Integrating the Healthcare Enterprise

IHE Radiation Oncology
Technical Framework Supplement

Exchange of Radiotherapy Summaries (XRTS)

Revision 0.2.1 – Draft in Preparation for Public Comment

<The IHE Documentation Specialist will change the title to just "Draft for Public Comment" or "Trial Implementation" upon publication. Leave "as is" until then.>

Date: <Month xx, 20xx>

Author: Radiation Oncology Technical Committee

Email: <domain_name@ihe.net>

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

Foreword

This is a supplement to the IHE Radiation Oncology Technical Framework <VX.X>. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

<For Public Comment:> This supplement is published on <Month XX, 201x> for Public Comment. Comments are invited and can be submitted at http://www.ihe.net/Public_Comment/#domainname. In order to be considered in development of the Trial Implementation version of the supplement, comments must be received by <Month XX, 201X>.

<For Trial Implementation:> This supplement is published on <Month XX, 201X> 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 <Domain Name> Technical Framework. Comments are invited and can be submitted at http://www.ihe.net/Public_Comment/#domainname.

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 Radiation Oncology domain can be found at ihe.net/IHE_Domains.

Information about the organization of IHE Technical Frameworks and Supplements and the process used to create them can be found at http://ihe.net/IHE_Process and http://ihe.net/Profiles.

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

<Comments may be submitted on IHE Technical Framework templates any time at http://ihe.net/Templates_Public_Comments. Please enter comments/issues as soon as they are found. Do not wait until a future review cycle is announced.>

CONTENTS

Introduction to this Supplement

The purpose of the Exchange of Radiotherapy Summaries (XRTS) profile is to provide a standard approach for exchange of information related to radiation treatment at a high level, such as would be suitable for software systems that are not specific to radiation therapy. This kind of exchange enables greater unity between a patient's Radiation Oncology Information System (ROIS) chart and the corresponding chart in a broader Health Information System (HIS). This assists providers who work primarily in the HIS to remain aware of information about their patients' radiation treatments, and providers who work primarily in the ROIS to receive relevant patient details before planning radiation treatment. Moreover, administrative functions run from the HIS, like data analytics, chart coding, and release of information, can also include radiation information without requiring users to log in to multiple systems and manually synthesize data from multiple sources.

History

Date	Rev.	Author	Change Summary
2018 February 7	0.1	Madeline Etrheim, Tucker Meyers (tmeyers@epic.com)	Write initial content and open issues.
2018 March 22	0.1.1	Tucker Meyers	Add first draft of use cases.
2018 June 7	0.1.2	Tucker Meyers	Expand use cases and actor definitions.
2018 October 17	0.1.3	Tucker Meyers	Vol. 1: Update actors. Vol. 2: Add first draft of HL7 v. 2 content definitions.
2019 January 9	0.1.4	Tucker Meyers, Daniel Rutz	Vol. 3: Start data-element specifications and coding choices.
2019 June 20	0.1.5	Tucker Meyers, Sophie Connor	Vol. 2: Expand HL7 content definitions. Vol. 3: Update data-element specifications.
2019 July 18	0.1.6	Tucker Meyers, Sophie Connor	Adopt "prescription summary" as preferred term for "prescription" transaction. Vol. 1: Refresh actors and use cases. Vol. 3: Add specifications for segment optionality and sample messages.
2019 August 12	0.1.7	Tucker Meyers, Daniel Rutz	Vol. 2: Expand transaction definitions.
2019 November 6	0.1.8	Tucker Meyers, John Stamm	Vol. 1: Update diagrams and prose for actors, use cases.
2019 December 12	0.1.9	Tucker Meyers, John Stamm	Enumerate open issues. Vol. 1: Clean prose and diagrams. Flesh out proposed use cases. Vol. 2: Clean prose and add remarks for HL7 fields requiring clarification. Vol. 3: Detail requirements and recommendations for data elements in OBX segments. Enumerate codes for OBX segments. Refresh sample messages.

Date	Rev.	Author	Change Summary
2019 December 13	0.2	Tucker Meyers, John Stamm	Adopt profile name *Exchange of Radiotherapy Summaries* (XRTS). Vol. 1: Clarify actor relations in use cases. Vol. 2: Clarify message semantics. Vol. 3: Expand on segment order. Clarify semantics of dose elements. Specify value sets.
2019 January 14	0.2.1	Tucker Meyers	Clarify semantics of repeated (shared) phases. [3.P.4.1.2.8]

Open Issues and Questions

1. No known codes have been found for the following concepts. A request will be placed through IHE to get these codes assigned for use in this profile. As written, this profile refers to any missing codes using the string XXXXX-X.
   - Narrative
   - General methods
   - Related chemotherapy
   - Related surgery
   - Concurrent therapies comment
   - Prescription summary predecessor
   - Intent predecessor
   - Site predecessor
   - Cancelation reason
   - Approval status (prescription)
   - Delivery status (prescription)
   - Delivery status (site)
   - Approval status (phase)
   - Delivery status (phase)
   - Total planned dose (site) – LOINC code 77304-4 is available for radiation dose given or planned. This may be an option so long as use of the same code for site and phase is not a concern.
   - Phase label
   - Reason for early completion
   - Protocol
   - Technique
   - Modality
   - Treatment accessories
   - Dose per fraction
   - Planned number of fractions
   - Frequency of delivery
   - Total planned dose (phase)

- Session start date and time
- Session end date and time
- Delivery status (session)
- Nominal total dose planned (site)
- Nominal cumulative dose planned (site)
- Nominal cumulative dose delivered (phase) – LOINC code 21958-4 is available for regional radiation treatment dose. This may be an option so long as use of this code for phase level information is not a concern.
- Plan UIDs
- Fraction number
- Nominal fraction dose planned
- Nominal fraction dose delivered
- Free Text Stage

2. This profile defines three transactions and define state through fields within the message instead of within additional transactions. The following workflows are not described in depth within the current profile. Comments regarding whether to further refine the profile to include these workflows and how to do so are encouraged.

   - Intent sent in error. What is the desired outcome if an Intent Producer sends an intent in error? For example, if the documentation was entered on an incorrect patient, what transaction or what fields should be used to tell Treatment Observers that the information was invalid? How codified should that information be?

   - Intent cancelation. What is the desired outcome if an intent must be canceled? For example, if a patient moves out of the jurisdiction such that treatment should not be continued, or declines further treatment? What transaction or what fields should be used to tell Treatment Observers that the intent is no longer accurate? How codified should that information be?

   - Prescription without intent. Should the profile permit a prescription summary to be sent that has no source intent? Are there clinical scenarios where this would be appropriate? If so, we must decide how this scenario will be modeled in the message structure. (See section 3.P.4.1.2.4.)

3. New HL7 transactions may be needed as part of this profile. A change request to HL7 will be submitted after Public Comment is received for this profile to ensure that any requested transactions align with the future approach of the profile. As written, the profile refers to these transactions as follows –

4. PPR^XXX – Send Intent [XRTS-01]
5. PPR^XXY – Send Prescription Summary [XRTS-02]
6. ORU^XXZ – Send Delivery Results [XRTS-03]

7. Table X.3.1-4 lists codes to be used for OBX segment documentation. In that table, Protocol and Modality are anticipated to be coded (CWE) data elements. As written, no value set is associated with that field. Input is requested on what values to provide for these coded elements.

Closed Issues

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General Introduction and Shared Appendices

The IHE Technical Framework General Introduction and Shared Appendices are components shared by all of the IHE domain technical frameworks. Each technical framework volume contains links to these documents where appropriate.

Appendix A – Actor Summary Definitions

Actor Name	Definition
Results Producer	A system in which the delivery of radiation treatment is documented.
Treatment Observer	A system that needs to track the course of treatment.
Prescription Producer	A system in which a specialist plans the details around a course of treatment, keeping in mind the particulars of the patient condition and prior courses of treatment.
Intent Producer	A system in which the need and intent for radiation treatment is documented. This will include the clinical details of the condition for which treatment is intended.

Appendix B – Transaction Summary Definitions

Transaction Name and Number	Definition
Send Intent [XRTS-01]	This transaction transmits clinical documentation about a condition and the intent to treat it with radiation therapy.
Send Prescription Summary [XRTS-02]	This transaction is used to send clinical documentation and detailed radiation delivery information.
Send Delivery Results [XRTS-03]	This transaction is used to convey the details of the delivery of radiation.

Appendix D – Glossary

Glossary Term	Definition
Hospital Information System	A system that provides information access for users across disciplines so that all providers can make well-informed decisions about each patient's care.
Intent	The high level desired approach for treatment.
Phase	A grouping of the primary treatment volume and anatomic target to be treated in one round of radiation.
Prescription	The clinical documentation surrounding the detailed aim of treatment.
Prescription Summary	A subset of information in the prescription that is relevant for external observers.
Radiation Oncology Information System	A system used to manage the planning and administration of radiation therapy electronically.
Treatment Session	A single continuous encounter between a patient and a radiation therapy treatment machine.

Volume 1 – Profiles

X Exchange of Radiotherapy Summaries (XRTS) Profile

Radiation therapy is a complex domain. Many organizations manage the planning and administration of such therapy electronically using dedicated specialty software systems. A Radiation Oncology Information System (ROIS) enables users to perform complex and specialized tasks related to the exchange of radiotherapy summaries. At the same time, many healthcare organizations keep a single comprehensive health record for patients in a centralized software system, such as a Hospital Information System (HIS), which provides information access for users across disciplines so that all providers can make well-informed decisions about each patient's care.

A provider wanting the complete picture of a patient would need access to both the ROIS and the HIS. Challenges with providing access and training for providers in both systems can lead to impediments for care. Some systems mitigate this risk through the use of other interoperability methods such as exchanging scheduling and charging data. The remaining gaps in information, however, are substantial and are often addressed by double documentation—identical data manually entered in two systems—if they are addressed at all.

The purpose of the Exchange of Radiotherapy Summaries (XRTS) profile is to provide a standard approach for exchange of information related to radiation treatments. This kind of exchange enables greater unity between a patient's ROIS chart and the corresponding chart in the broader HIS. This assists providers who work primarily in the HIS to review information about their patients' radiation treatments, and providers who work primarily in the ROIS to receive relevant patient details around planning treatments. Moreover, administrative functions run from the HIS, like data analytics, chart coding, and release of information can also include radiation information without requiring users to log in to multiple systems and manually synthesize data from multiple sources.

X.1 XRTS Actors, Transactions, and Content Modules

Figure X.1-1 shows the actors directly involved in the XRTS Profile and the relevant transactions between them.

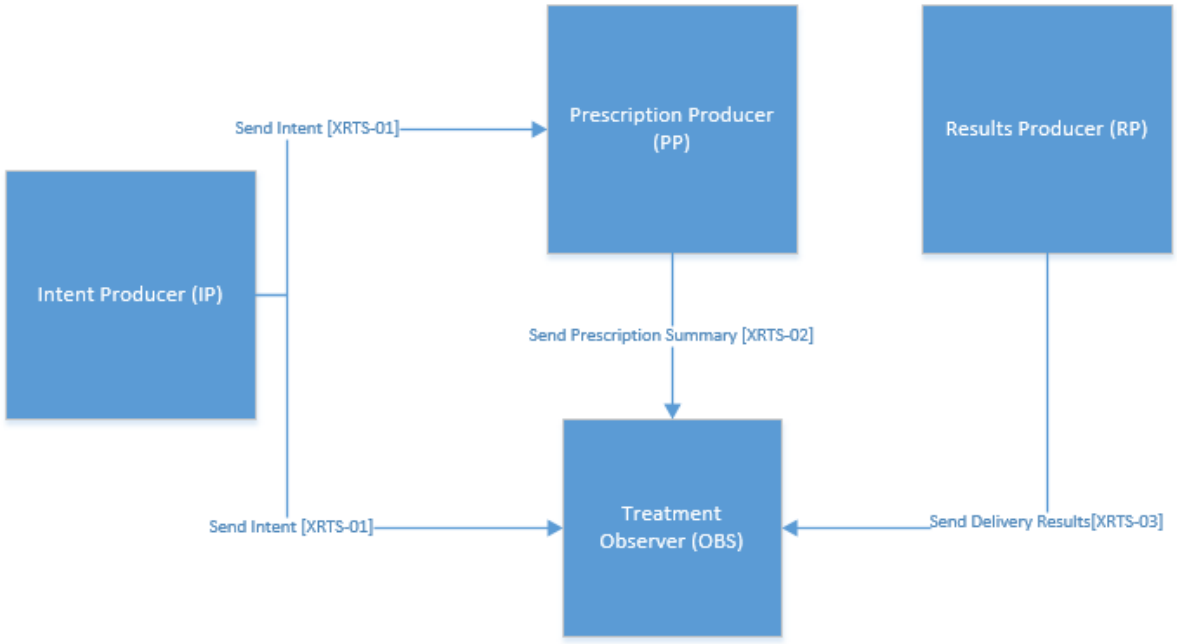

Figure X.1-1: Actors & Transactions

Table X.1-1 lists the transactions for each actor directly involved in the XRTS Profile. In order to claim support of this Profile, an implementation of an actor must perform the required transactions (labeled "R") and MAY support the optional transactions (labeled "O"). Actor groupings are further described in Section X.3.

Table X.1.1: XRTS – Actors and Transactions

Actors	Transactions	Initiator or Receiver	Optionality	Reference
Intent Producer	Send Intent [XRTS-01]	Initiator	R	XRTS 3.I
Prescription Producer	Send Intent [XRTS-01]	Receiver	O	XRTS 3.I
	Send Prescription Summary [XRTS-02]	Initiator	R	XRTS 3.P
Results Producer	Send Delivery Results [XRTS-03]	Initiator	R	XRTS 3.R
Treatment Observer	Send Intent [XRTS-01][1]	Receiver	O	XRTS 3.I
	Send Prescription Summary [XRTS-02][1]	Receiver	O	XRTS 3.P
	Send Delivery Results [XRTS-03][1]	Receiver	O	XRTS 3.R

1. A Treatment Observer MUST be able to receive at least one of the listed transactions.

X.1.1 Actor Descriptions and Actor Profile Requirements

Most requirements are documented in Transactions (Volume 2). This section documents additional requirements and considerations for this profile's actors.

X.1.1.1 Intent Producer (IP)

The Intent Producer (IP) is a system where a physician can document intent to treat a patient with radiation. The contents of that intent can be transmitted to the Prescription Producer (PP), where that intent may prompt treatment planning activities, and/or to one or more Treatment Observers (OBS), which consume the information for other uses.

An IP SHALL be able to transmit intent information using the Send Intent [XRTS-01] transaction.

Some systems may provide functionality for performing both intent and planning activities. Those systems MAY group the IP and PP actors.

An IP system may wish to receive back the details of treatment, either from the PP or from the Results Producer (RP). In that situation, the IP MAY be grouped with the Treatment Observer (OBS) actor.

X.1.1.2 Prescription Producer (PP)

The Prescription Producer (PP) is the system where planning of radiation treatment occurs and is the source of the patient's prescription for radiation delivery. That prescription can be transmitted to an external Treatment Observer (OBS).

A PP SHALL be able to transmit prescription summary information using the Send Prescription Summary [XRTS-02] transaction.

A PP will coordinate with a Results Producer (RP) on treatment. This coordination will typically take the form of DICOM transactions that are out of scope for this profile.

Some systems may provide functionality for performing both intent and planning activities. Those systems MAY group the Intent Producer (IP) and PP actors.

A PP system may wish to receive back the details of treatment from the Results Producer (RP). A PP may also wish to receive the intent for treatment from external IP systems. In those situations, the PP MAY be grouped with the Treatment Observer (OBS) actor.

X.1.1.3 Results Producer (RP)

The Results Producer (RP) directly manages the delivery and recording of radiation treatments. That delivery can be transmitted to external observers to assist with ongoing care of the patient. The RP must also be capable of computing dose accumulation at the phase level and at the site level.

A RP will coordinate with a Prescription Producer (PP) on treatment. This coordination will typically take the form of DICOM transactions that are out of scope for this profile.

A RP SHALL be able to transmit treatment delivery information using the Send Delivery Results [XRTS-03] transaction.

X.1.1.3 Treatment Observer (OBS)

A Treatment Observer (OBS) is a system interested in receiving information related to the planning and/or delivery of radiation treatment.

A Treatment Observer SHALL be able to receive at least one of the transactions listed in table X.1.1.

An Intent Producer (IP) system may wish to receive back the details of treatment, either from the PP or from the Results Producer (RP). In that situation, the IP MAY be grouped with the Treatment Observer (OBS) actor.

A PP system may wish to receive back the details of treatment from the RP. A PP may also wish to receive the intent for treatment from external IP systems. In those situations, the PP MAY be grouped with the Treatment Observer (OBS) actor.

X.2 XRTS Actor Options

Options that may be selected for each actor in this profile are listed in the Table X.2-1.

Table X.2-1: XRTS– Actors and Options

Actor	Option Name	Reference
Intent Producer	*No options defined*	—
Prescription Producer	*No options defined*	—
Results Producer	*No options defined*	—
Treatment Observer	*No options defined*	—

X.3 XRTS Required Actor Groupings

An actor from this profile (Column 1) shall implement all of the required transactions in this profile in addition to all of the transactions required for the grouped actor (Column 2).

Section X.5 describes some optional groupings that may be of interest for security considerations and Section X.6 describes some optional groupings in other related profiles.

Table X.3-1: XRTS Required Actor Groupings

XRTS Actor	Actor(s) to be grouped with	Reference	Content Bindings Reference
Intent Producer	N/A		
Prescription Producer	N/A		
Results Producer	N/A		
Treatment Observer	N/A		

X.4 XRTS Overview

X.4.1 Concepts

The process of planning and providing a radiation treatment may involve many care specialists logged into a variety of systems that need to be in close communication to help ensure positive outcomes. The concepts here are defined as they are used within this profile, but may be expanded within a given scope of treatment to meet the needs of that environment.

A provider, typically an oncologist, documents the status and progression of a patient's condition. That status informs the provider on whether and how to proceed with radiation treatment. That formulation of clinical information and the need for radiation are taken as the 'Intent' to treat.

A variety of specialists, typically logging into a Radiation Oncology Information System (ROIS) work together to formulate the particulars of the treatment strategy. Often, this includes the collection of body sites and treatment phases that may be necessary for that patient's treatment. This detailed approach at development is the 'Prescription'. This level of documentation may also be transmitted by DICOM transactions in profiles outside of the scope of XRTS.

Those same specialists collaborate on the dose and fractionation scheme that describes how that radiation dose will be achieved. This typically involves specification of the number of fractions and schedule for treatment. These considerations group together as a 'Phase' of treatment.

A treatment 'Fraction' is used in this profile as a planning concept. It is used to help providers and specialists determine the number of patient treatment visits necessary to receive the prescribed dose of radiation.

Treatment visits are often defined in terms of 'Sessions', or single encounters between a patient and a treatment machine. A given session may involve delivery of radiation for one or more phases in one or more fractions.

X.4.2 Use Cases

X.4.2.1 Use Case #1: Initiate Treatment Plan with Intent

This use case encompasses a patient being seen by an oncologist who needs to refer the patient to specialty systems for radiation treatment planning and delivery.

X.4.2.1.1 Use Case Description

A patient presents at her medical oncologist. As part of the patient's treatment, the oncologist documents in the Hospital Information System (HIS) clinical and pathologic information about the patient's breast cancer. With the detailed information gathered, the oncologist documents the intent to treat the cancer with radiation therapy.

The treatment team, consisting of a radiation oncologist, a dosimetrist and a physicist meet to review the intent to treat. They collaborate on a prescription and plan of treatment for the patient, documented in the planning system.

The patient presents for treatment. The radiation therapist uses the documented treatment plan to deliver the prescribed radiation.

X.4.2.1.2 Process Flow

In this use case, the Hospital Information System (HIS) plays the role of the Intent Producer (IP). The Treatment Planning and Management System (TPMS) plays the role of the Treatment Observer (OBS). In this scenario, the Treatment Observer may be considered an "Intent Observer", and there are no Prescription Producers or Results Producers.

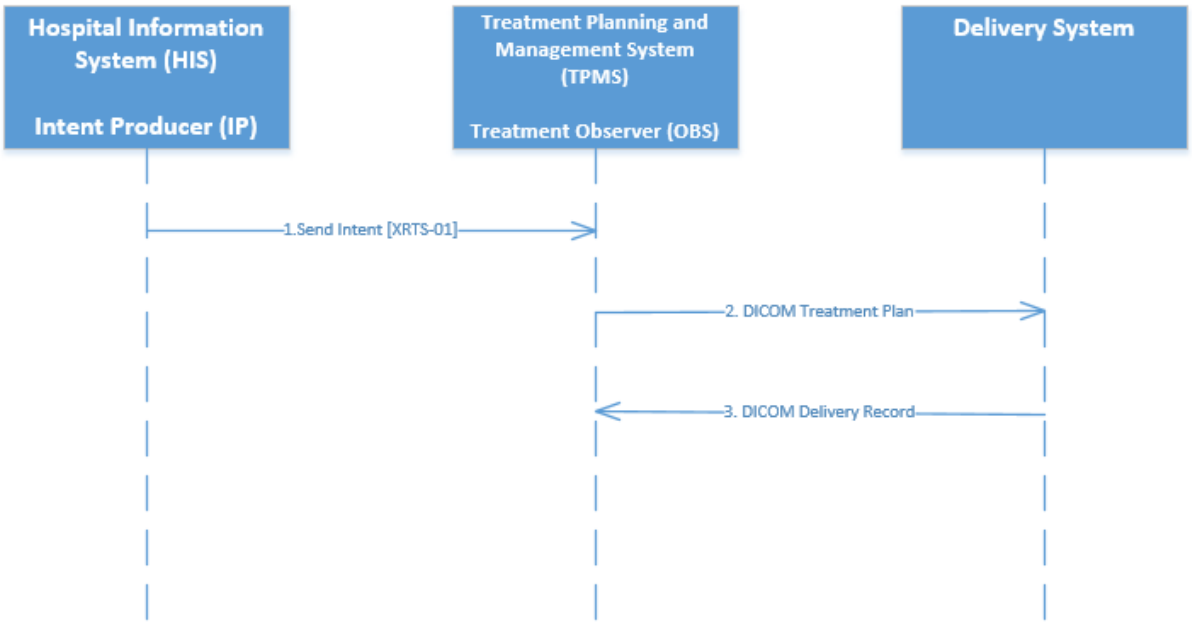

Figure X.4.2.1.2-1 Use Case 1 – Initiate Treatment Plan with Intent Process Flow

Pre-conditions:

The patient is being seen by a medical oncologist. During documentation of the patient's cancer, the oncologist determines that radiation therapy would be an appropriate treatment.

Main Flow:

1. Patient presents to medical oncologist.

2. The medical oncologist documents clinical details and intent to treat in the Hospital Information System (HIS), which serves as the Intent Producer (IP). The medical oncologist refers patient to a radiation oncology department for treatment.
    a. The IP uses the Send Intent [XRTS-01] transaction to transmit the intent to the Treatment Observer (OBS).
    b. The OBS receives the Send Intent [XRTS-01] transaction.
3. The treatment team meet to review the intent to treat and create a prescription and plan to treat the patient using a Treatment Planning and Management System (TPMS). The following steps may occur multiple times. (Note that these transactions are not defined in XRTS.)
    a. A new treatment plan is documented, resulting in the plan being sent from the TPMS to the Treatment Delivery System (TDS) using DICOM transactions.
    b. The TDS receives the treatment plan. The plan is used to provide radiation therapy to the patient. That record of delivery is transmitted from the TDS to the TPMS to assist with the next round of prescriptions using DICOM transactions.

Post-conditions:

The treatment team determines that this course of radiation is complete.

X.4.2.2 Use Case #2: Intent with Observation of Planning and Treatment

This use case involves a patient being seen by their oncologist in an Electronic Medical Record (EMR) who wants to monitor the course of treatment being performed in a specialty system.

X.4.2.2.1 Use Case Description

A patient presents at his medical oncologist. As part of the patient's treatment, the oncologist documents in the Electronic Medical Record (EMR) clinical and pathologic information about the patient's prostate cancer. With the detailed information gathered, the oncologist documents the intent to treat the cancer with radiation therapy.

The treatment team, consisting of a radiation oncologist, a dosimetrist and a physicist meet to review the intent to treat. They collaborate on a prescription for radiation therapy in their planning system. That prescription is sent back to the medical oncologist.

The patient presents for treatment. The radiation therapist uses the documented treatment plan to deliver the prescribed radiation. The results of the radiation delivery are sent back to the medical oncologist.

The medical oncologist uses their insight into the radiation therapy prescription and delivery to ensure that treatment is progressing as anticipated. The medical oncologist can adjust the treatment as necessary.

X.4.2.2.2 Process Flow

In this use case, the Electronic Medical Record (EMR) plays the role of an Intent Producer (IP) and an Observer (OBS). The Treatment Management System (TMS) is playing the role of a Prescription Producer (PP) and a Results Producer (RP). A Treatment Planning System (TPS) and Treatment Delivery System (TDS) are also involved in this process but do not participate in any XRTS transactions. (The DICOM transactions shown are not prescribed or defined by this profile.)

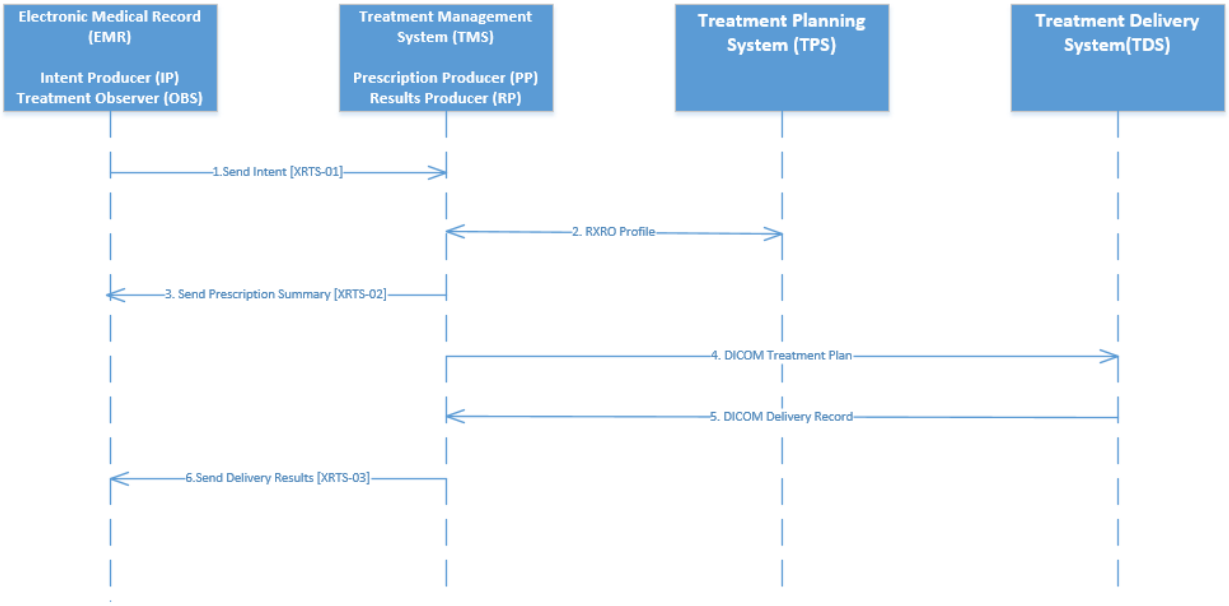

Figure X.4.2.2.2-1 Use Case 2 – Intent with Observation of Planning and Treatment Process Flow

Pre-conditions:

The patient is being seen by a medical oncologist. During documentation of the patient's cancer, the oncologist determines that radiation therapy would be an appropriate treatment.

Main Flow:

1. Patient presents to medical oncologist.
2. The medical oncologist documents clinical details and intent to treat in the Electronic Medical Record (EMR), serving as the Intent Producer (IP). The medical oncologist refers the patient to a radiation oncology department for treatment.
    a. The IP uses the Send Intent [XRTS-01] transaction to transmit the intent to the Prescription Producer (PP).

b. The PP receives the Send Intent [XRTS-01] transaction.

c. The PP sends a DICOM representation of the physician's intent (see RXRO) to the Treatment Planning System (TPS).

3. The treatment team meet to review the intent to treat and create a prescription and plan to treat the patient. The following steps may occur multiple times.

   a. A treatment plan is documented in the TPS.

      i. The TPS sends the prescription to the TMS/PP using DICOM transactions.

      ii. The TMS/PP transmits a summary of the prescription to the EMR/OBS using the Send Prescription Summary [XRTS-02] transaction.

      iii. The EMR/OBS receives the Send Prescription Summary [XRTS-02] transaction.

      iv. The TMS transmits the plan to the Treatment Delivery System (TDS) using DICOM transactions.

   b. Treatment is provided to the patient and documented in the TDS.

      i. The TDS transmits the delivery record to the TMS/RP using DICOM transactions.

      ii. The TMS/RP transmits the details of radiation therapy to the EMR/OBS using the Send Treatment Results [XRTS-03] transaction.

      iii. The EMR/OBS receives the Send Treatment Results [XRTS-03] transaction.

   c. The medical oncologist in the EMR/OBS reviews the treatment prescription and treatment results and uses that information to assist in the care of the patient.

Post-conditions:

The treatment team determines that this course of radiation is complete.

X.4.2.3 Use Case #3: External Registry Observing Planning and Treatment

This use case involves a radiation therapy registry that is recording the steps of treatment but not participating directly in the treatment of a patient.

X.4.2.3.1 Use Case Description

A patient's chart is referred to a tumor board for review. A medical oncologist, radiation oncologist, and surgeon meet to review the patient's documentation.

They decide that radiation is appropriate. The radiation oncologist documents intent to treat in the Radiation Oncology Information System (ROIS). An external registry receives that intent information.

The treatment team, consisting of a radiation oncologist, a dosimetrist and a physicist meet to collaborate on a prescription for radiation therapy in the ROIS. That prescription is sent to the registry.

The patient presents for treatment. The radiation therapist uses the documented treatment plan to deliver the prescribed radiation. The results of the radiation delivery are sent to the registry.

The registry uses information from patients like this one to do outcomes research and find the most effective treatments for patients with similar conditions.

X.4.2.3.2 Process Flow

In this use case, the Radiation Oncology Information System (ROIS) plays the roles of Intent Producer (IP), Prescription Producer (PP), and Results Producer (RP). The ROIS comprises activities of planning, management, and delivery in a system system. The tumor registry plays the role of the Treatment Observer (OBS).

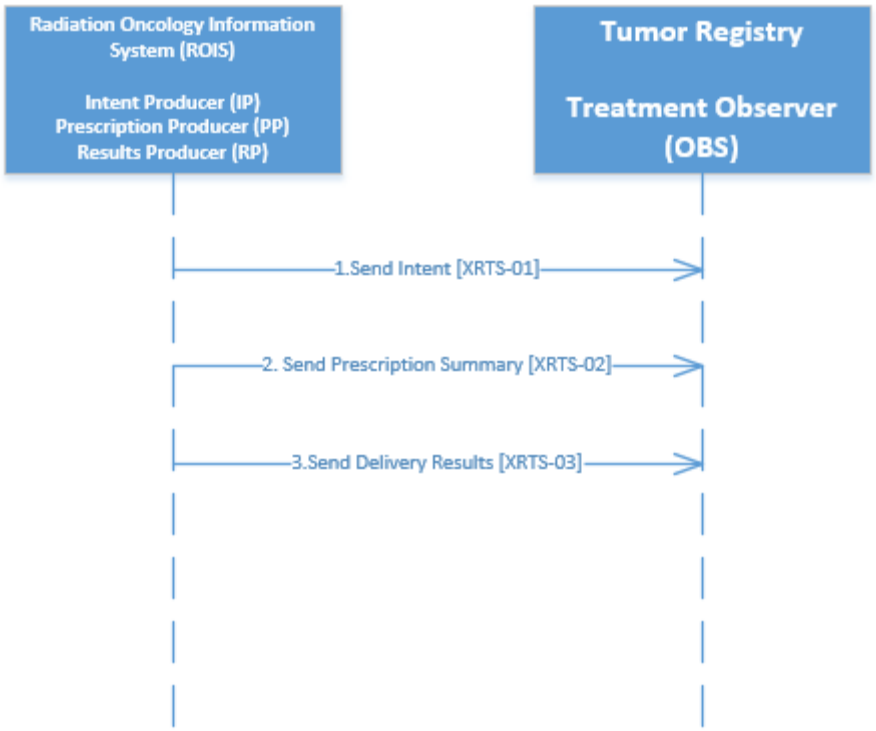

Figure X.4.2.3.2-1 Use Case 3 – External Registry Observing Planning and Treatment Process Flow

Pre-conditions:

The patient has been referred to a tumor board for review.

Main Flow:

1. The tumor board consisting of a medical oncologist, radiation oncologist, and surgeon meet to review the patient's condition. The radiation oncologist documents the intent to treat in the Radiation Oncology Information System (ROIS).
    a. The ROIS transmits a Send Intent [XRTS-01] transaction to the registry.
    b. The registry, as a Treatment Observer (OBS) receives the Send Intent [XRTS-01] transaction.
2. The treatment team meet to create the plan to treat the patient. The following steps may occur multiple times.
    a. A new treatment plan is documented. The plan will be used to provide radiation therapy to the patient.
    b. A new treatment prescription is documented in the ROIS.
        i. A Send Treatment Prescription [XRTS-02] transaction is sent by the ROIS to the Registry Treatment Observer (OBS).
        ii. The Registry/OBS receives the Send Treatment Prescription [XRTS-02] transaction.
    c. Treatment is provided to the patient and documented in the ROIS.
        i. The ROIS transmits the details of radiation therapy to the Registry/OBS using the Send Treatment Results [XRTS-03] transaction.
        ii. The Registry/OBS receives the Send Treatment Results [XRTS-03] transaction.
3. The registry (OBS) uses the aggregate data of multiple patients to inform effective treatment for similar conditions.

Post-conditions:

The treatment team determines that this course of radiation is complete.

X.5 XRTS Security Considerations

There are many risks that cannot be mitigated by an IHE Profile directly. It is recommended that application developers perform a Risk Assessment in the design of the applications, and that Organizations responsible for the operational environment using XRTS perform Risk Assessments in the design and deployment of the operational environment.

X.5.1 Consistent Time (CT)

In order to address identified security risks, all actors in XRTS SHOULD be grouped with Consistent Time (CT) Profile – Time Client. This grouping will assure that all systems have a consistent time clock to assure a consistent timestamp for audit logging and form accuracy.

X.5.2 Audit Trail and Node Authentication (ATNA)

Some XRTS transactions include clinical content related to the information subject. In those cases, it is anticipated that transfers of Personal Health Information (PHI) will be protected. The IHE ITI Audit Trail and Node Authentication (ATNA) Profile SHOULD be implemented by the Intent Producer, Prescription Producer, Results Producer and Treatment Observer Actors to protect node-to-node communication and to produce an audit trail of the PHI related actions when they exchange messages. Other private security mechanisms MAY be used to secure content within enterprise managed systems.

X.6 XRTS Cross-Profile Considerations

X.6.1 Prescription in Radiation Oncology (RXRO)

The RXRO Profile may be used to facilitate the DICOM transactions between the XRTS Prescription Producer (PP) and Results Producer (RP).

Appendices

N/A

Volume 2 – Transactions

3.I Send Intent

3.I.1 Scope

This transaction is used to convey from one software system to another a physician's intent to treat a particular patient with radiation. This reduces duplication of work across software systems by allowing a planning system to receive information about a patient to be treated, including body sites, diagnoses, and staging from another system where those details have already been recorded.

The intent may carry information regarding related therapy (such as surgery or chemotherapy), but the inclusion of that information does not constitute an order or prescription for those therapies.

3.I.2 Actor Roles

Table 3.I.2-1: Actor Roles

Actor:	Intent Producer
Role:	Sends information about treatment intent to other software systems
Actor:	Prescription Producer
Role:	Receives intent information for the purpose of prompting or aiding treatment planning
Actor:	Treatment Observer
Role:	Receives intent information for other purposes such as information archiving, reporting, or analytics

3.I.3 Referenced Standards

The reference definition of the relevant HL7 message for this transaction, PPR, is given in HL7 Version 2, Chapter 12: Patient Care. Additional chapters in HL7 Version 2 supply the definitions for specific segments.

3.I.4 Interaction Diagram

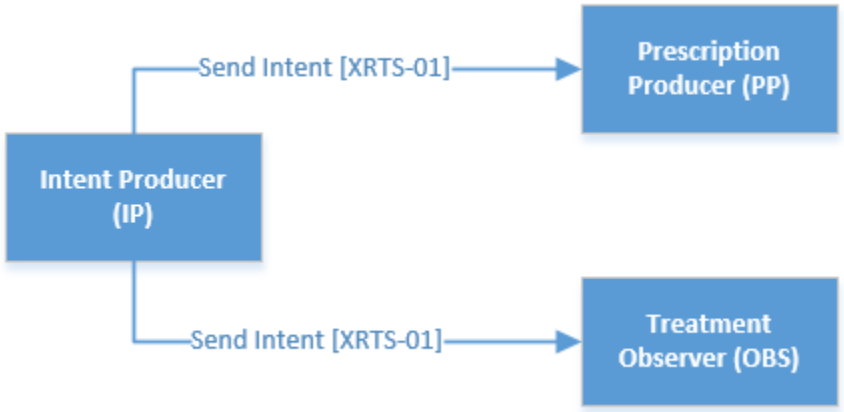

Figure 3.I.4-1: Intent Interaction

3.I.4.1 Transaction Description

The Send Intent transaction is used to inform a recipient that a particular patient is a candidate for radiation therapy. The transaction comprises an HL7 message that carries information related to the patient, the physician's expectations regarding treatment, and the disease in question (body sites, diagnoses, and staging information).

The transaction can be used to inform a recipient of a new intent to treat or of changes to an existing intent.

3.I.4.1.1 Trigger Events

The intent transaction SHALL occur when an intent to treat is documented by a user in the software system that is acting as Intent Producer. The transaction SHALL also be used when relevant changes to the information in that intent are recorded.

For scenarios where a user makes multiple changes to the contents of an intent that belong together (because the changes are all made during a short span of time, for example), the Intent Producer (IP) SHOULD send those changes in a single transaction containing the multiple changes rather than in multiple transactions, each containing a single change. The exact conditions for changes that "belong together" are left to implementers, but each Send Intent transaction SHALL include a complete list of observations related to the intent and problem, as known by the IP.

3.I.4.1.2 Message Semantics

The transaction comprises a single HL7 message of type PPR^XXX. The segments that compose the message are described in the following tables. Additional definitions are described in the HL7 Version 2 specifications. Except where otherwise noted, fields that are listed as optional are

shown here because they are recommended; senders should provide values for those fields when appropriate values are available. For fields that are not explicitly defined in this section, implementers should refer to the HL7 source material.

The tables below are accompanied by notes indicating their logical relationships and basic explanations of important fields. More detailed guidance for those fields and specifications for encoding those data elements are given in Volume 3, as are the optionality and repeatability specifications for each segment.

Note that the message structure for the intent is closely related to the message structure for the prescription summary (Section 3.P). For the most part, the prescription summary is simply a superset of the intent.

Table X.3.I.4-1: Intent Segments

PPR	Intent	HL7 Chapter
MSH	Message Header	3
PID	Patient Identification	3
PV1	Patient Visit	3
GOL	Goal Detail	12
PRT	Participation	7
PRB	Detail Problem	12
OBX	Observation/Result	7

More detailed information about segment order, optionality, and repeatability are given in Volume 3, section 3.1.1.

3.I.4.1.2.1 MSH Segment

MSH-9.1 must contain message type PPR. MSH-9.2 must be PPR^XXX.

3.I.4.1.2.2 PID Segment

Table X.3.I.4-2: Exchange of Radiotherapy Summaries – PID Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
3		CX	R		00106	Patient Identifier List
5		XPN	R	0200	00108	Patient Name
7	12	DTM	R		00110	Date/Time of Birth
8	1	IS	R	0001	00111	Administrative Sex
11		XAD	O		00114	Patient Address
13		XTN	O		00116	Phone Number – Home
18		CX	O		00121	Patient Account Number

630 **3.I.4.1.2.3 PV1 Segment**

Table X.3.I.4-3: Exchange of Radiotherapy Summaries – PV1 Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
2	1	IS	O	0004	00132	Patient Class
3		PL	O		00133	Patient Location
7		XCN	O	0010	00137	Attending Doctor
8		XCN	O	0010	00138	Referring Doctor
9		XCN	O		00139	Consulting Doctor
19		CX	O		00149	Visit Number

3.I.4.1.2.4 GOL Segment

Table X.3.I.4-4: Exchange of Radiotherapy Summaries – PTH Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	2.2	ID	R	0287	00816	Action Code
2		DTM	R		00817	Action Date/Time
4		EI	R		00819	Goal Instance ID
7		DTM	O		00822	Goal Established Date/Time
9		CWE	O		00825	Goal Classification
18		CWE	O		00834	Goal Life Cycle Status
19		DTM	O		00835	Goal Life Cycle Status Date/Time

The GOL segment contains data related to the intent itself.

635 - GOL-1: an indicator of the type of update being sent by this segment.
- GOL-4: an identifier for the intent that is unique across all patients
- GOL-7: the date and time at which the intent was established or recorded
- GOL-9: the therapeutic goal or “intent type”. Values for this field are defined in Table X.3.1-5 in Volume 3.

640 - GOL-18: the status of the intent. Values for this field are defined in Table X.3.1-7 in Volume 3.
- GOL-19: the date and time at which the current status was set

All optional fields in this segment SHOULD be populated with values when those values are available.

3.I.4.1.2.5 PRT Segment

Table X.3.I.4-5: Exchange of Radiotherapy Summaries – PTH Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
2	2..2	ID	R	0287	00816	Action Code
3		CWE	O		02380	Action Reason
4		CWE	R	0912	02381	Participation
5		XCN	R		02382	Participation Person

The PRT segment is used to add auditing information to the message (indicating who is responsible for a particular action and at what time the action occurred).

3.I.4.1.2.6 PRB Segment

Table X.3.I.4-6: Exchange of Radiotherapy Summaries – PRB Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	2..2	ID	R		00816	Action Code
2	12	DTM	R		00817	Action Date/Time
3	250	CWE	R		00838	Problem ID
4		EI	R		00839	Problem Instance ID
5		EI	O		00820	Episode of Care ID
10		CWE	O		00845	Problem Classification
26		CWE	O		02234	Problem Severity

The PRB segment contains information related to a specific treatment site. The segment occurs one or more times, with each occurrence representing a different unique site to be treated.

- PRB-1: an indicator of the type of update being sent by this segment.
- PRB-3: one or more identifiers for the problem.
  Multiple codes and multiple coding systems MAY be included in this field. The primary code SHOULD be an ICD-10 code. If an ICD-O-3 code is available, it SHOULD be supplied as an alternate code in addition to ICD-10.
- PRB-4: a unique identifier for this site instance, unique across intents and patients
- PRB-5: reserved for future use
- PRB-10: Identifier for the body site. This SHALL be identified as an ICD-O-3 Site Code.
- PRB-26: information related to staging, if available.

3.I.4.1.2.7 OBX Segment

Table X.3.I.4-7: Exchange of Radiotherapy Summaries – OBX Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	1..4	SI	R		00569	Set ID – OBX
2	2..3	ID	O	0125	00570	Value type
3		CWE	R		00571	Observation Identifier
5		Varies	R		00573	Observation Value
6		CWE	O		00574	Units
11	1..1	ID	O	0085	00579	Observation Result Status

OBX segments carry individual values for specific data elements that are not represented in fields in other segments. Refer to Table X.3.1-4 in Volume 3 for specifications regarding which OBX segments are required and how data elements should be coded.

3.I.4.1.3 Expected Actions

There are no required actions to be taken by a sender or receiver upon sending or receiving, respectively, messages belonging to this transaction.

However, it is likely that a PP would take receipt of an intent message as the prompt for planning activities that take place within the PP on the basis of the information in the intent. Other types of recipients (Observers) may implement other actions in response to receipt of an intent message.

3.I.5 Protocol Requirements

N/A

3.I.6 Security Considerations

Refer to section X.5.

3.P Prescription Summary

3.P.1 Scope

This transaction is used to convey from one software system to another a summary of a prescription for radiation treatment for a patient. The summary describes the sites to be treated along with planned doses and fractionation information for those sites. This makes it possible for the prescription to be entered in a single location (the Prescription Producer) and viewed in multiple systems, such as EHRs for other departments, cancer registries, or data warehouses.

3.P.2 Actor Roles

Table 3.P.2-1: Actor Roles

Actor:	Prescription Producer
Role:	Sends the summary of a patient's prescription to interested parties
Actor:	Treatment Observer
Role:	Receives the summary of a patient's prescription

3.P.3 Referenced Standards

The reference definition of the relevant HL7 message for this transaction, PPR, is given in HL7 Version 2, Chapter 12: Patient Care. Additional chapters in HL7 Version 2 supply the definitions for specific segments.

3.P.4 Interaction Diagram

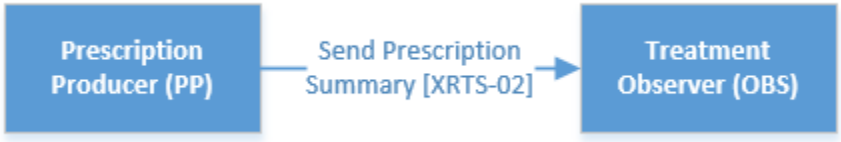

Figure 3.P.4-1: Prescription Summary Interaction

3.P.4.1 Transaction Description

The Send Prescription Summary transaction is used to inform a recipient that a radiation prescription has been written for a patient to undergo therapy. The transaction comprises an HL7 message that carries information related to the patient, the disease in question (body sites, diagnoses, staging information), and the doses, fractionation, and techniques prescribed for treatment, among other details.

The transaction can be used to inform a recipient of a new prescription or of changes to an existing prescription.

3.P.4.1.1 Trigger Events

The prescription summary transaction SHALL occur when a prescription is documented and approved by a user in the software system that is acting as Prescription Producer. The transaction SHALL also be used when relevant changes to the information in that prescription are recorded.

For scenarios where a user makes multiple changes to the contents of a prescription that belong together (because the changes are all made during a short span of time, for example), the Prescription Producer SHOULD send those changes in a single transaction containing the multiple changes rather than in multiple transactions, each containing a single change. The exact conditions for changes that "belong together" are left to implementers, but each transaction SHALL include a complete set of observations related to the intent, prescription, site and phase as known by the PP.

3.P.4.1.2 Message Semantics

The transaction comprises a single HL7 message of type PPR^XXY. The segments that compose the message are described in the following tables. Additional definitions are described in the HL7 Version 2 specifications. Except where otherwise noted, fields that are listed as optional are shown here because they are recommended; senders should provide values for those fields when appropriate values are available. For fields that are not explicitly defined in this section, implementers should refer to the HL7 source material.

The tables below are accompanied by notes indicating their logical relationships and basic explanations of important fields. More detailed guidance for those fields and specifications for encoding those data elements are given in Volume 3, as are the optionality and repeatability specifications for each segment.

Note that the prescription summary shares much of its message structure with the intent (section 3.I).

Table X.3.P.4-1: Exchange of Radiotherapy Summaries – Prescription Summary Segments

PPR	Prescription Summary	HL7 Chapter
MSH	Message Header	3
PID	Patient Identification	3
PV1	Patient Visit	3
GOL	Goal Detail	12
PTH	Detail Pathway	12
PRT	Participation	7
PRB	Detail Problem	12
ORC	Common Order Segment	4
OBR	Observation Request Segment	4
OBX	Observation/Result	7

More detailed information about segment order, optionality, and repeatability are given in Volume 3, section 3.1.2.

3.P.4.1.2.1 MSH Segment

MSH-9.1 must contain message type PPR. MSH-9.2 must be PPR^XXY.

3.P.4.1.2.2 PID Segment

Table X.3.P.4-2: Exchange of Radiotherapy Summaries – PID Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
3		CX	R		00106	Patient Identifier List
5		XPN	R	0200	00108	Patient Name
7	12	DTM	R		00110	Date/Time of Birth
8	1	IS	R	0001	00111	Administrative Sex
11		XAD	O		00114	Patient Address
13		XTN	O		00116	Phone Number – Home
18		CX	O		00121	Patient Account Number

3.P.4.1.2.3 PV1 Segment

Table X.3.P.4-3: Exchange of Radiotherapy Summaries – PV1 Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
2	1	IS	O	0004	00132	Patient Class
3		PL	O		00133	Patient Location
7		XCN	O	0010	00137	Attending Doctor
8		XCN	O	0010	00138	Referring Doctor
9		XCN	O		00139	Consulting Doctor
19		CX	O		00149	Visit Number

3.P.4.1.2.4 GOL Segment

Table X.3.P.4-4: Exchange of Radiotherapy Summaries – PTH Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	2.2	ID	R	0287	00816	Action Code
2		DTM	R		00817	Action Date/Time
4		EI	R		00819	Goal Instance ID
7		DTM	O		00822	Goal Established Date/Time
9		CWE	O		00825	Goal Classification
18		CWE	O		00834	Goal Life Cycle Status
19		DTM	O		00835	Goal Life Cycle Status Date/Time

The GOL segment contains data related to the intent on which the prescription is based. See section 3.I.4.1.2.4.

3.P.4.1.2.5 PTH Segment

Table X.3.P.4-5: Exchange of Radiotherapy Summaries – PTH Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	2..2	ID	R		00816	Action Code
2		EI	R		01207	Pathway ID
3		EI	R		01208	Pathway Instance ID
4		DTM	R		01209	Pathway Established Date/Time
5		CWE	O		01210	Pathway Life Cycle Status
6		DTM	O		01211	Change Pathway Life Cycle Status Date/Time

The PTH segment contains data related to the prescription itself.

- PTH-2: Phase level identifier
- PTH-3: a unique identifier for the prescription (unique across patients)
- PTH-4: date and time of approval of prescription
- PTH-5: approval status of prescription. See Table X.3.1-7.
- PTH-6: date and time when approval status was last set

3.P.4.1.2.6 PRT Segment

Table X.3.P.4-6: Exchange of Radiotherapy Summaries – PTH Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
2	2..2	ID	R	0287	00816	Action Code
3		CWE	O		02380	Action Reason
4		CWE	R	0912	02381	Participation
5		XCN	R		02382	Participation Person

The PRT segment is used to add auditing information to the message (indicating who is responsible for a particular action and at what time the action occurred).

3.P.4.1.2.7 PRB Segment

Table X.3.P.4-7: Exchange of Radiotherapy Summaries – PRB Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	2..2	ID	R		00816	Action Code
2	12	DTM	R		00817	Action Date/Time
3	250	CWE	R		00838	Problem ID
4		EI	R		00839	Problem Instance ID

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
5		EI	O		00820	Episode of Care ID
6		NM	O		00841	Problem List Priority
7		DTM	O		00842	Problem Established Date/Time
10		CWE	O		00845	Problem Classification
26		CWE	O		02234	Problem Severity

The PRB segment contains information related to a specific treatment site. The segment occurs one or more times, with each occurrence representing a different unique site to be treated. See section 3.I.4.1.2.6.

3.P.4.1.2.8 ORC Segment

Table X.3.P.4-8: Exchange of Radiotherapy Summaries – OBX Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	2..2	ID	R	0119	00215	Order Control Code
2		EI	R		00216	Placer Order Number
4		EIP	R		00218	Placer Group Number
8		EIP	O		00222	Parent Order
9		DTM	O		00223	Date/Time of Transaction

The ORC segment carries information related to a single phase of treatment. The segment occurs one or more times under each PRB segment, representing the one or more phases prescribed for each site to be treated.

- ORC-1: Order control code
- ORC-2: a unique identifier for this phase (unique across sites, prescriptions, and patients)
- ORC-4: the unique identifier for the prescription to which this phase belongs
- ORC-8: if the phase is a revision of another phase, the unique identifier of the phase that is replaced by this one. The field is required unless the phase is not a revision.
- ORC-9: tentative start date of treatment in this phase

A single phase may treat more than one site. Consequently, multiple ORC segments in a single message may have the same unique identifier (ORC-2), but they may occur only once each *per site*. That is, after each PRB segment (site), one or more ORC segments may occur, and among those ORC segments, the values of ORC-2 must all be unique. However, uniqueness is *not* required for ORC segments that occur under different PRB segments.

The reason for explicitly representing a single phase multiple times in the message is that the values at the phase level may be specific to individual sites. That is, in some scenarios, a single phase may contribute different doses to different sites. So for a single phase UID there may be multiple values for the data elements *dose per fraction* and *planned total dose*, each value

specific to one of the sites that is treated by that phase. All other data elements are expected to be the same for a single phase regardless of site (technique, number of fractions, and so on).

3.P.4.1.2.9 OBR Segment

Table X.3.P.4-9: Exchange of Radiotherapy Summaries – OBX Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	1..4	SI	O		00237	Set ID – OBR
2		EI	R		00216	Placer Order Number
3		EI	R		00217	Filler Order Number
4		CWE	R	9999	00238	Universal Service ID

The OBR segment is paired with an ORC segment and carries additional information related to a single phase. The segment occurs one or more times, each one immediately following its counterpart ORC segment.

- OBR-2: Placer Order Number as defined by the Prescription Producer
- OBR-3: Filler Order Number as defined by the Results Producer
- OBR-4: Universal Service ID

3.P.4.1.2.10 OBX Segment

Table X.3.P.4-10: Exchange of Radiotherapy Summaries – OBX Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	1..4	SI	R		00569	Set ID – OBX
2	2..3	ID	O	0125	00570	Value type
3		CWE	R		00571	Observation Identifier
5		Varies	R		00573	Observation Value
6		CWE	O		00574	Units
11	1..1	ID	O	0085	00579	Observation Result Status

OBX segments carry individual values for specific data elements that are not represented in fields in other segments. Refer to Table X.3.1-4 in Volume 3 for specifications regarding which OBX segments are required and how data elements should be coded.

3.P.4.1.3 Expected Actions

There are no required actions to be taken by a sender or receiver upon sending or receiving, respectively, messages belonging to this transaction.

3.P.5 Protocol Requirements

N/A

3.P.6 Security Considerations

Refer to section X.5.

3.R Session Result

3.R.1 Scope

This transaction is used to convey from one software system to another information about radiation dosage delivered during a treatment session. The message contains information about the radiation delivered to one or more sites, organized by phases (as in a prescription summary). The message includes data about the doses delivered as well as the doses planned for that session. This makes it possible for users in other systems to stay informed of a patient's progress through radiation treatments without requiring access to the Results Producer.

3.R.2 Actor Roles

Table 3.R.2-1: Actor Roles

Actor:	Results Producer
Role:	Sends information about radiation delivery to other software systems for each treatment session
Actor:	Treatment Observer
Role:	Receives radiation delivery information

3.R.3 Referenced Standards

The reference definition of the relevant HL7 message for this transaction, PPR, is given in HL7 Version 2, Chapter 7: Observation Reporting. Additional chapters in HL7 Version 2 supply the definitions for specific segments.

3.R.4 Interaction Diagram

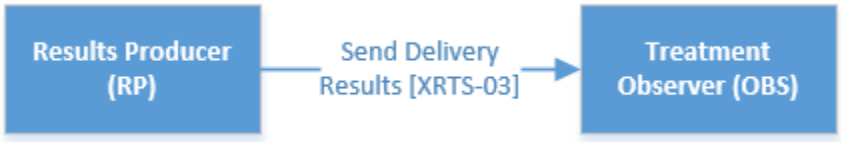

Figure 3.R.4-1: Session Results Interaction

3.R.4.2 Transaction Description

The Send Session Results transaction is used to inform a recipient that a patient has undergone a session of radiation therapy. The transaction comprises an HL7 message that carries information related to the patient, the sites treated, the planned doses, and the doses actually delivered.

3.R.4.2.1 Trigger Events

The session result transaction SHALL occur when a treatment session is performed by a software system that is acting as the Results Producer. It is not necessary that the session be completed as planned for this transaction to occur; a session that is terminated before completion of the planned dose(s) should also result in the sending of a session result message.

Each transaction SHALL include a complete set of observations related to the site and phase, as known by the RP.

3.R.4.2.2 Message Semantics

The transaction comprises a single HL7 message of type ORU^XXZ. The segments that compose the message are described in the following tables. Additional definitions are described in the HL7 Version 2 specifications. Except where otherwise noted, fields that are listed as optional are shown here because they are recommended; senders should provide values for those fields when appropriate values are available. For fields that are not explicitly defined in this section, implementers should refer to the HL7 source material.

The tables below are accompanied by notes indicating their logical relationships and basic explanations of important fields. More detailed guidance for those fields and specifications for encoding those data elements are given in Volume 3, as are the optionality and repeatability specifications for each segment.

Note that the session result shares much of its message structure with the prescription summary (section 3.P).

Table X.3.R.4-1: Exchange of Radiotherapy Summaries – Session Result Segments

PPR	Segment	Optionality	HL7 Chapter
MSH	Message Header	R	3
PID	Patient Identification	R	3
PV1	Patient Visit	R	3
PRB	Problem Detail	R	12
OBX	Observation/Result	R	7
ORC	Common Order	R	4
OBR	Observation Request	R	4
OBX	Observation/Result	R	7

More detailed information about segment order, optionality, and repeatability are given in Volume 3, section 3.1.3.

3.R.4.1.2.1 MSH Segment

MSH-9.1 must contain message type ORU. MSH-9.2 must be ORU^XXZ.

3.R.4.1.2.2 PID Segment

Table X.3.R.4-2: Exchange of Radiotherapy Summaries – PID Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
3	250	CX	R		00106	Patient Identifier List
5	250	XPN	R	0200	00108	Patient Name
7	12	DTM	R		00110	Date/Time of Birth
8	1	IS	R	0001	00111	Administrative Sex
11	250	XAD	O		00114	Patient Address

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
13	250	XTN	O		00116	Phone Number – Home
18	250	CX	O		00121	Patient Account Number

3.R.4.1.2.3 PV1 Segment

Table X.3.R.4-3: Exchange of Radiotherapy Summaries – PV1 Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
2	1	IS	O	0004	00132	Patient Class
3	250	PL	O		00133	Patient Location
7	250	XCN	O	0010	00137	Attending Doctor
8	250	XCN	O	0010	00138	Referring Doctor
9	250	XCN	O		00139	Consulting Doctor
19	250	CX	R		00149	Visit Number

3.P.4.1.2.4 PRB Segment

Table X.3.R.4-4: Exchange of Radiotherapy Summaries – PRB Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	2..2	ID	R		00816	Action Code
2	12	DTM	R		00817	Action Date/Time
3	250	CWE	R		00838	Problem ID
4		EI	R		00839	Problem Instance ID

The PRB segment contains information related to a specific treatment site. The segment occurs one or more times, with each occurrence representing a different unique site treated during this session. See section 3.I.4.1.2.7.

3.R.4.1.2.5 ORC Segment

Table X.3.R.4-5: Exchange of Radiotherapy Summaries – ORC Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	2..2	ID	R	0119	00215	Order Control Code
2		EI	R		00216	Placer Order Number
4		EIP	R		00218	Placer Group Number
5	1..2	ID	R	0038	00219	Order Status
8		EIP	O		00222	Parent Order
9		DTM	O		00223	Date/Time of Transaction

The ORC segment carries information related to a single phase of treatment. The segment occurs one or more times under each PRB segment, representing the one or more phases treated during this session. See section 3.P.4.1.2.8.

Note: Because the session result includes the prescription UID in the ORC segment (i.e., at the phase level) and not at any higher level, a single message may contain data from sites and phases in multiple prescriptions.

3.R.4.1.2.6 OBR Segment

Table X.3.R.4-6: Exchange of Radiotherapy Summaries – OBR Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	1..4	SI	O		00237	Set ID – OBR
2		EI	R		00216	Placer Order Number
3		EI	R		00217	Filler Order Number
4		CWE	R	9999	00238	Universal Service ID
7		DTM	O		00241	Observation Date/Time
25		ID	R		00258	Result Status

The OBR segment is paired with an ORC segment and carries additional information related to a single phase. The segment occurs one or more times, each one immediately following its counterpart ORC segment. See section 3.P.4.1.2.9.

- OBR-2: a unique identifier for the site, assigned by the Intent Producer
- OBR-3: a unique identifier for the site, assigned by the Results Producer
- OBR-4: Universal Service ID
- OBR-7: the date and time at which treatment was completed
- OBR-25: Status. This field should always be F.

3.R.4.1.2.7 OBX Segment

Table X.3.R.4-7: Exchange of Radiotherapy Summaries – OBX Segment

SEQ	LEN	DT	OPT	TBL #	ITEM #	ELEMENT NAME
1	1..4	SI	R		00569	Set ID – OBX
2	2..3	ID	O	0125	00570	Value type
3		CWE	R		00571	Observation Identifier
5		Varies	R		00573	Observation Value
6		CWE	O		00574	Units
11	1..1	ID	O	0085	00579	Observation Result Status

OBX segments carry individual values for specific data elements that are not represented in fields in other segments. Refer to table X.3.1-4 in Volume 3 for specifications regarding which OBX segments are required and how data elements should be coded.

3.R.4.1.3 Expected Actions

There are no required actions to be taken by a sender or receiver upon sending or receiving, respectively, messages belonging to this transaction.

3.R.5 Protocol Requirements

N/A

3.R.6 Security Considerations

Refer to section X.5.

Appendices

N/A

Volume 2 Namespace Additions

Volume 3 – Content Modules

3 Overview of Content

Because many of the individual data elements that describe the exchange of radiotherapy summaries are not represented in message segments already defined by HL7 Version 2, the transactions in this profile rely on OBX segments with agreed meanings to encode values of interest. The following sections describe the required and optional OBX segments as well as other encoding considerations for data elements in these transactions.

This profile is designed with the intent of sending full snapshot-level messages instead of smaller messages that only include updated data. A snapshot model allows more complete documentation for record matching and bidirectional ownership of the patient record. Where possible, it is best practice to include any fields persisted by your system so that those assumptions can be reconciled by the Observers.

3.1 Segment Optionality and Repeatability

3.1.1 Intent Message Structure

Table X.3.1-1: Exchange of Radiotherapy Summaries – Segment Order (Intent)

PPR	Intent Segmentation	HL7 Chapter
MSH	Message Header	3
PID	Patient Identification	3
[PV1]	Patient Visit	3
[		
GOL	Goal Detail	12
[		
{OBX}	Observation/Result Associated with the Intent [1]	7
[{PRT}]	Participation Associated with the Intent	7
]		
[{		
PRB	Detail Problem	12
[{OBX}]	Observation/Result associated with the Problem [2]	7
}]		
]		

1. OBX segments at intent level:
   Narrative — SHOULD be included.
   Related chemotherapy — SHOULD be included.
   Related surgery — SHOULD be included.
   Concurrent therapy comments — SHOULD be included.
   General methods — SHOULD be included.

Intent cancelation reason — SHALL be included if the status of the intent is *canceled*.
Intent predecessor — SHALL be included if there is a previous intent.

2. OBX segments at the Problem level:
Free Text Stage – SHOULD be included when available.
Diagnosis Confirmed (21861-0) – SHOULD be included.
Clinical Tumor (21905-5) – SHOULD be included when available
Clinical Nodes (21906-3) – SHOULD be included when available
Clinical Metastases (21907-1) – SHOULD be included when available
Clinical Staging Descriptor (21909-7) – SHOULD be included

See section 3.2 for specifications of these segments.

3.1.2 Prescription-Summary Message Structure

Table X.3.1-2: Exchange of Radiotherapy Summaries – Segment Order (Prescription Summary)

PPR	Prescription Segmentation	HL7 Chapter
MSH	Message Header	3
PID	Patient Identification	3
[PV1]	Patient Visit	3
[		
GOL	Goal Detail	12
[{PTH}]	Detail Pathway	12
[{		
OBX	Observation/Result Associated with the Intent [1]	
[{PRT}]	Participation Associated with the Intent	7
}]		
[{		
OBX	Observation/Result Associated with the Prescription [2]	7
[{PRT}]	Participation Associated with the Prescription	7
}]		
[{		
PRB	Detail Problem	12
[{OBX}]	Observation/Result Associated with the Site [3]	7
[{		
ORC	Common Order Segment	4
OBR	Observation Request Segment	4
[{OBX}]	Observation/Result Associated with the Phase [4]	7
}]		
}]		
]		

1. OBX segments at intent level:
   Narrative — SHOULD be included.
   Concurrent therapies — SHOULD be included.
   General methods — SHOULD be included.
   Intent cancelation reason — SHALL be included if the status of the intent is canceled.
   Intent predecessor — SHALL be included if there is a prior intent.
2. OBX segments at prescription level:
   Delivery status (prescription) — SHALL be included.
   Prescription cancelation reason — SHALL be included if the approval status of the prescription is *Canceled*.
   Prescription summary predecessor — SHALL be included if there is a prior prescription.
3. OBX segments at the site level:
   Delivery status (site) — SHALL be included.
   Total planned dose (site) — SHALL be included.
   Site predecessor — SHALL be included if there is a prior site.
4. OBX segments at the phase level:
   Phase label — SHALL be included
   Approval status (phase) — SHALL be included.
   Delivery status (phase) — SHALL be included.
   Reason for early completion — SHOULD be included if the delivery status of the phase is *Completed Early*.
   Protocol — MAY be included.
   Technique — SHALL be included
   Modality — SHALL be included
   Treatment accessories — SHALL be included
   Dose per fraction — SHALL be included
   Planned number of fractions — SHALL be included
   Frequency of delivery — SHALL be included
   Total planned dose (phase) — SHALL be included

See section 3.2 for specifications of these segments.

3.1.3 Session Result Message Structure

Table X.3.1-3: Exchange of Radiotherapy Summaries – Segment Order (Session Result)

PPR	Result Segmentation	HL7 Chapter
MSH	Message Header	3
PID	Patient Identification	3
PV1	Patient Visit	3
{		
PRB	Detail Problem	12
[{OBX}]	Observation/Result Associated with the Site [1]	7
{		
ORC	Common Order Segment	4

PPR	Result Segmentation	HL7 Chapter
OBR	Observation Request Segment	4
{OBX}	Observation/Result Associated with the Phase [2]	7
}		
}		

1. OBX segments at site level:
   Session start date and time — SHALL be included
   Session end date and time — SHALL be included
   Session delivery status (session) — SHALL be included
   Session delivery status (site) — SHALL be included
   Nominal total dose planned (site) — SHALL be included
   Nominal cumulative dose delivered (site) — SHALL be included

2. OBX segments at phase level:
   Phase label — SHALL be included
   Plan UIDs — SHALL be included
   Session delivery status (phase) — SHALL be included
   Fraction number — SHALL be included
   Planned number of fractions — SHALL be included
   Nominal fraction dose planned — SHALL be included
   Nominal fraction dose delivered — SHALL be included
   Nominal total dose planned (phase) — SHALL be included
   Nominal cumulative dose delivered (phase) — SHALL be included

See section 3.2 for specifications of these segments.

3.2 Tables of Values

3.2.1 Observation Segment Specifications

The following are data elements that should be representing using OBX segments. The data type belongs in OBX-2. The code belongs in OBX-3. The value for the data elements belongs in OBX-5. The unit for the value, when applicable, belongs in OBX-6.

Table X.3.1-4: Exchange of Radiotherapy Summaries – Codes for Specified OBX Segments

The "Usage" column indicates whether a given data element applies to the Intent (I), Prescription Summary (P), Session Result (S), or some combination thereof.

Name	Usage	Type	Unit	Code	Description
Narrative	I, P	ST		XXXXX-X	Physician's free-text narrative of intent
General methods	I, P	ST		XXXXX-X	Free-text description of methods of treatment
Related chemotherapy	I, P	ST		XXXXX-X	Indication of timing of related chemotherapy Allowed values are defined in Table X.3.1-6
Related surgery	I, P	ST		XXXXX-X	Indication of timing of related surgery Allowed values are defined in Table X.3.1-6
Concurrent therapy comment	I, P	ST		XXXXX-X	Additional free-text description of concurrent therapies
Diagnostic Confirmation	I, P	CWE		21861-0	NAACCR Diagnostic Confirmation
Clinical Tumor	I, P	CWE		21905-5	TNM Clinical Tumor
Clinical Node	I, P	CWE		21906-3	TNM Clinical Node
Clinical Metastases	I, P	CWE		21907-1	TNM Clinical Metastases
Clinical Staging Descriptor	I, P	CWE		21909-7	Clinical Staging Descriptor
Free Text Stage	I, P	ST		XXXXX-X	Used to describe clinical staging information if codified staging information is not available.
Intent predecessor	I, P	ID		XXXXX-X	The unique identifier of the intent.
Intent cancelation reason	I, P	ST		XXXXX-X	The reason for which the intent was canceled.
Prescription summary predecessor	P	ID		XXXXX-X	For a prescription summary that is a revision to an existing prescription summary, this segment carries the unique identifier of the predecessor of which this prescription summary is a revision
Prescription cancelation reason	P	ST		XXXXX-X	The reason for which the prescription was canceled
Site predecessor	I, P	ID		XXXXX-X	For a site that is a revision to an existing site, this segment carries the unique identifier of the predecessor of which this site is a revision

Name	Usage	Type	Unit	Code	Description
Reason for early completion	I, P	ST		XXXXX-X	Free-text reason for early completion.
Phase label	P, S	ST		XXXXX-X	Free-text label for the phase.
Protocol	P	CWE		XXXXX-X	Free text label for the protocol on which this phase is based, if applicable
Technique	P	ST		XXXXX-X	Free-text label for identifying the types of planning and delivery methods
Modality	P	ST		XXXXX-X	Description of irradiation type to be used for treatment
Treatment accessories	P	ST		XXXXX-X	Free-text description of devices to be used in addition to the delivery device
Approval status (phase)	P	ST		XXXXX-X	Allowed values are defined in Table X.3.1-7
Delivery status (prescription)	P	ST		XXXXX-X	Describes whether or not delivery of a set of planned treatments has begun, is completed, etc. Allowed values are defined in Table X.3.1-8
Delivery status (site)	P	ST		XXXXX-X	Allowed values are defined in Table X.3.1-8
Delivery status (phase)	P	ST		XXXXX-X	Allowed values are defined in Table X.3.1-8
Session delivery status (session)	S	ST		XXXXX-X	Describes whether or not the delivery of radiation planned for this session was completed or not. Allowed values are defined in Table X.3.1-9
Session delivery status (site)	S	ST		XXXXX-X	Allowed values are defined in Table X.3.1-9
Session delivery status (phase)	S	ST		XXXXX-X	Allowed values are defined in Table X.3.1-9
Session start date and time	S	DTM		XXXXX-X	
Session end date and time	S	DTM		XXXXX-X	
Dose per fraction	P	NM	cGy	XXXXX-X	The dose prescribed per fraction in this phase
Planned number of fractions	P	NM		XXXXX-X	The number of fractions planned for this phase
Frequency of delivery	P	ST		XXXXX-X	Free text description of frequency of delivery.
Total planned dose (phase)	P	NM	cGy	XXXXX-X	The total dose to be delivered to the site in this phase
Total planned dose (site)	P	NM	cGy	XXXXX-X	The total dose to be delivered to this site, across all phases

Name	Usage	Type	Unit	Code	Description
Plan UIDs	S	ID		XXXXX-X	A list of IDs of the plans associated with this site and phase from the RP
Fraction number	S	NM		XXXXX-X	The number of the fraction being treated in this phase in this session
Nominal fraction dose planned	S	NM	cGy	XXXXX-X	
Nominal fraction dose delivered	S	NM	cGy	XXXXX-X	
Nominal total dose planned (phase)	S	NM	cGy	XXXXX-X	
Nominal cumulative dose delivered (phase)	S	NM	cGy	XXXXX-X	
Nominal total dose planned (site)	S	NM	cGy	XXXXX-X	
Nominal cumulative dose delivered (site)	S	NM	cGy	XXXXX-X	

3.2.1.1 Dose Element Semantics

In a session result message, each phase reports a *nominal fraction dose planned* and a *nominal fraction dose delivered*. Note that these are fraction doses and not session doses. This is relevant in case of interrupted treatment. Suppose that a patient arrives and begins treatment in fraction 3 with a planned dose of 2 Gy. Several minutes into the session, the machine goes offline and the session ends at 0.87 Gy. The session result sent from this treatment shows delivery status *Incomplete*, fraction number 3, a planned fraction dose of 2 Gy, and a delivered fraction dose of 0.87 Gy. When the treatment is resumed later, the patient receives the remaining 1.13 Gy. This is recorded as a new session under the same fraction number. The session result sent from this treatment shows delivery status *Complete*, fraction number 3, a planned fraction dose of 2 Gy, and a delivered fraction dose of 2 Gy (not 1.13 Gy). In other words, in this scenario, the Result Producer must provide the accumulated dose for the fraction if the fraction was delivered over multiple sessions.

3.2.2 Value Set Specifications

Table X.3.1-5: Values for Therapeutic Goal (GOL-9)

Value	Description
CURATIVE	This therapy is intended to cure the disease in question
PALLIATIVE	This therapy is intended to alleviate symptoms of the disease in question
PROPHYLACTIC	This therapy is intended to prevent the development of a disease

Table X.3.1-6: Values for Timing of Related Therapies (OBX-5)

Value	Description
NONE	No related therapy is planned
BEFORE RADIATION	This related therapy will occur before radiotherapy is started
DURING RADIATION	This related therapy will be concurrent with radiotherapy
AFTER RADIATION	This related therapy will occur after radiotherapy is completed

In this context, "radiotherapy" refers to the entire course of treatment, not to an individual session. For example, if a patient receives radiation and chemotherapy on alternating days, that chemotherapy would be classified as "during radiation".

Table X.3.1-7: Values for Approval Status Fields (OBX-5, GOL-18, PTH-5)

Value	Description
NOT APPROVED	This item (e.g., prescription) is currently not approved.
ACTIVE	This item is currently active (i.e., not canceled and not superseded). This status should only be used when a more specific status (approved or not approved) is not available.
CANCELED	This item has been evaluated and will not be approved. A recipient should not expect to receive further updates.
APPROVED	This item has been approved
SUPERSEDED	A newer revision to this item exists, and the current status of the item is specified on the latest revision.

Table X.3.1-8: Values for Prescription/Site/Phase Delivery Status Fields (OBX-5)

Value	Description
NOT BEGUN	Treatment delivery has not yet been started.
IN PROGRESS	Treatment delivery is in progress.
COMPLETED	Treatment delivery was completed.
COMPLETED EARLY	Treatment delivery was completed early.

These values are used in delivery status fields in Prescription Summary messages and are evaluated relative to the entire set of treatments at a given level (as opposed to an individual treatment session). For example, the status of a phase is *Not Begun* until the first session for that phase is started, at which point its status becomes *In Progress*. Finally, once the last session is

finished, the status becomes *Completed* (if all of the planned fractions have been delivered) or *Completed Early* (if no more fractions will be delivered for this phase but not all of the planned fractions were delivered).

Table X.3.1-9: Values for Session Delivery Status Fields (OBX-5)

Value	Description
INCOMPLETE	Treatment delivery was begun but is incomplete.
COMPLETE	Treatment delivery was completed.
COMPLETE (PARTIAL)	Treatment delivery was completed, but only a partial dose was delivered.

These values are used in delivery status fields in Session Results messages and are evaluated relative to the treatment that was planned for this session. For example, the status of a phase in a session is *Complete* if the entire session was carried out as planned (full dose delivered to the sites in question). If the full dose was not delivered, then the status of the phase is *Incomplete* if the fraction that was interrupted will be resumed later or *Complete (Partial)* if this fraction will not be resumed.

3.3 Sample Messages

3.3.1 Intent

```
MSH|^~\&|||||20040629164652|1|PPR^XXX|331|P|2.3.1||
PID|||112345^^^SYSTEM^MRN||Radonc^Patient^^^^||20010620|F|||123 Frog
  Lane^APT 02^Verona^WI^53593^USA^H||518-345-2938|||||AccountNumber|
PV1||I|PointOfCare^Room^Bed^^^^Building^^||||00573^Attending^Provider^
  ^^^^^ProvID^^^^|00382^Referring^Provider^^^^^^ProvID^^^^|00573^Atte
  nding^Provider^^^^^^ProvID^^^^|||||||||||VisitNumber|
GOL|NW|20190710032200||IntentUID|||20190710032200||Curative|||||||||03
  ^In Progress^IntentCode|20190710032200|
PRT||NW|10^PCP^RoleCode|00133^Provider^Primary^^^^^^ProvID|00573^Atten
  ding^Provider^^^^^^ProvID^^^^
OBX|1|ST|XXXXX-X^Intent Narrative^LOINC||This is the intent
  narrative.||||||F|
OBX|2|ST|XXXXX-X^Concurrent Therapies^LOINC||This is the concurrent
  therapies narrative.||||||F|
OBX|3|ST|XXXXX-X^General Methods||This is the free text methods of
  treatment.||||||F|
OBX|4|ID|XXXXX-X^Intent Predecessor||ID for the Intent||||||F|
PRB|UP|20190710032200|C80.1^Malignant Tumor^ICD-
  10|SiteUID|EpisodeofCareUID||20181202104130|||1385^Left
  Breast^RegionCode||||08^Active-Improving^
  StatusCode|20190710032200||||||||||CXX.X^Cancer stage 2^ICD-10|
OBX|1|CWE|21861-0^Dx Confirmed^LOINC||1^Positive Histology^NAACCR
  Diagnostic Confirmation
OBX|2|CWE|21905-5^Clinical Tumor^LOINC||T2^Tumor 2 to 5 cm^TNM 7
  Edition||||||F|
OBX|3|CWE|21906-3^Clinical Node^LOINC||N2^^TNM 7 Edition||||||F|
OBX|4|CWE|21907-1^Clinical Metastases^LOINC||M0^No evidence^TNM 7
  Edition||||||F|
OBX|5|CWE|21909-7^Clinical Staging Descriptor^LOINC||0^None^TNM 7
  Edition||||||F|
```

3.3.2 Prescription Summary

```
MSH|^~\&|||||20040629164652|1|PPR^XXY|331|P|2.3.1||
PID|||112345^^^SYSTEM^MRN||Radonc^Patient^^^^||20010620|F|||123 Frog
  Lane^APT 02^Verona^WI^53593^USA^H||518-345-2938|||||AccountNumber|
PV1||I|PointOfCare^Room^Bed^^^^Building^^||||00573^Attending^Provider^
  ^^^^^ProvID^^^^|00382^Referring^Provider^^^^^^ProvID^^^^|00573^Atte
  nding^Provider^^^^^^ProvID^^^^|||||||||VisitNumber|
GOL|NW|20190710032200||IntentUID|||20190710032200||Curative|||||||||03
  ^In Progress^IntentCode|20190710032200|
PRT||NW|10^PCP^RoleCode|00133^Provider^Primary^^^^^^ProvID|00573^Atten
  ding^Provider^^^^^^ProvID^^^^
OBX|1|ST|XXXXX-X^Intent Narrative^LOINC||This is the intent
  narrative.||||||F|
OBX|2|ST|XXXXX-X^Concurrent Therapies^LOINC||This is the concurrent
  therapies narrative.||||||F|
OBX|3|ST|XXXXX-X^General Methods||This is the free text methods of
  treatment.||||||F|
OBX|4|ID|XXXXX-X^Intent Predecessor||ID for the Intent||||||F|
PTH|NW|Pathway ID|01^New Prescription^Coding
  System|20190715041500|Pathway Cycle Status|20190715041500
PRT||NW|Action Reason|Action Code|00572^Provider^RadOnc^^^^^^ProvID
OBX|1|ST|XXXXX-X^Approval Status (prescription)^LOINC||This is the
  approval status.||||||F|
OBX|2|ST|XXXXX-X^Delivery Status (prescription)^LOINC||This is the
  delivery status.||||||F|
OBX|3|ID|XXXXX-X^Prescription Sumarry Predecessor^LOINC||This is the
  prescription summary predecessor.||||||F|
PRB|UP|20190710032200|C80.1^Malignant Tumor^ICD-
  10|SiteUID|EpisodeofCareUID||20181202104130|||1385^Left
  Breast^RegionCode||||08^Active-Improving^
  StatusCode|20190710032200||||||||||CXX.X^Cancer stage 2^ICD-10|
OBX|1|ST|XXXXX-X^Approval Status (site)^LOINC||This is the approval
  status.||||||F|
OBX|2|ST|XXXXX-X^Delivery Status (site)^LOINC||This is the delivery
  status.||||||F|
OBX|3|NM|XXXXX-X^Total planned dose (site)^LOINC||This is the total
  planned dose.|cGy|||||F|
OBX|4|ID|XXXXX-X^Site predecessor^LOINC||This is the site
  predecessor.||||||F|
ORC|1|Phase1UID^^^IDType||PrescriptionUID|20190715041500|||Parent
  Order|20190715041500
OBR|1|Phase1UID^^^IDType|Phase1UID^^^IDType|77332^Simple Device
  Radiation^CPT|||20190715041500||||||||||||||||||F
OBX|1|ST|XXXXX-X^Phase Label^LOINC||Phase Label||||||F|
```



```
OBX|2|ST|XXXXX-X^Approval Status (Phase)^LOINC||Approval Status
  (Phase)||||||F|
OBX|3|ST|XXXXX-X^Delivery Status (Phase)^LOINC||Delivery Status
  (Phase)||||||F|
OBX|4|ST|XXXXX-X^Reason for early completion^LOINC||Reason for early
  completion||||||F|
OBX|5|CWE|XXXXX-X^Protocol^LOINC||Protocol||||||F|
OBX|6|CWE|XXXXX-X^Technique^LOINC||Technique||||||F|
OBX|7|CWE|XXXXX-X^Modality^LOINC||Modality||||||F|
OBX|8|ST|XXXXX-X^Treatment Accessories^LOINC||Treatment
  Accessories||||||F|
OBX|9|NM|XXXXX-X^Dose per fraction^LOINC||Dose per fraction|cGy|||||F|
OBX|10|NM|XXXXX-X^Planned number of fractions^LOINC||Planned number of
  fractions||||||F|
OBX|11|ST|XXXXX-X^Frequency of delivery^LOINC||Frequency of
  delivery||||||F|
OBX|12|NM|XXXXX-X^Total Planned Dose (phase)^LOINC||Total Planned Dose
  (phase)|cGy|||||F|
ORC|2|Phase2UID^^^IDType||PrescriptionUID|20190715041500|||Parent
  Order|20190715041500
OBR|2|Phase2UID^^^IDType|Phase2UID^^^IDType|77332^Simple Device
  Radiation^CPT|||20190715041500||||||||||||||||F
OBX|1|ST|XXXXX-X^Phase Label^LOINC||Phase Label||||||F|
OBX|2|ST|XXXXX-X^Approval Status (Phase)^LOINC||Approval Status
  (Phase)||||||F|
OBX|3|…
```


3.3.3 Session Results

```
MSH|^~\&|SYSTEM|SYSTEM|EHR|EHR|20130123122336|EDIREGO|ORU^R01^ORU_R01|
  5F5DEEE_1DC_0_F57D|P|2.5.1|||AL|NE|||||Common_Component^Profile
  Component^2.16.840.1.113883.9.20^ISO
PID|||112345^^^SYSTEM^MRN||Radonc^Patient^^^^||20010620|F|||123 Frog
  Lane^APT 02^Verona^WI^53593^USA^H||518-345-2938|||||AccountNumber|
PV1||I|PointOfCare^Room^Bed^^^^Building^^||||00573^Attending^Provider^
  ^^^^^ProvID^^^^|00382^Referring^Provider^^^^^^ProvID^^^^|00573^Atte
  nding^Provider^^^^^^ProvID^^^^|||||||||||VisitNumber|
PRB|UP|20190710032200|C80.1^Malignant Tumor^ICD-
  10|SiteUID|EpisodeofCareUID||20181202104130|||1385^Left
  Breast^RegionCode||||08^Active-Improving^
  StatusCode|20190710032200||||||||||CXX.X^Cancer stage 2^ICD-10|
OBX|1|DTM|XXXXX-X^Session start date and time^LOINC||Session start
  date and time||||||F|
OBX|2|DTM|XXXXX-X^Session end date and time^LOINC||Session end date
  and time||||||F|
OBX|3|ST|XXXXX-X^Delivery status (Session)^LOINC||Delivery status
  (session)||||||F|
OBX|3|ST|XXXXX-X^Delivery Status (site)^LOINC||Delivery Status
  (site)||||||F|
OBX|4|NM|XXXXX-X^Nominal Total Dose Planned (site)^LOINC||Nominal
  Total Dose Planned (site)|cGy|||||F|
OBX|5|NM|XXXXX-X^Nominal Cumulative Dose Delivered
  (site)^LOINC||Nominal Cumulative Dose Delivered (site)|cGy|||||F|
ORC|1|Phase1UID^^^IDType||PrescriptionUID|20190715041500|||Parent
  Order|20190715041500
OBR|1|Phase1UID^^^IDType|Phase1UID^^^IDType|77332^Simple Device
  Radiation^CPT|||20190715041500||||||||||||||||||F
OBX|1|ST|XXXXX-X^Phase Label^LOINC||Phase Label||||||F|
OBX|2|ID|XXXXX-X^Plan UIDs^LOINC||Plan UIDs||||||F|
OBX|3|ST|XXXXX-X^Delivery Status (Phase)^LOINC||Delivery Status
  (Phase)||||||F|
OBX|4|NM|XXXXX-X^Fraction Number^LOINC||Fraction Number||||||F|
OBX|5|NM|XXXXX-X^Planned Number of Fractions^LOINC||Planned Number of
  Fractions||||||F|
OBX|6|NM|XXXXX-X^Nominal Fraction Dose Planned^LOINC||Nominal Fraction
  Dose Planned|cGy|||||F|
OBX|7|NM|XXXXX-X^Nominal Fraction Dose Delivered^LOINC||Nominal
  Fraction Dose Delivered|cGy|||||F|
OBX|8|NM|XXXXX-X^Nominal Total Dose Planned (phase)^LOINC||Nominal
  Total Dose Planned (Phase)|cGy|||||F|
OBX|9|NM|XXXXX-X^Nominal Cumulative Dose Delivered
  (phase)^LOINC||Nominal Cumulative Dose Delivered (phase)|cGy|||||F|
```



```
ORC|2|Phase2UID^^^IDType||PrescriptionUID|20190715041500|||Parent
  Order|20190715041500
OBR|2|Phase2UID^^^IDType|Phase2UID^^^IDType|77332^Simple Device
  Radiation^CPT|||20190715041500||||||||||||||||||F
OBX|1|ST|XXXXX-X^Phase Label^LOINC||Phase Label||||||F|
OBX|2|ID|XXXXX-X^Plan UIDs^LOINC||Plan UIDs||||||F|
OBX|3|…
```


5 IHE Namespaces, Concept Domains and Vocabularies

NA

6 Content Modules

NA

Appendices

NA

Volume 4 – National Extensions

1185 NA

Appendices

NA

