Integrating the Healthcare Enterprise

IHE QRPH
Technical Framework Supplement

Research Matching
(RM)

Trial Implementation

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Foreword

This is a supplement to the IHE Quality, Research and Public Health (QRPH) Technical Framework V0.1. 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 September 13, 2013 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 Quality, Research and Public Health Technical Framework. Comments are invited and may be submitted at http://www.ihe.net/QRPH_Public_Comments. This supplement describes changes to the existing technical framework documents.

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

Amend section X.X by the following:

Where the amendment adds text, make the added text **bold underline**. Where the amendment removes text, make the removed text **~~bold strikethrough~~**. When entire new sections are added, introduce with editor's instructions to "add new text" or similar, which for readability are not bolded or underlined.

General information about IHE can be found at: www.ihe.net.

Information about the IHE QRPH domain can be found at: http://www.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://www.ihe.net/IHE_Process and http://www.ihe.net/Profiles.

The current version of the IHE QRPH Technical Framework can be found at: http://www.ihe.net/Technical_Frameworks.

CONTENTS

Introduction to this Supplement

This profile specifies methods of matching patients and investigators with appropriate clinical research studies. The profile also specifies a method for publishing research process definitions to interested EHR systems.

This supplement is written for public comment. It is written as an addition to the Trial Implementation version of the Quality, Research and Public Health Technical Framework.

This supplement also references the following documents. The reader should review these documents as needed:

1. IT Infrastructure Technical Framework Volume 1
2. IT Infrastructure Technical Framework Volume 2
3. IT Infrastructure Technical Framework Volume 3
4. IHE PCC Retrieve Clinical Knowledge
5. Health Level Seven International (HL7) Clinical Research Filtered Query Service Function Model (CRFQ SFM)
6. HL7 Context Aware Information Retrieval, 'Infobutton'

Open Issues and Questions

1. What is the relationship between this profile and the PCC's Clinical Knowledge Request and HL7's 'Infobutton'?
2. What is the minimal patient context that can be used to return a list of applicable research studies? For starters, go with age, gender, and primary diagnosis.

Closed Issues

None

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

Actor	Definition
Research Information Consumer	The Research Information Consumer is responsible for the retrieval of a list of potential research studies or of eligibility criteria.
Research Information Source	The Research Information Source is responsible for providing lists of potential research studies, or eligibility criteria.

Appendix B - Transaction Summary Definitions

Transaction	Definition
Retrieve Research Study List [QRPH-40]	This transaction fetches a context specific list of potential research studies.
Research Information Subscribe [QRPH-41]	This transaction allows the Research Information Consumer to subscribe to protocol information releases.
Research Information Notify [QRPH-42]	This transaction allows the Research Information Source to notify the Research Information Consumer that new protocol information is available.

Glossary

Glossary Term	Definition
Clinical Trial	A research investigation involving human subjects that is designed to answer specific questions about the safety and efficacy of a biomedical intervention
Subject	An individual who participates in a clinical trial, either as recipient of the investigational product(s) or as a control.
Electronic Health Record (EHR)	An electronic record derived from a computerized system used primarily for delivering patient care in a clinical setting.
Eligibility Criteria	Defines the study population by specifying inclusion and exclusion criteria. Inclusion criteria must be met for prospective subjects to be eligible for participation in a study. Exclusion criteria are the characteristics in a protocol, any one of which may exclude a potential subject from participation in a study.
Infobutton	An Infobutton is a graphical user interface element which allows the user of an application to quickly obtain information about a specialized term or value found on application displays. It is typically represented as a lowercase letter “i”, in a blue circle  . The term may also be used to refer to the HL7 Context Aware Information Retrieval standard, which is often used to implement the information retrieval side of the interface.

Volume 1 – Profiles

Copyright Licenses

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

None

Domain-specific additions

None

X Research Matching (RM) Profile

Clinical research studies do not do a good job of recruiting appropriate subjects. A better system is needed. EHRs and registries contain much of the information that is needed to identify appropriate subjects. An automated method allowing research sponsors to search EHRs will lead to better results and be more efficient and cost effective. An automated method allowing providers or patients to identify studies of interest to them would have similar benefits. Finally, if a research system is enabled to push a research protocol to an EHR, the result is an EHR-enabled approach to research matching.

Government, advocacy groups, health care providers and the pharmaceutical industry all agree that the current clinical research recruitment system needs improvement and that more minorities need to be recruited into studies. Individuals and groups from all these constituencies have been in discussions about development of a National Clinical Trial Network (NCTN) linking, among others, physicians, provider networks, academic research centers, hospitals and the pharmaceutical industry; most of them will be available to provide support, financial or otherwise, to implement the profile. The tools developed as a result of this profile will be key components of the NCTN.

This profile combines workflow and content.

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

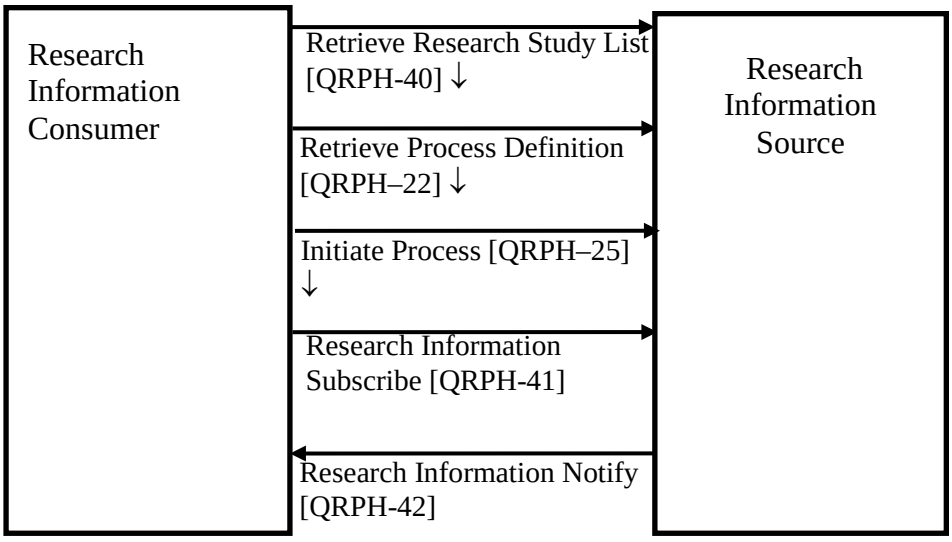

Figure X.1-1: RM Actor Diagram

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

Actors	Transactions	Optionality	Reference
Research Information Consumer	Retrieve Research Study List	O	QRPH TF-2: 3.40
	Retrieve Process Definition	O	QRPH TF-2: 3.22
	Initiate Process	O	QRPH TF-2: 3.25
	Research Information Subscribe	O	QRPH TF-2: 3.41
	Research Information Notify	O	QRPH TF-2: 3.42
Research Information Source	Retrieve Research Study List	R	QRPH TF-2: 3.40
	Retrieve Process Definition	R	QRPH TF-2: 3.22
	Initiate Process	R	QRPH TF-2: 3.25
	Research Information Subscribe	R	QRPH TF-2: 3.41
	Research Information Notify	R	QRPH TF-2: 3.42

Refer to actor options in section X.2 to determine appropriate transaction usage by the Research Information Consumer. The Research Information Consumer SHALL implement at least one of the optional transactions.

X.1.1 Actor Descriptions and Actor Profile Requirements

Most requirements are documented in Transactions (Volume 2) and Content Modules (Volume 3). This section documents any additional requirements on profile's actors.

X.1.1.1 Research Information Consumer

The Research Information Consumer is responsible for the collection of appropriate clinical context on a particular patient, and the retrieval of a list of potential research studies or of eligibility criteria based on the content of the request.

X.1.1.2 Research Information Source

The Research Information Source is responsible for providing lists of potential research studies, or eligibility criteria.

X.2 RM Actor Options

Options that may be selected for each actor in this profile, if any, are listed in the table X.2-1.

Table X.2-1: Research Matching- Actors and Options

Actor	Option Name	Reference
Research Information Consumer	Retrieve Study List Option	X.2.1
	View Eligibility Criteria Option	X.2.2
	Execute Patient Search Option	X.2.3
	Pub/Sub Option	X.2.4
Research Information Source	No options defined	--

X.2.1 Retrieve Study List Option

In this option, the Research Information Consumer retrieves a list of studies using the Retrieve Study List transaction. The Research Information Consumer SHALL use the Retrieve Research Study List transaction (QRPH TF-2: 3.40).

X.2.2 View Eligibility Criteria Option

This option enables retrieval of eligibility criteria for consideration of a particular patient's participation in a particular study. The Research Information Consumer SHALL use the Retrieve Process Definition transaction (IHE QRPH TF-2: 3.22).

X.2.3 Execute Patient Search Option

This option allows an EHR or registry to ingest executable instructions to search for eligible subjects for a study. The Research Information Consumer SHALL implement Initiate Process (QRPH-25).

X.2.4 Pub/Sub Option

This option enables the publishing and subscription of research information. The Research Information Consumer SHALL implement the Research Information Subscribe and Research Information Notify transactions (IHE QRPH TF-2: 3.41 and IHE QRPH TF-2: 3.42).

X.3 RM Required Actor Groupings

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

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

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

Section X.5 describes some optional groupings that may be of interest for security considerations.

Table X.3-1: Research Matching - Required Actor Groupings

RM Actor	Actor to be grouped with	Reference	Content Bindings Reference
Research Information Consumer	Subscriber/Notification Recipient [see note 1]	DSUB TF-1: 4.4.1.4	
	Consistent Time Client	ITI TF-1: 7.1	
	XUA X-Service User	ITI TF-1: 13.4	

RM Actor	Actor to be grouped with	Reference	Content Bindings Reference
	ATNA Secure Node or ATNA Secure Application	ITI TF- 1: 9.4	
Research Information Source	Publisher/Notification Broker	DSUB TF-1: 4.4.1.4	--
	Consistent Time Client	ITI TF- 1: 7.1	
	XUA X-Service Provider	ITI TF- 1: 13.4	
	ATNA Secure Node or ATNA Secure Application	ITI TF- 1: 9.4	

Note 1: This grouping is only required if using the Publish/Subscribe option for Research Information Consumer (see section X.2, Actor Options).

X.4 RM Overview

The central concept of the Research Matching profile is to identify appropriate research studies for patient and physician, and to disseminate information about the study that will aid in evaluating and subsequently executing a particular study. The profile enables this central concept in distinct but complementary ways:

The profile will address how a provider in an EHR, or a patient in a PHR or disease registry, can use a contextual query to seek out potential research or clinical trial opportunities that match the patient's interest and condition. Use cases 1, Find Relevant Studies, and 2, Find Personalized Studies, address this goal.

The profile enables an EHR to receive eligibility criteria to review those criteria to determine a particular patient's eligibility. Use case 3, Review Eligibility Criteria, addresses this.

The profile enables searches for eligible patients. Use case #4, Execute Patient Search, addresses this goal.

The profile enables a research system to publish a study definition which can be ingested by subscribing EHRs. Use case #5, Publish Protocol to Subscribers, addresses this goal.

X.4.1 Concepts

Research matching proceeds from an expression of general interest through a set of filtering steps that end with a commitment to a particular study. This process resembles a funnel, as shown in figure X.4.1-1.

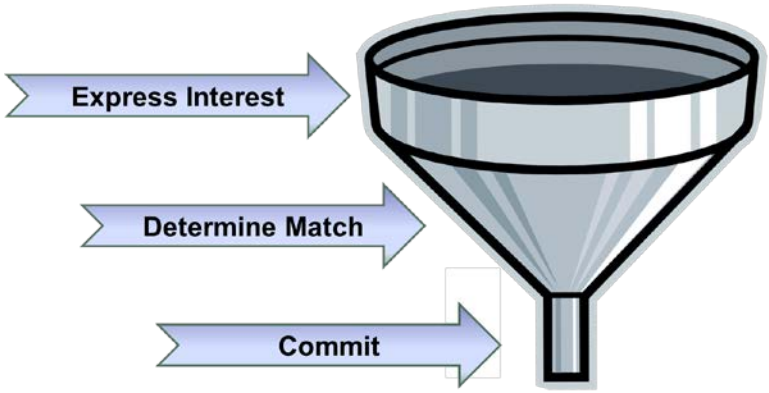

Figure X.4.1-1: Research Matching Funnel

The use cases illustrate this progression through a series of narratives.

X.4.2 Use Cases

X.4.2.1 Use Case #1: Find Relevant Studies

This use case is intended to develop a research-capable PHR or EHR "info button" that the patient or his/her physician can run in a study database such as clinicaltrials.gov and receive in return a context specific list of research studies, with brief descriptions, for the patient and/or his/her physician to consider. The patient's clinical context could include specific diseases, medical conditions, sets of symptoms or complaints, medications, etc. This use case borrows from the IHE Patient Care Coordination Retrieve Clinical Knowledge (RCK) profile the specifics of "a consistent set of rules for issuing … requests for information" and ways to return results so that EHRs and PHRs can display them.

X.4.2.1.1 Find Relevant Studies Use Case Description

Dr. Jones diagnoses patient Jeff Smith as having monogenic diabetes. Dr. Jones and patient Smith wonder if there are clinical studies that might apply to this diagnosis from which the patient could benefit. Formerly, there was no systematic way for this Dr. Jones and patient Smith (or for that matter the patient) to find such clinical research studies. Dr. Jones, patient Smith, and any sponsors of research studies about monogenic diabetes would benefit if there was an efficient and effective way for the patient or his/her physician to find such studies and identify themselves to the research sponsors.

Now, using the Research Matching profile, a search is launched directly from the EHR which returns a list of potentially relevant studies. Dr. Jones and patient Smith review the list and

discuss the merits of participating in each, arrive at a conclusion to enroll in the Granular study from Abracadabra pharmaceuticals.

X.4.2.1.2 Find Relevant Studies Process Flow

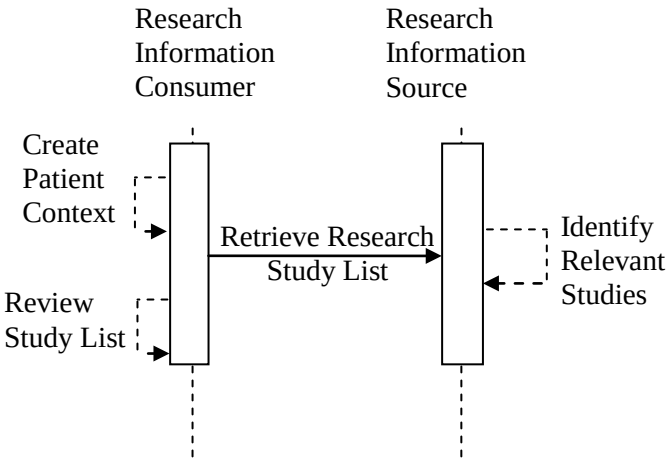

Figure X.4.2.1.2-1: Basic Process Flow in RM Profile

Pre-conditions:

A potential subject or investigator is interested in participating in a research study.

Main Flow:

- The patient's physician diagnoses the disease of the patient.
- The patient or physician enters the information into the Research Information Consumer, thereby defining the patient context, or the EHR would automatically create the patient context.
- The Research Information Consumer queries the Research Information Source.
- The Research Information Source returns to the Research Information Consumer a context specific list of studies to consider for the patient's participation. This list contains a description of each study and relevant contact information.

Post-conditions:

The patient or physician considers participation in the relevant studies and acts accordingly.

X.4.2.2 Use Case #2: Find Personalized Studies

This use case differs from **Use Case #1** in that it is entirely patient-directed, sending patient-self-reported data from online, standalone registries to the research information consumer. Examples of such registries include BreastCancerTrials.org (QuantumLeap), ClinicalResearch.com (Quintiles), and ResearchMatch.org (NIH). These registries are designed to engage patients in clinical research and offer educational content to raise awareness about trials and dispel mis-information, in addition to providing trial matching services.

A patient is interested in finding out if there are active (recruiting) clinical research studies about a disease or condition of interest to him/her. Using a patient-friendly disease registry, the patient retrieves a context-specific list of research studies for which he or she is potentially eligible with brief descriptions and site contact information.

X.4.2.2.1 Find Personalized Studies Use Case Description

A patient who is interested in clinical trials enters information about his/her diagnosis and treatment history into an online disease registry. The registry can be either disease-specific or represent multiple disease domains. Today, there is a growing number of e-patients who seek health information online, but no standardized way for independent trial seekers to easily find clinical research studies; each registry collects information differently and eligibility criteria are coded without reference to an accepted standard. The patient and research sponsors would both benefit if there was an efficient and effective way for patients to directly identify themselves to research sponsors or proactively engage their physicians to discuss clinical trials as an option for care. This profile is intended to develop a research-capable REGISTRY “info button” that the patient can run in a study database such as clinicaltrials.gov or ClinicalTrialsMatch.org (QuantumLeap) and receive in return a context specific list of research studies, with brief descriptions, for the patient to consider and share with his/her physician. The list returned would contain contact information to for trial coordinators at research sites.

X.4.2.2.2 Find Personalized Studies Process Flow

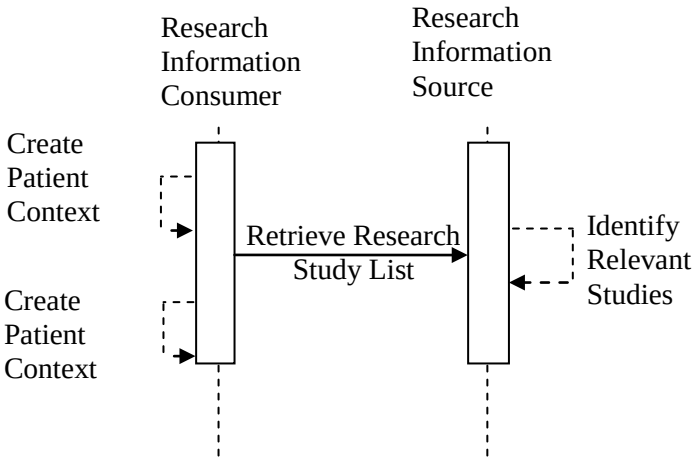

Figure X.4.2.2.2-1: Basic Process Flow in RM Profile

Pre-conditions:

A potential research participant is encouraged to seek clinical trials opportunities as an option for care.

Main Flow:

- The patient enters health history into the Research Information Consumer, thereby defining the patient context.
- The Research Information Consumer queries the Research Information Source.
- The Research Information Source returns to the Research Information Consumer a context specific list of studies to consider for the patient's participation. This list contains a description of each study and relevant contact information.

Post-conditions:

- The patient considers participation in the relevant studies and acts accordingly.
- Research Information Consumer alerts the patient whenever a newly listed trial matches his/her patient context.
- Research Information Consumer enables secure communication between patient and site.
- Patient can apply additional filters (e.g., geographic proximity, trial types) to results
- Patient can update profile to either refine match results and/or update health situation.

- Research Information Consumer tracks patient enrollment or barriers to enrollment.

X.4.2.3 Use Case #3: Review Eligibility Criteria

This use case allows a site investigator or study coordinator to review the eligibility criteria for a specific study.

X.4.2.3.1 Review Eligibility Criteria Description

Dr. Jones and patient Jeff Smith, using the Find Relevant Studies process described above or by some other means, identify the Granular study as the best fit for Jeff's condition, based on the brief study description provided. They wonder if Jeff meets the detailed inclusion/exclusion criteria of the study, some of which was not specified in the brief description. Using the Review Eligibility process, they retrieve and display specific, detailed eligibility, and determine that Jeff does indeed qualify.

X.4.2.3.2 Review Eligibility Criteria Process Flow

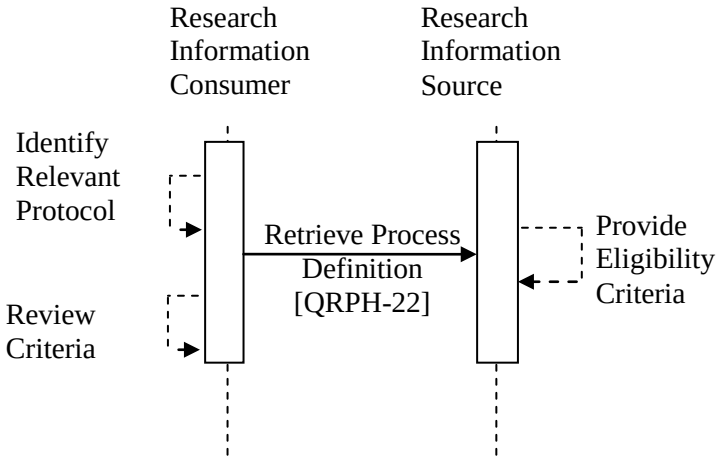

Figure X.4.2.3.2-1: Use Case Process Flow

Pre-conditions:

- The EHR subscribes to the database maintained by research sponsors of research studies and publishes a topic of interest.
- The research sponsor creates the research protocol for the topic of interest to the EHR with eligibility criteria in executable format.

Main Flow:

The Research Information Consumer retrieves research protocol with the eligibility criteria in executable format (the "app") from the Research Information Source.

Post-conditions:

- The 'app' is run within the EHR and automatically creates a list of eligible patients
- The EHR's site clinical research coordinator uses the list to recruit patients and notifies the research sponsor (Research Information Source) of any patients that are interested.

X.4.2.4 Use Case #4: Execute Patient Search

An EHR or disease registry retrieves executable eligibility criteria for a particular research protocol, runs a search against a database of potential subjects, and derives a cohort of potential study subjects by comparing the protocol's eligibility criteria with patients' characteristics.

X.4.2.4.1 Execute Patient Search Description

Clinical research sponsors are required to find an adequate number of eligible, willing and randomized research subjects to support a valid clinical trial. The current research recruitment system does not take advantage of the growing use of EHRs by healthcare sites. EHRs contain much of the information that is needed to identify appropriate subjects. This profile is intended to develop an automated method that allows research sponsors to utilize the power of EHRs to make patient recruitment better and more cost effective. It will also assist research sponsors in finding more appropriate diverse subjects in the United States rather than having to fill research studies with subjects from overseas who may not have a genetic makeup leading to results that will translate well to the increasingly diverse US population.

Today, a research coordinator at a healthcare site solicits and receives a protocol from a research sponsor that specifies the inclusion/exclusion criteria for a clinical research study. The coordinator uses the EHR's search capabilities to find eligible patients by manually entering the criteria and running the search jobs.

This profile is intended to improve on this manual process by providing research sponsors with access to an electronic research protocol in executable format (an "application" or "app") in which the sponsor can specify the inclusion/exclusion criteria for a new clinical research study. This application can then be inserted into an EHR or disease registry. The application, which contains instructions for searching the EHR's database, then runs within the EHR and produces a de-identified list of eligible patients for the study that is automatically sent to the sponsor.

Narrative:

Janis Cord, a study coordinator at Johnson Clinics, considers if the site should participate in the Granular Study of monogenic diabetes, based on interest expressed by Dr. Jones on behalf of his patient Jeff Smith. Janis feels confident that the Johnson patient base includes plenty of patients who would qualify as subjects for the study. In an earlier time

she would have used a paper copy of the protocol to identify the eligibility criteria, and would have keyed a series of Boolean searches into the EHR's search engine. But with the advent of the Execute Patient Search profile, she invokes the Research Information Consumer actor, provides the unique identifier of the study, and a list of eligible patients appears automatically. Janis then works the list, contacting patients and inviting them to consent to the study.

X.4.2.4.2 Execute Patient Search Process Flow

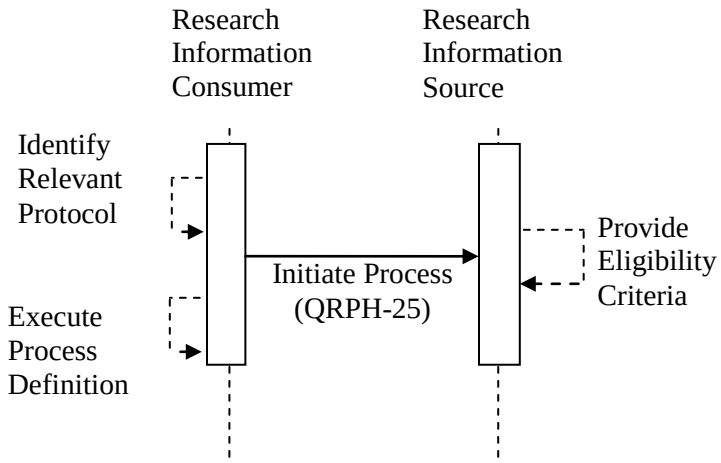

Figure X.4.2.4.2-1: Use Case Process Flow

Pre-conditions:

- The EHR identifies a study by unique identifier.
- The research sponsor creates the research protocol for the topic of interest to the EHR with eligibility criteria in executable format.

Main Flow:

The Research Information Consumer retrieves research protocol with the eligibility criteria in executable format (the "app") from the Research Information Source.

Post-conditions:

- The 'app' is run within the EHR and automatically creates a list of eligible patients
- The EHR's site clinical research coordinator uses the list to recruit patients and notifies the research sponsor (Research Information Source) of any patients that are interested.

X.4.2.5 Use Case #5: Publish Protocol to Subscribers

A clinical research sponsor publishes an executable research protocol to all subscribing healthcare sites. A subscribing, EHR-using healthcare site receives notification of the new research protocol. The site's research coordinator uses the study description to assess the study.

X.4.2.5.1 Publish Protocol to Subscribers Description

Clinical research sponsors elect to publish executable research protocols to all subscribing healthcare sites. The executable research protocols are categorized by clinical research topic. Healthcare sites with EHR systems subscribe to clinical research topics of interest. When a clinical research sponsor publishes an executable research protocol that matches a topic of interest, the subscribing healthcare sites may elect to download a copy of the executable protocol into their EMR system.

A research sponsor develops a new clinical study definition as part of a program to create a novel medical product or procedure. The detailed study definition is loaded into a clinical research system. The clinical research system has a publish/subscribe capability that provides EHR systems with the ability to subscribe to a list of specific, standardized research topics. After the study definition is loaded into the clinical research system, the system identifies the standardized clinical research topics associated with the study, and searches the list of EHR system subscribers for matches. The clinical research system uses the study definition to create an executable protocol application, and a notification citing the availability of the protocol application is sent to each subscribing EHR system.

The EHR system receives the notification that a new study protocol is available in a clinical research area of interest previously expressed by the site. The healthcare site's research coordinator signs onto the EHR system, receives a notification that a new study protocol is available, and elects to download the protocol application. The EHR system informs the site coordinator that the new study protocol application is available and ready for review. The clinical research system publishes this study definition in the form of an executable protocol application. A healthcare site may elect to unsubscribe to specific clinical research topics and may elect to ignore certain published study protocols.

Using today's systems and processes, patients must be matched to new clinical research studies manually. The initial study information is sent to the site coordinator via phone calls and mail. The site coordinator receives a protocol document that is not machine-readable, and must manually enter the eligibility criteria, execute the search jobs, and create the de-identified list of potential research subjects. This process inhibits the research sponsor's ability to identify suitable research subjects in a timely manner, but also makes it difficult for patients to find new clinical research studies that meet their interests and needs.

Today's manual processes also do not leverage the EHR systems and machine-readable study designs that are available today. EHR systems contain much of the information needed to match patients to clinical research studies. The CDISC Study Design Model (SDM-XML) makes it possible to capture key eligibility criteria in a more machine-readable way. This profile is

intended to develop an automated capability that leverages these technologies to improve the efficiency and cost effectiveness of patient recruitment for clinical research. It also improves patient access to clinical research by making it easier for healthcare sites using EHRs to find research studies that meet the needs of their patients.

X.4.2.5.2 Publish Protocol to Subscribers Process Flow

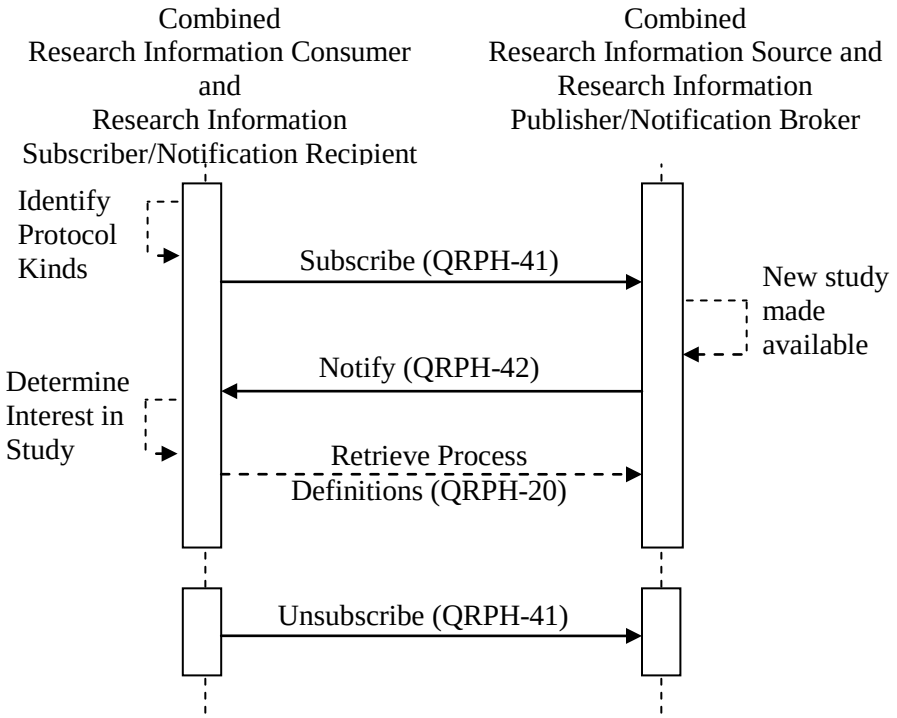

Figure X.4.2.5.2-1: Use Case Process Flow

X.5 RM Security Considerations

Research Matching includes clinical content related to the information subject. As such, the transfers of Personal Health Information (PHI) will be protected. The IHE ITI ATNA Integration Profile SHOULD be implemented by all of the actors involved in the IHE transactions specified in this profile to protect node-to-node communication and to produce an audit trail of the PHI related actions when they exchange messages, though other private security mechanisms MAY be used to secure content within enterprise managed systems. When sending information to research systems which need to know the identity of the user and the location to identify the data source, the XUA MAY be utilized to support this implementation. In some cases patient identity may need to be protected in Research Matching systems. This MAY be addressed through Pseudonymization techniques as described by the IHE Pseudonymization White Paper. In some cases consent may be needed to provide this information to the research system. For these cases, the IHE ITI BPPC Integration Profile SHOULD be used to enable this consent management.

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X.6 RM Cross Profile Considerations

None

Appendices

None

Volume 2 – Transactions

Add section 3.40

3.40 RetrieveResearchStudyList [QRPH-40]

3.40.1 Scope

This transaction is used by the Research Information Consumer to fetch a patient context specific list of applicable research studies from the Research Information Source. The patient context is determined by processes outside the scope of this transaction.

3.40.2 Actor Roles

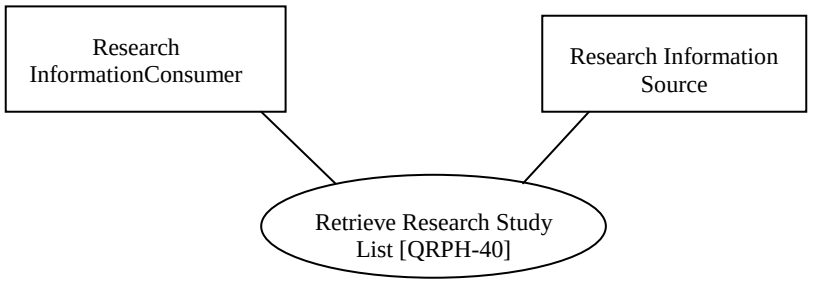


Figure 3.40.2-1: Use Case Diagram

Table 3.40.2-1: Actor Roles

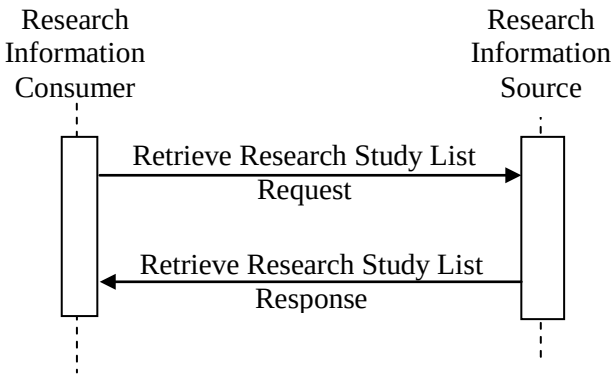
Actor:	Research Information Consumer
Role:	Supply a patient specific context. Receive the list of research studies from the Research Information Source that match the provided context.
Actor:	Research Information Source
Role:	Maintain a list of study definitions. Provide a patient context specific response to a request.

3.40.3 Referenced Standards

- Extensible Markup Language (XML) 1.0 (Second Edition). W3C Recommendation 6 October 2000. http://www.w3.org/TR/REC-xml.

- Web Services Description Language (WSDL) 1.1. W3C Note 15 March 2001. http://www.w3.org/TR/wsdl.
- SOAP 1.2 Second Edition, W3C Recommendation 27 April 2007. http://www.w3.org/TR/soap12-part1
- HL7 Version 3 Standard: Context-Aware Retrieval Application (Infobutton); Release 1http://www.hl7.org/implement/standards/product_brief.cfm?product_id=208
- RCK

3.40.4 Interaction Diagram



3.40.4.1 Retrieve Research Study List Request

Having established the patient context for the research studies, the Research Information Consumer sends a patient context specific request to the Research Information Source. The Retrieve Research Study List Request is an HTTP Request conforming to HL7 Version 3 Standard: Context-Aware Retrieval Application (Infobutton).

3.40.4.1.1 Trigger Events

A context aware request is triggered by the Research Information Consumer in response to a user clicking on the research infobutton in an EHR.

3.40.4.1.2 Message Semantics

The Retrieve Research Study List Request is sent as a set of name-value pairs in an HTTP POST transaction. Refer to Retrieve Clinical Knowledge Table 3.40.4.1.2-1: Infobutton Request Parameters for permissible and required parameters. The search SHALL meet all the passed criteria.

Table 3.40.4.1.2-1: Infobutton Request Parameters

Parameter Name	Repeatable	Required/ Optional
patientPerson.administrativeGenderCode	N	R2
ageGroup	N	R
mainSearchCriteria	Y	R

Gender. The Research Information Consumer shall send the gender when it is known. When the gender is not known, this parameter may be omitted1. The code system is fixed by the HL7 Infobutton Standard to be codes from the HL7 Administrative Gender domain. Table 3.40.4.1.2-2 below lists the allowed codes that shall be used in a request.

Table 3.40.4.1.2-2: Administrative Gender Codes

Code	Description
M	Male
F	Female
UN	Undifferentiated, used when gender cannot be distinguished. This is commonly misinterpreted to be Unknown, but that interpretation is not correct.

Age. The ageGroup parameter may use terms from the Medical Subheadings (MeSH) Code System (2.16.840.1.113883.6.177) from UMLS described in the table below.

Table 3.40.4.1.2-3: Age Group Codes

Concept code	Display name
D007231	infant, newborn; birth to 1 month
D007223	Infant; 1 to 23 months
D002675	child, preschool; 2 to 5 years
D002648	child; 6 to 12 years
D000293	adolescent; 13-18 years
D055815	young adult; 19-24 years
D000328	adult; 19-44 years
D000368	aged; 56-79 years
D008875	middle aged; 45-64 years

Concept code	Display name
D000369	aged, 80 and older; a person 80 years of age and older

mainSearchCriteria. The mainSearchCriteria parameters are used to send coded information about the term being queried. Usually this will be a coded diagnosis term. The general format is derived from the EligibilityCriterion model as presented in the CRPC content profile. The parameters will have two requited components:

`EligibilityCriterion.code` – the code identifying the meaning of the parameter
`EligibilityCriterion.value` – the value of the parameter.

Depending on the type of parameter, in addition to the value, it may have the following properties:

`EligibilityCriterion.value.codeSystem` – the code system from which the value comes
`EligibilityCriterion.value.unit` – the units for the value, when the value is some measurable quantity

For example, the search criteria for diagnosis of diabetes can be represented as
`EligibilityCriterion.code="DIAG"` – the parameter represents a diagnosis
`EligibilityCriterion.value="E10"` – the value is insulin-dependent diabetes mellitus
`EligibilityCriterion.value.codeSystem="2.16.840.1.113883.6.90"` – the value comes from the ICD-10 code system.

Possible values for `EligibilityCriterion.code` may come from the following value set:

Table 3.40.4.1.2-4: Eligibility Criterion Codes

Problem Codes	
Code	**Description**
64572001	Condition
418799008	Symptom
404684003	Finding
409586006	Complaint
248536006	Functional limitation
55607006	Problem
282291009	Diagnosis

The codes come from the Snomed CT code system.

3.40.4.1.3 Expected Actions

665 The Research Information Consumer SHALL generate an HTTP POST request passing the Infobutton parameters described above.

3.40.4.2 Retrieve Research Study List Response

This message is used by the Research Information Source to return a document that lists patient context specific research studies to the Research Information Consumer.

670 #### 3.40.4.2.1 Trigger Events

This message is triggered by the completion of the list of relevant research studies.

3.40.4.2.2 Message Semantics

A Research Information Source actor is required to return the following values:

675 **Table 3.40.4.2.2.-1: Response Codes**

Response Code	When to Return	Support
200 – OK	If the request is valid and data are available.	R
304 – Not Modified	If the request is a valid conditional GET [see HTTP specification], and the document has not been modified since the requested modification date.	O
400 – Bad Request	If the request is not valid.	R
401 – Authorization Required	If the request requires authentication, and an Authorization header is not present, or is not valid.	O
403 – Forbidden	If access needs to be denied for reasons other than authentication failure [e.g., because the request comes from a Node that is not allowed access to the document].	R
404 – Not Found	If the request is syntactically valid, but the document cannot be located, or does not otherwise exist.	R
410 – Gone	If the request is valid, and the document once existed, but is no longer available [e.g., the document may have been removed at the patients request].	O
5XX – Server Error	The server may return any error code beginning with the digit 5 to indicate a server error.	O

3.40.4.2.3 Expected Actions

The Research Information Source shall accept requests in HTTP POST methods.

Upon receipt of the Research Study List, the Research Information Source shall parse the request and return the response as specified.

3.40.5 Security Considerations

There is no individually identifiable health information being exchanged, and therefore no audit logging requirements.

3.40.5.1 Security Audit Considerations

There is no individually identifiable health information being exchanged, and therefore no audit logging requirements.

Add section 3.41

3.41 ResearchInformationSubscribe [QRPH-41]

This section corresponds to Transaction QRPH-41 of the IHE QRPH Technical Framework. Transaction QRPH-41 is used by the Research Information Consumer and the Research Information Source actors. The transaction uses the Publish/Subscribe Infrastructure as described in IHE ITI TF-3: 4.4. The Research Information Source represents a combined Publisher/Notification Broker and the Research Information Consumer represents a Combined Subscriber/Notification recipient, as described in IHE ITI TF-3: 4.4.1.4.

3.41.1 Scope

This transaction involves a request by the Research Information Consumer actor to the Research Information Source actor to start a subscription using a particular set of filters, or to cancel an existing subscription

3.41.2 Actor Roles

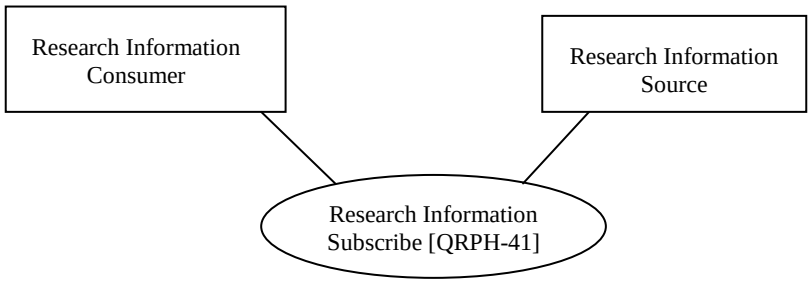


Figure 3.41.2-1: Use Case Diagram

Table 3.41.2-1: Actor Roles

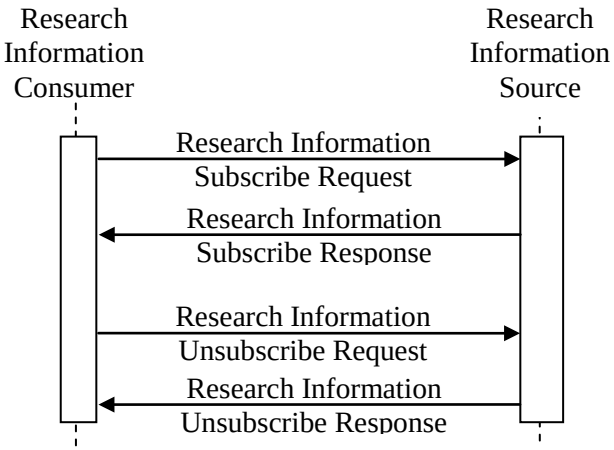
Actor:	Research Information Consumer
Role:	Sends subscription requests, or subscription cancellation messages to the Research Information Source
Actor:	Research Information Source
Role:	Manages subscriptions of Research Information Consumers

3.41.3 Referenced Standards

- IHE ITI TF-3: 4.4 – Publish/Subscribe Infrastructure

- OASIS Web Services Notification Family of Standards
- WS-BaseNotification 1.3 OASIS Standard
- WS-BrokeredNotification 1.3 OASIS Standard
- WS-Topics 1.3 OASIS Standard
- IHE QRPH TF: Clinical Research Process Content (CRPC)
- IHE ITI TF-2x: Appendix V

3.41.4 Interaction Diagram



3.41.4.1 Research Information Subscribe Request

3.41.4.1.1 Trigger Events

A user's decision to receive information about particular types of clinical research studies will result in an action in the Research Information Consumer system to trigger a Research Information Subscribe Request.

3.41.4.1.2 Message Semantics

The Subscribe Request message shall comply with the requirements in the WS-BaseNotification standard as described in IHE ITI TF-3: 4.4.2.1.4.1.2.

This transaction uses simple topics in accordance with the WS-Topics standard and as specified in IHE QRPH TF-2: 3.41.5.

This transaction uses a filter based on a variety of concepts and codes as specified in IHE QRPH TF-2: 3.41.5 Subscription Topics and Filter Expressions.

3.41.4.1.3 Expected Actions

The expected actions are described in IHE ITI TF-3: 4.4.2.1.4.1.3. The subsequent matching on filter expressions, which is performed by the Research Information Source, is further described in IHE QRPH TF-2: 3.41.5 Subscription Topics and Filter Expressions.

3.41.4.1.4 Example

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:hl7="urn:hl7-org:v3"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd urn:hl7-org:v3 ../TBD">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/NotificationProducer/SubscribeRequest</a:Action>
        <a:MessageID>382dcdc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
    </s:Header>
    <s:Body>
        <wsnt:Subscribe>
            <!-- The Recipient on whose behalf the subscription is requested - the address where
the notification is to be sent -->
            <wsnt:ConsumerReference>
                <a:Address>https://ResearchInformationConsumer/StudyNotification</a:Address>
            </wsnt:ConsumerReference>
            <wsnt:Filter>
                <wsnt:TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:MinimalStudyInformation</wsnt:TopicExpression>
                <hl7:eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
                    <hl7:code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
                    <hl7:value xsi:type="CD" code="E10-E14" codeSystem="2.16.840.1.113883.6.90"/>
                </hl7:eligibilityCriterion>
            </wsnt:Filter>
            <wsnt:InitialTerminationTime>2010-05-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
        </wsnt:Subscribe>
    </s:Body>
</s:Envelope>
```

3.41.4.2 Research Information Subscribe Response

3.41.4.2.1 Trigger Events

This message is an immediate response to a Subscribe Request, and it is sent from the Research Information Source to the Research Information Consumer.

3.41.4.2.2 Message Semantics

The message semantics are described in IHE ITI TF-3: 4.4.2.1.4.2.2.

3.41.4.2.3 Expected Actions

The expected actions are described in IHE ITI TF-3: 4.4.2.1.4.2.3.

3.41.4.2.4 Example

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:ihe="urn:ihe:iti:dsub:2009"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/NotificationProducer/SubscribeResponse</a:Action>
    </s:Header>
    <s:Body>
        <wsnt:SubscribeResponse>
            <!-- A WS-Addressing endpoint, where modification and cancelation requests for this
subscription must be sent -->
            <wsnt:SubscriptionReference>
                <a:Address>https://ResearchInformationSource/Subscription/</a:Address>
                <a:ReferenceParameters>
                    <ihe:SubscriptionId>382dcdc7-8e84-9fdc-8443-48fd83bca938</ihe:SubscriptionId>
                </a:ReferenceParameters>
            </wsnt:SubscriptionReference>
            <wsnt:TerminationTime>2008-05-31T00:00:00Z</wsnt:TerminationTime>
        </wsnt:SubscribeResponse>
    </s:Body>
</s:Envelope>
```

3.41.4.3 Research Information Unsubscribe Request

3.41.4.3.1 Trigger Events

When a subscription is no longer needed, a Research Information Consumer will trigger an Unsubscribe Request message.

3.41.4.3.2 Message Semantics

The message semantics are described in IHE ITI TF-3: 4.4.2.1.4.3.2.

3.41.4.3.3 Expected Actions

The expected actions are described in IHE ITI TF-3: 4.4.2.1.4.3.3.

3.41.4.3.4 Example

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
```



```
    xmlns:ihe="urn:ihe:iti:dsub:2009"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/SubscriptionManager/UnsubscribeRequest</a:Action>
        <a:MessageID>382dcdc9-8e86-9fde-8445-48fd83bca93a</a:MessageID>
        <a:To>https://ResearchInformationSource/Subscription/</a:To>
        <ihe:SubscriptionId a:IsReferenceParameter="true">382dcdc7-8e84-9fdc-8443-
48fd83bca938</ihe:SubscriptionId>
    </s:Header>
    <s:Body>
        <wsnt:Unsubscribe/>
    </s:Body>
</s:Envelope>
```

3.41.4.4 Research Information Unsubscribe Response

3.41.4.4.1 Trigger Events

This message is an immediate response to an Unsubscribe Request message, and it is sent from the Research Information Source to the Research Information Consumer.

3.41.4.4.2 Message Semantics

The message semantics are described in IHE ITI TF-3: 4.4.2.1.4.4.2.

3.41.4.4.3 Expected Actions

The actions are described in IHE ITI TF-3: 4.4.2.1.4.4.3.

The Research Information Source shall cancel the corresponding subscription.

The Research Information Consumer shall mark the corresponding subscription as successfully terminated.

3.52.4.4.4 Example

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/SubscriptionManager/UnsubscribeRequest</a:Action>
    </s:Header>
    <s:Body>
        <wsnt:UnsubscribeResponse/>
    </s:Body>
</s:Envelope>
```


3.41.5 Security Considerations

There is no individually identifiable health information being exchanged, and therefore no audit logging requirements.

3.41.5.1 Security Audit Considerations

There is no individually identifiable health information being exchanged, and therefore no audit logging requirements.

3.41.6 Subscription Topics and Filter Expressions

This transaction restricts the subscription topic to be a MinimalStudyInformation (IHE QRPH TF-2: 3.41.5.1) and restricts the semantics of filter expressions to the semantics of a subset (IHE QRPH TF-2: 3.41.5.2) of the CRPC Eligibility Criterion content module.

3.41.6.1 Topics

This transaction defines simple topics as described in the WS-Topics specification. The Research Information Source shall support the following topics in a Research Information Subscribe Request, and the Research Information Consumer Subscriber may support a subset of these:

3.41.6.1.1 ihe:MinimalStudyInformation

This topic indicates that the events for which the subscription is made shall be the availability of a clinical research study definition, and that the notification shall contain the minimal set of data identifying each matching research study as described in the Notification transaction in IHE ITI QRPH-2: 3.Y4.4.1.2.

3.41.6.2 Building Filter Expressions

The study definition, specified in IHE QRPH TF-3: 8.3.4.S1 (found in the IHE QRPH CRPC supplement), describes how eligibility criteria are represented in the study definition. This transaction limits the filtering expression to only a subset of the conditions that can be expressed in a study definition, and uses the syntax of the Eligibility Criterion content module, specified in IHE QRPH TF-3: 8.3.4.S1 (found in the IHE QRPH CRPC supplement) to express the filter.

In this transaction, the stream of events, for which subscriptions are possible, is limited to events representing the existence a clinical research study. The evaluation of filter expressions happens when a new clinical research study becomes known to the Research Information Source. The Research Information Source becomes aware of such events via mechanisms, not specified by IHE. The Research Information Source shall determine if there is a subscription which matches any of the clinical research studies in an event.

A match means that a clinical research study definition contains the set of eligibility criteria described in the subscription.

A good understanding of the Eligibility Criterion content module is necessary to understand how the filter expressions work. For example, the eligibility criteria shown below

```
<eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
    <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
    <value xsi:type="CD" code="J45" codeSystem="2.16.840.1.113883.6.90"/>
    <precondition typeCode="PRCN">
        <conjunctionCode code="OR"/>
        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
            <value xsi:type="CD" code="J45.2" codeSystem="2.16.840.1.113883.6.90"/>
        </eligibilityCriterion>
    </precondition>
    <precondition typeCode="PRCN">
        <conjunctionCode code="OR"/>
        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
            <value xsi:type="CD" code="J45.3" codeSystem="2.16.840.1.113883.6.90"/>
        </eligibilityCriterion>
    </precondition>
    <precondition typeCode="PRCN">
        <conjunctionCode code="OR"/>
        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
            <value xsi:type="CD" code="J45.4" codeSystem="2.16.840.1.113883.6.90"/>
        </eligibilityCriterion>
    </precondition>
    <precondition typeCode="PRCN">
        <conjunctionCode code="OR"/>
        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
            <value xsi:type="CD" code="J45.5" codeSystem="2.16.840.1.113883.6.90"/>
        </eligibilityCriterion>
    </precondition>
    <precondition typeCode="PRCN">
        <conjunctionCode code="OR"/>
        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
            <value xsi:type="CD" code="J45.9" codeSystem="2.16.840.1.113883.6.90"/>
        </eligibilityCriterion>
    </precondition>
</eligibilityCriterion>
```

will match patients with active asthma problems. When used as a filter expression, the same structure will yield a match against a study definition, where the eligibility criteria are for one of the ICD-10 codes J45, J45.2, J45.3, J45.4, J45.5, J45.9. The following snippet shows an example of such a definition:

```
<clinicalStudyDefinition xmlns="urn:hl7-org:v3"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        classCode="CLNTRL" moodCode="DEF">
    <templateId><item root="1.2.3.4.5.6"/></templateId>
    <!-- Study Description Content Module -->
    <!-- Multiple IDs can describe the various IDs associated with the study -->
    <id>
        <item root="1.2.3.4" extension="ABCD"/>
    </id>
    <title value="Study Title"/>
    <text value="Study Description"/>
    <!-- Eligibility criteria -->
```



```
    <!-- Adults age 18-55, with Severe Persistent Asthma, coded in ICD-10 -->
    <precondition typeCode="PRCN">
        <conjunctionCode code="AND"/>
        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
            <id>
                <item root="6.2.3.4.5" extension="218"/>
            </id>
            <code code="AGE" valueSet="3.3.4.5"/>
            <text value="Adults between 18 and 55"/>
            <value xsi:type="IVL_PQ">
                <low value="18" unit="year"/>
                <high value="55" unit="year"/>
            </value>
        </eligibilityCriterion>
    </precondition>
    <precondition typeCode="PRCN">
        <conjunctionCode code="AND"/>
        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
            <id>
                <item root="6.2.3.4.5" extension="234"/>
            </id>
            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
            <text value="Severe persistent asthma"/>
            <value xsi:type="CD" code="J45.5" codeSystem="2.16.840.1.113883.6.90"/>
        </eligibilityCriterion>
    </precondition>
    <!-- Definition of the different epochs of the study -->
    <component1 typeCode="COMP">
        <sequenceNumber value="1"/>
        <epoch classCode="CLNTRL" moodCode="DEF">
            <id extension="ABDC" root="1.2.3.4"/>
            <code code="Treatment" valueSet="2.3.4.5"/>
            <title value="First Treatment Epoch"/>
        </epoch>
    </component1>
    <component1 typeCode="COMP">
        <sequenceNumber value="2"/>
        <epoch classCode="CLNTRL" moodCode="DEF">
            <id root="2.3.4.5" extension="ABLMN"/>
            <code code="Treatment" valueSet="2.3.4.5"/>
            <title value="Second treatment epoch"/>
        </epoch>
    </component1>
    <!-- Definition of the different arms of the study -->
    <component2 typeCode="COMP">
        <arm classCode="CLNTRL" moodCode="DEF">
            <id>
                <item root="2.3.4.6" extension="MLNOP"/>
            </id>
            <title value="Arm 1"/>
        </arm>
    </component2>
    <component2 typeCode="COMP">
        <arm classCode="CLNTRL" moodCode="DEF">
            <id>
                <item root="2.3.4.6" extension="MLNOQ"/>
            </id>
            <title value="Arm 2"/>
        </arm>
    </component2>
…
</clinicalStudyDefinition>
```


When a Research Information Consumer constructs a filter expression, it shall include the whole eligibility criterion expression (as shown above) directly in the Subscribe Request message as a child of the wsnt:Filter element:

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/NotificationProducer/SubscribeRequest</a:Action>
        <a:MessageID>382dcdc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
    </s:Header>
    <s:Body>
        <wsnt:Subscribe>
            <!-- The Recipient on whose behalf the subscription is requested - the address where
the notification is to be sent -->
            <wsnt:ConsumerReference>
                <a:Address>https://ResearchInformationConsumer/StudyNotification</a:Address>
            </wsnt:ConsumerReference>
            <wsnt:Filter>
                <wsnt:TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:MinimalStudyInformation</wsnt:TopicExpression>
                <eligibilityCriterion xmlns="urn:hl7-org:v3" classCode="CLNTRL" moodCode="CRT">
                    <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
                    <value xsi:type="CD" code="J45" codeSystem="2.16.840.1.113883.6.90"/>
                    <precondition typeCode="PRCN">
                        <conjunctionCode code="OR"/>
                        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
                            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
                            <value xsi:type="CD" code="J45.2"
codeSystem="2.16.840.1.113883.6.90"/>
                        </eligibilityCriterion>
                    </precondition>
                    <precondition typeCode="PRCN">
                        <conjunctionCode code="OR"/>
                        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
                            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
                            <value xsi:type="CD" code="J45.3"
codeSystem="2.16.840.1.113883.6.90"/>
                        </eligibilityCriterion>
                    </precondition>
                    <precondition typeCode="PRCN">
                        <conjunctionCode code="OR"/>
                        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
                            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
                            <value xsi:type="CD" code="J45.4"
codeSystem="2.16.840.1.113883.6.90"/>
                        </eligibilityCriterion>
                    </precondition>
                    <precondition typeCode="PRCN">
                        <conjunctionCode code="OR"/>
                        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
                            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
                            <value xsi:type="CD" code="J45.5"
codeSystem="2.16.840.1.113883.6.90"/>
                        </eligibilityCriterion>
```



```
                    </precondition>
                    <precondition typeCode="PRCN">
                        <conjunctionCode code="OR"/>
                        <eligibilityCriterion classCode="CLNTRL" moodCode="CRT">
                            <code code="64572001" codeSystem="2.16.840.1.113883.6.96"/>
                            <value xsi:type="CD" code="J45.9"
codeSystem="2.16.840.1.113883.6.90"/>
                        </eligibilityCriterion>
                    </precondition>
                </eligibilityCriterion>
            </wsnt:Filter>
            <wsnt:InitialTerminationTime>2008-07-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
        </wsnt:Subscribe>
    </s:Body>
</s:Envelope>
```

The actual implementation of how the Research Information Source evaluates the filter expression, and how it performs the matching against the existing subscriptions, is out of scope of this profile. It is expected that such implementation details will allow vendors to differentiate themselves in the marketplace.

It is important to note that not all eligibility criteria, and not all expressions defined for the research study definitions are suitable for filter expressions. The Research Information Source shall support the following types of eligibility criteria when used in subscription requests, and the Research Information Source may support a subset of these:

3.41.6.2.1 Subscriptions based on condition, symptom, diagnosis, problem, finding

Research Information Sources that accept a Subscribe Request containing filter expressions based on condition, symptom, diagnosis, problem, or finding shall yield a match as described earlier in this section. The structure of the eligibility criterion is as follows:

- a top-level `<eligibilityCriterion>` element containing:
  - a `<code>` element, which describes the type of criterion
  - a `<value>` element, containing the matching value or expression
  - optionally, zero or more `<precondition>` elements, each containing:
    - a `<conjunctionCode>` expressing the logical relationship among the criteria
    - exactly one nested `<eligibilityCriterion>`

The list of codes to be used in the `<code>` element of an eligibility criterion is shown in the following table:

Table 3.41.6.2.1-1: Eligibility Criterion Codes

Code	Description
64572001	Condition

Code	Description
418799008	Symptom
404684003	Finding
409586006	Complaint
55607006	Problem
282291009	Diagnosis

The codes come from the Snomed CT code system.

3.41.6.3 Combining Topics and Filter Expressions

A topic defines static rules for creating notifications. This transaction defines one topic in IHE QRPH TF-2: 3.41.5.1. Each subscription request shall contain exactly one topic expression.

A filter expression describes a specific set of properties associated with a research study. If multiple top-level eligibility criteria are listed in one subscription request, they shall be considered as combined via a logical AND. Within a top level-level eligibility criterion this specification allows only one level of nesting via the `<precondition>` element, and the logical relationship is described in the `<conjunctionCode>` element. The possible values for the `code` attribute of the `<conjunctionCode>` element are "OR", "AND", "NOT", "AND NOT", and "OR NOT".

Add section 3.42

3.42 ResearchInformationNotify [QRPH-42]

This section corresponds to Transaction QRPH-42 of the IHE QRPH Technical Framework.
Transaction QRPH-42 is used by the Research Information Consumer and the Research Information Source actors. The transaction uses the Publish/Subscribe Infrastructure as described in IHE ITI TF-3: 4.4. The Research Information Source represents a combined Publisher/Notification Broker and the Research Information Consumer represents a Combined Subscriber/Notification recipient, as described in IHE ITI TF-3: 4.4.1.4.

3.42.1 Scope

This transaction delivers a notification from the Research Information Source to the Research Information Consumer about an event which matches an existing subscription.

3.42.2 Actor Roles

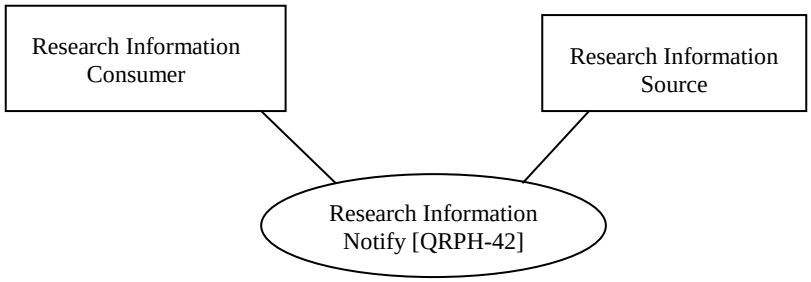


Figure 3.42.2-1: Use Case Diagram

Table 3.42.2-1: Actor Roles

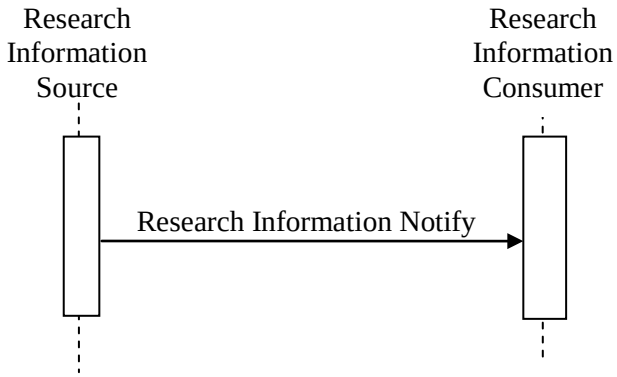
Actor:	Research Information Consumer
Role:	Receives and processes notifications about events matching a set of filter expressions.
Actor:	Research Information Source
Role:	Sends notifications to subscribed Research Information Consumers based on events matching a set of filter expressions

3.42.3 Referenced Standards

- IHE ITI TF-3: 4.4 – Publish/Subscribe Infrastructure

- OASIS Web Services Notification Family of Standards
- WS-BaseNotification 1.3 OASIS Standard
- WS-BrokeredNotification 1.3 OASIS Standard
- WS-Topics 1.3 OASIS Standard
- IHE QRPH TF: Clinical Research Process Content (CRPC)
- IHE ITI TF-2x: Appendix V

3.42.4 Interaction Diagram



3.42.4.1 Research Information Notify

3.42.4.1.1 Trigger Events

When an event occurs where the topics of the event match the filter requirements of one or more existing subscriptions, the Research Information Source will trigger a Notification message to the corresponding Research Information Consumer. The description of matching subscriptions to events can be found in IHE QRPH TF-2: 3.41.5.2.

3.42.4.1.2 Message Semantics

Depending on the event which triggered the notification, there may be one or more study definitions whose eligibility criteria match the filter conditions of any particular subscription. This transaction defines the following structure for conveying a Notify message:

- There shall be a single `wsnt:Notify/wsnt:NotificationMessage/wsnt:Message` element in this transaction

- The response consists of a `<hl7:clinicalStudyDefinition>` element, representing a specific clinical study. This element will contain only the one or more IDs that identify the corresponding study definition.
- If multiple study definitions need to be represented in a single notification, their `<hl7:clinicalStudyDefinition>` structures shall be siblings under the single `wsnt:Message` element.

3.42.4.1.3 Expected Actions

The Research Information Consumer shall accept the Notify message. The Notify message shall be processed according to the configuration and business logic of the actor. Possibilities include conveying the notification information to other systems and/or users.

The Research Information Source may send the filter conditions of the subscription. This does not require any action from the Research Information Consumer.

3.42.4.1.4 Examples

3.42.4.1.4.1 Minimal Notification Example

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:hl7="urn:hl7-org:v3"
    xmlns:ihe="urn:ihe:iti:dsub:2009"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd urn:ihe:iti:xds-b:2007
../../schema/IHE/XDS.b_DocumentRepository.xsd urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0
../../schema/ebRS/rim.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-2/NotificationConsumer/Notify</a:Action>
        <a:MessageID>382dcdca-8e87-9fdf-8446-48fd83bca93b</a:MessageID>
        <a:To>https://ResearchInformationConsumer/ResearchInformationNotification</a:To>
    </s:Header>
    <s:Body>
        <wsnt:Notify>
            <wsnt:NotificationMessage>
                <wsnt:SubscriptionReference>
                    <a:To>https://ResearchInformationSource/Subscription/</a:To>
                    <ihe:SubscriptionId>382dcdc7-8e84-9fdc-8443-48fd83bca938</ihe:SubscriptionId>
                </wsnt:SubscriptionReference>
                <wsnt:Topic Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:MinimalStudyInformation</wsnt:Topic>
                <wsnt:ProducerReference>
                    <a:Address>https://ProducerReference</a:Address>
                </wsnt:ProducerReference>
                <wsnt:Message>
                  <hl7:clinicalStudyDefinition>
                    <hl7:id>
                      <hl7:item root="1.2.3.4" extension="ABCD"/>
                    </hl7:id>
                  </hl7:clinicalStudyDefinition>
                </wsnt:Message>
            </wsnt:NotificationMessage>
```



```
        </wsnt:Notify>
    </s:Body>
</s:Envelope>
```

1225

3.42.5 Security Considerations

There is no individually identifiable health information being exchanged, and therefore no audit logging requirements.

3.42.5.1 Security Audit Considerations

1230 There is no individually identifiable health information being exchanged, and therefore no audit logging requirements.

Appendices

None

Volume 2 Namespace Additions

Add the following terms to the IHE General Introduction Appendix G:

None

Volume 3 – Content Modules

None

Volume 4 – National Extensions

Add appropriate Country section

None

