The 5 Stages of Radiation Therapy

initial consultation, simulation, treatment planning, treatment delivery and post treatment follow-up
STORE Manual Radiation Therapy Coding & Case Scenario with Coding Applied

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Initial Consultation

- Consultation is the first step in the radiation process
- This involves an appointment with a radiation oncologist
  - Review medical records
  - Path reports
  - Radiology images
  - Physical examination of the patient
- Based off these findings, if radiation therapy is the recommended course of treatment, the patient will be scheduled for a CT simulation

Simulation

- Simulation allows the radiation oncologist to define the exact location and configuration of the treatment.
- A CT scan will be performed in the radiation oncology department
  - Contrast may be used to improve the quality of information
- Patient is placed in treatment position via a custom immobilization device
  - Masks, headrests, form-fit body molds
- The immobilization device will be used daily by the patient for precision treatment
- Patient will me given treatment tattoos
  - This is a tiny tattoo “dot” used for treatment setup to ensure treatment is directed properly each day
  - Tattoos are permanent and can not be removed

Treatment Planning

- Performed in collaboration with the radiation oncologist, physicist and dosimetrist
- The purpose of treatment planning is to deliver a high dose of radiation to the tumor while sparing the dose received by surrounding normal tissue
  - This reduces side effects of the radiation
- The CT scan images from the patient simulation, along with MRI or PET scans, if needed, are analyzed to design the field of radiation therapy treatment
- Each treatment plan is customized to the patient
- Creating the radiation plan may take several days to complete as it is often a complex process aided by the use of technology to recreate “virtual anatomy” and precise location of the tumor

Treatment Delivery

- Radiation therapists are responsible for positioning the patient and for delivering the radiation dose prescribed by the radiation oncologist
- Images are taken on the first day of treatment and at regular intervals to ensure dose is delivered to the precise location and has not changed position
- Treatment session typically do not last long, often less than 20 minutes
  - Most of that time is used to accurately position the patient
- Radiation therapy may be given in the form of photons, electrons, protons, brachytherapy or radioisotopes

Post Treatment Follow-up

- Upon completion of treatment, a follow-up appointment is scheduled to monitor recovery and overall health of the patient
- Additional diagnostic tests may be ordered
- Patient progress notes are sent to all providers on the patient’s medical team
- Final treatment summary notes are added to patient charts for data collection
- As time progresses, the frequency of visits in radiation oncology decrease, and the patient is released to their primary care for continued follow-up

STORE MANUAL Radiation Treatment Coding

Please note: The tables below are not complete and only include most commonly used codes. Please reference the STORE manual for full list of codes used for Radiation Treatment

Location of Radiation treatment

- Location of radiation treatment will typically be found in the radiation oncologist’s summary letter for the first course of treatment.

Code	Label	Definition
1	ALL RT at this facility	All RT at reporting facility
2	Primary treatment at reporting facility, boost elsewhere	Primary tx given at reporting facility, boost elsewhere
3	Boost at reporting facility, Primary treatment elsewhere	Boost given at reporting facility, primary treatment elsewhere
4	All RT elsewhere	ALL RT elsewhere

Phase I-II-III Radiation Primary Treatment Volume

- Identifies the primary treatment volume (field) or primary anatomic target treated during phase I-II-III of radiation therapy during the first course of treatment.
  - Phase I: Used to indicate the primary target volume (field), typically the primary tumor or tumor bed
    - **Note** that for many of the treatment volumes, the same code should be used when the anatomic structure is targeted or when the surgical bed of the resected anatomical structure is targeted. However, there is an exception to the rule for breast cancer
  - Phase II-III: Commonly includes draining lymph node regions that are associated with the primary tumor or tumor bed. The draining lymph nodes are recorded in the Phase II Radiation to Draining Lymph Nodes
    - ***Please Note***: Subsequent phase may be referred to as a boost or cone down

Please reference the Radiation Primary Treatment Volume Table in the STORE Manual

Phase I-II-III Radiation to Draining Lymph Nodes

- Identifies if any draining lymph nodes are treated during the phase I-II-III of radiation therapy delivered to the patient
- Only use codes 01 to 08 when the lymph nodes are the primary target

Code	Label
01	Neck lymph node regions
02	Thoracic lymph node regions
03	Neck and Thoracic lymph node regions
04	Breast/Chest wall lymph node regions
05	Abdominal lymph node regions
06	Pelvic lymph nodes
07	Abdominal and pelvic lymph nodes
08	Lymph node region, NOS

Phase I-II-III Radiation Treatment Modality

- Radiation modality (type) reflects whether a treatment was external beam (photons, electrons, protons), brachytherapy (HDR, LDR, intracavitary, interstitial), a radioisotope or a combination of modalities
  - The modality used will typically be found in the radiation oncologist’s treatment summary for the first course of treatment

Code	Label
02	External Beam, Photons
04	External beam, electrons
09	Brachytherapy, intracavitary, HDR
11	Brachytherapy, interstitial, HDR
13	Radioisotopes, NOS

Phase I-II-III External Beam Radiation Planning Technique

- External beam radiation is the most commonly-used radiation modality in North America. The most common types are 3D Conformal and IMRT

Code	Label	Description
00	No RT	RT not given
04	3D Conformal	Using multiple, fixed beams shaped to conform to a defined target volume. Should be clearly described as conformal or 3-D therapy in patient record.
05	IMRT	the shape or energy of beams is optimized using software algorithms. IMRT generally refers to photon or proton beams. Is also referred to as VMAT
06	Stereotactic Radiotherapy, NOS SBRT	Also referred to as SABR, SRS or SRT.
88	NA	Tx not by external beam

Phase I-II-III Dose per Fraction

- Radiation therapy is delivered in one or more phases with identified dose per fraction. ODS to record dose per fraction (treatment session) delivered to the patient in the first phase of radiation during the first course of treatment. The unit of measure is centi-Gray (cGy)
  - **NOTE:** dose is still occasionally specified in “rads” 1 rad = 1cGy
  - ODS to record the actual dose delivered (NOT the initially prescribed dose) as documented in the treatment summary

Code	Label
000001-99997	Record the actual cGy delivered

Phase I-II-III Number of Fractions

- Radiation therapy is delivered in one or more phases with each phase spread out over a number of fractions (treatment sessions). ODS to record the total number of fractions (treatment sessions) delivered to the patient in the first phase of radiation during the first course of treatment.
  - **NOTE:** ODS to record the actual number of fractions delivered (NOT initially prescribed), as documented in the treatment summary
  - ***Phase I must be coded,*** however blanks allowed for Phase II-III if no radiation treatment administered

Code	Label
001-998	Record number of fractions administered

Phase I-II-III Total Dose

- This information is used to evaluate the patterns of radiation care
  - Each phase is meant to reflect the delivered radiation prescription, with phase I-II-III added together to give the total dose
  - ODS to record the actual total dose delivered (NOT initially prescribed), as documented in the radiation treatment summary
  - ODS to record total dose in cGy
    - **NOTE:** dose is still occasionally specified in “rads”. 1 rad = 1cGy

Code	Label
0000001-999997	Record the total dose delivered in cGy

Radiation Treatment Discontinued Early

- used to identify patients whose radiation treatment course was discontinued earlier than initially planned. These the patients received fewer treatment fractions (sessions) than originally intended by the treating physician
  - these patients can be excluded from analyses attempting to describe adherence to radiation treatment guidelines or patterns of care analyses

Code	Label
01	RT completed as prescribed
02	RT discontinued early - toxicity
03	Radiation treatment discontinued early - contraindicated due to other patient risk factors
04	RT discontinued early - patient decision
05	RT discontinued early - family decision
06	RT discontinued early - patient expired

Date Radiation Ended

- ODS to record the date on which the patient completes or receives the last radiation treatment at any facility. The date when treatment ended will typically be found in the radiation oncologist’s summary letter for the first course of treatment.
  - Date is recorded as YYYYMMDD

Case Scenario

Patient Case Scenario with coding examples

Diagnosis:
C15.5 - T3N1 adenocarcinoma of the distal esophagus

History of Present Illness:

68 year old male who presented to the ER on 4/5/20 with progressive epigastric pain for several months and weight loss. His work up was delayed due to COVID restrictions. Upper GI on 4/6/20 revealed esophageal stricture. EGD on 4/9/20 revealed partially obstructing malignant esophageal tumor in lower third of the esophagus. EUS with biopsies and PEG placement on 04/09/20 showed a mass in the lower third of the esophagus at 35 cm to 41 cm. The lesion was circumferential and borders were irregular. The mass measured up to 21 mm in thickness with evidence suggesting invasion into the adventitia (Layer 5). **This** was staged T3 N1 Mx. Biopsy of the esophageal mass at 42 cm was positive for adenocarcinoma. Gastric cardia biopsy was negative. Body CT on 4/10/20 showed distal esophageal mass, which at least partially obstructs the esophagus. Mildly enlarged gastrohepatic lymph nodes are concerning for malignant nodal involvement. 4 mm pulmonary nodules in the lower lobes, metastatic involvement is not excluded. PET CT on 4/24/20 shows hypermetabolic distal esophageal mass. Cluster of small to mildly enlarged gastrohepatic lymph nodes inferiorly adjacent to the esophageal mass which are not hypermetabolic and indeterminate. Otherwise no evidence of metastatic disease. The patient presents to radiation oncology to discuss radiation to his esophagus concurrently with chemotherapy.

Region Treated- Simulation & Treatment Planning:

CT scan in radiation oncology was obtained on 4/22/20. Patient was positioned using a wingboard with arms up above head, holding T-bar at the A2 position. Treatment planning found the tumor was isolated to the Esophagus and Lymph Nodes. Treatment planning will also include an Esophagus Boost. Patient was scheduled for X-rays for positioning on 4/29/20 and tattoos were given, with radiation set to begin on 4/30/20. Patient to receive a total dose of 5040 cGy over 28 fx.

Response to Treatment:

The patient continued all nutrition through a feeding tube. He lost 9 pounds during concurrent therapy. He used Norco elixir for pain management. He experienced nausea despite using Compazine and Zofran. Ativan helped the nausea but he stopped it due to the way it made him feel.

Recommendation:

The patient is scheduled for PET CT and reevaluation with Dr. **Chung.** He is to follow up with Dr. Knol. He will return to Radiation Oncology for follow up in four to six weeks.

Radiation Treatment Summary from Patient Chart

Region Treated:

Treatment Site	Energy	Dose/Fx (cGy)	#Fx	Dose Correction (cGy)	Total Dose (cGy)	Start Date	End Date	Elapsed Days
Esophagus and Lymph Nodes	6X	180	25 / 25	0	4,500	4/30/2020	6/4/2020	35
Technique= VMAT 2 partial arcs (30-181, 181-30)								
Esophagus Boost	6X	180	3 / 3	0	540	6/5/2020	6/9/2020	4
Technique= VMAT 2 partial arcs (30-181, 181-30)								
Total:					5,040	4/30/2020	6/9/2020	40

- **Location of Radiation treatment:** We assume this was all at the reporting facility
  - Code 1
- **Phase I-II-III Radiation Primary Treatment Volume:** Phase I -Esophagus and Lymph Nodes, Phase II- Esophagus Boost (information found in the treatment summary)
  - Code 50
- **Phase I-II-III Radiation to Draining Lymph Nodes:** per the treatment summary, lymph nodes were included
  - Phase I - Code 02 thoracic lymph nodes, Phase II- leave blank
- **Phase I-II-III Radiation Treatment Modality:** per the treatment summary, treatment was external beam, Photons. This is indicated from the Energy, 6X
  - Phase I & Phase II - Code 02
- **Phase I-II-III External Beam Radiation Planning Technique:** per the treatment summary, Technique was VMAT in 2 partial arcs
  - Phase I & Phase II - Code 05
- **Phase I-II-III Dose per Fraction**: per the treatment summary, Phase I& Phase II both show 180 cGy per fx
  - Code 00180 for both Phases
- **Phase I-II-III Number of Fractions:** per the treatment summary, Phase I included 25 fx & Phase II included 3 fx
  - Code Phase I- 025, Phase II- 003
- **Phase I-II-III Total Dose**: per the treatment summary, Phase I total dose 4500 cGy & Phase II total dose 540 cGy
  - Code Phase I- 004500, Phase II- 000540
- **Radiation Treatment Discontinued Early**: Not applicable per the Treatment summary, this patient completed the prescribed Radiation dose
  - leave blank
- **Date Radiation Ended:** Per the Treatment summary, Phase I ended June 4, 2020 & Phase II ended June 9, 2020.
  - Code Phase I- 20200604 and Phase II - 20200609