergency situation.

Today, there is no central registry of all IDC devices and their patients in many countries. In such countries, each IDC vendor typically maintains its own database of their devices and patients. Clinicians cannot directly access these databases.

The objectives of this profile:

- Provide centralized and secure access to the IDC and patient information, compliant with HIPAA or other relevant privacy regulations.
- Make possible the international cross-country access of the IDC information, so that even if the patient resides outside of the geography where his device is interrogated, his/her device could be identified
- Possibility to identify the IDC even in the case of missing or ambiguous patient demographic information

This profile does not address the access of other information recorded during IDC implantation and follow-ups. This will be addressed by other profiles.

Figure 10-1 illustrates the real world implementation model for the flow of information that this profile will support.

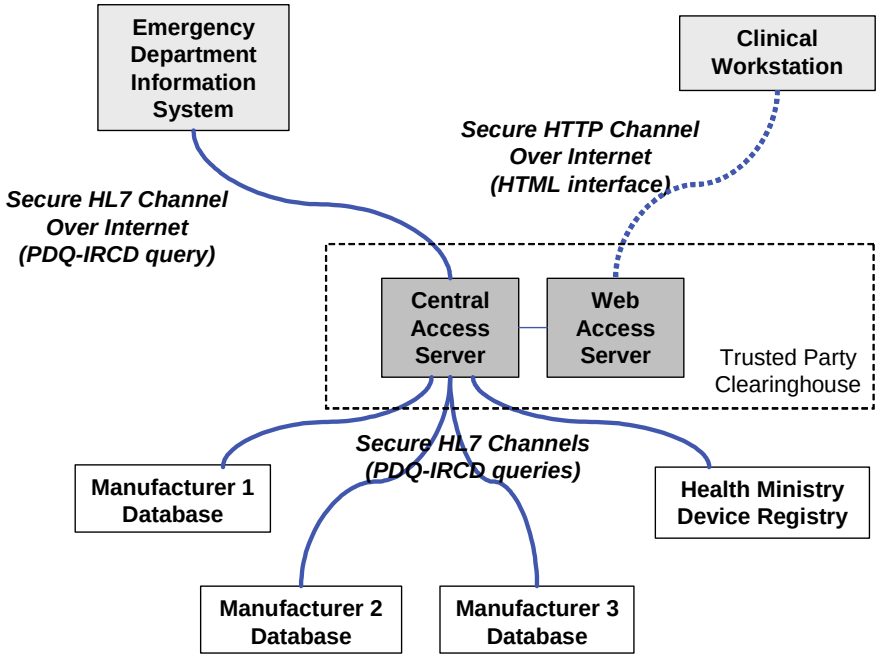

Figure 10-1. PDQ-IDC Implementation Model

10.1 IDC Patient Identifier

The ITI TF defines Patient Identifier domains that assign patient identifiers. In this profile, each IDC vendor establishes a patient identifier domain, and patients are identified by combination of the vendor identifier and the device model/serial number.

- Patient ID – combination of device Model and Serial Number
- Assigning Authority – IDC manufacturer

The patient ID (model/serial number) must be unique within Assigning Authority, i.e. manufacturer.

10.2 Actors/ Transactions

Figure 10.2-1 shows the actors directly involved in the PDQ-IDC Integration Profile and the relevant transactions between them. Other actors that may be indirectly involved due to their participation in ATNA profile, etc. are shown in dashed lines.

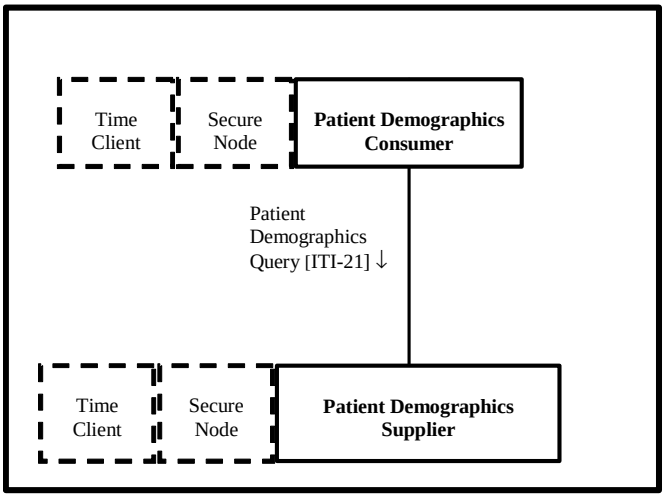

Figure 10.2-1 PDQ-IDC Profile Actor Diagram

Table 10.2-1 lists the transactions for each actor directly involved in the PDQ-IDC Profile. In order to claim support of this Integration Profile, an implementation must perform the required transactions (labeled "R"). Transactions labeled "O" are optional. A complete list of options defined by this Integration Profile and that implementations may choose to support is listed in Section 10.3.

Table 10.2-1. PDQ-IDC Integration Profile - Actors and Transactions

Actors	Transactions	Optionality	Section in Vol. 2
Patient Demographics Consumer	Patient Demographics Query	R	ITI TF-2: 3.21
Patient Demographics Supplier	Patient Demographics Query	R	ITI TF-2: 3.21

The PDQ Profile defines an optional Patient Demographics and Visit Query transaction for its actors, but that is not used in the PDQ-IDC Profile. Only transactions in the table 10.2-1 are required for compliance to the PDQ-IDC content profile.

10.3 PDQ-IDC Integration Profile Options

No options are specified for this Integration Profile.

10.4 PDQ-IDC Storyboard

This section describes the operation of the PDQ-IDC Profile from the user's perspective.

The basic flow of the PDQ-IDC Profile begins when a patient presents to the emergency department of a community hospital in atrial fibrillation, because of which he/she has received, and continues to receive, inappropriate shocks from his IDC.

The patient is unknown to the E.D. physician, the patient does not know what type of IDC he has, and does not carry his manufacturer-issued ID card.

Steps:

- The physician places a magnet on the IDC to inhibit further shock delivery
- The physician signs in at a clinical workstation and authenticates his identity.
- The physician complies with appropriate national/regional privacy requirements for emergency access to patient information (e.g., by initialing a legal form).
- The physician enters the known patient demographic information and requests device information.
- The workstation sends the request, and after a brief wait, a list of potentially matching patients, if any, are displayed on the screen.
- If the list does not provide satisfactory confidence that it contains correct patient, the physician may change the initial parameters and rerun the query.
- The list also displays the device manufacturer's name and device model number for each returned patient record.
- The system may optionally display a reference to the technical specification document of this device model. If so, the physician can click on the reference and the system displays the technical document where physician can find helpful information about the current device and its programmer.
- The medical staff retrieves the appropriate manufacturer's programmer, and proceeds to interrogate the IDC and reprogram it as required.

10.5 Use Cases

The storyboard scenario could be accomplished with different system architectures and by applying different actor groupings that represent systems that need to be involved. Which grouping is most appropriate to be used depends on the implementing nation and the existence of IDC databases managed by manufacturers or central national organizations.

This section details use cases for various possible system architectures.

10.5.1 Case 1: Distributed databases

This is the case where databases with IDC data reside only at each vendor. There is a system acting as a single centralized access point that forwards the requests for data to the systems possessing that

data. In this case, there is no central patient identity database. The access point, provided by a national organization, proxies the queries to the vendor systems and consolidates their responses.

In this use case, the physician user interface described in the storyboard is a function of an emergency department information system. This system manages the access rights of the individual physician in that institution. The system uses the ITI-21 (PDQ) transaction to request patient device information form the centralized access point. The access point verifies the access rights of the user's system.

The access point forwards the request to the IDC vendor systems using the same ITI-21 transaction. The ITI-21 responses are consolidated from the vendor systems and returned in a single ITI-21 response to the user's system.

Alternatively, the physician user interface might be implemented as a web application hosted by a national organization and accessed from any internet-connected workstation with appropriate security. In this situation, the web application must manage user access rights for user.

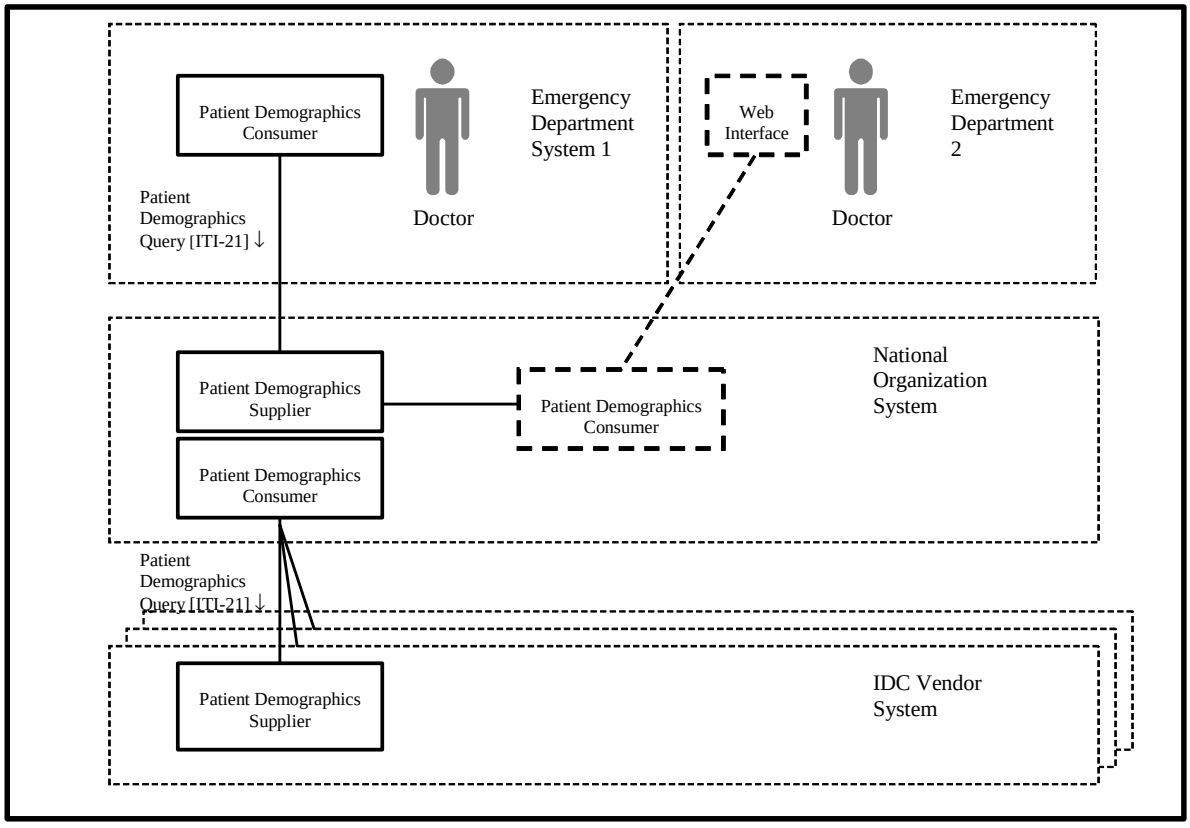

Figure 10.5-1 PDQ-IDC Profile Case 1 System Mapping/Actor Grouping

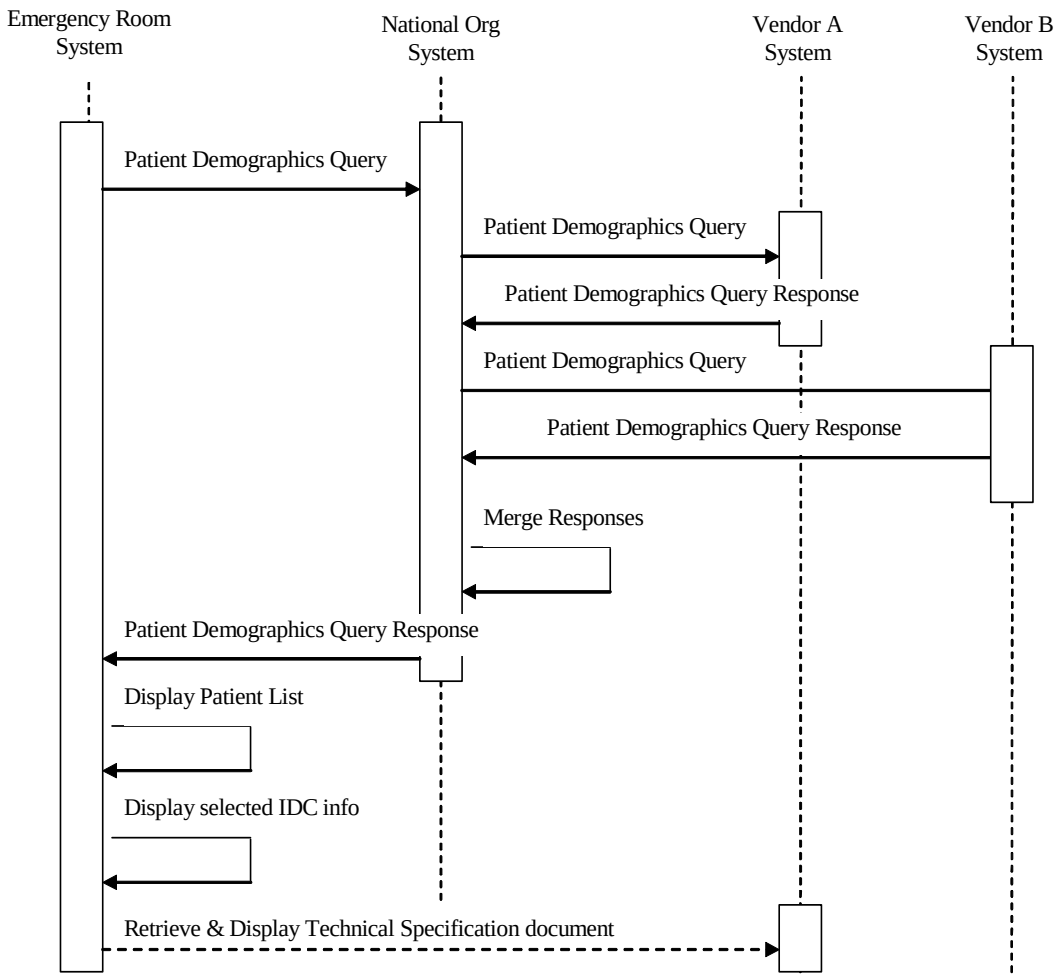

Figure 10.5-2 Process Flow Case 1: Distributed Databases

10.5.2 Case 2: Centralized database

This is the case where a central database with IDC/patient demographic data is hosted at a coordinating National Organization. The vendor systems, or the systems at the implanting hospital, populate the central system with patient/IDC data, possibly using the Patient Identity Cross-reference Profile (PIX) to submit the data. Note there are some national regulations that prohibit an IDC manufacturer to possess the identity of the patient with the implanted device.

Note: Using PIX to submit the data is only an example in this use case; the National Organization may use other means to populate the database with the data that is necessary to respond to the PDQ-IDC query.

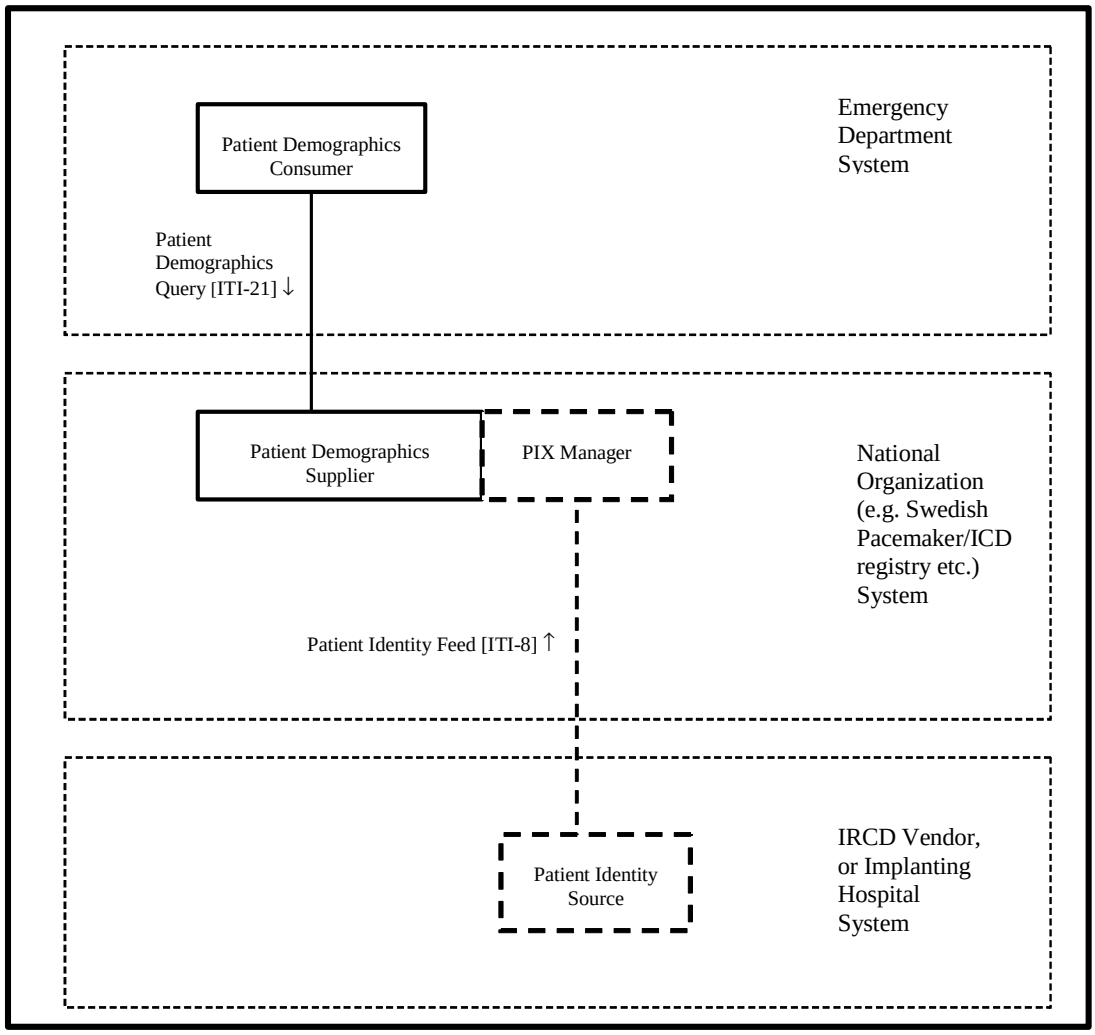

Figure 10.5-3 PDQ-IDC Profile Case 2 System Mapping/Actor Grouping

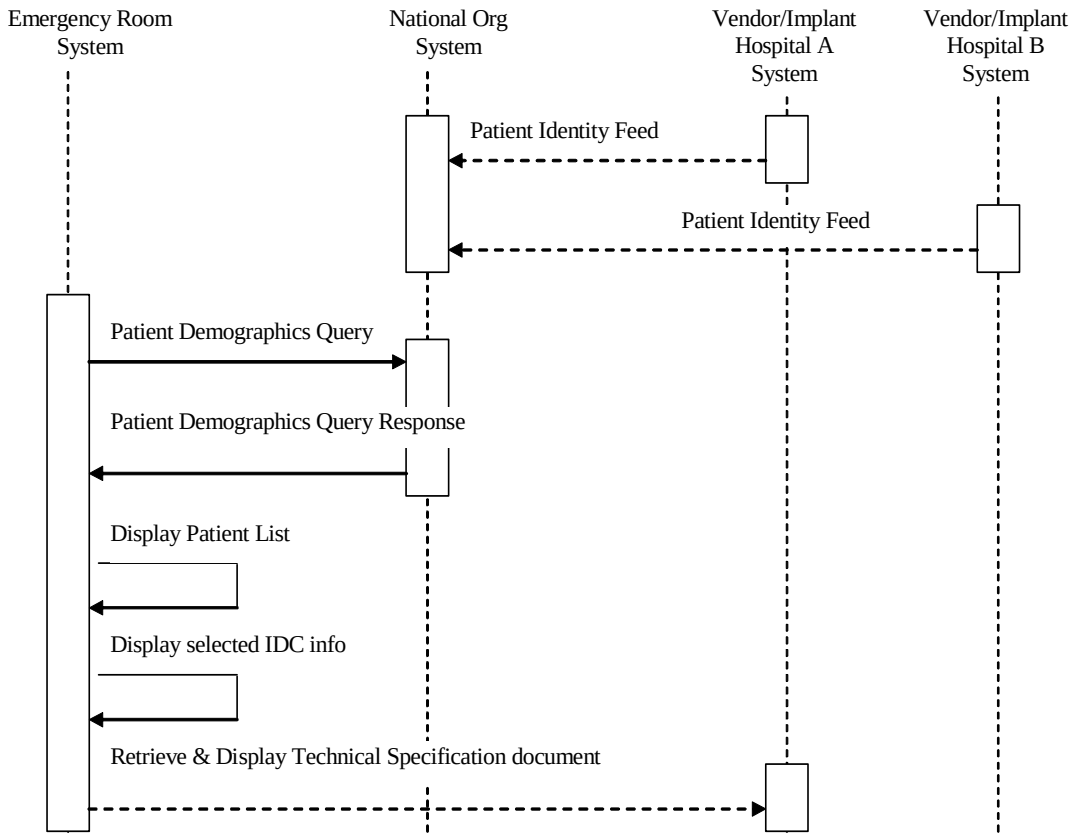

Figure 10.5-4 Process Flow Case 2: Central database

10.5.3 Case 3: Non-resident patient

This case is like C1, but the patient was not implanted in the country where the emergency situation occurred. In this use-case, there needs to be a secure and compliant link among the national organizations at issue. Queries are forwarded from the national organization server being queried to the server in the patient's country of implant.

Note: The implementation of the national access point responsible for the implantation record is transparent to the requesting system. That system may be implemented as a central database, or as a proxy to individual vendor systems.

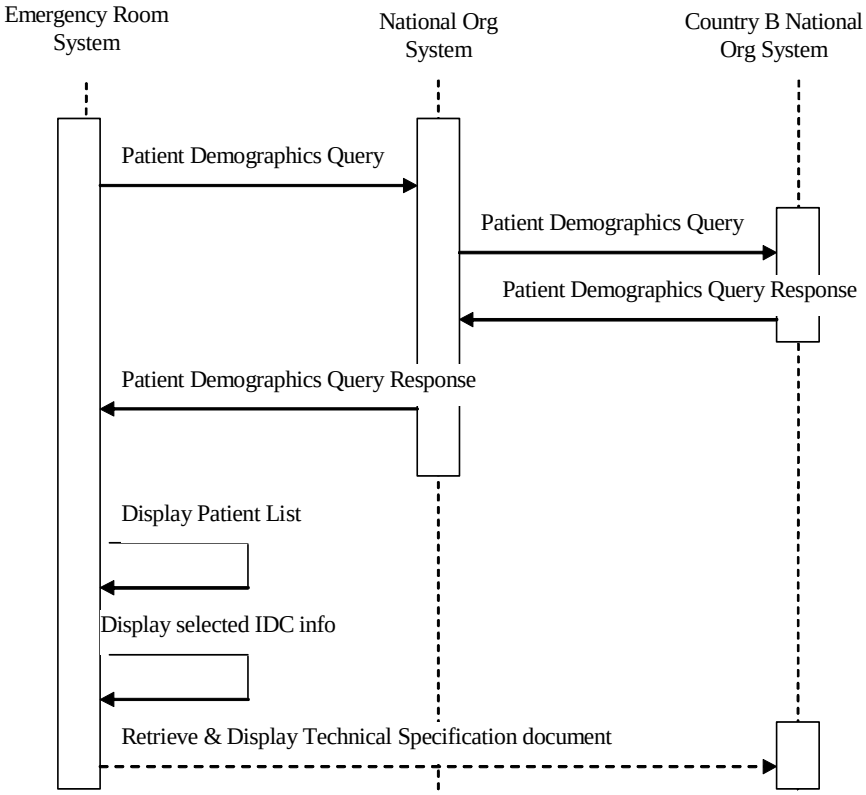

Figure 10.5-5 Process Flow Case 3: International Access

In this case, the display of a technical specification document may be problematic, as it would link to the site in another country and might be in a different language.

10.6 Security related actor grouping

Because the system may function in not otherwise protected healthcare environments, security and data protection must be addressed. The IHE Technical Framework provides Profile specifications that may be used to support HIPAA or other national/regional security and privacy protection requirements:

- User authentication
- Access control
- Centralized auditing
- ePHI protection

The IHE ATNA profile in the IT Infrastructure Technical Framework defines a mechanism to achieve these goals. Each system in PDQ-IDC profile has to be bundled with corresponding security related actors.

For description of how ATNA addresses these aspects, refer to TF ITI-1 chapter 9.

The next diagram illustrates the security related transactions that the system must support and perform as appropriate to the transactions of this profile.

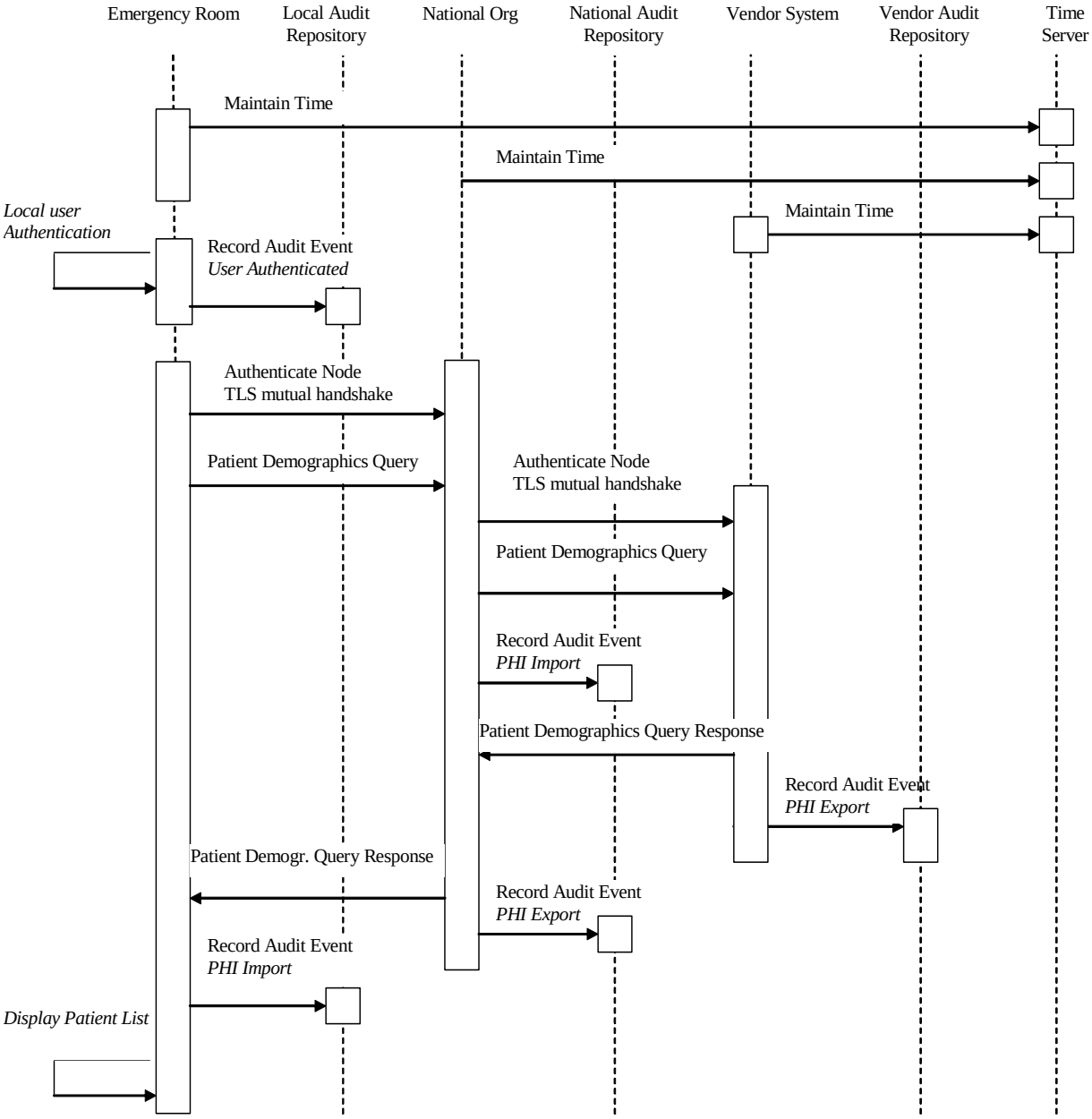

Figure 10.6-1 Security transactions

1. Each system is responsible to synchronize the clocks before starting other functions. Doing so is important in this profile because of the need to track the audit events related to PHI access among systems.

2. The Emergency Department System requires user authentication via login. The user information of the login is recorded in Audit Repository
3. The Emergency Department System has to establish a trusted and secure communication channel with the appropriate National Organization system. That is done via mutual exchange of certificates. Both peers must recognize and authorize the presented certificates
4. Over the secure encrypted TLS channel, the PDQ Query message is sent.
5. National Organization system performs the same authentication with IDC vendor systems before PDQ Query message can be sent and accepted
6. The Vendor System is obliged to record the audit log, which specifies which patient's information was sent to National Organization system
7. The National Organization System is obliged to record in the audit log which patient's information was provided to the emergency department system
8. The Emergency Department System must record an audit log that specifies the patients whose PHI was fetched.

The IHE technical framework does not define security policies or configurations. That is up to each implementation and system deployment. The TF does not define how user databases are set up and used, how keys and certificates are exchanged or how audit repositories are used. IHE and ATNA specifically make sure that if systems implement ATNA actors, the secure and protected and regulation compliant system can be set up and used. Synchronization of each system's clock makes it possible to correlate audit logs in different repositories to track PHI access paths through across all systems.

Add to Appendix D Glossary

IDC - Implantable Device Cardiac. Note that this acronym is a defined term of HL7 and IEEE, and is selected to not be confused with the well known acronym "ICD" used for "implantable cardioverter defibrillator".

Implantable Device Cardiac : Implantable medical devices that treat heart rhythm problems. These devices are categorized as pacemakers, implantable cardioverter defibrillators, and cardiac resynchronization therapy devices.

Volume 2 - Transactions

Add New Transaction Constraints

4.12 Patient Demographics Query [ITI-21] Constraints

This section specifies only exceptions and additional constraints to the ITI-21 transaction used in the PDQ-IDC profile.

The message semantics are described in ITI-TF-2: 3.21.4.2.2

4.12.1 QPD Query Segment

4.12.1.1 QPD-3 – Demographics Fields

The PDQ Supplier shall support the QPD-3 Query Parameters specified in Table 4.12-1

Table 4.12-1 QPD-3 Parameters

Parameter Name	Segment	Field	Value/Formatting	Example
Family name	PID	5.1.1	May contain wildcards	@PID.5.1.1^Johnson @PID.5.1.1^*John*
Given Name	PID	5.2	May contain wildcards	@PID.5.2^Vincent @PID.5.2^Vince*
DOB	PID	7.1	If the DOB is known approximately, then it is allowed to specify what is known (i.e. only year)	@PID.7.1^1920 @PID.7.1^192007 @PID.7.1^19350725
Gender	PID	8	User Table 0001 in HL7 2.5 Ch 3 3.4.2.8	@PID.8^F
Street address	PID	11.1	Wildcards can be used	
City	PID	11.3	Wildcards can be used	
State or Province	PID	11.4	Formatting depends country. Refer to User –defined Table 0347 In USA the 2-letter	@PID.11.8^CA

			codes should be used	
Zip or Postal code	PID	11.5	Wildcards can be used	
Country	PID	11.6	Must come from table ISO 3166 – Alpha 2 format	@PID.11.6^SE
Social Security Number	PID	19	No wildcards	
Patient ID Effective Date (Implantation Date)	PID	3.7	Date of the last implantation, if only year is known that is passed.	@PID.3.7^1997 @PID.3.7^199707 @PID.3.7^19970725
Patient ID Assigning Facility Namespace ID (Implantation city)	PID	3.6	If the city of the implanting hospital is known	@PID.3.6.^Seattle
Patient ID Assigning Jurisdiction (Implantation Country)	PID	3.9	If the country of the implanting hospital is known Must come from table ISO 3166 – Alpha 2 format	@PID.3.9^US

PID.18 – Patient Account Number is not required, even though it is required by the ITI-21 transaction.

The PDQ Consumer can pass any number of parameters.

The strings passed to the parameters shall be treated as NOT case sensitive.

4.12.1.2 Usage of Wildcards in query parameters

An asterisk (*) shall be supported as a wildcard.

- When used at the beginning of a parameter, it indicates that the end of the matching string has to contain the substring after asterisk
    - "***Smith**" returns "Johnson-Smith", "Aerosmith"
- When used at the end of the parameter, it indicates that the beginning of the matching string has to contain the substring before asterisk
    - "**Smith***" returns "Smith-Johnson", "Smithonia"

- When used at the beginning and at the end of a parameter, it indicates that the matching string has to contain the substring between asterisks
    - "***Smith***" return "Johnson-Smith", "Smith-Johnson", "Aerosmithonia"
- When used in the middle of a parameter, it indicates that the matching string has to start with substring before an asterisk and has to end with the substring after the asterisk
    - "**Joh*son**" returns "Johnson", "Johnsson", "Johansson"
    - "**John*son**" returns "Johnson", "Johnsson"

4.12.2 Patient Demographics Response

4.12.2.1 Message Semantics

The RSP message specified in ITI-21 shall be augmented with a ZTS segment as specified in Table 4.12-2.

Table 4.12-2 RSP message structure

RSP	Segment Pattern	Chapter in HL7 2.5
MSH	Message Header	2
MSA	Message Acknowledgement	2
[{ERR}]	Error	2
QAK	Query Acknowledgement	5
QPD	Query Parameter Definition	5
[{ PID	Patient Identification	3
[QRI]	Query Response Instance	5
[ZTS] }]	Technical Specification	n/a – this is an IHE defined segment specified in this transaction
[DSC]	Continuation Pointer	2

The PD1 segment, Optional in ITI-21, is not supported.

4.12.2.2 PID Segment

The following are additional specifications for the PID segment used in the PDQ IDC Profile:

The PID-3 component (Patient Identifier List) of the response message shall contain the following sub-components:

- PID-3.1 (ID Number)--Model/Serial Number

  The Patient Identity Source Actor shall provide the patient identifier in the ID component (first component) of the PID-3 field (PID-3.1). The value should be a combination of patient's IDC model and serial number, formatted in following way:

  |model:xxx/serial:yyy|

  Where xxx is IDC model number and yyy is IDC serial number

  Example:

  If model number is *ABC123* and serial number is 23456abc567, then the PID-3-1 could be formatted as

  |model:ABC123/serial:23456abc567|

- PID-3.4 (Assigning Authority) shall be the manufacturer name in a human readable form.
- PID-3.6 (Assigning Facility) shall contain the city of the implanting hospital.
- PID-3.7 (Effective Date) shall be the implantation date.
- PID-3.8 (Expiration Date) shall be the explantation date.
- PID-3.9 (Assigning Jurisdiction) shall be the country of implantation.

The following fields shall be supported:

- PID-5 Patient Name
- PID-7 Date/Time of Birth
- PID-8 Gender
- PID-10 Race (if available)
- PID-11 Patient Address (if available)
- PID-19 Social Security Number (if available)

4.12.2.3 QRI Segment

This segment is recommended in this profile, but not required.

PDQ could calculate the score for how well the returned data in PID segment matches the input parameters in QPD segment. In order for being able to compare the scores returned from different PDQ suppliers, if this segment is added to the message, the score shall be presented as a value between 0 and 100.

4.12.2.4 ZTS – Technical Specification Segment

New user defined segment for technical specification document reference.

The optional ZTS segment can be added to the response message.

Table 4.12-3 ZTS Segment

SEQ	LEN	DT	OPT	RP#	TBL#	ITEM#	ELEMENT NAME
1	65536	RP	R				Document Reference

4.12.2.4.1 ZTS–1 Document Reference (RP)

Definition: This field contains the reference as a URL to the technical document about the device whose model number is given in PID-3.1. The document that the reference refers to must be of some common MIME type that all browsers can handle (text/html or application/PDF) and available for opening in a default web-browser running at the client's machine. The document should only contain public technical information and no patient information.

The ZTS-1 component (Document Reference) of the response message shall contain the following sub-components:

- ZTS-1.1 (Pointer) – This shall be a unique key assigned by the system that stores the data. The key, which is a ST data type, is used to identify and access the data. This is a URL path and optional query as defined by RFC-2396 (e.g. "document/model_123.pdf").
- ZTS-1.2 (Application ID) – This shall contain a unique designator of the system that stores the data as a URL including scheme and authority as defined in RFC-2396 (e.g. "http://harry.solomon.com").
- ZTS-1.3 (Type of Data) – The MIME class of the referenced document (e.g. "Application").
- ZTS-1.4 (Subtype) – The MIME type of the reference document (e.g. "PDF").

Note: The hyperlink may contain HL7 control characters, e.g., ~), and if it does, they must be replaced with HL7 escape characters.

Note: The complete URL must be constructed by the receiver from the Application ID and Pointer separated by a slash (e.g. "http://harry.solomon.com/document/model_123.pdf"), after processing any Hl7 character escapes.

