Integrating the Healthcare Enterprise

IHE Quality, Research and Public Health (QRPH)

Technical Framework Supplement

Redaction Services
(RSP)

Trial Implementation

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Foreword

This is a supplement to the forthcoming IHE Quality, Research and Public Health Technical Framework. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is submitted for Trial Implementation as of August 30, 2010 and will 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 forthcoming Quality, Research, and Public Health Technical Framework. Comments are invited and may be submitted on the IHE forums at http://forums.rsna.org/forumdisplay.php?f=371or by email to qrph@ihe.net.

This supplement describes changes to the existing technical framework supplement documents and where indicated amends text by addition (**bold underline**) or removal (**bold strikethrough**), as well as addition of large new sections introduced by editor's instructions to "add new text" or similar, which for readability are not bolded or underlined.

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

> *Replace Section X.X by the following:*

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

Information about IHE Quality, Research, and Public Health can be found at: http://www.ihe.net/Domains/index.cfm

Information about the structure of IHE Technical Frameworks and Supplements can be found at: http://www.ihe.net/About/process.cfm and http://www.ihe.net/profiles/index.cfm

The current versions of the IHE Technical Frameworks can be found at: http://www.ihe.net/Technical_Framework/index.cfm

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Introduction

The Redaction Services Profile (RSP) provides a method for redacting data from a document within a user's current application to meet the requirements of an external system in preparation for exporting the redacted document to the external system. RSP supports the redaction of a document according to an extraction specification provided by the external system.

Open Issues and Questions

1. How will the Document Source indentify the extraction specification?

2. How will a record of the transaction persist?

3. Quality use case?

4. How will RSP manage privacy constraints on data, e.g. IRB constraints?
5. Does the redacted document retain the format of the exported source document?

Closed Issues

1. How to export aggregate data? Out of scope, since RSP is about a document and not aggregated data.

2. Can the Redactor send a redacted document directly to the Document Receiver? No. The Redacted Document must be returned to the Source.

3. What standard controls the expression of an extraction specification? XSLT, XPath.

4. Should pseudonimization be done as an extension of Redactions Services or is that a separate profile? Separate.
5. Should the Redactor return two documents, original source and redacted version, to the Source?   Only one. The Source already has the source.

6. Should the Redactor retain the redacted data? No. The Redactor retains no data.

7. How will Redaction comply with 21 CRF 11 and the need for an audit trail? [See RFD informative appendix.]

Should the Redactor retain a copy of the Extraction Specification? The Redactor MAY retain a copy of an extraction specification. For example, the public health use case where specifications are defined by statute and persist over time.

Volume 1 – Profiles

1.1.5 Copyright Permissions

2.5 Dependencies of the QRPH Integration Profiles

Integration Profile	Depends on	Dependency Type	Purpose
HL7 Clinical Document Architecture (CDA)	None	Content definition	Defines export document
HL7 Continuity of Care Document (CCD)	CDA	Content definition	Defines export document

2.7 History of Annual Changes

X Redaction Services Integration Profile

X.1 Purpose and Scope

The Redactions Services Profile (RSP) provides a means to redact data from a document in advance of transmitting the document from a sending to a recipient system. The data that should not be transmitted from one system to another may have one or more operational requirements that make said transmission unacceptable under the given business operating environment. These requirements are the social, legal and regulatory boundaries imposed on appropriate exchange of health data. The use cases covered in this supplement refer specifically to document transactions from an EHR to research, quality (public health) and drug safety systems. However it is the intention that The Redaction Services profile be created in such a way as to be generalizable and should apply to any two systems exchanging documents.

The Redaction Service applies context-aware restrictions to data transmission by matching security and confidentiality attributes of the source information with similar requirements in the recipient system. The Redaction Service provides a 'safety-net' for systems in that only data that the recipient systems need gets transmitted. In this way Redaction Services provides means to ensure that appropriate data exchanges are taking place, a risk-amelioration strategy. The transmission occurs, a record of the transmission and its payload is created and this persists to support audit and data quality processes.

X.2 Use Cases

X.2.1 Clinical Research Use Case

Dr. Jones is conducting research into the efficacy of pain control methods for patients with chronic pain. Cohorts for the study will be recruited from the pain clinics associated with several regional medical centers. After IRB approval of Dr. Jones' protocol, health status information is requested from EHR's at each of the participant's respective institutions. Only those institutions that have data sharing agreements with Dr. Jones or her home institution are sent requests electronically. Participating institutions with valid data sharing agreements populate CRD templates with data from their EHR with only those data elements that are a part of the approved protocol. Jack Robertson is a Registered Nurse and research assistant working with Dr. Jones on this study. It is Jack's role to obtain and / or conduct pain assessments per the protocol specified assessment instrument throughout the course of the study. Jack is able to view the available pain assessments populated by as a function of the redacted requests to the available EHRs, but not the remainder of the information requested for the study. Jack conducts the pain assessments per protocol specifications, and these are provided electronically for inclusion in EHRs only for those institutions that have valid data sharing agreements with Dr. Jones or her institution.

The clinical research use case references a straight-line work-flow that starts with cohort identification and directly proceeds to admission to research-centric facility. Real world research operations involve complex social, legal and regulatory obligations concerning data use and reuse. One style of data reuse does not fit all scenarios. What is required is additional attention to details of data access and reuse permissions reflecting the variable operational requirements pertaining to issues, for example, as the intellectual property rights of research data, participant (consumer) preference, protocol requirements as imposed by one or more investigational review boards and data-sharing partnerships as specified by research and registry networks. A richer set of permission variables and a means of packaging business circumstance expressions are required to build sufficiently robust redaction schemas that will support the business and operational requirements of research data. The following use cases reflect an enhancement to the clinical research use cases as well as propose additional operational circumstances for repurposing EHR data for research, including cohort discovery.

1) Enhancement to clinical research

Without Redaction Services

The desired state as mentioned in CRD[1] without Redaction Service is reflected in the clinical research use case. It addresses the needs of a research encounter that is focused on the execution of the research protocol, and assumes a unified set of permissions for viewing a protocol form and writing that data to an EDC. It also assumes that the visit is concerned with one and only one protocol.

With Redaction Services

If there is data collection for multiple or multiple arms of a protocol, it may be necessary to collect more data in an encounter than is required for an outbound transaction to an EDC. With redaction services, any data collected will be routed to the appropriate data collection system per the explicit permission associated with the data collection use.

X.2.2 Drug Safety Redaction Use Cases

Enhancement to Drug Safety Content - Clinical Trial AE Reporting

Without Redaction Services

Dr. Smith is conducting a clinical trial and observes an adverse event in a patient enrolled in the trial. Because DSC was available, he was able to issue an adverse event case report and add his interpretation of the case during the patient visit, while the impressions were fresh in his mind. The entire process usually took him only a few minutes to complete and he knew that the report

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[1] IHE Quality, Research and Public Health (QRPH) Technical Framework Supplement, Clinical Research Document (CRD) pages 5-6 http://www.ihe.net/Technical_Framework/upload/IHE_QRPH_TF_Supplement_CRD_TI_2009-08-11.pdf

would be complete and of high quality. He also knew that he could call the report up whenever he wished to review it in light of new information or similar cases. However, when the DSC document is sent to the reporting system, there is some risk that inappropriate data may be transmitted. Thus, there is a need for an additional, potentially manual, step to ensure this in fact does not occur, and a need to document that appropriate procedures were followed preventing or removing said inappropriate data.

With Redaction Services

When the DSC document is sent to the reporting system, only those data elements permitted are sent. The redacted DSC form (with only the elements permitted) is transmitted to the recipient system. A record of the transmission and its payload are stored for future reference.

Enhancement to DSC - Post-Market Surveillance AE Reporting

Without Redaction Services
Clinical Trials and Phase IV

 In clinical trials, an investigator should be able to use a single process to report AEs across any CTs, and should not have to remember or transcribe data that already exists in the clinical systems. Additionally, to improve the reporting process, maintenance of data required for reporting should be accomplished without modification of each underlying data source system, especially given the large number of systems used in generating the data at the sites, in managing the trials, in processing the data at the manufacturers, and in receiving the data at the regulators Standardization of data collection instruments and avoidance of duplicate data entry and transcription is similarly a desire for post marketing trials. However, there is no mechanism at this time to prevent the data that should not be transmitted from being sent to a recipient system

Post-market Surveillance

The desired state for post-marketing reporting is one in which the burden to submit an AE report is very low, and is part of the routine of the reporter - especially in the case of the physician or other healthcare practitioner. This same reasoning holds true if the reporter is a consumer or patient using a system to maintain their personal health information such as a Personal Health Record. In such post-marketing AE reporting, integrated reporting solutions should trigger and pre-populate essential information to the extent possible in standard formats. [2] Again, what is missing is a means for preventing the transmission of unauthorized or inappropriate data.

With Redaction Services

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[2] Drug Safety Content Profile
http://www.ihe.net/Technical_Framework/upload/IHE_QRPH_TF_Supplement_Drug_Safety_Content_DSC_TI_2009-08-10.pdf pages 8-9

The DSC benefits persist, and additionally there is the assurance that appropriate transmission of data occurred in every case and a record of that transmission can be retrieved for any future quality or auditing purpose.

X.2.3 Quality Redaction Use Cases

<TBD>

X.2.4 Public Health Redaction Use Cases

[A standard document is defined for US domain and redacted based on each state's statutes. Reference New Born Screening white paper.]

X.3 Actors/Transactions

X.3.1 Actors

X.3.1.1 Document Source

The Document Source exports a standard document that requires redaction. The Document Source is typically an EHR, and the export is a type of CDA, specifically a CDA R2, which specifies that any change in a document requires a new identifier. The Document Source must also hand off information on where the correct extraction specification can be found. When redaction takes place as part of RFD form pre-population, the Document Source is grouped with the Form Filler.

X.3.1.2 Redactor

The Redactor receives the export document, retrieves the corresponding extraction specification, and creates a new document which contains only the extracted data and leaves behind the redacted data.

X.3.1.3 Extraction Specification Manager

The Extraction Specification Manager provides an extraction specification that tell the Redactor how to redact the document. The application of an extraction specification against an export source document creates a redacted document.

X.3.1.4 Document Consumer

The Document Consumer receives the redacted document from the document source, and applies the data to the secondary use. This actor is not specified in this profile, but is grouped with the Document Consumer of XDS or XDR, or RFD's Forms Manager when RSP is nested inside of the RFD Retrieve Form transaction.

Figure X.3-1 shows the actors directly involved in the Redaction Services Integration Profile. The final transaction, represented in dotted lines, is not part of the profile but is shown to close the loop on the process.
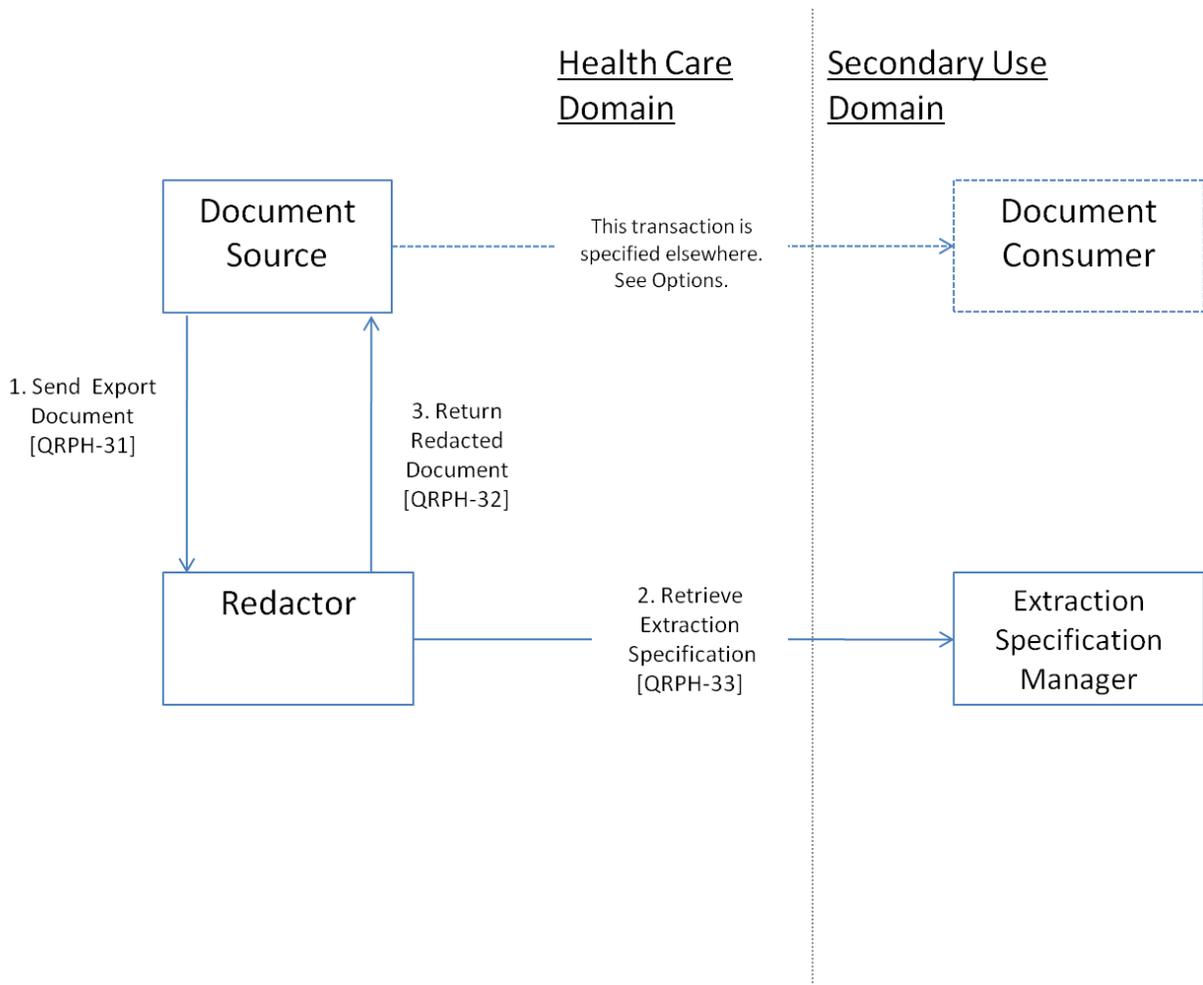

Figure X.3.1.4-1 Redaction Services Actor Diagram

Table X.3-1.4-1 lists the transactions for each actor directly involved in the Redaction Services 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 Profile and that implementations may choose to support is listed in Volume 1, Section X.4.

Table X.3.1.4-1 Redaction Services Integration Profile - Actors and Transactions

Actors	Transactions	Optionality	Section in Vol. 2
DocumentSource	SendExportDocument [QRPH-31]	R	
	ReturnRedactedDocument [QRPH-32]	R	
Redactor	RetrieveExtractionSpecification [QRPH-33]	O	
	SendExportDocument [QRPH-31]	R	
	ReturnRedactedDocument [QRPH-32]	R	
ExtractionSpecificationManager	RetrieveExtractionSpecification [QRPH-33]	R	

X.4 Redaction Services Integration Profile Options

Options that may be selected for this Integration Profile are listed in the table X.4-1 along with the Actors to which they apply.

Table X.4-1 DRR - Actors and Options

Actor	Options	Vol & Section
Document Source	Export Redaction: XDS.b Export Redaction: XDR Export Redaction: XDM Export Redaction: RFD	QRPH TF-1:X.3
Redactor	Extraction Specification	QRPH TF-3.Y+1
Extraction Definition Manager	No Options Defined	

The Document Source may export the redacted document using the ITI profiles XDS.b, XDR or XDM, but is not limited to these mechanisms. Each option is defined below:

Export Redaction: XDS.b – A Document Source that claims this option will export redacted documents by grouping with the Document Source actor in the XDS.b Integration Profile.

Export Redaction: XDR – A Document Source that claims this option will export redacted documents by grouping with the Document Source actor in the XDR Integration Profile.

Export Redaction: XDM – A Document Source that claims this option will export redacted documents by grouping with the Portable Media Creator in the XDM Integration Profile.

Export Redaction: RFD – A Document Source that claims this option will export redacted documents by grouping with the Form Filler in the RFD Integration Profile. The redacted document is sent from the Document Source to the RFD Forms Manager as pre-population data using the RFD transaction RetrieveForm transaction. See informative appendix for further description.

X.5 Groupings

The Document Source actor may be grouped with any of these actors:

- Document Source / XDS.b profile
- Document Source / XDR profile
- Portable Media Creator / XDM profile
- Form Filler/RFD profile

When grouped with these actors, the RSP Document Source will export the redacted document according to the specifications in the referenced profile.

X.6 Security Considerations

The Document Source and the Redactor reside in the same healthcare delivery site and may freely share patient identifiable health information (PHI). Export of PHI to the Document Receiver must comply with appropriate policies and preferences.

X.7 Requirements of Actors

Document Source shall be able to create a standard export document, e.g. a CCD.

Redactor shall be able to retrieve an Extraction Specification.

Extraction Specification Manager shall be able to provide an Extraction Specification.

X.8 Content Modules

None.

X.9 Process Flow
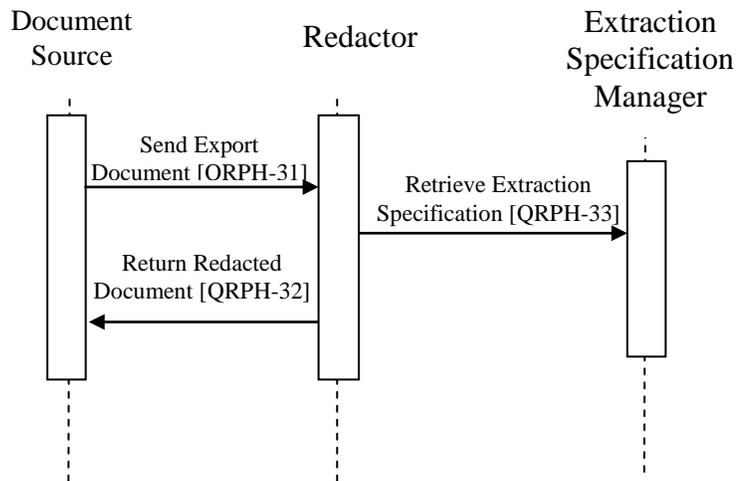
Appendix A: Actor Summary Definitions

Document Source: The Document Source produces a standard document for exchange purposes. In the context of Redaction Services, the Document Source is typically an EHR, and the export is a type of CDA.

Redactor: The Redactor receives the export document, retrieves the corresponding extraction specification, and creates a new document that contains only the extracted data.

Extraction Specification Manager: The Extraction Specification Manager provides extraction specifications that tell the Redactor how to redact the export document. The application of an extraction specification against an export source document creates a redacted document.

Appendix B: Transaction Summary Definitions

Send Export Document [QRPH-31]: In this transaction the Document Source sends an export document to the Redactor.

Retrieve Extraction Specification [QRPH-32]: In this transaction the Extraction Specification Manager sends an extraction specification to the Redactor.

Return Redacted Document [QRPH-33]**:** In this transaction the Redactor returns the redacted document to the Document Source.

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Glossary

1. **Export source document** – A CDA document from which data will be drawn to send to an external system for secondary use.

2. **Extraction specification** – An XSLT provided by a system external to the EHR which specifies which data elements of the CDA should be sent to the external system for secondary use.

3. **Extracted data** – Those data specified by the extraction specification.

4. **Redacted document** – A document that contains extracted data from the export source document which will be sent to the external system for secondary use.

5. **Healthcare domain/ secondary use domain** – The healthcare domain and its central system the EHR exist to provide medical care to patients. Data are created by the healthcare domain which are of value to the secondary use domains such as research, public health, and quality reporting. In general, only tightly specified data are permitted to be exported by the healthcare domain to a secondary use domain.

Volume 2 – Transactions and Content Modules

3.0 IHE Transactions

3.Y Send Export Document [QRPH-31]

3.Y.1 Scope

In this transaction the Document Source sends an export document to the Redactor. The Document Source specifies an extraction specification ID for the Redactor to use on the Retrieve Extraction Specification transaction.

3.Y.2 Use Case Roles
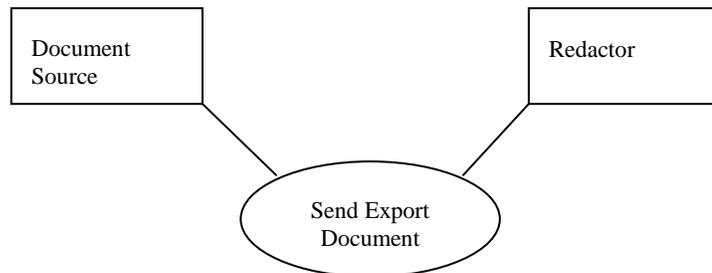
Actor: Document Source

Role: A system capable of producing and exporting a standard patient care document.

Actor: Redactor

Role: A system that applies an extraction specification to an exported document and creates a new document, a sub-set on the export, that redacts unwanted information.

3.Y.3 Referenced Standard

Additional educational information may be found on the IHE Wiki.

IETF RFC1738, Uniform Resource Locators (URL), December 1994,
http://www.faqs.org/rfcs/rfc1738.html

IETF RFC2616 HyperText Transfer Protocol HTTP/1.1

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

3.Y.4 Interaction Diagram

```
    Document
     Source                        Redactor


        ┌─┐                          ┌─┐
        │ │  SendExportDocument [QRPH-31]  │ │
        │ │ ───────────────────────────▶ │ │
        │ │                          │ │
        └─┘                          └─┘
```
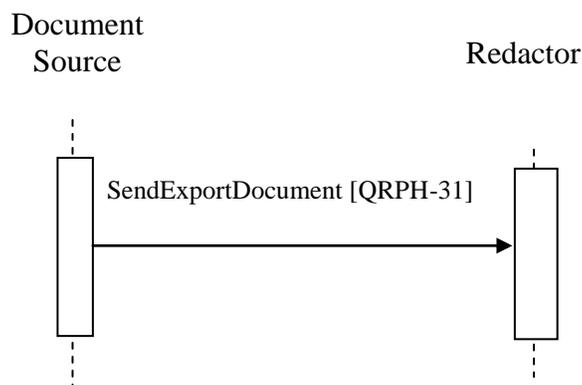
3.Y.5 Trigger Events

Send Export Document is triggered by the Document Source as part of a workflow that requires document redaction.

3.Y.6 Message Semantics: Send Export Document

Parameter Name	REQ	Description	Value
extractionSpecificationID	R	Identifies the extraction specification to be applied to the export document by the redactor.	This value is a string.
extractionSpecificationManagerURL	O	Identifies the location of the extraction specification manager from where the Redactor retrieves the extraction specification.	This value is a URL
exportDocumentID	R	Identifies the document that is exported; this value is used again in the Return Redacted Document transaction.	This value is a string.
exportDocument	R	The xml content supplied by the Document Source for redaction.	This value is a well-formed xml document.

3.Y.7 Expected Actions

The Document Source sends a standard export document to the Redactor. The Redactor should receive the document and return the redacted document as specified in the Return Redacted Document message transaction. (See error conditions in Return Redacted Document section).

3.Y.8 Security Considerations

PHI is permitted to be shared between the Document Source and the Redactor.

3.Y.8.1 Security Audit Considerations

This transaction is an auditable event.

3.Y.8.2 Actor Specific Security Considerations

The Document Source may not share PHI to the secondary use document consumer.

3.Y+1 Retrieve Extraction Specification [QRPH-33]

3.Y+1.1 Scope

In this transaction the Extraction Specification Manager sends an extraction specification to the Redactor. The Redactor will apply the data extraction to the export document, creating the redacted document. The Retrieve Extraction Specification transaction is one synchronous query and response. The interaction diagram breaks the single transactions into its two constituents, the query and response.

3.Y+1.2 Use Case Roles
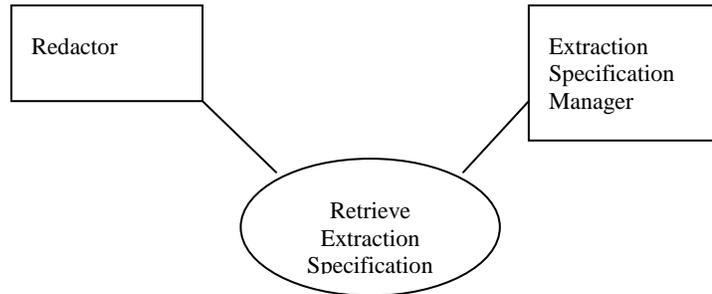
Actor: Redactor

Role: In this transaction a Redactor retrieves the extraction specification from an Extraction Specification Manager.

Actor: Extraction Specification Manager

Role: A system that contains extraction specifications that describe how a data elements can be extracted from a standard export document to produce a properly redacted document according to some policy.

3.Y+1.3 Referenced Standard

Additional educational information may be found on the IHE Wiki.

IETF RFC1738, Uniform Resource Locators (URL), December 1994, http://www.faqs.org/rfcs/rfc1738.html

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IETF RFC2616 HyperText Transfer Protocol HTTP/1.1

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

3.Y+1.4 Interaction Diagram
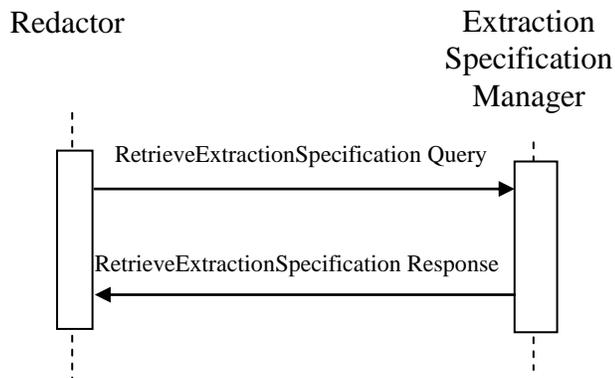
3.Y+1.4.1 Retrieve Extraction Specification

The Redactor sends the extraction specification identifier to the Extraction Specification Manager.   The Extraction Specification Manager returns the matching specification.

3.Y+1.4.1.1 Trigger Events

Retrieve Extraction Specification Request is triggered by the receipt of the export document by the Redactor.

3.Y+1.4.1.2 Message Semantics

Parameter Name	REQ	Description	Value
extractionSpecificationID	R	Identifies the extraction specification to be applied to the export document by the redactor.	This value is a string.
extractionSpecification	R	The definition for data to be extracted by the Redactor against the export document.	This value is an XSLT.

3.Y+1.4.2.3 Expected Actions

Upon receipt of the extractionSpecificationID, the Extraction Specification Manager will return the proper extraction specification. If the extractionSpecificationID is not recognized by the Extraction Specification Manager, it should return the following fault:

faultcode: Client

faultstring: Extraction Specification with extractionSpecificationID not found

3.Y+1.8 Security Considerations

PHI is permitted to be shared between the Document Source and the Redactor.

3.Y+1.8.1 Security Audit Considerations

This transaction is an auditable event.

3.Y+1.8.2 Actor Specific Security Considerations

The Document Source may not share PHI to the secondary use document consumer.

3.Y+2 Return Redacted Document [QRPH-32]

3.Y+2.1 Scope

In this transaction the Redactor returns the redacted document to the Document Source.

3.Y+2.2. Use Case Roles
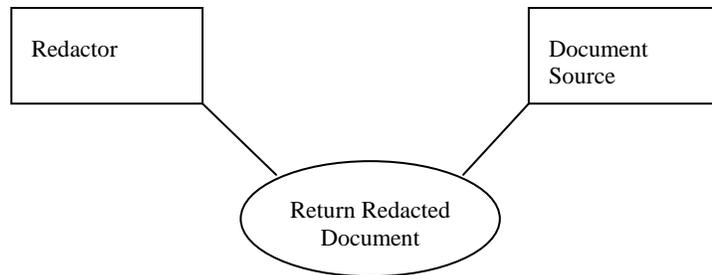
Actor: Redactor

Role: A system that applies an extraction specification to an exported document and creates a new document, a sub-set on the export, that redacts unwanted information.

Actor: Document Source

Role: A system capable of producing and exporting a standard patient care document.

3.Y+2.3 Referenced Standard

Additional educational information may be found on the IHE Wiki.

IETF RFC1738, Uniform Resource Locators (URL), December 1994,
http://www.faqs.org/rfcs/rfc1738.html

IETF RFC2616 HyperText Transfer Protocol HTTP/1.1

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

3.Y+2.4 Interaction Diagram
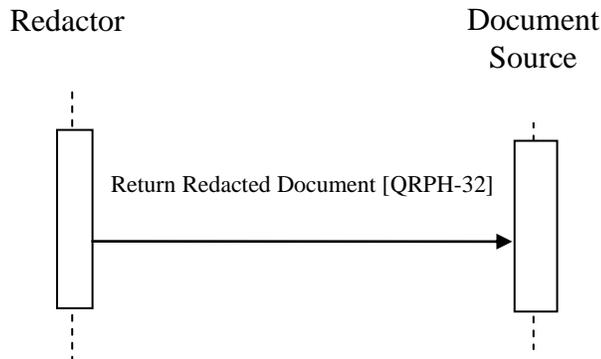
3.Y+2.4.1 Return Redacted Document

3.Y+2.4.1.1 Trigger Events

This transaction is triggered by the completion of the data extraction from the source document and the creation of the redacted document.

3.Y+2.4.1.2 Message Semantics: Return Redacted Document

Parameter Name	REQ	Description	Value
exportDocumentID	R	The original identifier sent by the Document Source assigned to the export document and retained by the redacted document.	This value is a string.
extractionSpecificationID	R	The identifier of the extraction specification retrieved by the Redactor.	This value is a string.
redactedDocument	R	The xml content returned by the Redactor to the Document Source.	This value is a well-formed xml document.

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3.Y+2.4.1.3 Expected Actions

Upon receipt of the extraction specification, the Redactor executes the Return Redacted Document transaction. If the Redactor is unable to successfully complete this transaction sequence, it should return one of the following error codes:

If the exportDocument is not correctly formatted:

faultcode: Client

faultstring: exportDocument incorrectly formatted

If the extractionSpecification could not be retrieved:

faultcode: Server

faultstring: Extraction Specification could not be retrieved

If the extractionSpecification is not well defined:

faultcode: Server

faultstring: Extraction Specification not well defined

3.Y+2.8 Security Considerations

PHI is permitted to be shared between the Document Source and the Redactor.

3.Y+2.8.1 Security Audit Considerations

This transaction is an auditable event.

3.Y+2.8.2 Actor Specific Security Considerations

The Document Source may not share PHI to the secondary use document consumer.

Appendix A: Informative Appendix on Use of Redaction with RFD

In this use case, Redaction creates the pre-population data which travels with the RFD Retrieve Form (ITI 34) request, so redaction has to precede the actual Retrieve Form transaction.

Document Source/ Form Filler	Redactor	Extraction Specification Manager

Send Export
Document [ORPH-31]

Retrieve Extraction
Specification [QRPH-33]

Return Redacted
Document [ORPH-32]

Form
Manager

RFD (ITI-34) Retrieve Form, with Redacted Document as Pre-pop
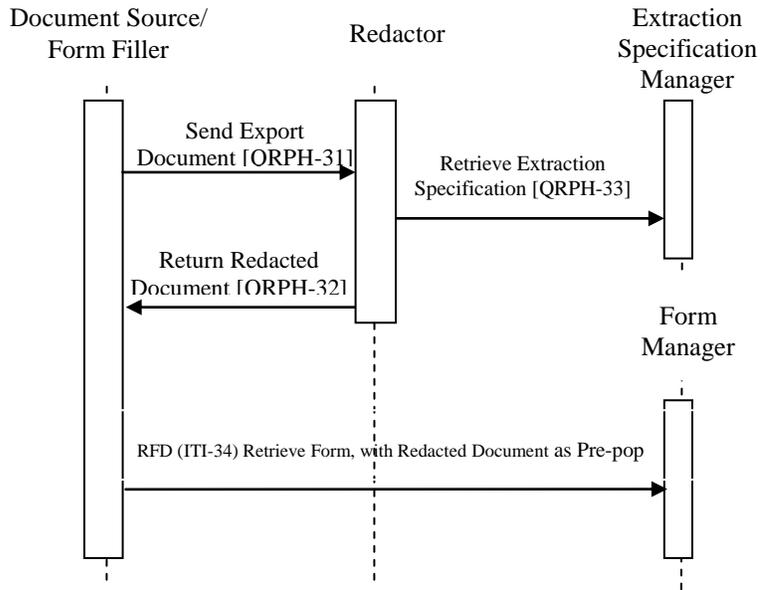
Appendix B: Schema and WSDL

The schema for Redaction is defined below:

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
    IHE Redaction Services Profile (RSP) XML Schema
    for use in WSDL definitions.

-->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
    targetNamespace="urn:ihe:qrph:rsp:2010" xmlns:rsp="urn:ihe:qrph:rsp:2010"
    xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
    xmlns:wsa=http://www.w3.org/2005/08/addressing
    xmlns="urn:ihe:qrph:rsp:2010">
    <xs:element name="extractionSpecificationID" type="xs:string">
        <xs:annotation>
            <xs:documentation>
                The identifier of the extraction definition to be applied to the export document.
            </xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="extractionSpecificationManagerURL" type="xs:anyURI">
        <xs:annotation>
            <xs:documentation>
                The URL of the extraction specification manager from where the Redactor retrieves
the extraction specification.
            </xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="exportDocumentID" type="xs:string">
        <xs:annotation>
            <xs:documentation>
                The identifier of the document that is to be redacted.
            </xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="exportDocument" type="xs:anyType">
        <xs:annotation>
            <xs:documentation>
                The XML content supplied by the Document Source. This content will be redacted.
            </xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="extractionSpecification" type="xs:anyType">
        <xs:annotation>
            <xs:documentation>
                The extraction specification as an XSLT transform that the Redactor applies to
the export document.
            </xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="redactedDocument" type="xs:anyType">
        <xs:annotation>
            <xs:documentation>
                The XML content returned by the Redactor to the Document Source.
            </xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:complexType name="SendExportDocument">
        <xs:sequence>
```

```
                <xs:element ref="rsp:extractionSpecificationID" minOccurs="1" maxOccurs="1"/>
                <xs:element ref="rsp:extractionSpecificationManagerURL" minOccurs="0" maxOccurs="1"/>
                <xs:element ref="rsp:exportDocumentID" minOccurs="1" maxOccurs="1"/>
                <xs:element ref="rsp:exportDocument" minOccurs="1" maxOccurs="1"/>
            </xs:sequence>
        </xs:complexType>
        <xs:complexType name="RetrieveExtractionSpecificationRequest">
            <xs:sequence>
                <xs:element ref="rsp:extractionSpecificationID" minOccurs="1" maxOccurs="1"/>
            </xs:sequence>
        </xs:complexType>
        <xs:complexType name="RetrieveExtractionSpecificationResponse">
            <xs:sequence>
                <xs:element ref="rsp:extractionSpecification" minOccurs="1" maxOccurs="1"/>
            </xs:sequence>
        </xs:complexType>
        <xs:complexType name="ReturnRedactedDocument">
            <xs:sequence>
                <xs:element ref="rsp:exportDocumentID" minOccurs="1" maxOccurs="1"/>
                <xs:element ref="rsp:redactedDocument" minOccurs="1" maxOccurs="1"/>
            </xs:sequence>
        </xs:complexType>
</xs:schema>
```

The WSDL for RSP is defined below:

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
    IHE Redaction Services Profile (RSP) WSDL definition.
-->
<wsdl:definitions targetNamespace="urn:ihe:qrph:rsp:2010"
    xmlns="urn:ihe:qrph:rsp:2010"
    xmlns:http="http://schemas.xmlsoap.org/wsdl/http/"
    xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/"
    xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
    xmlns:wsoap12="http://schemas.xmlsoap.org/wsdl/soap12/"
    xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
    xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsa="http://www.w3.org/2005/08/addressing"
    xmlns:ihe="urn:ihe:qrph:rsp:2010">
    <wsdl:types>
        <xs:schema targetNamespace="urn:ihe:qrph:rsp:2010">
            <xs:include schemaLocation="RSP.xsd"/>
        </xs:schema>
    </wsdl:types>

    <!-- Messages -->
    <wsdl:message name="SendExportDocument_Message">
        <documentation>Send Export Document</documentation>
        <wsdl:part name="SendExportDocument" element="ihe:SendExportDocument"
type="ihe:SendExportDocument"/>
    </wsdl:message>
    <wsdl:message name="RetrieveExtractionSpecification_Message">
        <documentation>Retrieve Extraction Specification Request</documentation>
        <wsdl:part name="body" element="ihe:RetrieveExtractionSpecificationRequest"
type="ihe:RetrieveExtractionSpecificationRequest"/>
    </wsdl:message>
    <wsdl:message name="RetrieveExtractionSpecificationResponse_Message">
        <documentation>Retrieve Extraction Specification Response</documentation>
        <wsdl:part name="body" element="ihe:RetrieveExtractionSpecificationResponse"
```

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```
type="ihe:RetrieveExtractionSpecificationResponse"/>
    </wsdl:message>
    <wsdl:message name="ReturnRedactedDocument_Message">
        <documentation>Return Redacted Document</documentation>
        <wsdl:part name="body" element="ihe:ReturnRedactedDocument"
type="ihe:ReturnRedactedDocument"/>
    </wsdl:message>

    <!-- Operations -->
    <wsdl:portType name="RedactorPortType">
        <wsdl:documentation>Document Source</wsdl:documentation>
        <wsdl:operation name="SendExportDocument">
            <wsdl:input message="SendExportDocument_Message"/>
        </wsdl:operation>
        <wsdl:operation name="RetrieveExtractionSpecification">
            <wsdl:documentation>Retrieve Extraction Specification</wsdl:documentation>
            <wsdl:input message="RetrieveExtractionSpecification_Message"/>
            <wsdl:output message="RetrieveExtractionSpecificationResponse_Message"/>
        </wsdl:operation>
        <wsdl:operation name="ReturnRedactedDocument">
            <wsdl:documentation>Return Redacted Document</wsdl:documentation>
            <wsdl:output message="ReturnRedactedDocument_Message"/>
        </wsdl:operation>
    </wsdl:portType>

    <!-- Binding -->
    <wsdl:binding name="Redactor_Binding" type="RedactorPortType">
        <wsoap12:binding transport="http://schemas.xmlsoap.org/soap/http" style="document"/>
        <wsdl:operation name="SendExportDocument">
            <wsoap12:operation soapAction="urn:ihe:qrph:rsp:2010:SendExportDocument"/>
            <wsdl:input><wsoap12:body use="literal"/></wsdl:input>
        </wsdl:operation>
        <wsdl:operation name="RetrieveExtractionSpecification">
            <wsoap12:operation
soapAction="urn:ihe:qrph:rsp:2010:RetrieveExtractionSpecification"/>
            <wsdl:input><wsoap12:body use="literal"/></wsdl:input>
            <wsdl:output><wsoap12:body use="literal"/></wsdl:output>
        </wsdl:operation>
        <wsdl:operation name="ReturnRedactedDocument">
            <wsoap12:operation soapAction="urn:ihe:qrph:rsp:2010:ReturnRedactedDocument"/>
            <wsdl:output><wsoap12:body use="literal"/></wsdl:output>
        </wsdl:operation>
    </wsdl:binding>

    <!-- Service -->
    <wsdl:service name="Redaction_Service">
        <wsdl:port binding="Redactor_Binding" name="Redaction_Service_Redactor">
            <wsoap12:address location=""/>
        </wsdl:port>
    </wsdl:service>
</wsdl:definitions>
```

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Appendix C: Sample Messages and Documents

The sample message is defined below:

```
<?xml version="1.0" encoding="UTF-8"?>
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsa="http://www.w3.org/2005/08/addressing" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <soap:Header>
        <wsa:MessageID>urn:uuid:76A2C3D9BCD3AECFF31217932910053</wsa:MessageID>
        <wsa:Action>urn:ihe:qrph:rsp:2010:SendExportDocument</wsa:Action>
    </soap:Header>
    <soap:Body>
        <SendExportDocument xmlns="urn:ihe:qrph:rsp:2010">
            <extractionSpecificationID>ExtractionSpec2010050512345</extractionSpecificationID>
            <extractionSpecificationManagerURL>http://127.0.0.1/specifications
            </extractionSpecificationManagerURL>
            <exportDocumentID>ExampleDocumentID99999</exportDocumentID>
            <exportDocument>
                <!-- ... this is the document you want to redact -->
            </exportDocument>
        </SendExportDocument>
    </soap:Body>
</soap:Envelope>
```

The following is a sample exportDocument:

```
<?xml version="1.0" encoding="UTF-8"?>
    <document>
        <record id="0014">
            <name>
                <last>Smith</last>
                <first>John</first>
                <middle>L</middle>
            </name>
            <gender>Male</gender>
            <lastTestDate>20090823</lastTestDate>
        </record>
        <record id="0027">
            <name>
                <last>Smith</last>
                <first>Jane</first>
                <middle>G</middle>
            </name>
            <gender>Female</gender>
            <lastTestDate>20060316</lastTestDate>
        </record>
        <record id="0103">
            <name>
                <last>Doe</last>
                <first>Jonathan</first>
                <middle>F</middle>
            </name>
            <gender>Male</gender>
            <lastTestDate>20041214</lastTestDate>
        </record>
    </document>
```

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The following is a sample extractionSpecification:

```xml
<?xml version="1.0" encoding="ISO-8859-1"?>
<xsl:stylesheet xmlns:xsl="http://www.w3.org/1999/XSL/Transform" version="1.0">
    <xsl:output method="xml" indent="yes"/>
    <xsl:template match="/">
        <document>
            <xsl:apply-templates/>
        </document>
    </xsl:template>
    <xsl:template match="record">
        <record>
            <xsl:apply-templates select="gender"/>
            <xsl:apply-templates select="lastTestDate"/>
        </record>
    </xsl:template>
    <xsl:template match="gender">
        <gender>
            <xsl:value-of select="."/>
        </gender>
    </xsl:template>
    <xsl:template match="lastTestDate">
        <lastTestDate>
            <xsl:value-of select="."/>
        </lastTestDate>
    </xsl:template>
</xsl:stylesheet>
```

The following is a sample redactedDocument. It is the sample extractionSpecification applied to the sample exportDocument:

```xml
<?xml version="1.0" encoding="UTF-8"?>
    <document>

        <record>
            <gender>Male</gender>
            <lastTestDate>20090823</lastTestDate>
        </record>

        <record>
            <gender>Female</gender>
            <lastTestDate>20060316</lastTestDate>
        </record>

        <record>
            <gender>Male</gender>
            <lastTestDate>20041214</lastTestDate>
        </record>

    </document>
```

It is important to note that the redacted document is still a well formed XML document.