



CLINICAL GUIDELINES

Oncology Imaging Guidelines

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eviCore healthcare Clinical Decision Support Tool Diagnostic Strategies: This tool addresses common symptoms and symptom complexes. Imaging requests for individuals with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or individual's Primary Care Physician (PCP) may provide additional insight.

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Oncology Imaging Guidelines

Abbreviations for Oncology Guidelines
ONC-1: General Guidelines
ONC-2: Primary Central Nervous System Tumors
ONC-3: Squamous Cell Carcinomas of the Head and Neck
ONC-4: Salivary Gland Cancers
ONC-5: Melanomas and Other Skin Cancers
ONC-6: Thyroid Cancer
ONC-7: Small Cell Lung Cancer
ONC-8: Non-Small Cell Lung Cancer
ONC-9: Esophageal and GE Junction Cancer
ONC-10: Other Thoracic Tumors
ONC-11: Breast Cancer
ONC-12: Sarcomas – Bone, Soft Tissue and GIST
ONC-13: Pancreatic Cancer
ONC-14: Upper GI Cancers
ONC-15: Neuroendocrine Cancers and Adrenal Tumors
ONC-16: Colorectal and Small Bowel Cancer
ONC-17: Renal Cell Cancer (RCC)
ONC-18: Transitional Cell Cancer
ONC-19: Prostate Cancer
ONC-20: Testicular, Ovarian and Extragonadal Germ Cell Tumors
ONC-21: Ovarian Cancer
ONC-22: Uterine Cancer
ONC-23: Cervical Cancer
ONC-24: Anal Cancer & Cancers of the External Genitalia
ONC-25: Multiple Myeloma and Plasmacytomas
ONC-26: Leukemias, Myelodysplasia and Myeloproliferative Neoplasms
ONC-27: Non-Hodgkin Lymphomas
ONC-28: Hodgkin Lymphoma
ONC-29: Hematopoietic Stem Cell Transplantation
ONC-30: Medical Conditions with Cancer in the Differential Diagnosis
ONC-31: Metastatic Cancer, Carcinoma of Unknown Primary Site, and Other Types of Cancer
ONC-32: Medicare Coverage Policies for PET

Abbreviations for Oncology Guidelines			
ACTH	adrenocorticotrophic hormone		
AFP	alpha-fetoprotein		
ALKP	alkaline phosphatase	AP	anteroposterior
betaHCG	beta human chorionic gonadotropin		
CA 125	cancer antigen 125 test	CA 19-9	cancer antigen 19-9
CA 15-3	cancer antigen 15-3	CA 27-29	cancer antigen 27-29
CBC	complete blood count		
CEA	carcinoembryonic antigen	CNS	central nervous system
CR	complete response		
CTA	computed tomography angiography	DCIS	ductal carcinoma in situ
DLBCL	diffuse large B cell lymphomas		
DRE	digital rectal exam	EGD	esophagogastroduodenoscopy
ENT	ear, nose, throat	EOT	end of therapy
ERCP	endoscopic retrograde cholangiopancreatography		
ESR	erythrocyte sedimentation rate	EUA	exam under anesthesia
EUS	endoscopic ultrasound		
FDG	fluorodeoxyglucose	FNA	fine needle aspiration
FUO	fever of unknown origin		
GE	gastroesophageal	GI	gastrointestinal
GU	genitourinary		
GTR	gross total resection	HG	high grade
HIV	human immunodeficiency disease		
HRPC	hormone refractory prostate cancer	hypermet	hypermetabolic
IFRT	Involved field radiation therapy	inv	invasive
LAR	low anterior resection	LCIS	lobular carcinoma in situ
LDH	lactate dehydrogenase	LFT	liver function tests
LND	Lymph node dissection		

MALT	mucosa associated lymphoid tissue	maint	maintenance
MEN	multiple endocrine neoplasia	MG	myasthenia gravis
MGUS	monoclonal gammopathy of unknown significance		
MIBG	I-123 metaiodobenzylguanidine scintigraphy		
MRA	magnetic resonance angiography	MRI	magnetic resonance imaging
MUGA	'multiple gated acquisition' cardiac nuclear scan		
MWA	microwave ablation		
NaF	Sodium Fluoride		
NET	Neuroendocrine tumor		
NCCN®	National Comprehensive Cancer Network		
NHL	non-Hodgkin's lymphoma	NPC	nasopharyngeal carcinoma
NSABP	National Surgical Adjuvant Breast and Bowel Project		
NSAIDS	nonsteroidal anti-inflammatory drugs		
NSCLC	non-small cell lung cancer		
NSGCT	non-seminomatous germ cell tumor	PA	posteroanterior
PCI	prophylactic cranial irradiation		
PET	positron emission tomography	COG	Children's Oncology Group
PSA	prostate specific antigen	RFA	radiofrequency ablation
RPLND	retroperitoneal lymph node dissection		
SqCCa	squamous cell carcinoma	SCLC	small cell lung cancer
SIADH	syndrome of inappropriate secretion of antidiuretic hormone		
TCC	transitional cell carcinoma		
TLH	total laparoscopic hysterectomy		
TNM	tumor node metastasis staging system		
TSH	thyroid-stimulating hormone		
TURBT	trans-urethral resection of bladder tumor		
VIPoma	vasoactive intestinal polypeptide	WLE	wide local incision
WB-MRI	whole body MRI		
WM	Waldenstrom's macroglobulinemia	WBXRT	Whole brain radiation therapy

ONC-1: General Guidelines

ONC-1.0: General Guidelines

ONC-1.1: Key Principles

ONC-1.2: Phases of Oncology Imaging and General Phase-Related Considerations

ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology

ONC-1.4: PET Imaging in Oncology

ONC-1.5: Unlisted Procedure Codes in Oncology

ONC-1.6: Predisposition Syndromes

ONC-1.0: General Guidelines

- A recent clinical evaluation (within 60 days) or meaningful contact (telephone call, electronic mail or messaging) should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled off therapy surveillance evaluation or cancer screening. The clinical evaluation may include a relevant history and physical examination, including biopsy, appropriate laboratory studies, and results of non-advanced or advanced imaging modalities.
- Unless otherwise stated in the disease-specific guideline, a histological confirmation of malignancy (or recurrence) and the stage of disease is required to perform a medical necessity review of the requested imaging.
- Routine imaging of brain, spine, neck, chest, abdomen, pelvis, bones, or other body areas is not indicated except where explicitly stated in a diagnosis-specific guideline section, or if one of the following applies:
 - ◆ Known prior disease involving the requested body area
 - ◆ New or worsening symptoms or physical exam findings involving the requested body area (including non-specific findings such as ascites or pleural effusion)
 - ◆ New finding on basic imaging study such as plain x-ray or ultrasound
 - ◆ New finding on adjacent body area CT/MRI study (i.e., pleural effusion observed on CT abdomen)
- Unless otherwise stated in the disease-specific guideline, advanced imaging of asymptomatic individuals is not routinely supported without signs or symptoms of systemic involvement of cancer.
- Conventional imaging performed prior to diagnosis should not be repeated unless there is a delay of at least 6 weeks since previous imaging and treatment initiation or there are new or significantly worsening clinical signs or symptoms

Phase	Imaging Timeframe
After definitive local therapy of primary tumor (surgery or radiation therapy)	◆ Follow surveillance guidelines
During adjuvant chemotherapy	◆ Follow surveillance guidelines
After ablative therapy	◆ See disease-specific guidelines
During chemotherapy or immunotherapy for measurable disease	◆ Every 2 cycles (generally every 6 to 8 weeks)
During endocrine/hormonal therapy for measurable disease	◆ Every 3 months
Measurable metastatic disease being monitored off therapy	◆ Every 3 months
Minimal metastatic disease on maintenance therapy	◆ Every 3 months
Surveillance for history of metastatic disease with complete response and being observed off-therapy	◆ Imaging typically not indicated beyond 5 years from completion of treatment for metastatic disease

- Advanced imaging is not indicated for evaluation of in situ or non-invasive cancers or cancer surveillance after complete surgical removal of primary disease unless otherwise stated in the cancer-specific guidelines.
- Advanced imaging is not indicated for monitoring disease in individuals who choose to not receive standard oncologic therapy, but may be receiving alternative therapies or palliative care and/or hospice. All advanced imaging indicated for initial staging of the specific cancer type can be approved once when the patient is considering initiation of a standard therapeutic approach (surgery, chemotherapy, or radiation therapy).
- Brain imaging is performed for signs or symptoms of brain disease
 - ◆ MRI Brain without and with contrast (CPT® 70553) is the recommended study for evaluation of suspected or known brain metastases. If a non-contrast CT head shows suspicious lesion, MRI brain may be obtained to further characterize the lesion
 - ◆ CT without and with contrast (CPT® 70470) can be approved when MRI is contraindicated or not available, or if there is skull bone involvement
 - ◆ Certain malignancies including, but not limited to melanoma and lung cancer have indications for brain imaging for asymptomatic patients
 - ◆ If stage IV disease is demonstrated elsewhere or if systemic disease progression is noted, refer to disease specific guidelines
 - ◆ Initiation of angiogenesis therapy is not an indication for advanced imaging of the brain in asymptomatic patients (Avastin/Bevacizumab; < 3% risk of bleeding and < 1% risk of serious bleeding)
- Bone Scan:
 - ◆ Primarily used for evaluation of bone metastases in patients with solid malignancies.
 - ◆ Indications for bone scan in patients with history of malignancy include – bone pain, rising tumor markers, elevated alkaline phosphatase or in patients with primary bone tumor.
 - ◆ For evaluation of suspected or known bony metastases, CPT® 78306 (Nuclear bone scan whole body), may be approved.
 - ◆ Radiopharmaceutical Localization scan SPECT (CPT® 78803 or CPT® 78831) or SPECT/CT (CPT® 78830 or CPT® 78832) may be approved as an add-on test for further evaluation of a specific area of interest.
 - ◆ CPT® codes 78300 (Nuclear bone scan limited), 78305 (Nuclear bone scan multiple areas) or 78315 do not have any indications in oncology nuclear medicine imaging.
- Bone scan supplemented by plain x-rays are the initial imaging modalities for suspected malignant bone pain. For specific imaging indications, see also:
 - ◆ **ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology**
 - ◆ **ONC-31.5: Bone (including Vertebral) Metastases**
 - ◆ **ONC-31.6: Spinal Cord Compression**
 - ◆ **ONC-31.7: Carcinoma of Unknown Primary Site**

- Delay PET/CT for at least 12 weeks after completion of radiation treatment, unless required sooner for imminent surgical resection.
- PET/CT may be considered prior to biopsy in order to determine a more favorable site for biopsy when a prior biopsy was nondiagnostic or a relatively inaccessible site is contemplated which would require invasive surgical intervention for biopsy attempt.
- PET/CT may be indicated if:
 - ◆ Conventional imaging (CT, MRI or bone scan) reveals findings that are inconclusive or negative, with continued suspicion for recurrence
- Unless specified in diagnosis-specific guideline section PET/CT Imaging is NOT indicated for:
 - ◆ Infection, inflammation, trauma, post-operative healing, granulomatous disease, rheumatological conditions
 - ◆ Concomitantly with separate diagnostic CT studies
 - ◆ Conclusive evidence of distant or diffuse metastatic disease on recent conventional imaging studies
 - ◆ Metastatic disease in the central nervous system (CNS)
 - ◆ Lesions less than 8 mm in size
 - ◆ Follow up after localized therapy (i.e. radiofrequency ablation, embolization, stereotactic radiation, etc.)
 - ◆ Rare malignancies, due to lack of available evidence regarding the diagnostic accuracy of PET in rare cancers
 - ◆ Surveillance
 - Serial monitoring of individuals who are not currently receiving anti-tumor treatment or are receiving maintenance treatment
 - Serial monitoring of FDG avidity until resolution.
 - PET/CT avidity in a residual mass at the end of planned therapy is not an indication for PET/CT imaging during surveillance.
 - Residual mass that has not changed in size since the last conventional imaging does not justify PET imaging
- Unless otherwise specified for a specific cancer type, once PET has been documented to be negative for a given patient's cancer or all PET-avid disease has been surgically resected, PET should not be used for continued disease monitoring or surveillance.
- PET/MRI is generally not supported by eviCore for a vast majority of oncologic conditions due to lack of standardization in imaging technique and interpretation.
- The specific radiotracer planned to be used with PET/CT imaging is required to perform a medical necessity review. Indications for PET/CT imaging using non-FDG radiotracers are listed in diagnosis-specific guidelines.
 - ◆ Covered radiotracers:
 - ¹⁸F-FDG
 - ⁶⁸Gallium DOTATATE (NETSPOT®) for low grade neuroendocrine tumors and medullary thyroid cancer
 - ⁶⁴Cu-DOTATATE (DETECTNET®) for low grade neuroendocrine tumors
 - ⁶⁸Ga-DOTA-TOC for low grade neuroendocrine tumors

- ^{11}C Choline for prostate cancer
- ^{18}F -Fluciclovine (AXUMIN®) for prostate cancer
- ^{68}Ga PSMA-11 for prostate cancer
- ^{18}F Piflufolastat (Pylarify®) for prostate cancer
- ◆ Not covered radiotracers:
 - ^{18}F -Na Fluoride PET bone scan
 - ^{18}F Fluoroestradiol
 - PET/CT imaging using isotopes other than those specified above
- Octreotide scan:
 - ◆ Specific for low and intermediate grade neuroendocrine tumors which express specific cell surface somatostatin receptors. See cancer specific guidelines for recommended use.
 - ◆ One of the following codes may be approved when Octreotide scan is requested:
 - ◆ CPT® 78802 (Radiopharmaceutical localization of tumor whole body single day study)
 - ◆ CPT® 78804 (Radiopharmaceutical localization of tumor whole body two or more days)
 - ◆ In addition to one of the above CPT codes, CPT® 78803 (Radiopharmaceutical localization of tumor SPECT), SPECT CPT® 78831, or hybrid SPECT/CT (CPT® 78830 or 78832) may be approved as an add-on test for further evaluation of a specific area of interest.

Clinical Trials

- Similar to investigational and experimental studies, clinical trial imaging requests will be considered to determine whether they meet Health Plan coverage and eviCore's evidence-based guidelines.
- Imaging studies which are inconsistent with established clinical standards, or are requested for data collection and not used in direct clinical management are not supported.

ONC-1.1: Key Principles

AGE APPROPRIATE GUIDELINES	
Age of Individual	Appropriate Imaging Guidelines
≥ 18 years old at initial diagnosis	Adult Oncology Imaging Guidelines, except where directed otherwise by a specific guideline section
< 18 years old at initial diagnosis	Pediatric Oncology Imaging Guidelines, except where directed otherwise by a specific guideline section
15 to 39 years old at initial diagnosis (defined as Adolescent and Young Adult (AYA) oncology individuals)	- When unique guidelines for a specific cancer type exist only in either Oncology or Pediatric Oncology, AYA individuals should be imaged according to the guideline section for their specific cancer type, regardless of the individual's age - When unique guidelines for a specific cancer type exist in both Oncology and Pediatric Oncology, AYA individuals should be imaged according to the age rule in the previous bullet

- Conventional Imaging (mostly CT, sometimes MRI or bone scan) of the affected area(s) drives much of initial and re-staging and surveillance. PET is not indicated for surveillance imaging unless specifically stated in the diagnosis-specific guideline sections
- Brain imaging is performed for signs or symptoms of brain disease
 - ◆ MRI Brain without and with contrast (CPT® 70553) is the recommended study for evaluation of suspected or known brain metastases. If a non-contrast CT head shows suspicious lesion, MRI brain may be obtained to further characterize the lesion
 - ◆ CT without and with contrast (CPT® 70470) can be approved when MRI is contraindicated or not available, or if there is skull bone involvement
 - ◆ Certain malignancies including, but not limited to melanoma and lung cancer have indications for brain imaging for asymptomatic patients
 - ◆ If stage IV disease is demonstrated elsewhere or if systemic disease progression is noted, refer to disease specific guidelines
 - ◆ Initiation of angiogenesis therapy is not an indication for advanced imaging of the brain in asymptomatic patients (Avastin/Bevacizumab; < 3% risk of bleeding and < 1% risk of serious bleeding)
- Patients receiving cardiotoxic chemotherapy (such as doxorubicin, trastuzumab, pertuzumab, mitoxantrone, etc.) may undergo cardiac evaluation – at baseline and for monitoring while on active therapy.
 - ◆ eviCore guidelines support using Echocardiography (CPT® 93306, CPT® 93307, or CPT® 93308) rather than MUGA scan for determination of LVEF and/or wall motion.
 - MUGA Scan may be performed instead of ECHO in individuals who have a low LV ejection fraction of <50% on a prior ECHO, pre-existing left ventricular wall motion abnormalities from ischemic or non-ischemic cardiomyopathies, congestive heart failure or when ECHO is technically limited and prevents accurate assessment of LV function.
 - A prior MUGA is not a reason to approve another MUGA (it is not necessary to compare LVEF by the same modality)

- ◆ The timeframe for monitoring the ejection fraction should be determined by the provider, but no more often than baseline and at every 6 weeks.
- ◆ May repeat every 4 weeks if cardiotoxic chemotherapeutic drug is withheld for significant left ventricular cardiac dysfunction.
- ◆ See also: **CD-12.1: Oncologic Indications for Cancer Therapeutics-Related Cardiac Dysfunction (CTRCD)**
- Adults (≥18 years) with a diagnosis of Li-Fraumeni Syndrome (LFS) may be screened for malignancy with a Whole Body MRI (CPT® 76498) on an annual basis. Annual Brain MRI (CPT® 70553) may be performed as part of Whole Body MRI or as a separate exam. Due to lack of standardization of technique, interpretation, and availability of Whole Body MRI, individuals with LFS are encouraged to participate in clinical trials.
- CTA or MRA of a specific anatomic region is indicated when requested for surgical planning when there is suspected vascular proximity to proposed resection margin.

Use of Contrast

- CT imaging should be performed with contrast for known or suspected body regions, unless contraindicated.
 - ◆ Shellfish allergy is not a contraindication to contrast. Patients with known shellfish allergy do not have contrast reaction any more often than other atopic individuals or patients with other food allergies.
 - ◆ For iodinated contrast dye allergy, either CT scans without contrast or MRI scans without and with contrast are indicated.
 - ◆ If CT scanning is considered strongly indicated in a patient with known contrast allergy, CT with contrast may be considered to be safely performed following prednisone premedication over a 24-hour period prior to the study.
- For patients with renal insufficiency which precludes contrast use, CT without contrast appropriate disease-specific areas should be offered. Further imaging (such as MRI) may be indicated if noncontrast CT results are inconclusive.
- Severe renal insufficiency, i.e. an eGFR less than 30, is a contraindication for an MRI using a gadolinium-based contrast agent (GBCA) as well. In patients with eGFR greater than 40, GBCA administration can be safely performed. GBCA administered to patients with acute kidney injury or severe chronic kidney disease can result in a syndrome of nephrogenic systemic fibrosis (NSF), but GBCAs are not considered nephrotoxic at dosages approved for MRI.
- Gadolinium deposition has been found in patients with normal renal function following the use of gadolinium based contrast agents (GBCAs).
 - ◆ The U.S. Food and Drug Administration (FDA) is investigating the risk of brain deposits following repeated use of GBCAs.
 - ◆ The FDA has noted that, “It is unknown whether these gadolinium deposits are harmful or can lead to adverse health effects.” and have recommended:
 - To reduce the potential for gadolinium accumulation, health care professionals should consider limiting GBCA use to clinical circumstances in which the additional information provided by the contrast is necessary.
 - Health care professionals are also urged to reassess the necessity of repetitive GBCA MRIs in established treatment protocols.

Radiation Exposure

- The use of MRI in place of CT scans to reduce risk of secondary malignancy is not supported by the peer-reviewed literature. Unless otherwise specified in the Guidelines, MRI in place of CT scans for this purpose alone is not indicated. In some instances (i.e., testicular cancer surveillance), MRI may be considered inferior to CT scans.

ONC-1.2: Phases of Oncology Imaging and General Phase-Related Considerations

Phases of Oncology Imaging	Definition
Screening	Imaging requested for patients at increased risk for a particular cancer in the absence of known clinical signs or symptoms
Suspected Diagnosis	Imaging requested to evaluate a suspicion of cancer, prior to histological confirmation
Initial work-up and Staging	Imaging requested after biopsy confirmation and prior to starting specific treatment
Treatment response or Interim Restaging	Imaging performed during active treatment with chemotherapy, targeted therapy, immunotherapy, or endocrine therapy
Restaging of locally treated lesions	Imaging performed to evaluate primary or metastatic lesions with ablation using cryoablation, radiofrequency, radioactive isotope, microwave or chemotherapy
Restaging / Suspected Recurrence	Imaging requested when there is suspicion for progression or recurrence of known cancer based on clinical signs/symptoms, laboratory tests or basic imaging studies
Surveillance	Imaging performed in individuals who: ◆ Are asymptomatic or have chronic stable symptoms, and ◆ Have no clinical suspicion of change in disease status, and ◆ Are not receiving active anti-tumor treatment or are receiving maintenance treatment

General phase-related considerations:

- Conventional imaging performed prior to diagnosis should not be repeated unless there is a delay of at least 6 weeks since previous imaging and treatment initiation or there are new or significantly worsening clinical signs or symptoms

Phase	Imaging Timeframe
After definitive local therapy of primary tumor (surgery or radiation therapy)	◆ Follow surveillance guidelines
During adjuvant chemotherapy or endocrine therapy	◆ Follow surveillance guidelines
After ablative therapy	◆ See disease-specific guidelines
During chemotherapy or immunotherapy for measurable disease	◆ Every 2 cycles (generally every 6 to 8 weeks)
During endocrine/hormonal therapy for measurable disease	◆ Every 3 months
Metastatic disease on maintenance therapy	◆ Every 3 months
Measurable metastatic disease being monitored off therapy	◆ Every 3 months for up to 5 years after completion of treatment for metastatic disease

ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology

- This section does not apply to PET imaging. PET imaging considerations can be found in **ONC-1.4: PET Imaging in Oncology**
- **Bone Scan:**
 - ◆ Primarily used for evaluation of bone metastases in patients with solid malignancies.
 - ◆ Indications for bone scan in patients with history of malignancy include – bone pain, rising tumor markers, elevated alkaline phosphatase or in patients with primary bone tumor.
 - ◆ For evaluation of suspected or known bony metastases, CPT® 78306 (Nuclear bone scan whole body), may be approved.
 - Radiopharmaceutical Localization scan SPECT (CPT® 78803 or CPT® 78831) or SPECT/CT (CPT® 78830 or CPT® 78832) may be approved as an add-on test for further evaluation of a specific area of interest with prior positive whole body scan or documented bone metastasis.
 - ◆ CPT® codes 78300 (Nuclear bone scan limited), 78305 (Nuclear bone scan multiple areas) or 78315 do not have any indications in oncology nuclear medicine imaging.
- **Octreotide scan:**
 - ◆ Specific for low and intermediate grade neuroendocrine tumors which express specific cell surface somatostatin receptors. See cancer specific guidelines for recommended use.
 - ◆ One of the following codes may be approved when Octreotide scan is requested:
 - CPT® 78802 (Radiopharmaceutical localization of tumor whole body single day study)
 - CPT® 78804 (Radiopharmaceutical localization of tumor whole body two or more days)
 - ◆ In addition to one of the above CPT codes, CPT® 78803 (Radiopharmaceutical localization of tumor SPECT), SPECT CPT® 78831, or hybrid SPECT/CT (CPT® 78830 or 78832) may be approved as an add-on test for further evaluation of a specific area of interest.
- **Bone marrow imaging:**
 - ◆ This study is rarely performed for evaluation of the entire bone marrow in conditions like myeloproliferative disorders, sickle cell bone infarct or ischemia, avascular necrosis or myeloma
 - ◆ The correct CPT code for this study is CPT® 78104 (Diagnostic Nuclear Medicine Procedures on the Hematopoietic, Reticuloendothelial and Lymphatic System)
- **Brain imaging SPECT with Technetium-99m or thallium-201 (CPT® 78803):**
 - ◆ Immunocompromised patients with mass lesion detected on CT or MRI for differentiation between lymphoma and infection
 - ◆ In distinguishing recurrent brain tumor from radiation necrosis

- Radiopharmaceutical localization of tumor or distribution of radiopharmaceutical agent(s):
 - ◆ CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78804, CPT® 78803, CPT® 78831 (SPECT), or CPT® 78830 or CPT® 78832 (SPECT/CT)
 - ◆ For evaluation of fever of unknown origin and osteomyelitis
 - ◆ For suspected infections such as infected central lines, grafts or shunts
- Gallium Isotope Scan:
 - ◆ Radiopharmaceutical Localization of tumor (CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804), SPECT CPT® 78831, or hybrid SPECT/CT CPT® 78830 or 78832
 - ◆ This may be rarely used in place of PET/CT scan when PET/CT scan not available and PET/CT is indicated by guidelines for lymphoma, sarcoma, melanoma or myeloma

ONC-1.4: PET Imaging in Oncology

NOTE: Some payors have specific restrictions on PET imaging, and those coverage policies may supersede the recommendations for PET imaging in these guidelines.

- CPT codes:
 - ◆ PET imaging in oncology should use PET/CT fusion imaging (CPT® 78815 or CPT® 78816) Unbundling PET/CT imaging into separate PET and diagnostic CT codes is otherwise not supported.
 - ◆ The decision whether to use skull base to mid-femur (“eyes to thighs”) procedure code for PET (CPT® 78812 or CPT® 78815) or whole body PET (CPT® 78813 or CPT® 78816) is addressed in the diagnosis-specific guideline sections.
 - ◆ ‘Limited area’ protocol is done infrequently, but may be considered, and is reported with PET (CPT® 78811) or for PET/CT, (CPT® 78814).
- Radiotracers:
 - ◆ Unless specified otherwise, the term “PET” refers to ¹⁸F-FDG-PET and PET/CT fusion studies
 - ◆ Indications for PET/CT imaging using non-FDG radiotracers are listed in diagnosis-specific guidelines. The indications may be as follows:
 - Covered:
 - ¹⁸F-FDG
 - ⁶⁸Gallium DOTATATE (NETSPOT®) for low grade neuroendocrine tumors and medullary thyroid cancer
 - ⁶⁴Cu-DOTATATE (DETECTNET®) for low grade neuroendocrine tumors
 - ⁶⁸Ga-DOTA-TOC for low grade neuroendocrine tumors
 - ¹¹C Choline for prostate cancer
 - ¹⁸F-Fluciclovine (AXUMIN®) for prostate cancer
 - ⁶⁸Ga PSMA-11 for prostate cancer
 - ¹⁸F Piflufolastat (Pylarify®) for prostate cancer
 - Not covered:
 - ¹⁸F-Na Fluoride PET bone scan
 - ¹⁸F Fluoroestradiol
 - PET/CT imaging using isotopes other than those specified above

Most Common Isotopes				
CPT/ HCPCS Code	Code Description	Brand or common name	FDA approved?	Code reviewed by eviCore?
A9552	fluorine-18 (F-18) fluorodeoxyglucose (FDG), diagnostic, per study dose, up to 45 millicuries	FDG	Yes, to assess abnormal glucose metabolism	No
A9580	Sodium fluoride f-18, diagnostic, per study dose, up to 30 millicuries	N/A	Yes, for bone imaging	No
A9587	Gallium GA-68, dotatate, diagnostic, 0.1 millicurie	NETSPOT®	Yes, for localization of somatostatin receptor positive neuroendocrine tumors in adult and pediatric population	No
C9461	Choline C 11, diagnostic, per study dose	N/A	Yes, for suspected prostate cancer recurrence	No
A9588	¹⁸ F-Fluciclovine	AXUMIN®	Yes, for suspected prostate cancer recurrence	No
A9593 A9594	⁶⁸ Ga PSMA-11	N/A	Yes, for newly diagnosed and suspected recurrence of prostate cancer	No
A9597	¹⁸ F Piflufolastat	Pylarify®	Yes, for newly diagnosed and suspected recurrence of prostate cancer	No
A9591	¹⁸ F Fluoroestradiol	Cerianna®	Yes, for the detection of estrogen receptor (ER)- positive lesions as an adjunct to biopsy in patients with recurrent or metastatic breast cancer	No
C9068	⁶⁴ Cu Copper dotatate	Detectnet®	Yes, for the localization of somatostatin receptor positive neuroendocrine tumors (NETs) in adult patients	No
	⁶⁸ Ga Gallium-DOTA- TOC	N/A	Yes, for somatostatin receptor (SSTR) positive gastroenteropancreatic neuroendocrine tumors.	No

- Unless specified in diagnosis-specific guideline section PET/CT Imaging is NOT indicated for:
 - ◆ Infection, inflammation, trauma, post-operative healing, granulomatous disease, rheumatological conditions
 - ◆ Concomitantly with separate diagnostic CT studies
 - ◆ Conclusive evidence of distant or diffuse metastatic disease on recent conventional imaging studies
 - ◆ Metastatic disease in the central nervous system (CNS)
 - ◆ Lesions less than 8 mm in size
 - ◆ Follow up after localized therapy (i.e. radiofrequency ablation, embolization, stereotactic radiation, etc.)
 - ◆ Rare malignancies, due to lack of available evidence regarding the diagnostic accuracy of PET in rare cancers
 - ◆ Surveillance
 - Serial monitoring of individuals who are not currently receiving anti-tumor treatment or are receiving maintenance treatment
 - Serial monitoring of FDG avidity until resolution.
 - PET/CT avidity in a residual mass at the end of planned therapy is not an indication for PET/CT imaging during surveillance.
 - Residual mass that has not changed in size since the last conventional imaging does not justify PET imaging
 - ◆ Unless otherwise specified for a specific cancer type, once PET has been documented to be negative for a given patient's cancer or all PET-avid disease has been surgically resected, PET should not be used for continued disease monitoring or surveillance.
- PET/CT may be indicated if:
 - ◆ Conventional imaging (CT, MRI or bone scan) reveals findings that are inconclusive or negative, with continued suspicion for recurrence
 - ◆ The patient is undergoing salvage treatment for a recurrent solid tumor with residual measurable disease on conventional imaging and confirmed repeat negative PET imaging will allow the patient to transition from active treatment to surveillance.
 - ◆ PET/CT may be considered prior to biopsy in order to determine a more favorable site for biopsy when a prior biopsy was nondiagnostic or a relatively inaccessible site is contemplated which would require invasive surgical intervention for biopsy attempt.
- PET/CT for rare malignancies is not covered by eviCore guidelines due to lack of available evidence regarding diagnostic accuracy of PET/CT in the majority of rare cancers. Conventional imaging studies should be used for initial staging and treatment response for these diagnoses. PET/CT can be approved if all of the following apply:
 - ◆ Conventional imaging (CT, MRI or bone scan) reveals equivocal or suspicious findings
 - ◆ No other specific metabolic imaging (MIBG, octreotide, technetium, etc.) is appropriate for the disease type
 - ◆ The submitted clinical information describes a specific decision regarding the patient's care that will be made based on the PET/CT results

- Delay PET/CT for at least 12 weeks after completion of radiation treatment, unless required sooner for imminent surgical resection.
- PET mammography (PEM, generally reported with CPT® 78811) is considered experimental and investigational at this time.

ONC-1.5: Unlisted Procedure Codes in Oncology

- eviCore authorizes requests for CT or MRI associated with image-directed biopsy or radiation therapy treatment planning for some payors.
- eviCore does not routinely authorize requests for PET associated with image-directed biopsy or radiation therapy treatment planning.
- There is often no unique procedure code for a service performed solely for treatment planning purposes. AMA instructions in the CPT state that if no specific code exists for a particular service, the service is reported with an unlisted code.
- Advanced imaging being used for radiation therapy treatment planning should not be authorized using any of the diagnostic imaging codes for CT, MRI or PET. In the absence of written payor guidelines, advanced imaging performed in support of radiation therapy treatment planning should be reported with:
 - ◆ **CPT® 76498 for Unlisted MRI** – when MRI will be used for treatment planning of radiation therapy to be delivered ONLY to the brain, prostate and cervix. The use of this code for radiation treatment planning of any other cancers/body parts not listed above may be reviewed on a case-by-case basis.
 - ◆ **CPT® 76497 for Unlisted CT** – may NOT be used for radiation treatment planning. CT imaging performed in support of radiation therapy treatment planning is bundled in with the concurrent radiation treatment authorization codes and a separate authorization for treatment planning is not required.
 - ◆ **CPT® 78999 for Unlisted procedure, nuclear medicine (PET)** – eviCore does not perform prior authorization for this CPT code for any payor. This code may not be reviewed or offered as an alternative recommendation to the provider.
 - ◆ Imaging associated with image-directed biopsy should be reported with the corresponding interventional codes. See also: **Preface-4.2: CT-, MR-, or Ultrasound-Guided Procedures.**
 - ◆ For advanced imaging used solely for the purpose of Surgical planning, see: **Preface-4.3: Unlisted Procedures/Therapy treatment planning**

ONC-1.6: Predisposition Syndromes

For predisposition syndrome screening in adult patients, see: **PEDONC-2: Screening Imaging in Cancer Predisposition Syndromes**

References

1. ACR Committee on Drugs and Contrast Media. *ACR Manual on Contrast Media, version 10.3*. Reston, VA: American College of Radiology; 2018.
2. The American College of Radiology. *Practice parameter for the performance of skeletal scintigraphy (bone scan)*. Rev. 2017.
3. The American College of Radiology. *Practice parameter for performing FDG-PET/CT in oncology*. Rev. 2016.
4. The American College of Radiology. *Practice parameter for the performance of tumor scintigraphy with gamma cameras*. Rev. 2015.
5. Erdi YE. Limits of tumor detectability in nuclear medicine and PET. *Mol Imaging Radionucl Ther*. 2012;21(1):23-28. doi:10.4274/Mirt.128.
6. Hapani S, Sher A, Chu D, Wu S. Increased risk of serious hemorrhage with bevacizumab in cancer patients: a meta-analysis. *Oncology*. 2010;79(1):27-38. doi:10.1159/000314980.
7. ACR Appropriateness Criteria. *Pretreatment planning of Invasive cancer of Cervix*. Rev. 2015.
8. ACR Appropriateness Criteria. *External Beam Radiation therapy treatment planning for clinically localized prostate cancer*. Rev. 2016.
9. Metcalfe P, Liney GP, Holloway L, et al. The potential for an enhanced role for MRI in radiation-therapy treatment planning. *Technol Cancer Res Treat*. 2013;12(5):429-46. doi:10.7785/tcrt.2012.500342.
10. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – November 20, 2020, Genetic/Familial High Risk Assessment: Breast and Ovarian, available at: https://www.nccn.org/professionals/physician_gls/pdf/genetics_screening.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Genetic/Familial High Risk Assessment: Breast and Ovarian V2.2021 – November 20, 2020 ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
11. Coverage of Clinical Trials under the Patient Protection and Affordable Care Act; 42 U.S.C.A. § 300gg-8.
12. Benson III AB, D'Angelica MI, Abbott DE, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – April 14, 2021. Neuroendocrine tumors, available at: https://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine tumors V1.2021 – April 14, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.

ONC-2: Primary Central Nervous System Tumors**ONC-2.1: Primary Central Nervous System Tumors – General Considerations****ONC-2.2: Low Grade Gliomas****ONC-2.3: High Grade Gliomas****ONC-2.4: Medulloblastoma and Supratentorial Primitive Neuroectodermal Tumors (sPNET)****ONC-2.5: Ependymoma****ONC-2.6: Central Nervous System Germ Cell Tumors****ONC-2.7: CNS Lymphoma (also known as Microglioma)****ONC-2.8: Meningiomas (Intracranial and Intraspinal)****ONC-2.9: Spinal Cord Tumors (Benign and Malignant)****ONC-2.10: Choroid Plexus Tumors**

ONC-2.1: Primary Central Nervous System Tumors – General Considerations

- This guideline section applies to primary CNS tumors only. For imaging guidelines in metastatic brain cancer, see the appropriate diagnosis-specific section or **ONC-31.3: Brain Metastases** for imaging guidelines.
- Primary brain tumors presenting only with uncomplicated headache are very uncommon. Most primary brain tumors present with specific CNS symptoms.
- Histologic confirmation is critical. Therapeutic decisions should not be made on radiographic findings alone, except for the following:
 - ◆ Medically fragile patients for whom attempted biopsy carries excess medical risk, as stated in writing by both the attending physician and surgeon.
 - ◆ Brain stem tumors or other sites where the imaging findings are pathognomonic and the risk of permanent neurological damage is excessive with even a limited biopsy attempt.
- For evaluation of known or suspected spinal cord compromise, see: **ONC-31.6: Spinal Cord Compression**
- For suspected brain tumors in neurofibromatosis, see: **PEDONC-2: Screening Imaging in Cancer Predisposition Syndromes**
- Rare tumors occurring more commonly in the pediatric population should be imaged according to the imaging guidelines in: **PEDONC-4: Pediatric Central Nervous System Tumors**

Indication	Imaging Study
Characterization and follow up of all brain tumors	◆ MRI Brain without and with contrast (CPT® 70553) ◆ CT Head without and with contrast (CPT® 70470) can be approved when MRI is contraindicated or not available, or there is skull bone involvement ◆ CT Head (contrast as requested) can be approved for preoperative planning when requested by the operating surgeon
Preoperative planning or to clarify inconclusive findings on MRI or CT	◆ MRA Head (CPT® 70544) or CTA Head (CPT® 70496)
Within 24 to 72 hours following brain tumor surgery	◆ MRI Brain without and with contrast (CPT® 70553)
Clinical deterioration or development of new neurological features	◆ MRI Brain without and with contrast (CPT® 70553)

MR Spectroscopy in Brain Tumors (MRS, CPT® 76390)

NOTE: Some payors have specific restrictions on MR Spectroscopy, and those coverage policies may supersede the recommendations for MRS in these guidelines

- MRS is only supported for use in brain tumors of specified histologies where diagnostic accuracy has been established in peer-reviewed literature
 - ◆ See diagnosis-specific guidelines for MRS indications
- MRS is considered investigational/experimental for all other histologies and indications not listed in a diagnosis-specific guideline section.

PET Brain Imaging (CPT® 78608 and CPT® 78609)

NOTE: Some payors have specific restrictions on PET Brain Metabolic Imaging, and those coverage policies may supersede the recommendations for this study in these guidelines.

- PET Brain Metabolic Imaging (CPT® 78608) is only supported for use in brain tumors of specified histologies where diagnostic accuracy has been established in peer-reviewed literature
 - ◆ See diagnosis-specific guidelines for PET indications below.
 - ◆ According to Medicare NCD 220.6.17, FDG-PET may be approved once for initial treatment strategy and three times for subsequent treatment strategy for brain tumors.
- PET Brain metabolic imaging (CPT® 78608) is considered investigational/experimental for all other histologies and indications not listed in a diagnosis-specific guideline section.
- PET Brain perfusion imaging (CPT® 78609) is not indicated in the evaluation or management of primary CNS tumors, and is nationally non-covered by Medicare per NCD 220.6.17.
- Body PET studies (CPT® 78811, CPT® 78812, and CPT® 78813) and fusion PET/CT studies (CPT® 78814, CPT® 78815, or CPT® 78816) are not indicated in the evaluation or management of primary CNS tumors
- See: **HD-24: Other Imaging Studies** for details on other advanced neuro-imaging studies

ONC-2.2: Low Grade Gliomas

These tumors are defined as having a WHO histologic grade of I or II (out of IV), can occur anywhere in the CNS, and includes the following tumors:

- Pilocytic Astrocytoma
- Fibrillary (or Diffuse) Astrocytoma
- Optic Pathway Gliomas
- Pilomyxoid Astrocytoma
- Oligodendroglioma
- Oligoastrocytoma
- Oligodendrocytoma
- Subependymal Giant Cell Astrocytoma (SEGA)
- Ganglioglioma
- Gangliocytoma
- Dysembryoplastic infantile astrocytoma (DIA)
- Dysembryoplastic infantile ganglioglioma (DIG)
- Dysembryoplastic neuroepithelial tumor (DNT)
- Tectal plate gliomas
- Cervicomedullary gliomas
- Pleomorphic xanthoastrocytoma (PXA)
- Any other glial tumor with a WHO grade of I or II

Indication	Imaging Study
Initial Staging	◆ MRI Brain without and with contrast (CPT® 70553) if not already done ◆ MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) ◆ MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
After initial resection or other treatment (XRT, etc.)	◆ MRI Brain without and with contrast (CPT® 70553)
For patients undergoing chemotherapy treatment	◆ MRI Brain without and with contrast (CPT® 70553) every 2 cycles ◆ Patients with spinal cord involvement at diagnosis can have MRI without and with contrast of the involved spinal region on the same schedule as MRI brain
<u>One of the following:</u> ◆ Determine need for biopsy when transformation to high grade glioma is suspected based on clinical symptoms or recent MRI findings ◆ Evaluate a brain lesion of indeterminate nature when the PET findings will be used to determine whether biopsy/resection can be safely postponed	◆ Any of the following: ◆ PET Brain metabolic imaging (CPT® 78608) ◆ MRI Perfusion imaging (CPT® 70553)
<u>One of the following:</u> ◆ Distinguish low grade from high grade gliomas ◆ Evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed ◆ Distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy	◆ Any of the following: ◆ MR Spectroscopy (CPT® 76390) ◆ MRI Perfusion imaging (CPT® 70553)
Surveillance	◆ MRI Brain without and with contrast (CPT® 70553) every 3 months for 2 years, then every 6 months for 3 years, then annually ◆ Patients with spinal cord involvement at diagnosis can have MRI spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) on the same schedule as MRI Brain

ONC-2.3: High Grade Gliomas

These tumors are defined as having a WHO histologic grade of III or IV (out of IV can occur anywhere in the CNS (though the majority occur in the brain), and include the following tumors:

- Anaplastic astrocytoma
- Glioblastoma multiforme
- Diffuse intrinsic pontine glioma (DIPG, or “brainstem glioma”)
- Gliomatosis cerebri
- Gliosarcoma
- Anaplastic oligodendroglioma
- Anaplastic ganglioglioma
- Anaplastic mixed glioma
- Anaplastic mixed ganglioneuronal tumors
- Any other glial tumor with a WHO grade of III or IV

Indication	Imaging Study
Initial Staging	◆ MRI Brain without and with contrast (CPT® 70553) if not already done ◆ MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) ■ MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
Immediately following partial or complete resection	◆ MRI Brain without and with (CPT® 70553)
Immediately following radiation therapy (XRT)	◆ MRI Brain without and with contrast (CPT® 70553) once within 2 to 6 weeks following completion of treatment, and then go to surveillance imaging
For patients undergoing chemotherapy treatment	◆ MRI Brain without and with contrast (CPT® 70553) every 2 cycles ◆ Patients with spinal cord involvement at diagnosis can have MRI without and with contrast of the involved spinal region on the same schedule as MRI brain

Indication	Imaging Study
<u>One of the following:</u> ◆ Distinguish low grade from high grade gliomas ◆ Evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed ◆ Distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy	◆ Any of the following: ◆ MR Spectroscopy (CPT® 76390) ◆ MRI Perfusion imaging (CPT® 70553)
<u>One of the following:</u> ◆ Distinguish radiation-induced tumor necrosis from progressive disease ◆ Evaluate inconclusive MRI findings when the PET findings will be used to determine need for biopsy or change in therapy, including a change from active therapy to surveillance ◆ Evaluate a brain lesion of indeterminate nature when the PET findings will be used to determine whether biopsy/resection can be safely postponed	◆ Any of the following: ◆ MRI Perfusion imaging (CPT® 70553) ◆ PET Brain metabolic imaging (CPT® 78608) ■ PET Brain is not indicated in gliomas occurring in the brain stem due to poor uptake and lack of impact on patient outcomes
Surveillance	◆ MRI Brain without and with contrast (CPT® 70553) every 3 months for 3 years and every 6 months thereafter ◆ Patients with spinal cord involvement at diagnosis can have MRI spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) on the same schedule as MRI Brain

ONC-2.4: Medulloblastoma and Supratentorial Primitive Neuroectodermal Tumors (sPNET)

Medulloblastoma and sPNET imaging indications in adult patients are identical to those for pediatric patients. See: **PEDONC-4.4: Medulloblastoma (MDB), Supratentorial Primitive Neuroectodermal Tumors (sPNET), and Pineoblastoma** for imaging guidelines.

ONC-2.5: Ependymoma

Ependymoma imaging indications in adult patients are identical to those for pediatric patients. See: **PEDONC-4.8: Ependymoma** for imaging guidelines.

ONC-2.6: Central Nervous System Germ Cell Tumors

Central nervous system germ cell tumor imaging indications in adult patients are identical to those for pediatric patients. See: **PEDONC-4.7: CNS Germinomas and Non-Germinomatous Germ Cell Tumors (NGGCT)** for imaging guidelines.

ONC-2.7: CNS Lymphoma (also known as Microglioma)

Indication	Imaging Study
Initial Staging	All of the following are indicated: ◆ MRI Brain without and with contrast (CPT® 70553) ◆ MRI Cervical spine without and with contrast (CPT® 72156) ◆ MRI Thoracic spine without and with contrast (CPT® 72157) ◆ MRI Lumbar spine without and with contrast (CPT® 72158)
Extra-neural evaluation to confirm CNS primary *Patients with CNS Lymphoma that is metastatic should be imaged according to: ◆ ONC-27: Non-Hodgkin Lymphomas for patients age ≥ 18 years ◆ PEDONC-5.3: Pediatric Aggressive Mature B-Cell Non-Hodgkin Lymphomas (NHL) for patients age ≤ 17 years	Any or all of the following are indicated: ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ PET/CT (CPT® 78815) can be approved for evaluation of inconclusive findings on CT imaging
Treatment Response	◆ MRI without and with contrast of all positive disease sites every 2 cycles
Surveillance	◆ MRI without and with contrast of all positive disease sites every 3 months for 2 years, then every 6 months for 3 years, then annually thereafter

ONC-2.8: Meningiomas (Intracranial and Intraspinal)

Indication	Imaging Study
Initial Staging of Intracranial Meningioma	<u>Any or all of the following are indicated:</u> ◆ MRI Brain without and with contrast (CPT® 70553) ◆ CT Head (contrast as requested)
Initial staging of Intraspinal Meningioma	<u>One of the following:</u> ◆ MRI without and with contrast of appropriate spinal region (Cervical CPT® 72156, Thoracic CPT® 72157, and Lumbar CPT® 72158) ◆ CT without and with contrast of the appropriate spinal region (Cervical CPT® 72127, Thoracic CPT® 72130, and Lumbar CPT® 72133)
Treatment Response	◆ MRI without and with contrast of all positive disease sites every 2 cycles
Surveillance for Grade I (low grade) and Grade II (atypical) meningioma (completely resected, partially resected and unresected)	◆ <u>Intracranial Meningioma:</u> MRI Brain without and with contrast (CPT® 70553) at 3, 6, and 12 months, then annually for 5 years ◆ <u>Intraspinal Meningioma:</u> MRI without and with contrast CPT® 72156 (Cervical spine), CPT® 72157 (Thoracic spine), CPT® 72158 (lumbar spine) OR CT without and with contrast CPT® 72127 (Cervical spine), CPT® 72130 (Thoracic spine), CPT® 72133 (Lumbar spine) of the involved spinal level at 3, 6 and 12 months, and then annually for 5 years
Surveillance for Grade III (malignant or anaplastic) meningioma	◆ <u>Intracranial Meningioma:</u> MRI Brain without and with contrast (CPT® 70553) every 3 months for 3 years, and then every 6 months thereafter ◆ <u>Intraspinal Meningioma:</u> MRI or CT without and with contrast of the involved spinal region every 3 months for 3 years and then every 6 months thereafter

ONC-2.9: Spinal Cord Tumors (Benign and Malignant)

- See also: **ONC-2.2: Low Grade Gliomas** and **ONC-2.3: High Grade Gliomas** for imaging guidelines of low grade and high grade gliomas of the spinal cord
- See also: **PEDONC-4.9: Malignant Tumors of the Spinal Cord** for imaging guidelines for other malignant spinal cord tumors
- See also: **PEDPN-2.1: Neurofibromatosis 1** and **PEDPN-2.2: Neurofibromatosis 2** for spinal tumors in patients with Neurofibromatosis 1 or 2
- See also: **ONC-31.6: Spinal Cord Compression** for known secondary malignancy involving the spine/spinal canal/spinal cord

ONC-2.10: Choroid Plexus Tumors

Choroid Plexus Tumor imaging indications in adult patients are identical to those for pediatric patients. See: **PEDONC-4.13: Choroid Plexus Tumors** for imaging guidelines.

References

1. Nabors LB, Portnow J, Ahluwalia M, et. al. National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2020 – September 11, 2020 Central Nervous System Cancers, available at: https://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Tumors Cancer V3.2020. – September 11, 2020 ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Brandão LA, Castillo M. Adult brain tumors: clinical applications of magnetic resonance spectroscopy. *Magn Reson Imaging Clin N Am*. 2016;24(4):781-809. doi:10.1016/j.mric.2016.07.005.
3. Pasquier D, Bijmolt S, Veninga T, et al. Atypical and malignant meningioma: outcome and prognostic factors in 119 irradiated patients. A multicenter, retrospective study of the Rare Cancer Network. *Int J Radiat Oncol Biol Phys*. 2008;71(5):1388. doi:10.1016/j.ijrobp.2007.12.020.
4. Modha A, Gutin PH. Diagnosis and treatment of atypical and anaplastic meningiomas: a review. *Neurosurgery*. 2005;57(3):538-550.
5. Horská A, Barker PB. Imaging of brain tumors: MR spectroscopy and metabolic imaging. *Neuroimaging Clin N Am*. 2010;20(3):293-310. doi:10.1016/j.nic.2010.04.003.
6. Sundgren PC. MR Spectroscopy in radiation Injury. *Am J Neuroradiol*. 2009;30(8):1469-1476. doi:10.3174/ajnr.A1580.
7. American College of Radiology. ACR–ASNR–SPR practice parameter for the performance of intracranial magnetic resonance perfusion imaging. 2017; Available at: <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/MR-Perfusion.pdf?la=en>.

ONC-3: Squamous Cell Carcinomas of the Head and Neck

ONC-3.0: Squamous Cell Carcinomas of the Head and Neck – General Considerations

ONC-3.1: Squamous Cell Carcinomas of the Head and Neck – Suspected/Diagnosis

ONC-3.2: Squamous Cell Carcinomas of the Head and Neck – Initial Work-up/Staging

ONC-3.3: Squamous Cell Carcinomas of the Head and Neck – Restaging/Recurrence

ONC-3.4: Squamous Cell Carcinomas of the Head and Neck – Surveillance/Follow-up

ONC-3.0: Squamous Cell Carcinomas of the Head and Neck – General Considerations

- Patients with esthesioneuroblastoma should be imaged according to this guideline section
- For evaluation of squamous cell carcinoma from an unknown primary to the cervical lymph nodes, CT Neck (CPT® 70491) and CT Chest (CPT® 71260) are indicated. CT scans of the abdomen and pelvis are not routinely indicated, unless there are signs/symptoms related to these areas.
- Imaging of the CNS (head, spine) is indicated only to evaluate specific signs or symptoms or if concern for base of skull invasion suggesting spread to those areas
- Stage III/IV disease encompasses any primary tumor larger than 4 cm or documented lymph node positive disease

ONC-3.1: Squamous Cell Carcinomas of the Head and Neck – Suspected/Diagnosis

- See also: **NECK-5.1 – Neck Masses - Imaging** for imaging guidelines for evaluation of suspected malignancy in the neck
- PET may be considered prior to biopsy in order to determine a more favorable site for biopsy when a prior biopsy was nondiagnostic or a relatively inaccessible site is contemplated which would require invasive surgical intervention for biopsy attempt

ONC-3.2: Squamous Cell Carcinomas of the Head and Neck – Initial Work-up/Staging

Indication	Imaging Study
All Stages of Disease	◆ CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck (OFN) without and with contrast (CPT® 70543) ◆ CT Chest with contrast (CPT® 71260) ◆ Lymph system imaging (lymphoscintigraphy, CPT® 78195) is indicated for sentinel lymph node evaluation when nodes are not clinically positive
Nasal cavity and paranasal sinuses (bony erosion or skull base and intracranial involvement)	One of the following studies is indicated: ◆ CT Maxillofacial with contrast (CPT® 70487) ◆ CT Neck with contrast (CPT® 70491) ◆ MRI Orbits/Face/Neck without and with contrast (CPT® 70543)
Nasopharyngeal (NPC) Cancer	◆ MRI Orbits/Face/Neck without and with contrast (CPT® 70543) is the preferred study ■ CT Neck (CPT® 70491) and/or CT Maxillofacial (CPT® 70487) with contrast can be approved if contraindication to MRI ◆ Chest x-ray or CT Chest with contrast (CPT® 71260)
For any of the following: ◆ Known stage III or IV disease ◆ Prior to start of primary chemoradiotherapy and have not undergone definitive surgical resection ◆ Nasopharyngeal primary site ◆ Inconclusive findings on conventional imaging (CT, MRI) ◆ In order to direct laryngoscopy/exam under anesthesia for biopsy ◆ Pulmonary nodule(s) ≥ 8 mm in size ◆ Cervical lymph node biopsy positive for squamous cell carcinoma and no primary site identified on CT or MRI of neck and chest ◆ Inconclusive findings suggestive of disease outside the head and neck area	◆ PET/CT (CPT® 78815)
Signs or symptoms of abdominal metastatic disease, including elevated liver function tests	◆ CT Abdomen with contrast (CPT® 74160)
Any head and neck cancer with neurological findings or suspicion of skull base invasion	◆ MRI Brain without and with contrast (CPT® 70553)

ONC-3.3: Squamous Cell Carcinomas of the Head and Neck – Restaging/Recurrence

Indication	Imaging Study
Following complete resection and/or radical neck dissection	See: <u>ONC-3.4: Surveillance/Follow-up</u>
Following primary chemoradiotherapy or radiation therapy in individuals who have not undergone surgical resection of primary tumor or neck dissection	<u>Any one of the following:</u> ◆ CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543) ◆ PET/CT scan (CPT® 78815), no sooner than 12 weeks (3 months) post completion of radiation therapy. ■ If post-treatment PET/CT scan is negative, further surveillance imaging is not routinely indicated.
Induction chemotherapy response	◆ CT neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543) ◆ PET not indicated to assess response to induction chemotherapy
Suspected local recurrence	◆ CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543) ◆ CT Chest with contrast (CPT® 71260)
Biopsy proven local recurrence	<u>Either one of the following:</u> ◆ PET/CT (CPT® 78815) OR ◆ CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543) AND CT Chest with contrast (CPT® 71260)
Inconclusive conventional imaging (CT or MRI)	◆ PET/CT (CPT® 78815)
If new symptoms or chest previously involved	◆ CT Chest with contrast (CPT® 71260)

ONC-3.4: Squamous Cell Carcinomas of the Head and Neck – Surveillance/Follow-up

Indications	Imaging Study
Individuals treated with surgical resection of primary site and/or neck dissection (with or without postoperative radiation therapy)	<u>Once within 6 months of completing all treatment:</u> ◆ CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543) ◆ CT with contrast of any other involved body area
Individuals treated with definitive radiation therapy or combined chemoradiation, and post-treatment imaging is negative	Further surveillance imaging is not routinely indicated
If post-treatment imaging shows residual abnormalities	<u>One of the following, once within 6 months of prior imaging:</u> ◆ CT Neck with contrast (CPT® 70491) OR ◆ MRI Orbits/Face/Neck without and with contrast (CPT® 70543)
<u>After initial post-treatment study, for any of the following:</u> ◆ Nasopharyngeal primary site ◆ Physical exam unable to visualize deep-seated primary site	<u>Annually for 3 years:</u> ◆ CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543)
◆ CT Chest is not indicated for surveillance. Individuals with smoking history may undergo annual low dose CT cancer screening if criteria are met (See: <u>CH-33: Lung Cancer Screening</u> in the Chest Imaging Guidelines)	

References

1. Pfister DG, Spencer S, Adelstein D et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – November 9, 2020 Head and Neck Cancers, available at: https://www.nccn.org/professionals/physician_gls/pdf/head-and-neck.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Head and Neck Cancer V1.2021 – November 9, 2020. ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Goel R, Moore W, Sumer B, Khan S, Sher D, Subramaniam RM. Clinical practice in PET/CT for the management of head and neck squamous cell cancer. *AJR Am J Roentgenol*. 2017;209(2):289-303. doi:10.2214/AJR.17.18301.

ONC-4: Salivary Gland Cancers

ONC-4.0: Salivary Gland Cancers – General Considerations

ONC-4.1: Salivary Gland Cancers – Suspected/Diagnosis

ONC-4.2: Salivary Gland Cancers – Initial Work-up/Staging

ONC-4.3: Salivary Gland Cancers – Restaging/Recurrence

ONC-4.4: Salivary Gland Cancers – Surveillance/Follow-up

ONC-4.0: Salivary Gland Cancers – General Considerations

- Salivary gland tumors may originate within the parotid, submandibular, sublingual or minor salivary glands in the mouth.
- Histological subtypes include mucoepidermoid, acinic, adenocarcinoma, adenoid cystic carcinoma, malignant myoepithelial tumors and squamous cell carcinoma. Lymphoma and metastatic squamous carcinoma can also occur in the parotid gland.
- Over 80% of parotid gland tumors are benign. A bilateral parotid tumor is most likely Warthin's tumor.
- The role of PET in salivary gland tumors has yet to be established.

ONC-4.1: Salivary Gland Cancers – Suspected/Diagnosis

See: **NECK-11** and **NECK-5.1** for evaluation of salivary gland masses, salivary gland stones and neck masses.

ONC-4.2: Salivary Gland Cancers – Initial Work-up/Staging

Indication	Imaging Study
Biopsy-proven malignancy (only if none of these imaging studies has already been done)	<u>One of the following can be approved:</u> ◆ MRI Orbits/Face/Neck without and with contrast (CPT® 70543) ◆ CT Neck with contrast (CPT® 70491) ◆ CT Neck without contrast (CPT® 70490)
Skull base invasion	◆ MRI Brain without and with contrast (CPT® 70553)
Abnormalities on chest x-ray or if lymphadenopathy in neck	◆ CT Chest with contrast (CPT® 71260)
Pulmonary nodule(s) ≥ 8mm in size	◆ PET/CT (CPT® 78815)

ONC-4.3: Salivary Gland Cancers – Restaging/Recurrence

Indication	Imaging Study
Patients with unresected disease receiving systemic therapy (chemotherapy)	<u>One of the following may be approved every 2 cycles:</u> ◆ CT Neck with contrast (CPT® 70491) and any other sites of disease ◆ MRI Orbits/Face/Neck without and with contrast (CPT® 70543) and any other sites of disease
Recurrence or progression suspected based on new or worsening signs or symptoms	<u>One of the following may be approved:</u> ◆ CT Neck with contrast (CPT® 70491) ◆ MRI Orbits/Face/Neck without and with contrast (CPT® 70543) <u>In addition, for all patients:</u> ◆ CT Chest with contrast (CPT® 71260)
All other patients	◆ No routine advanced imaging indicated

ONC-4.4: Salivary Gland Cancers – Surveillance/Follow-up

Indication	Imaging Study
Total surgical resection	◆ No routine advanced imaging indicated
Unresectable or partially resected disease, including those treated with XRT	◆ Either CT Neck (CPT® 70491) or MRI Orbits/Face/Neck (CPT® 70543) once within 6 months of completion of treatment

References

1. Pfister DG, Spencer S, Adelstein D et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – November 9, 2020 Head and Neck Cancers, available at: https://www.nccn.org/professionals/physician_gls/pdf/head-and-neck.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Head and Neck Cancer V1.2021 – November 9, 2020. ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Palacios E, Ellis M, Lam EC, Neitzschman H, Haile M. Pitfalls in imaging the submandibular glands with PET/CT. *Ear Nose Throat J*. 2015;94(10-11):E37-E39.
3. Seo YL, Yoon DY, Baek S, et al. Incidental focal FDG uptake in the parotid glands on PET/CT in patients with head and neck malignancy. *Eur Radiol*. 2015;25(1):171-177. doi:10.1007/s00330-0140339701.
4. Park HL, Yoo le R, Lee N, et al. The value of F-18 FDG PET for planning treatment and detecting recurrence in malignant salivary gland tumors: comparison with conventional imaging studies. *Nucl Med Mol Imaging*. 2013;47(4):242-248. doi:10.1007/s13139-013-0222-8.
5. Bertagna F, Nicolai P, Maroldi R. Diagnostic role of 18F-FDG-PET or PET/CT in salivary gland tumors: a systematic review. *Rev Esp Med Nucl Imagen Mol*. 2015;34(5):295-302.

ONC-5: Melanomas and Other Skin Cancers**ONC-5.0: Melanoma – General Considerations****ONC-5.1: Melanoma – Suspected/Diagnosis****ONC-5.2: Melanoma – Initial Work-up/Staging****ONC-5.3: Melanoma – Restaging/Recurrence****ONC-5.4: Melanoma – Surveillance/Follow-up****ONC-5.5: Non-Melanoma Skin Cancers – General Considerations****ONC-5.6: Non-Melanoma Skin Cancers – Initial Work-up/Staging****ONC-5.7: Non-Melanoma Skin Cancers – Restaging/Recurrence****ONC-5.8: Non-Melanoma Skin Cancers – Surveillance/Follow-up****ONC-5.9: Ocular Melanoma**

ONC-5.0: Melanoma – General Considerations

- Melanomas can metastasize in an unpredictable fashion.

ONC-5.1: Melanoma – Suspected/Diagnosis

Indication	Imaging Study
All	♦ Imaging is not indicated until histologic diagnosis is confirmed

ONC-5.2: Melanoma – Initial Work-up/Staging

Indication	Imaging Study
Stage 0 or Ia (in situ or disease < 1 mm)	◆ Routine advanced imaging is not indicated
◆ Stage Ib ($\leq$ 1 mm with ulceration or high mitotic rate) ◆ Stage II (lesions > 1 mm thick, but node negative)	◆ CT with contrast or MRI without and with contrast of specific areas, only if signs or symptoms indicate need for further evaluation ◆ Lymph system imaging (lymphoscintigraphy, CPT® 78195) is indicated for sentinel lymph node (SLN) evaluation
<u>Any of the following:</u> ◆ Stage III (sentinel node positive, palpable regional nodes) ◆ Stage IV (metastatic)	◆ PET/CT (CPT® 78815 or CPT® 78816) <u>OR</u> ◆ CT Chest with contrast (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI Brain without and with contrast (CPT® 70553)
◆ Head or neck primary site ◆ Palpable lymphadenopathy in the neck ◆ Mucosal melanoma of the head or neck region	In addition to above initial staging imaging, if PET/CT not performed: ◆ CT Neck with contrast (CPT® 70491)
◆ Primary site of melanoma is unknown and CT Chest and Abdomen/Pelvis are negative	◆ PET/CT (CPT® 78815 or CPT® 78816)

ONC-5.3: Melanoma – Restaging/Recurrence

All recurrences should be confirmed histologically, except when excessive morbidity from a biopsy may occur, such as a biopsy requiring craniotomy.

Indication	Imaging Study
Patients receiving chemotherapy, with measurable disease	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 2 cycles (commonly every 6 to 8 weeks)
All in situ recurrences	◆ Restaging imaging is not needed after adequate aggressive local therapy (see Surveillance below)
Documented or clinically suspected (see top of page regarding biopsy morbidity) recurrence at: ◆ Primary site ◆ In-transit disease ◆ Regional lymph nodes ◆ Metastatic site	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ MRI Brain without and with contrast (CPT® 70553) ◆ PET/CT (CPT® 78815 or CPT® 78816) if inconclusive conventional imaging or isolated metastatic based on results of conventional imaging, initially
Brain imaging is indicated for: ◆ New discovery of metastatic disease or progression of metastatic disease ◆ Signs or symptoms of CNS disease ◆ If considering Interleukin (IL-2) therapy	◆ MRI Brain without and with contrast (CPT® 70553)

ONC-5.4: Melanoma – Surveillance/Follow-up

Indication	Imaging Study
Stage 0, IA, IB and IIA Melanomas	◆ No routine advanced imaging indicated
Stage IIB, IIC, IIIA and IIIB Melanomas	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 6 months for 2 years, then annually for 3 years
Stage IIIC and IV Melanomas	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 3 months for 2 years, then every 6 months for 3 years ◆ MRI Brain without and with contrast (CPT® 70553) annually for 3 years
Mucosal Melanoma of the head or neck region	In addition to above stage-based surveillance imaging, the following may be obtained once within 6 months of completing all treatment: ◆ CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543) ◆ CT with contrast of any other involved body area
Liver metastases treated with focal therapy	◆ See also: <u>ONC-31.2: Liver Metastases</u>

ONC-5.5: Non-Melanoma Skin Cancers – General Considerations

- Advanced Imaging is generally not indicated for basal cell and squamous cell skin cancers
- PET/CT scan is not indicated for evaluation of non-melanoma skin cancers unless specified within the guidelines below (e.g. Merkel cell carcinoma)
- Merkel cell carcinoma is an unusual skin cancer with neuroendocrine-like histologic features, which has a high propensity (25% to 33%) for regional lymph node spread and occasionally, metastatic spread to lungs.
- Merkel cell carcinoma may present as a primary cancer or as a skin metastasis from a noncutaneous primary neuroendocrine carcinoma (i.e., small cell lung cancer), therefore conventional imaging is indicated initially to confirm the absence of metastasis prior to considering PET scan.

ONC-5.6: Non-Melanoma Skin Cancers – Initial Work-up/Staging

Indication	Imaging Study
Body area with unexplained signs or symptoms	◆ CT with contrast of that body area
Perineural invasion or local regional extension (i.e. bone; deep soft tissue) involvement	<u>One of the following may be approved of the primary site:</u> ◆ MRI without contrast or without and with contrast ◆ CT (contrast as requested)
Skin lesion may be a dermal metastasis from distant primary	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ PET/CT (CPT® 78815 or 78816) is indicated if conventional imaging (CT or MRI) is unable to identify a primary site
Squamous cell carcinoma head or neck skin with regional lymphadenopathy	◆ CT Neck (CPT® 70491) and CT Chest (CPT® 71260) with contrast
Merkel Cell carcinoma	◆ CT Chest with contrast (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of other involved body area(s) ◆ PET/CT (CPT® 78815 or 78816) if inconclusive conventional imaging ◆ Lymph system imaging (lymphoscintigraphy, CPT® 78195) for sentinel lymph node evaluation
Signs or symptoms of CNS involvement	◆ MRI Brain with and without contrast (CPT® 70553)

ONC-5.7: Non-Melanoma Skin Cancers – Restaging/Recurrence

All recurrences should be confirmed histologically, except when excessive morbidity from a biopsy may occur, such as a biopsy requiring craniotomy.

Indication	Imaging Study
Recurrence where planned therapy is more extensive than simple wide local excision	◆ CT with contrast of the primary and recurrent site(s)
Suspected or biopsy-proven recurrence of Merkel cell carcinoma	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ CT with contrast of other symptomatic body area(s) ◆
Inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815 or 78816)
Signs or symptoms of CNS involvement	◆ MRI Brain without and with contrast (CPT® 70553)

ONC-5.8: Non-Melanoma Skin Cancers – Surveillance/Follow-up

Indication	Imaging Study
Merkel cell cancer – only if node positive	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 6 months for 5 years ◆ Add CT Neck with contrast (CPT® 70491) if known prior neck disease or scalp/facial/neck disease
All others	◆ Routine advanced imaging for surveillance is not indicated ◆ Imaging indicated only for signs and symptoms of recurrent disease

ONC-5.9: Ocular Melanoma

General Considerations

- Approximately 95% of ocular melanomas arise from the uvea (iris, ciliary body and choroid) and 5% arise from the conjunctiva or orbit.
- Treatment is directed to the affected eye with systemic therapy reserved only for known metastatic disease.
- The most common site of metastatic disease is the liver.
- Surveillance of the affected eye is with clinical examination only; advanced imaging is supported for surveillance of systemic metastatic disease based on individual risk factors. See Risk categories below for surveillance recommendations.

Ocular Melanoma Risk Categories		
Low Risk	Medium Risk	High Risk
T1	T2 and T3	T4
Class IA	Class IB	Class 2
Spindle cell histology	Mixed Spindle and Epitheloid cells	Epitheloid cell histology
No extraocular extension	No extraocular extension	Extraocular extension present
No ciliary body involvement	No ciliary body involvement	Ciliary body involvement present
Chromosome mutations: Disomy 3 EIF1AX mutation Gain of chromosome 6p	Chromosome mutations: SF3B1 mutation	Chromosome mutations: BAP1 mutation PRAME mutation Monosomy 3 Gain of chromosome 8q

Indication	Imaging Study
Initial staging	<u>Any or all of the following:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI orbits/face/neck without and with contrast (CPT® 70543)
Neurological signs/symptoms	◆ MRI Brain without and with contrast (CPT® 70553)
Restaging/Suspected Recurrence	<u>Any or all of the following:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI orbits/face/neck without and with contrast (CPT® 70543) ◆ MRI Brain without and with contrast (CPT® 70553)
Surveillance for Low Risk disease	<u>Annually for 10 years:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen with contrast (CPT® 74160) or MRI Abdomen without and with contrast (CPT® 74183)
Surveillance for Medium Risk disease	<u>Every 6 months for 2 years and then annually up to year 10:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen with contrast (CPT® 74160) or MRI Abdomen without and with contrast (CPT® 74183)
Surveillance for High Risk disease	<u>Every 3 months for 2 years, every 6 months for 3 years, then annually up to year 10:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen with contrast (CPT® 74160) or MRI Abdomen without and with contrast (CPT® 74183)

References

1. Swetter SM, Thompson JA, Albertini MR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – February 19, 2021 Cutaneous Melanoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/cutaneous_melanoma.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Cutaneous Melanoma V2.2021 – February 19, 2021 ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Swetter S, Thompson JA, Albertini MR, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2020 – January 15, 2021 Uveal Melanoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/uveal.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Uveal Melanoma V3.2020 – January 15, 2021 ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Schmulls CD, Blitzblau R, Aasi SZ, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – February 18, 2021 Merkel Cell Carcinoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/mcc.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Merkel Cell Carcinoma V1.2021 – February 18, 2021 ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
4. Schmulls CD, Blitzblau R, Aasi SZ, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – February 25, 2021 Basal Cell Skin Cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/nmsc.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Basal Cell Skin Cancer 2.2021 – February 25, 2021 ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
5. Schmulls CD, Blitzblau R, Aasi SZ, et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – February 5, 2021 Squamous Cell Skin Cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/squamous.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Squamous Cell Skin Cancer V1.2021 – February 5, 2021 ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
6. Schröder-Günther MA, Wolff RF, Westwood ME, et al. F-18-fluoro-2-deoxyglucose positron emission tomography (PET) and PET/computed tomography imaging in primary staging of patients with malignant melanoma: a systematic review. *Syst Rev.* 2012;1:62. doi:10.1186/2046-4053-1-62.
7. Xing Y, Bronstein Y, Ross MI, et al. Contemporary diagnostic imaging modalities for the staging and surveillance of melanoma patients: a meta-analysis. *J Natl Cancer Inst.* 2011;103(2):129-142. doi:10.1093/jnci/djq455.
8. Rodriguez Rivera AM, Alabbas H, Ramjuan A, Meguerditchian AN. Value of positron emission tomography scan in stage III cutaneous melanoma: a systematic review and meta-analysis. *Surg Oncol.* 2014;23(1):11-16. doi: 10.1016/j.suronc.2014.01.002.
9. Nathan P, Cohen V, Coupland S, et al. Uveal melanoma UK national guidelines. *European Journal of Cancer.* 2015;51(16):2404-2412. doi:10.1016/j.ejca/2015.07.013.

ONC-6: Thyroid Cancer

ONC-6.0: Thyroid Cancer – General Considerations

ONC-6.1: Thyroid Cancer – Suspected/Diagnosis

ONC-6.2: Thyroid Cancer – Initial Work-up/Staging

ONC-6.3: Thyroid Cancer – Restaging/Recurrence

ONC-6.4: Thyroid Cancer – Surveillance/Follow-up

ONC-6.0: Thyroid Cancer – General Considerations

- PET for initial staging for anaplastic thyroid cancer is currently not recommended before conventional imaging since recommendations for PET are derived from observational studies and clinical trials with other methodological limitations.
- Patients with measurable metastatic disease that are RAI refractory may be followed with conventional imaging, PET-CT scan is reserved for inconclusive findings.
- Whole body thyroid nuclear scan is coded with CPT® 78018. If CPT® 78018 is obtained and found to be positive, CPT® 78020 may be approved as an add-on test to evaluate the degree of iodine uptake.
- Single photon emission computed tomography (SPECT) imaging – Radiopharmaceutical Localization of Tumor SPECT (CPT® 78803 or 78831) or SPECT/CT Hybrid study (CPT® 78830, or 78832) may complement planar and pinhole imaging and can be approved as an add-on wherever radioiodine scans are indicated.

ONC-6.1: Thyroid Cancer – Suspected/Diagnosis

See: **NECK-8.1: Thyroid Nodule** for imaging guidelines for suspected thyroid malignancies

ONC-6.2: Thyroid Cancer – Initial Work-up/Staging

Follicular, Papillary and Hürthle Cell Carcinomas	Imaging Study
<u>One of the following:</u> ◆ Fixation suggested by clinical exam and/or ultrasound ◆ Substernal or bulky disease ◆ Disease precluding full ultrasound examination	<u>One of the following:</u> ◆ MRI Neck without contrast (CPT® 70540) ◆ MRI Neck without and with contrast (CPT® 70543) ◆ CT Neck without contrast (CPT® 70490) ◆ CT Neck with contrast (CPT® 70491) can be approved if contrast study is necessary for complete pre-operative assessment and use of IV contrast will not delay post-operative use of RAI therapy.
<u>Post-thyroidectomy to assess thyroid remnant and to look for iodine-avid metastases for one of the following:</u> ◆ Extent of thyroid remnant cannot be accurately ascertained from the surgical report or neck ultrasound ◆ When the results may alter the decision to treat ◆ Prior to administration of RAI therapy	◆ Whole body thyroid nuclear scan (CPT® 78018) ◆ The following may be approved as an add-on test: ■ CPT® 78020 to evaluate the degree of iodine uptake ■ SPECT (CPT® 78803 or 78831), or SPECT/CT Hybrid study (CPT® 78830, or 78832)
Skeletal pain	◆ Bone scan See also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u> ◆ Whole body nuclear thyroid scan (CPT® 78018) ◆ The following may be approved as an add-on test: ■ CPT® 78020 to evaluate the degree of iodine uptake ■ SPECT (CPT® 78803 or 78831), or SPECT/CT Hybrid study (CPT® 78830, or 78832)
Suspicious findings on CXR, US, or substernal extension of mass	◆ CT Chest without contrast (CPT® 71250)
All other patients	◆ Routine preoperative advanced imaging is not indicated

Medullary Thyroid Carcinomas	Imaging Study
<u>Any of the following:</u> ◆ Elevated CEA levels ◆ Calcitonin level > 400pg/mL ◆ Positive lymph nodes	<u>Any or all of the following:</u> ◆ CT Neck with contrast (CPT® 70491) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen either with (CPT® 74160) or CT Abdomen without and with contrast (CPT® 74170) ◆ Bone scan see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>
Skeletal pain	◆ Bone scan see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>
Inconclusive findings on conventional imaging	◆ ⁶⁸Gallium-labeled PET/CT (CPT® 78815)

Anaplastic Thyroid Carcinomas	Imaging Study
All	<u>Any or all of the following:</u> ◆ CT Neck with contrast (CPT® 70491) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI Brain without and with contrast (CPT® 70553) ◆ Bone scan see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>
Skeletal pain	◆ Bone scan see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>
Inconclusive finding on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-6.3: Thyroid Cancer – Restaging/Recurrence

Follicular, Papillary and Hürthle Cell Carcinomas	Imaging Study
Gross residual disease found in the neck post-thyroidectomy	<u>Any one of the following:</u> ◆ CT Neck with contrast (CPT® 70491) ◆ MRI Neck without and with contrast (CPT® 70543)
Within 2 weeks (ideally 7 to 10 days) following the administration of Radioactive Iodine therapy dose	◆ Whole body thyroid nuclear scan (CPT® 78018) ◆ The following may be approved as an add-on test: ■ CPT® 78020 to evaluate the degree of iodine uptake ■ SPECT (CPT® 78803 or 78831), or SPECT/CT Hybrid study (CPT® 78830 or 78832)
<u>Any of the following:</u> ◆ Recurrence documented by biopsy ◆ Increasing thyroglobulin level without Thyrogen® stimulation ◆ Thyroglobulin level > 2 ng/mL or higher than previous after Thyrogen® stimulation ◆ Anti-thyroglobulin antibody present ◆ Evidence of residual thyroid tissue on ultrasound or physical exam after thyroidectomy or ablation	<u>All of the following:</u> ◆ CT Neck with contrast (CPT® 70491) or MRI Neck without and with contrast (CPT® 70543) ◆ CT Chest with contrast (CPT® 71260) ◆ CT with contrast of any symptomatic body area ◆ Whole body thyroid nuclear scan (CPT® 78018) ■ The following may be approved as an add-on test: ■ CPT® 78020 to evaluate the degree of iodine uptake ■ SPECT (CPT® 78803 or 78831), or SPECT/CT Hybrid study (CPT® 78830 or 78832)
<u>Any of the following:</u> ◆ Rising thyroglobulin level with negative CT scan and radioiodine scan ◆ Inconclusive findings on conventional imaging (CT scan or radioiodine scan)	◆ PET/CT (CPT® 78815)

Medullary Thyroid Carcinoma	Imaging Study
<u>Any of the following:</u> ◆ Elevated CEA levels ◆ Calcitonin level ≥ 150 pg/mL ◆ Signs or symptoms of recurrence	<u>Any or all of the following:</u> ◆ CT Neck with contrast (CPT® 70491) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen either with (CPT® 74160) or without and with contrast (CPT® 74170) ◆ Bone scan See also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>
Inconclusive conventional imaging with calcitonin ≥ 150 pg per mL	◆ ^{68}Gallium-labeled DOTATATE PET/CT scan (CPT® 78815)
Anaplastic Thyroid Carcinoma	Imaging Study
Anaplastic carcinoma with signs or symptoms of recurrence	<u>Any or all of the following:</u> ◆ CT Neck with contrast (CPT® 70491) ◆ CT Chest with contrast (CPT® 71260) ◆ Either CT Abdomen/Pelvis with contrast (CPT® 74177) OR MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast ◆ MRI Brain without and with contrast (CPT® 70553)
Inconclusive conventional imaging	◆ PET/CT (CPT® 78815)

ONC-6.4: Thyroid Cancer – Surveillance/Follow-up

Follicular, Papillary and Hürthle Cell Carcinomas	Imaging/Diagnostic Study
All patients	Neck ultrasound (CPT® 76536), chest x-ray, and laboratory studies every 6 months for the first year, then annually
<u>For patients with any of the following:</u> - Node positive disease - RAI-avid metastases	- Whole body thyroid nuclear scan annually (CPT® 78018) - The following may be approved as an add-on test: - CPT® 78020 to evaluate the degree of iodine uptake - SPECT (CPT® 78803 or 78831), or SPECT/CT Hybrid study (CPT® 78830 or 78832)

Medullary Carcinomas	Imaging/Diagnostic Study
All patients	- CEA and calcitonin are required for monitoring medullary carcinomas - Routine surveillance imaging is not indicated

Anaplastic Thyroid Carcinomas	Imaging Study
All patients	<u>Every 3 months for 2 years:</u> - CT Neck with contrast (CPT® 70491) - CT Chest with contrast (CPT® 71260) - CT Abdomen/Pelvis with contrast (CPT® 74177) - MRI Brain without and with contrast (CPT® 70553)

References

1. Haddad RH, Bischoff L, Bernet V, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – April 9, 2021 Thyroid carcinoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/thyroid.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Thyroid carcinoma V1.2021 – April 9, 2021 ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Slough CM, Randolph GW. Workup of well-differentiated thyroid carcinoma. *Cancer Control*. 2006;13(2):99-105. doi:10.1177/107327480601300203.
3. Smallridge RC, Ain KB, Asa SL, et al. American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. *Thyroid*. 2012;22(11):1104-1139. doi:10.1089/thy.2012.0302.
4. Wells SA Jr, Asa SL, Dralle H, et al. American Thyroid Association guidelines for the management of medullary thyroid carcinoma. *Thyroid*. 2015;25(6):567-610. doi:10.1089/thy.2014.0335.
5. Yeh MW, Bauer AJ, Bernet VA, et al. American Thyroid Association statement on preoperative imaging for thyroid cancer surgery. *Thyroid*. 2015;25:3-14. doi:10.1089/thy.2014.0096.
6. Haugen BR, Alexander EK, Bible KB, et al. 2015 American Thyroid Association management guidelines for adult patients with thyroid nodules and differentiated thyroid cancer: the American Thyroid Association guidelines task force on thyroid nodules and differentiated thyroid cancer. *Thyroid*. 2016;26(1):1-133. doi:10.1089/thy.2015.0020.
7. Silberstein EB, Alavi A, Balon HR, et al. The SNMMI Practice Guideline for therapy of thyroid disease with ¹³¹I. *J Nucl Med*. 2012;53(10):1633-1651. doi:10.2967/jnumed.112.105148.
8. Avram AM, Fig LM, Frey KA, Gross MD, Wong KK. Preablation ¹³¹I scans with SPECT/CT in postoperative thyroid cancer patients: what is the impact on staging? *J Clin Endocrinol Metab*. February 21, 2013 [Epub ahead of print].

ONC-7: Small Cell Lung Cancer

ONC-7.0: Small Cell Lung Cancer – General Considerations

ONC-7.1: Small Cell Lung Cancer – Suspected/Diagnosis

ONC-7.2: Small Cell Lung Cancer – Initial Work-up/Staging

ONC-7.3: Small Cell Lung Cancer – Restaging/Recurrence

ONC-7.4: Small Cell Lung Cancer – Surveillance/Follow-up

ONC-7.0: Small Cell Lung Cancer – General Considerations

- Combined histologies of Small and Non-Small cell are considered Small cell lung cancer. Use this guideline for imaging recommendations for small and large cell high-grade (poorly differentiated) neuroendocrine tumors of the lung.
- Imaging is presently guided by traditional staging of limited or extensive disease.
 - ◆ Extensive stage is either metastatic disease or an extent which cannot be encompassed by a single radiotherapy portal.
 - ◆ Limited staging is confined to one side of the chest.
- Patients treated curatively for SCLC are at increased risk for developing a second lung cancer. If new lung nodule is seen on imaging without any evidence of other systemic disease, follow **ONC-31.1: Lung Metastases** for work-up of nodule.
- For carcinoid (low grade neuroendocrine tumors) of the lung, see: **ONC-15: Neuroendocrine Cancers and Adrenal Tumors**

ONC-7.1: Small Cell Lung Cancer – Suspected/Diagnosis

Indication	Imaging Study
Abnormal chest x-ray or clinical suspicion remains high despite a normal chest x-ray in symptomatic patient	- CT Chest without contrast (CPT® 71250) or - CT Chest with contrast (CPT® 71260)
Pulmonary nodule < 8 mm in size noted on CT Chest	See: <u>CH-16.2: Incidental Pulmonary Nodules Detected on CT Images</u>
Pulmonary nodule 8 mm (0.8 cm) to 30 mm (3 cm) seen on CT Chest or MRI Chest	- See: <u>CH-16.4: PET</u> - If PET is Positive: Qualifies as initial staging PET/CT <u>Biopsy is indicated prior to PET imaging for pulmonary masses ≥ 31 mm (3.1 cm) in size</u>
Mediastinal/Hilar Mass	See also: <u>CH-2: Lymphadenopathy</u>
Paraneoplastic syndrome suspected	See also: <u>ONC-30.3: Paraneoplastic Syndromes</u>

ONC-7.2: Small Cell Lung Cancer – Initial Work-up/Staging

Indication	Imaging Study
Initial staging	<u>Any or all of the following:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI Brain without and with contrast (CPT® 70553) ◆ Bone scan, if PET/CT not being done (See also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging</u> in Oncology)
Confirm limited stage (non-metastatic) disease if initial staging imaging (CT and MRI) shows disease limited to the thorax	◆ PET/CT (CPT® 78815)

ONC-7.3: Small Cell Lung Cancer – Restaging/Recurrence

Indication	Imaging Study
Treatment Response: ◆ After every 2 cycles of chemotherapy ◆ Following completion of chemoradiation	Any or all of the following: ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI Brain without and with contrast (CPT® 70553) for measurable brain metastases being treated with systemic therapy ◆ Bone scan (See also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>) ◆ PET is not indicated for evaluation of treatment response in SCLC, but can be considered on a case-by-case basis.
Restaging (suspected recurrence)	Any or all of the following: ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ Brain MRI without and with contrast (CPT® 70553) ◆ Bone scan (See: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>) ◆ PET is not indicated for evaluation of recurrent SCLC, but can be considered on a case-by-case basis.
Complete or partial response to initial treatment, if prophylactic cranial irradiation (PCI) is planned.	◆ MRI Brain without and with contrast (CPT® 70553)

ONC-7.4: Small Cell Lung Cancer – Surveillance/Follow-up

Indication	Imaging Study
Limited stage SCLC	<u>Every 3 months for one year, every 6 months for two years, and then annually:</u> ◆ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ For new nodules, see: <u>ONC-31.1: Lung Metastases</u>
Extensive stage SCLC	<u>Every 2 months for one year, every 4 months for two years, every 6 months for two years, and then annually:</u> ◆ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ For new nodules, see: <u>ONC-31.1: Lung Metastases</u>
Screening for brain metastases, regardless of PCI status	MRI Brain without and with contrast (CPT® 70553) every 4 months for one year and then every 6 months for one year

References

1. Ganti AKP, Loo Jr. BW, Bassetti M, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – January 11, 2021 Small Cell Lung Cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/sclc.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Small Cell Lung Cancer V2.2021 – January 11, 2021 ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Lu YY, Chen JH, Liang JA, Chu S, Lin WY, Kao CH. 18F-FDG PET or PET/CT for detecting extensive disease in small-cell lung cancer: a systematic review and meta-analysis. *Nucl Med Commun*. 2014;35(7):697-703. doi:10.1097/MNM.000000000000122.
3. Carter BW, Glisson BS, Truong MT, Erasmus JJ. Small cell lung carcinoma: staging, imaging, and treatment considerations. *Radiographics*. 2014;34(6):1707-1721. doi:10.1148/rg.346140178.
4. Kalemkerian G. Staging and imaging of small cell lung cancer. *Cancer Imag*. 2011;11(1):253-258. doi:10.1102/1470-7330.2011.0036.

ONC-8: Non-Small Cell Lung Cancer**ONC-8.0: Non-Small Cell Lung Cancer – General Considerations****ONC-8.1: Non-Small Cell Lung Cancer – Asymptomatic Screening****ONC-8.2: Non-Small Cell Lung Cancer – Suspected/Diagnosis****ONC-8.3: Non-Small Cell Lung Cancer – Initial Work-up/Staging****ONC-8.4: Non-Small Cell Lung Cancer – Restaging/Recurrence****ONC-8.5: Non-Small Cell Lung Cancer – Surveillance/Follow-up**

ONC-8.0: Non-Small Cell Lung Cancer – General Considerations

- Non-small cell lung cancer includes adenocarcinoma, squamous cell carcinoma, adenosquamous and large cell tumors.
- See: **ONC-15.6: Bronchopulmonary or Thymic Carcinoid – Initial Staging** for evaluation of low-grade neuroendocrine tumors (carcinoid) of the lung.
- See: **ONC-7: Small Cell Lung Cancer** for evaluation of high-grade small cell and large cell neuroendocrine tumors of the lung.
- PET/CT scan is generally not indicated for initial staging or restaging of NSCLC when multiple sites of extra-pulmonary metastases are found on conventional imaging (i.e., liver, bone and adrenal metastases, etc.).
- PET/CT may be considered to confirm solitary focus of extra-pulmonary metastatic disease (i.e., brain or adrenal) if the individual is being considered for an aggressive treatment for oligometastatic disease.

ONC-8.1: Non-Small Cell Lung Cancer – Asymptomatic Screening

See: **CH-33: Lung Cancer Screening** for criteria for low-dose CT scan chest for lung cancer screening.

ONC-8.2: Non-Small Cell Lung Cancer – Suspected/Diagnosis

Indication	Imaging Study
Abnormal chest x-ray or clinical suspicion remains high despite a normal chest x-ray in symptomatic patient	- CT Chest without contrast (CPT® 71250) or - CT Chest with contrast (CPT® 71260)
Pulmonary nodule < 8 mm in size noted on CT Chest	See: <u>CH-16.2: Incidental Pulmonary Nodules Detected on CT Images</u>
Pulmonary nodule 8 mm (0.8 cm) to 30 mm (3 cm) seen on CT Chest or MRI Chest	- PET/CT (CPT® 78815) See: <u>CH-16.4: PET</u> <u>If PET is Positive</u>: Qualifies as initial staging PET/CT
Pulmonary mass 31 mm (3.1 cm) or greater seen on CT or MRI	- PET/CT (CPT® 78815) can be approved prior to biopsy if one or more of the following applies: - Definitive treatment with resection or radiation will be utilized instead of biopsy if PET confirms limited disease - Multiple possible biopsy options are present within the chest and PET findings will be used to determine the most favorable biopsy site - Biopsy is indicated prior to PET imaging for all other indications in pulmonary masses ≥ 31 mm (3.1 cm) in size
Mediastinal/Hilar Mass	See also: <u>CH-2: Lymphadenopathy</u>
Paraneoplastic syndrome suspected	See also: <u>ONC-30.3: Paraneoplastic Syndromes</u>

ONC-8.3: Non-Small Cell Lung Cancer – Initial Work-up/Staging

Indication	Imaging Study
All patients	<u>Any or all of the following:</u> ◆ CT Chest (CPT® 71260) with contrast ◆ CT Abdomen (CPT® 74160) with contrast ■ CT Abdomen may be omitted if CT Chest report clearly documents upper abdomen through level of adrenals ◆ Bone scan, if PET/CT not being done See also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>
<u>Any of the following:</u> ◆ Stage I-IIIB ◆ Stage IV confined to the chest region (including pleural/pericardial effusion) ◆ Stage IV with oligometastatic disease on conventional imaging and patient is a candidate for aggressive surgical resection or other localized treatment of metastases with a curative intent ◆ Conventional imaging is inconclusive	◆ PET/CT (CPT® 78815) if not already completed prior to histological diagnosis
<u>Any of the following:</u> ◆ All Stage II-IV disease ◆ Stage I disease and considering surgical resection as primary therapy	◆ MRI Brain without and with contrast (CPT® 70553)
Superior sulcus (Pancoast) tumor suspected	<u>Any or all of the following:</u> ◆ MRI Chest without and with contrast (CPT® 71552) ◆ MRI Cervical spine without and with contrast (CPT® 72156) ◆ MRI Thoracic spine without and with contrast (CPT® 72157)

ONC-8.4: Non-Small Cell Lung Cancer – Restaging/Recurrence

Indication	Imaging Study
Stage I or II patients who undergo definitive local treatment with surgery, radiation, or radiosurgery	Restaging imaging is not indicated. See also: Surveillance ONC-8.5: Surveillance/Follow-up
Measurable disease, undergoing active treatment	<u>Any or all of the following every 2 cycles:</u> - CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250) - CT Abdomen with contrast (CPT® 74160) - CT Abdomen/Pelvis with contrast (CPT® 74177) may be substituted for known pelvic disease or pelvic symptoms - MRI Brain without and with contrast (CPT® 70553) for measurable brain metastases being treated with systemic therapy
<u>Any of the following:</u> - Locally advanced (Stage III, non-metastatic, unresectable) - Inoperable tumor if chemotherapy or chemoradiation was the initial treatment modality - Inadequately resected disease - Suspected recurrence	<u>Any or all of the following:</u> - CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250) - CT Abdomen with contrast (CPT® 74160) - CT Abdomen/Pelvis with contrast (CPT® 74177) may be substituted for known pelvic disease or pelvic symptoms
Newly identified lung nodule(s)	See: ONC-31.1: Lung Metastases for new nodule evaluation
<u>Any of the following:</u> - Suspected/biopsy proven recurrence localized to the chest cavity - Inconclusive findings conventional imaging - To differentiate tumor from radiation scar/fibrosis - Stage IV with oligometastatic disease on conventional imaging and patient is a candidate for aggressive surgical resection or other localized treatment of metastases with a curative intent	PET/CT (CPT® 78815)
<u>Any of the following:</u> - Following a demonstrated adequate response to neoadjuvant therapy if intracranial disease will preclude surgery - Documented recurrence/progression - New or worsening neurological signs or symptoms	MRI Brain without and with contrast (CPT® 70553)

ONC-8.5: Non-Small Cell Lung Cancer – Surveillance/Follow-up

Indication	Study
Stage I-II	◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) every 6 months for 5 years and then annually ***Patients treated with radiation therapy and residual abnormality on imaging may undergo CT Chest every 3 months for the first year after therapy, every 6 months for 4 years, and then annually thereafter
Stage III-IV (metastatic sites treated with definitive intent)	◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) every 3 months for 2 years, every 6 months for 3 years and then annually
New lung nodule	See: <u>ONC-31.1: Lung Metastases</u>

References

1. Ettinger DS, Wood DE, Aisner DL, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2021 – February 16, 2021. Non small cell lung cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Non-small cell lung cancer V3.2021 – February 16, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Scheider BJ, Ismaila N, Aerts J, et al. Lung cancer surveillance after definitive curative-intent therapy: ASCO guideline. *J Clin Oncol*. 2020;38(7):753-766. doi:10.1200/JCO.19.02748.
3. MacMahon H, Naidich DP, Goo JM, et al. Guidelines for management of incidental pulmonary nodules detected on CT images: from the Fleischner Society 2017. *Radiology*. 2017;284(1):228-243. doi:10.1148/radiol.2017161659.
4. Calman L, Beaver K, Hind D, Lorigan P, Roberts C, Lloyd-Jones M. Survival benefits from follow-up of patients with lung cancer: a systematic review and meta-analysis. *J Thorac Oncol*. 2011;6(12):1993-2004. doi:10.1097/JTO.0b013e31822b01a1.
5. Lou F, Huang J, Sima CS et al. Patterns of recurrence and second primary lung cancer in early-stage lung cancer survivors followed with routine computed tomography surveillance. *J Thorac Cardiovasc Surg*. 2013;145:75-81. <https://www.ncbi.nlm.nih.gov/pubmed/23127371>.
6. Colt HG, Murgu SD, Korst RJ, et al. Follow-up and surveillance of the patient with lung cancer after curative-intent therapy: diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. *Chest*. 2013;143:e437S-454S. <https://www.ncbi.nlm.nih.gov/pubmed/23649451>.
7. Dane B, Grechushkin V, Plank A, et al. PET/CT vs. non-contrast CT alone for surveillance 1-year post lobectomy for stage I non-small cell lung cancer. *Am J Nucl Med Mol Imaging*. 2013; 3:408-416. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3784804/>.
8. Zhao L, He ZY, Zhong XN, et al. (18)FDG-PET/CT for detection of mediastinal nodal metastasis in non-small cell lung cancer: a meta-analysis. *Surg Oncol*. 2012;21(3):230-236. <https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0049561/>.
9. Li J, Xu W, Kong F, et al. Meta-analysis: accuracy of 18FDG PET-CT for distant metastasis in lung cancer patients. *Surg Oncol*. 2013;22(3):151-155. <https://www.ncbi.nlm.nih.gov/pubmed/23664848>.
10. Ravenel JG. Evidence-based imaging in lung cancer: a systematic review. *J Thorac Imaging*. 2012; 27(5):315-324. http://journals.lww.com/thoracicimaging/Abstract/2012/09000/Evidence_based_Imaging_in_Lung_Cancer_A.8.aspx.
11. Bille A, Pelosi E, Skanjeti A, et al. Preoperative intrathoracic lymph node staging in patients with non-small-cell lung cancer: accuracy of integrated positron emission tomography and computed tomography. *Eur J Cardiothorac Surg*. 2009;36(3):440-445. <https://academic.oup.com/ejcts/article-lookup/doi/10.1016/j.ejcts.2009.04.003>.

ONC-9: Esophageal and GE Junction Cancer**ONC-9.0: Esophageal and GE Junction Cancer – General Considerations****ONC-9.1: Esophageal and GE Junction Cancer – Suspected/Diagnosis****ONC-9.2: Esophageal and GE Junction Cancer – Initial Work-up/Staging****ONC-9.3: Esophageal and GE Junction Cancer – Restaging/Recurrence****ONC-9.4: Esophageal and GE Junction Cancer – Surveillance/Follow-up**

ONC-9.0: Esophageal and GE Junction Cancer – General Considerations

- Clinicians must describe esophageal cancer by cell type and in which third of the esophagus it occurs.
- Cancers of the upper and middle third are usually squamous cell and are highly associated with tobacco and alcohol abuse.
- Cancers of the gastroesophageal (GE) junction are treated as lower third cancers. Lower third cancers are usually adenocarcinomas; 62% of these arise in the setting of Barrett's esophagus, a condition associated with high body mass index (BMI).

ONC-9.1: Esophageal and GE Junction Cancer – Suspected/Diagnosis

- See also: **NECK-3.1: Dysphagia** for imaging guidelines for evaluation of suspected esophageal malignancy

ONC-9.2: Esophageal and GE Junction Cancer – Initial Work-up/Staging

Indication	Imaging Study
Biopsy proven	◆ CT Chest (CPT® 71260) and CT Abdomen with contrast (CPT® 74160) ■ CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms
Upper 1/3 or neck mass	◆ CT Neck with contrast (CPT® 70491)
If no evidence of metastatic disease by conventional imaging	◆ PET/CT (CPT® 78815)

ONC-9.3: Esophageal and GE Junction Cancer – Restaging/Recurrence

Indication	Imaging Study
After primary chemoradiation therapy prior to surgery	◆ CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast
Post-surgical resection	◆ See: Surveillance <u>ONC-9.4: Surveillance/Follow-up</u>
◆ If conventional imaging is inconclusive or ◆ Salvage surgical candidate with recurrence and no metastatic disease documented by conventional imaging	◆ PET/CT (CPT® 78815) ■ PET imaging can be done as early as 6 weeks after completion of XRT if recent CT findings are inconclusive and PET findings will alter immediate care decision making
<u>For any of the following:</u> ◆ Signs or symptoms of recurrence ◆ Biopsy proven on follow-up endoscopy ◆ Recurrence suggested by other imaging (i.e. CXR or barium swallow)	◆ CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast
If previously involved or new signs or symptoms	◆ CT Pelvis with contrast (CPT® 72193) and/or CT Neck with contrast (CPT® 70491)

ONC-9.4: Esophageal and GE Junction Cancer – Surveillance/Follow-up

Indication	Imaging Study
Stage 0-IA (Tis, T1a) disease	◆ No routine advanced imaging indicated
Stage IB (T1b) disease	◆ CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast annually for 3 years
Stage II-III disease	◆ CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast every 6 months for 2 years and then annually for 3 more years
Stage IV disease	◆ See: <u>ONC-1.2: Phases of Oncology Imaging and General Phase-Related Considerations</u>

References

1. Ajani JA, D'Amico TA, Bentrem DJ, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 4.2021 – August 3, 2021. Esophageal and esophagogastric junction cancers, available at: https://www.nccn.org/professionals/physician_gls/pdf/esophageal.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Esophageal and esophagogastric junction cancers V4.2021 – August 3, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Klaeser B, Nitzsche E, Schuller JC, et al. Limited predictive value of FDG-PET for response assessment in the preoperative treatment of esophageal cancer: results of a prospective multi-center trial (SAKK 75/02). *Onkologie*. 2009;32(12):724-730. doi:10.1159/000251842.
3. Malik V, Lucey JA, Duffy GJ, et al. Early repeated 18F-FDG PET scans during neoadjuvant chemoradiation fail to predict histopathologic response or survival benefit in adenocarcinoma of the esophagus. *J Nucl Med*. 2010;51(12):1863-1869. doi:10.2967/jnumed.110.079566.
4. Stiekema J, Vermeulen D, Vegt E, et al. Detecting interval metastases and response assessment using 18F-FDG PET/CT after neoadjuvant chemoradiotherapy for esophageal cancer. *Clin Nucl Med*. 2014;39(10):862-867. doi:10.1097/RLU.0000000000000517.
5. Sudo K, Xiao L, Wadhwa R, et al. Importance of surveillance and success of salvage strategies after definitive chemoradiation in patients with esophageal cancer. *J Clin Oncol*. 2014;32(30):3400-3405. doi:10.1200/JCO.2014.56.7156.
6. Lou F, Sima CS, Adusumilli PS, et al. Esophageal cancer recurrence patterns and implications for surveillance. *J Thorac Oncol*. 2013;8(12):1558–1562. doi:10.1097/01.JTO.0000437420.38972.fb.
7. Goense L, van Rossum PS, Reitsma JB, et al. Diagnostic performance of 18F-FDG PET and PET/CT for the detection of recurrent esophageal cancer after treatment with curative intent: a systematic review and meta-analysis. *J Nucl Med*. 2015;56(7):995-1002. doi:10.2967/jnumed.115.155580.

ONC-10: Other Thoracic Tumors**ONC-10.1: Malignant Pleural Mesothelioma – Suspected/Diagnosis****ONC-10.2: Malignant Pleural Mesothelioma – Initial Work-up/Staging****ONC-10.3: Malignant Pleural Mesothelioma – Restaging****ONC-10.4: Malignant Pleural Mesothelioma – Surveillance****ONC-10.5: Thymoma and Thymic Carcinoma – Suspected/Diagnosis****ONC-10.6: Thymoma and Thymic Carcinoma – Initial Work-up/Staging****ONC-10.7: Thymoma and Thymic Carcinoma – Restaging****ONC-10.8: Thymoma and Thymic Carcinoma – Surveillance**

ONC-10.1: Malignant Pleural Mesothelioma – Suspected/Diagnosis

- See: **CH-9.1: Asbestos Exposure** for imaging guidelines for evaluation of suspected mesothelioma

ONC-10.2: Malignant Pleural Mesothelioma – Initial Work-up/Staging

Indication	Imaging Study
Cytologically or pathologically proven	◆ CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms ◆ PET/CT (CPT® 78815) if no evidence of metastatic disease or inconclusive conventional imaging
Preoperative planning	◆ MRI Chest without and with contrast (CPT® 71552)

ONC-10.3: Malignant Pleural Mesothelioma – Restaging

Indication	Imaging Study
Signs or symptoms of recurrence	◆ CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms
Treatment with chemotherapy	<u>Every 2 cycles:</u> ◆ CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms
Following induction chemotherapy prior to surgical resection	◆ CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms ◆ PET/CT (CPT® 78815) if no evidence of metastatic disease
Inconclusive Chest CT	◆ MRI Chest without and with contrast (CPT® 71552)

ONC-10.4: Malignant Pleural Mesothelioma – Surveillance

Indication	Imaging Study
All	◆ CT Chest with contrast (CPT® 71260) and previously involved regions every 3 months for 2 years, then annually thereafter

ONC-10.5: Thymoma and Thymic Carcinoma – Suspected/Diagnosis

- See: **CH-20.1: Mediastinal Mass** for imaging guidelines for evaluation of suspected thymic malignancies
- See: **ONC-15.6: Bronchopulmonary or Thymic Carcinoid – Initial Staging** for imaging guidelines for thymic carcinoid

ONC-10.6: Thymoma and Thymic Carcinoma – Initial Work-up/Staging

Indication	Imaging Study
Encapsulated or invasive limited disease	◆ CT Chest with contrast (CPT® 71260)
Extensive mediastinal involvement on Chest CT	◆ CT Abdomen with contrast (CPT® 74160) ◆ CT Neck with contrast (CPT® 70491)
Inconclusive finding on CT	<u>One of the following:</u> ◆ PET/CT (CPT® 78815) ◆ MRI Chest without and with contrast (CPT® 71552)
Preoperative planning	◆ MRI Chest without and with contrast (CPT® 71552)
Thymic Carcinomas	◆ Image according to <u>ONC-8: Non-Small Cell Lung Cancer</u>

ONC-10.7: Thymoma and Thymic Carcinoma – Restaging

Indication	Study
Adjuvant therapy following surgical resection	◆ Follow surveillance imaging
For suspected recurrence	◆ CT Chest with contrast (CPT® 71260)
Recurrence with extensive mediastinal involvement on chest CT	◆ CT Abdomen with contrast (CPT® 74160) ◆ CT Neck with contrast (CPT® 70491)
Thymic carcinomas	◆ See: <u>ONC-8: Non-Small Cell Lung Cancer</u>
Inconclusive finding on CT	<u>One of the following:</u> ◆ PET/CT (CPT® 78815) ◆ MRI Chest without and with contrast (CPT® 71552)
Metastatic disease on chemotherapy	◆ CT Neck (CPT® 70491), CT Chest (CPT® 71260), and CT Abdomen (CPT® 74160) with contrast, every 2 cycles of therapy ◆ Following induction chemotherapy prior to surgical resection, PET/CT (CPT® 78815) if no evidence of metastatic disease

ONC-10.8: Thymoma and Thymic Carcinoma – Surveillance

Indication	Study
Thymoma	◆ CT Chest with contrast (CPT® 71260) and previously involved regions every 6 months for 2 years, then annually for next 10 years
Thymic carcinomas	◆ CT Chest with contrast (CPT® 71260) every 6 months for 2 years and then annually for 5 years

References

1. Ettinger DS, Wood DE, Aisner DL, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021– February 16, 2021. Malignant Pleural Mesothelioma, available at: https://www.nccn.org/professionals/physician_gls/pdf/mpm.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Malignant Pleural Mesothelioma V2.2021 – February 16, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Ettinger DS, Wood DE, Aisner DL, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – December 4, 2020. Thymoma and Thymic carcinoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/thymic.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Thymoma and Thymic carcinoma, V1.2021 – December 4, 2020. ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Sørensen JB, Ravn J, Loft A, Brenøe J, Berthelsen AK, Nordic Mesothelioma Group. Preoperative staging of mesothelioma by 18F-fluoro-2-deoxy-D-glucose positron emission tomography/computer tomography fused imaging and mediastinoscopy compared to pathological findings after extrapleural pneumonectomy. *Eur J Cardiothorac Surg*. 2008;34:1090-1096. doi:10.1016/j.ejcts.2008.07.050.
4. Wilcox BE, Subramaniam RM, Peller PJ, et al. Utility of computed tomography-positron emission tomography for selection of operable malignant pleural mesothelioma. *Clin lung cancer*. 2009;10:244-248. doi: 10.3816/CLC.2009.n.033.
5. Marom EM. Imaging thymoma. *J Thorac Oncol*. 2010;5(10 Suppl 4):S296-S303. doi:10.1097/JTO.0b013e3181f209ca.
6. Marom EM. Advances in thymoma imaging. *J Thorac Imaging*. 2013;28(2):69-80. doi:10.1097/RTI.0b013e31828609a0.
7. Hayes SA, Huang J, Plodkowski AJ, et al. Preoperative computed tomography findings predict surgical resectability of thymoma. *J Thorac Oncol*. 2014;9(7):1023-1030. doi:10.1097/JTO.0000000000000204.
8. Mineo TC, Ambrogi V. Malignant pleural mesothelioma: factors influencing the prognosis. *Oncology*. 2012;26(12):1164-75.

ONC-11: Breast Cancer**ONC-11.0: Breast Cancer – General Considerations****ONC-11.1: Breast Cancer – Suspected/Diagnosis****ONC-11.2: Breast Cancer – Initial Work-up/Staging****ONC-11.3: Breast Cancer – Restaging/Recurrence****ONC-11.4: Breast Cancer – Surveillance/Follow-up**

ONC-11.0: Breast Cancer – General Considerations

- Advanced imaging to evaluate for distant metastases is not indicated for pre-invasive or in-situ breast cancer (histologies such as DCIS and LCIS). Bone scan has a high concordance rate with PET for detecting bone metastases.
- Scintimammography and Breast Specific Gamma Imaging (BSGI) are considered experimental and investigational.
- PET is not indicated for the following:
 - ◆ Non-invasive breast cancers
 - ◆ Prior to lymph node sampling in a patient with clinical stage I, II, or operable IIIA disease
 - ◆ Obvious multi-organ metastatic disease is present on CT or MRI

ONC-11.1: Breast Cancer – Suspected/Diagnosis

See: **BR-5: Breast MRI Indications** for imaging guidelines for evaluation of suspected breast cancer

ONC-11.2: Breast Cancer – Initial Work-up/Staging

Indication	Imaging Study
<u>Any of the following:</u> ◆ Biopsy proven invasive breast cancer or carcinoma in-situ ◆ Adenocarcinoma in axillary lymph node	◆ Bilateral Breast MRI (CPT® 77049)
<u>Any of the following:</u> ◆ Ductal carcinoma in situ ◆ Stage I and II	◆ For planned sentinel lymph node (SLN) biopsy: Lymph system imaging (lymphoscintigraphy, CPT® 78195)
Stages I, II, and III	◆ Routine systemic imaging is not indicated for initial staging of non-metastatic breast cancer in the absence of signs or symptoms
<u>Any of the following:</u> ◆ Clinically suspected or biopsy proven metastatic/Stage IV disease ◆ Signs or symptoms of systemic disease ◆ Elevated liver function tests or tumor markers	<u>Any or all of the following:</u> ◆ CT Chest with contrast (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ Bone scan See also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>
Inconclusive CT and/or bone scan	◆ PET/CT (CPT® 78815)
Bone pain	◆ Bone scan (see: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>) ◆ See also: <u>ONC-31.5: Bone (including Vertebral) Metastases</u> ◆ See also: <u>ONC-31.6: Spinal Cord Compression</u>

ONC-11.3: Breast Cancer – Restaging/Recurrence

Indication	Imaging Study
<u>Any of the following:</u> ◆ Biopsy proven local recurrence ◆ Suspicion of recurrence with inconclusive mammogram and/or ultrasound (BIRADS 0) ◆ Mammogram and ultrasound conflicts with physical exam ◆ End of planned neoadjuvant chemotherapy to determine resectability	Bilateral MRI Breast without and with contrast (CPT® 77049)
<u>Any of the following:</u> ◆ Assessing for residual disease after surgery ◆ Assessing response to neoadjuvant chemotherapy ◆ After lumpectomy or mastectomy, prior to adjuvant therapy	Neither PET nor CT are indicated for systemic restaging after neoadjuvant chemotherapy or after surgery
<u>Any of the following:</u> ◆ Elevated LFTs ◆ Elevated tumor markers ◆ Signs or symptoms of recurrence ◆ Biopsy proven recurrence	<u>Any or all of the following:</u> ◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ Bone scan (See also: ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology)
Treatment response in patients with metastatic disease and measurable disease on imaging	<u>Any or all of the following for patients being treated with chemotherapy, every 2 cycles:</u> ◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ Bone scan (see also: ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology) ◆ MRI Brain without and with contrast (CPT® 70553) for patients receiving systemic treatment for brain metastases <u>Any or all of the following for patients being treated with endocrine/hormonal therapy, every 3 months:</u> ◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ Bone scan (See: ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology)
Inconclusive CT, MRI, and/or bone scan for suspected recurrence, and further characterization is needed to make treatment decisions	◆ PET/CT (CPT® 78815)
Bone metastasis as the only site of stage IV disease (excluding brain metastases) and a prior bone scan has not been performed for serial comparison	◆ PET/CT (CPT® 78815)

ONC-11.4: Breast Cancer – Surveillance/Follow-up

Indication	Imaging Study
Measurable metastatic disease on maintenance therapy or being monitored off therapy	<u>Any or all of the following, every 3 months for up to 5 years after completion of active treatment:</u> ◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ Bone scan (see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>)
◆ Asymptomatic non-metastatic disease ◆ Individuals receiving post-operative adjuvant therapy	◆ No advanced imaging indicated
Breast surveillance in an individual with prior history of breast cancer (not treated with bilateral mastectomy) AND any one of the following: ◆ Age at diagnosis <50 years ◆ Clinical lifetime risk estimated to be ≥20% using genetic or clinical risk estimator, calculated prior to the initial diagnosis of breast cancer ◆ Extremely dense breast tissue (breast density category D) on mammography	◆ Bilateral MRI Breast without and with contrast (CPT® 77049) annually ◆ See also: <u>BR-5: Breast MRI Indications</u> for information on state-specific mandates
◆ Individuals treated with bilateral mastectomy ◆ All other individuals with no high risk features (as stated above)	◆ Breast MRI is not indicated for routine surveillance of asymptomatic individuals

References

1. Gradishar WJ, Moran MS, Abraham J, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 5.2021 – June 28, 2021. Breast cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Breast Cancer V5.2021 – June 28, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Cardoso F, Costa A, Norton L, et al. ESO-ESMO 2nd international consensus guidelines for advanced breast cancer (ABC2). *Ann Oncol*. 2014;25(10):1871-1888. doi:10.1093/annonc/mdl385.
3. Khatcheressian JL, Hurley P, Bantug E, et al. Breast cancer follow-up and management after primary treatment: American Society of Clinical Oncology clinical practice guideline update. *J Clin Oncol*. 2013;31:961-965. doi:10.1200/JCO.2012.45.9859.
4. Puglisi F, Follador A, Minisini AM, et al. Baseline staging tests after a new diagnosis of breast cancer: further evidence of their limited indications. *Ann Oncol*. 2005;16(2):263-266. doi:10.1093/annonc/mdi063.
5. Rong J, Wang S, Ding Q, Yun M, Zheng Z, Ye S. Comparison of 18 FDG PET-CT and bone scintigraphy for detection of bone metastases in breast cancer patients. A meta-analysis. *Surg Oncol*. 2013;22(2):86-91. doi:10.1016/j.suronc.2013.01.002.
6. Hong S, Li J, Wang S. 18FDG PET-CT for diagnosis of distant metastases in breast cancer patients. A meta-analysis. *Surg Oncol*. 2013;22(2):139-143. doi:10.1016/j.suronc.2013.03.001.
7. Cheng X, Li Y, Liu B, Xu Z, Bao L, Wang J. 18F-FDG PET/CT and PET for evaluation of pathological response to neoadjuvant chemotherapy in breast cancer: a meta-analysis. *Acta Radiol*. 2012;53(6):615-627. doi:10.1258/ar.2012.110603.
8. Simos D, Catley C, van Walraven C, et al. Imaging for distant metastases in women with early-stage breast cancer: a population-based cohort study. *CMAJ*. 2015;187(12):E387-E397. doi:10.1503/cmaj.150003.
9. Crivello ML, Ruth K, Sigurdson ER, et al. Advanced imaging modalities in early stage breast cancer: preoperative use in the United States Medicare population. *Ann Surg Oncol*. 2013;20(1):102-110. doi:10.1245/s10434-012-2571-4.
10. Heller SL, Lourenco AP, Niell BL, et al. ACR Appropriateness Criteria® - Imaging after Mastectomy and Breast Reconstruction. Available at <https://acsearch.acr.org/docs/3155410/Narrative/>. American College of Radiology.

ONC-12: Sarcomas – Bone, Soft Tissue and GIST

ONC-12.1: Bone and Soft Tissue Sarcomas – General Considerations
ONC-12.2: Soft Tissue Sarcomas – Initial Work-up/Staging
ONC-12.3: Soft Tissue Sarcomas – Restaging/Recurrence
ONC-12.4: Soft Tissue Sarcomas Surveillance/Follow-up
ONC-12.5: Gastrointestinal Stromal Tumor (GIST)
ONC-12.6: Bone Sarcomas – Initial Work-up/Staging
ONC-12.7: Bone Sarcomas – Restaging/Recurrence
ONC-12.8: Bone Sarcomas – Surveillance/Follow-up
ONC-12.9: Benign Bone Tumors – General Considerations
ONC-12.10: Benign Bone Tumors – Initial Work-up/Staging
ONC-12.11: Benign Bone Tumors – Restaging/Recurrence
ONC-12.12: Benign Bone Tumors – Surveillance/Follow-up

ONC-12.1: Bone and Soft Tissue Sarcomas – General Considerations

Sarcomas are tumors of mesenchymal origin, classified as high-, intermediate-, and low-grade (G) tumors (sometimes described as “spindle cell” cancers). They can arise in any bony, cartilaginous, smooth muscle, skeletal muscle, or cardiac muscle tissue.

Sarcomas occur in both adult and pediatric patients, but some are more common in one age group than the other. Unless specified below, patients age ≥ 18 years old should be imaged according to this guideline section.

Exceptions include:

- Rhabdomyosarcoma patients of all ages should be imaged according to guidelines in **PEDONC-8.2: Rhabdomyosarcoma**
- Osteogenic sarcoma (Osteosarcoma) patients of all ages should be imaged according to guidelines in **PEDONC-9.3: Osteogenic Sarcoma (OS)**
- Ewing sarcoma and Primitive Neuroectodermal Tumor patients of all ages should be imaged according to guidelines in **PEDONC-9.4: Ewing Sarcoma and Primitive Neuroectodermal Tumors (ESFT)**
- Kaposi’s sarcoma patients of all ages should be imaged according to guidelines in **ONC-31.10: Kaposi’s Sarcoma**
- See: **ONC-22** for imaging recommendations for uterine sarcoma

ONC-12.2: Soft Tissue Sarcomas – Initial Work-up/Staging

Indication	Imaging Study
Retroperitoneal or intraabdominal primary site	<u>Any or all of the following:</u> ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) ◆ Either CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
<u>Any of the following:</u> ◆ Extremity or trunk primary site ◆ Head or neck primary site	<u>Any or all of the following:</u> ◆ MRI without and with contrast of involved area ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)
<u>Any of the following:</u> ◆ Angiosarcoma ◆ Alveolar soft part sarcoma ◆ Clear cell sarcoma ◆ Epithelioid sarcoma ◆ Hemangiopericytoma ◆ Leiomyosarcoma ◆ Other histologies documented to have propensity for lymphatic spread and deep-seated tumors	<u>Any or all of the following:</u> ◆ MRI without and with contrast of involved area ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) ◆ Either CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Myxoid round cell liposarcoma	<u>Any or all of the following:</u> ◆ MRI without and with contrast of involved area ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) ◆ Either CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast ◆ MRI Cervical/Thoracic/Lumbar spine without and with contrast (CPT® 72156, CPT® 72157, and CPT® 72158)
<u>Any of the following:</u> ◆ Angiosarcoma ◆ Alveolar soft part sarcoma ◆ All patients with signs/symptoms of brain metastases	◆ MRI Brain without and with contrast (CPT® 70553)
<u>Any of the following:</u> ◆ Grade of tumor in doubt following biopsy ◆ Conventional imaging suggests solitary metastasis amenable to surgical resection	◆ PET/CT (CPT® 78815 or CPT® 78816)

Indication	Imaging Study
Desmoid Tumors	<u>One of the following:</u> ◆ CT without contrast or with contrast of the affected body part ◆ MRI without contrast or without and with contrast of the affected body part ◆ Imaging of lung, lymph node, and metastatic site for these tumors is not indicated
Dermatofibrosarcoma Protuberans (DFSP)	<u>One of the following:</u> ◆ CT without contrast or with contrast of the affected body part ◆ MRI without contrast or without and with contrast of the affected body part ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for ■ pulmonary symptoms ■ abnormal chest x-ray ■ sarcomatous differentiation

ONC-12.3: Soft Tissue Sarcomas – Restaging/Recurrence

Indication	Imaging Study
<u>Any of the following:</u> ◆ After preoperative radiotherapy ◆ After surgical resection ◆ After adjuvant radiotherapy	◆ MRI without and with contrast or CT with contrast of affected body area ◆ Chest or lymph node imaging is not indicated if no abnormality on previous imaging
<u>Any of the following:</u> ◆ Differentiate tumor from radiation or surgical fibrosis ◆ Determine response to neoadjuvant therapy ◆ Confirm oligometastatic disease prior to curative intent surgical resection	◆ PET/CT (CPT® 78815 or CPT® 78816)
Chemotherapy response for patients with measurable disease	◆ CT with contrast or MRI without and with contrast of affected body area every 2 cycles
Local recurrence suspected	◆ Repeat all imaging for initial workup of specific histology and/or primary site
Preoperative planning prior to resection	<u>Any or all of the following:</u> ◆ MRI without contrast or without and with contrast of involved area ◆ CT (contrast as requested) of involved area
Dermatofibrosarcoma Protuberans (DFSP)	<u>One of the following:</u> ◆ CT without contrast or with contrast of the affected body part ◆ MRI without contrast or without and with contrast of the affected body part ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for: ■ pulmonary symptoms ■ abnormal chest x-ray ■ sarcomatous differentiation

ONC-12.4: Soft Tissue Sarcomas Surveillance/Follow-up

Indication	Imaging Study
Retroperitoneal/intra-abdominal primary site	<u>Any or all of the following every 3 months for 2 years, then every 6 months for 2 more years, then annually:</u> ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast or MRI without and with contrast of any other involved body areas
Extremity, trunk, or Head/Neck primary site, low grade Stage I disease	<u>Any or all of the following every 6 months for 5 years, then annually thereafter:</u> ◆ Chest x-ray ■ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated for new findings on CXR or new/worsening pulmonary signs/symptoms ◆ CT with contrast, MRI without contrast, or MRI without and with contrast of primary site if primary site not easily evaluated by physical exam
Extremity, trunk, or Head/Neck primary site, Stages II-IV disease.	<u>Any or all of the following every 3 months for 2 years, then every 6 months for 2 more years, then annually:</u> ◆ CT with contrast, MRI without contrast, or MRI without and with contrast of primary site ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) ◆ CT with contrast or MRI without and with contrast of any other involved body areas
Desmoid tumors	<u>One of the following every 6 months for 3 years, then annually:</u> ◆ CT without contrast or with contrast of the affected body part ◆ MRI without contrast or without and with contrast of the affected body part
Dermatofibrosarcoma Protuberans	◆ No routine imaging unless clinical signs/symptoms of recurrence

ONC-12.5: Gastrointestinal Stromal Tumor (GIST)

General Considerations

GISTs are mesenchymal neoplasms of the gastrointestinal (GI) tract, mostly found in the stomach and upper small bowel, commonly metastasizing to the liver and abdominal cavity and primarily treated with surgery.

Indication	Imaging Study
Suspected/Diagnosis	◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Initial Work-up/Staging	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ MRI Abdomen without and with contrast (CPT® 74183) is indicated for evaluation of liver lesions that are equivocal on CT imaging or for preoperative assessment of liver ◆ PET (CPT® 78815) is indicated for evaluation of inconclusive findings on conventional imaging
Restaging/Recurrence	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Chest with contrast (CPT® 71260) if prior evidence of chest disease or signs or symptoms of chest disease ◆ PET (CPT® 78815) is indicated for evaluation of inconclusive findings on conventional imaging
Treatment Response	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Chest with contrast (CPT® 71260) if prior evidence of chest disease or signs or symptoms of chest disease ◆ PET (CPT® 78815) is indicated for evaluation of inconclusive findings on conventional imaging
Surveillance/Follow-up	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) every 6 months for 5 years, then annually

ONC-12.6: Bone Sarcomas – Initial Work-up/Staging

Indication	Imaging Study
Chondrosarcoma ◆ Low grade intracompartmental ◆ High grade (grade II or grade III) ◆ Clear cell ◆ Extracompartmental	<u>Any or all of the following:</u> ◆ MRI without contrast or without and with contrast of involved area ◆ CT (contrast as requested) of involved area ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)
Dedifferentiated chondrosarcoma	See: <u>PEDONC-9.3: Osteogenic Sarcoma (OS)</u> for imaging recommendations
Mesenchymal chondrosarcoma	See: <u>PEDONC-9.4: Ewing's Sarcoma Family of Tumors</u> for imaging recommendations
Chordoma	<u>Any or all of the following:</u> ◆ MRI without contrast or without and with contrast of involved area ◆ CT (contrast as requested) of involved area ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast ◆ Bone scan (see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>) ◆ PET may be approved for inconclusive conventional imaging

ONC-12.7: Bone Sarcomas – Restaging/Recurrence

Indication	Imaging Study
Chondrosarcoma ◆ Low grade intracompartmental ◆ High grade (grade II or grade III) ◆ Clear cell Extracompartmental	<u>Any or all of the following, after completion of radiotherapy or every 2 cycles of chemotherapy:</u> ◆ MRI without contrast or without and with contrast of involved area ◆ CT (contrast as requested) of involved area ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)
Dedifferentiated chondrosarcoma	See: <u>PEDONC-9.3: Osteogenic Sarcoma (OS)</u> for imaging recommendations
Mesenchymal chondrosarcoma	See: <u>PEDONC-9.4: Ewing's Sarcoma Family of Tumors</u> for imaging recommendations
Chordoma	<u>Any or all of the following, after completion of radiotherapy or every 2 cycles of chemotherapy:</u> ◆ MRI without contrast or without and with contrast of involved area ◆ CT (contrast as requested) of involved area ◆ Bone scan (see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>) ◆ PET may be approved for inconclusive conventional imaging

ONC-12.8: Bone Sarcomas – Surveillance/Follow-up

Indication	Imaging Study
◆ Grade I Chondrosarcoma ◆ Intracompartmental Chondrosarcoma	<u>Any or all of the following every 6 months for 2 years, then annually for 10 years:</u> ◆ Plain x-ray of primary site ■ MRI without and with contrast is indicated for new findings on plain x-ray or new/worsening clinical symptoms. ◆ Chest x-ray ■ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for new findings on CXR, or new/worsening signs/symptoms.
◆ Grade II or III Chondrosarcoma ◆ Clear Cell Chondrosarcoma ◆ Extracompartmental Chondrosarcoma	<u>Any or all of the following every 6 months for 5 years, then annually for 10 years:</u> ◆ Plain x-ray of primary site ■ MRI without and with contrast is indicated for new findings on plain x-ray or new/worsening clinical symptoms. ◆ Chest x-ray or CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250)
Dedifferentiated chondrosarcoma	See: <u>PEDONC-9.3: Osteogenic Sarcoma (OS)</u> for imaging recommendations
Mesenchymal chondrosarcoma	See: <u>PEDONC-9.4: Ewing's Sarcoma Family of Tumors</u> for imaging recommendations
Chordoma	◆ Plain x-ray of primary site every 6 months for 5 years and then annually until year 10 ■ MRI without and with contrast is indicated for new findings on plain x-ray or new/worsening clinical symptoms. ◆ Chest x-ray every 6 months for 5 years and then annually until year 10 ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) may be obtained annually or for evaluation of any new findings on CXR or new/worsening signs/symptoms

ONC-12.9: Benign Bone Tumors – General Considerations

- Variety of diagnoses, including osteoid osteochondroma, chondroblastoma, desmoplastic fibroma, Paget's disease, osteoid osteoma and others
- Plain x-ray appearance is diagnostic for many benign bone tumors and advanced imaging is generally unnecessary except for preoperative planning
- MRI without and with contrast is the primary modality for advanced imaging of bone tumors, and can be approved to help narrow differential diagnoses and determine whether biopsy is indicated
- Some benign bone tumor types carry a risk of malignant degeneration over time, but routine advanced imaging surveillance has not been shown to improve outcomes for these patients
- MRI without and with contrast can be approved to evaluate new findings on plain x-ray new/worsening clinical symptoms not explained by a recent plain x-ray
- There are no data to support the use of PET/CT in the evaluation of benign bone tumors, and PET requests should not be approved without biopsy confirmation of a malignancy
- Other benign bone tumor patients of all ages should be imaged according to guidelines in **PEDONC-9.2: Benign Bone Tumors**

ONC-12.10: Benign Bone Tumors – Initial Work-up/Staging

Indication	Imaging Study
Giant Cell Tumor of Bone (GCTB)	<u>Any or all of the following:</u> ◆ MRI without contrast or without and with contrast of involved area ◆ CT (contrast as requested) of involved area ◆ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) ◆ Bone scan (see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>)
Enchondroma	◆ MRI without contrast or without and with contrast of primary site

ONC-12.11: Benign Bone Tumors – Restaging/Recurrence

Indication	Imaging Study
Giant Cell Tumor of Bone (GCTB)	<u>Any or all of the following, after completion of radiotherapy or every 2 cycles of chemotherapy:</u> ◆ MRI without contrast or without and with contrast of involved area ◆ CT (contrast as requested) of involved area ◆ Bone scan (see also: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>)
Enchondroma	Generally no indication for this benign tumor unless symptoms

ONC-12.12: Benign Bone Tumors – Surveillance/Follow-up

Indication	Imaging Study
Giant Cell Tumor of Bone (GCTB)	Any or all of the following every 6 months for 4 years, then annually thereafter: ◆ Plain x-ray of primary site ■ MRI without and with contrast is indicated for new findings on plain x-ray or new/worsening clinical symptoms. ◆ Chest x-ray ■ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for new findings on CXR, or new/worsening signs/symptoms.
Enchondroma	Plain films of primary site

References

1. Mehren MV, Kane III JM, Bui MM, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – April 28, 2021. Soft Tissue Sarcoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/sarcoma.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Soft Tissue Sarcoma V2.2021 – April 28, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Biermann JS, Chow W, Boles S, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2022 – July 21, 2021. Bone cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/bone.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone cancer V1.2022 – July 21, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Nishiguchi T, Mochizuki K, Ohsawa M, et al. Differentiating benign notochordal cell tumors from chordomas: radiographic features on MRI, CT, and tomography. *Am Jour Roentgenol*. 2011;196(3):644-650. doi:10.2214/AJR.10.4460.
4. Van den Abbeele AD. The lessons of GIST-PET and PET/CT: a new paradigm for imaging. *Oncologist*. 2008;13:8-13. doi:10.1634/theoncologist.13-S2-8.
5. Demetri GD, von Mehren M, Antonescu CR, et al. NCCN Task Force report: update on the management of patients with gastrointestinal stromal tumors. *J Natl Compr Canc Netw*. 2010;8(Suppl 2):S42-44.
6. Peng PD, Hyder O, Mavros MN, et al. Management and recurrence patterns of desmoids tumors: a multi-institutional analysis of 211 patients. *Ann Surg Oncol*. 2012;19(13):4036-4042. doi:10.1245/s10434-012-2634-6.
7. Tseng WW, Amini B, Madewell JE. Follow-up of the soft tissue sarcoma patient. *J Surg Oncol*. 2015;111(5):641-645. doi:10.1002/jso.23814.
8. Grotz TE, Donohue JH. Surveillance strategies for gastrointestinal stromal tumors. *J Surg Oncol*. 2011;104(8):921-927. doi:10.1002/jso.21862.
9. Akram J, Wooler G, Lock-Andersen J. Dermatofibrosarcoma protuberans: clinical series, national Danish incidence data and suggested guidelines. *J Plast Surg Hand Surg*. 2014;48(1):67-73. doi:10.3109/2000656X.2013.812969.
10. Puri A, Gulia A, Hawaldar R, Ranganathan P, Badwe RA. Does intensity of surveillance affect survival after surgery for sarcomas? Results of a randomized noninferiority trial. *Clin Orthop Relat Res*. 2014;472(5):1568-1575. doi:10.1007/s11999-013-3385-9.
11. Biermann JS, Adkins DR, Aqlunlik M, et al. Bone cancer. *J Natl Compr Canc Netw*. 2013;11(6):688-723.

ONC-13: Pancreatic Cancer**ONC-13.0: Pancreatic Cancer – General Considerations****ONC-13.1: Pancreatic Cancer – Screening Studies for Pancreatic Cancer****ONC-13.2: Pancreatic Cancer – Suspected/Diagnosis****ONC-13.3: Pancreatic Cancer – Initial Work-up/Staging****ONC-13.4: Pancreatic Cancer – Restaging/Recurrence****ONC-13.5: Pancreatic Cancer – Surveillance/Follow-up**

ONC-13.0: Pancreatic Cancer – General Considerations

- This guideline refers only to adenocarcinoma of the exocrine pancreas, which accounts for over 90% of pancreatic malignancies. This guideline may also be used for cancer of the Ampulla of Vater.
- Neuroendocrine and carcinoid tumors of the pancreas are not included in this guideline, see: **ONC-15: Neuroendocrine Cancers and Adrenal Tumors**

ONC-13.1: Pancreatic Cancer – Screening Studies for Pancreatic Cancer

- Detailed history of any known inherited syndrome in the patient and detailed family history in first and second degree relatives, including the age and lineage, is essential to guide screening recommendations. See table below for age- and risk-specific screening recommendations
- New onset of diabetes in patients older than 50 has been recognized as a potential indicator of the development of pancreatic cancer. Approximately 1% of patients in this category are diagnosed with cancer within 3 years. A prediction model has been established which identifies those patients at greatest risk for pancreatic malignancy. The scoring system, known as ENDPAC (Enriching New-Onset Diabetes for Pancreatic Cancer) is based on 3 discriminatory factors, including change in blood glucose, change in weight, and age of onset at the time of the new diagnosis of diabetes. A score of > 3 imparts an elevated risk of pancreatic cancer (3.6%), and these patients should be screened. Screening is not indicated at this time for scores of 0-2.

Indications	Imaging Study
<u>Individuals who meet BOTH of the following criteria:</u> ◆ One or more first- or second-degree relative affected with pancreatic adenocarcinoma AND ◆ Known mutation carrier of one of the following genes: ■ Lynch Syndrome (MLH1, MSH2, or MSH6 gene mutations) ■ BRCA1, BRCA2 (Familial Breast and Ovarian syndrome) ■ PALB2 mutation ■ ATM (Ataxia-Telangiectasia)	◆ MRI Abdomen without and with contrast (CPT® 74183) starting at age 50 or 10 years earlier than the youngest affected family member, repeat annually
<u>Individuals with family history of pancreatic cancer, but no known genetic mutation:</u> ◆ Individuals with 2 relatives with pancreatic adenocarcinoma where one is a first-degree relative ◆ Individuals with 3 or more relatives with pancreatic adenocarcinoma	◆ MRI Abdomen without and with contrast (CPT® 74183) starting at age 45 or 10 years earlier than the youngest affected family member, repeat annually
Pancreatic Cancer Kindred (individuals who have at least one first-degree relative with pancreatic adenocarcinoma who in turn also has a first-degree relative with pancreatic adenocarcinoma) and NO known genetic germline mutations	◆ MRI Abdomen without and with contrast (CPT® 74183) starting at age 50 or 10 years earlier than the youngest affected family member, repeat annually

Indications	Imaging Study
Hereditary Pancreatitis (PRSS1, CPA1, and CTSC gene mutations)	◆ MRI Abdomen without and with contrast (CPT® 74183) beginning at age 40 or 20 years after the first pancreatitis attack, repeat annually.
Peutz-Jeghers Syndrome (LKB1/STK11 gene mutation)	◆ MRI Abdomen without and with contrast (CPT® 74183) starting at age 30, repeat annually
CDKN2A mutation (also known as p16, p16INK4a, and MTS1, FMM-Familial Atypical Multiple Melanoma and Mole Syndrome)	◆ MRI Abdomen without and with contrast or MRCP (CPT® 74183) beginning at age 40, repeat annually.
Screening MRI reveals cystic lesion of the pancreas	◆ Repeat MRI Abdomen without and with contrast (CPT® 74183) in 6 months
Screening MRI reveals indeterminate solid lesion	◆ CT Abdomen with contrast – pancreatic protocol (CPT® 74160) ◆ May repeat MRI Abdomen without and with contrast (CPT® 74183) in 3 months after the CT scan
Screening MRI reveals pancreatic stricture and/or dilation ≥ 6 mm without a mass	◆ CT Abdomen with contrast – pancreatic protocol (CPT® 74160) ◆ May repeat MRI Abdomen without and with contrast (CPT® 74183) in 3 months after the CT scan
New onset diabetes in adults with ENDPAC score of ≥ 3	◆ CT Abdomen without and with contrast (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183) at baseline; if negative, can be repeated once after 6 months

ONC-13.2: Pancreatic Cancer – Suspected/Diagnosis

Indication	Imaging Study
For any suspected symptoms only (e.g. epigastric pain, weight loss, pain radiating to back, etc.)	◆ Ultrasound (CPT® 76700 or CPT® 76705) ◆ Also see: <u>AB-2.5: Epigastric Pain and Dyspepsia</u>
Symptoms suspicious for pancreatic cancer AND any one of the following: ◆ Abnormal labs (e.g. elevated CA 19-9, ALKP, bilirubin, or GGTP) ◆ Abnormal physical exam findings (e.g. abdominal mass) ◆ Abnormal or non-diagnostic ultrasound/ERCP ◆ Any red flag signs (see: <u>AB-2.1</u>)	Any one of the following: ◆ CT Pancreatic Protocol (CT Abdomen with contrast with dual phase imaging, CPT® 74160) ◆ MRI Abdomen without and with contrast (CPT® 74183)
Preoperative studies for potentially resectable tumors without confirmed histologic diagnosis	◆ See also: <u>ONC-13.3: Pancreatic Cancer – Initial Work-up/Staging</u>

ONC-13.3: Pancreatic Cancer – Initial Work-up/Staging

Indication	Imaging Study
All patients	◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with (CPT® 74177) or CT Abdomen/Pelvis without and with contrast (CPT® 74178) ◆ EUS
For any of the following: ◆ Preoperative planning ◆ CT insufficient to determine resectability ◆ Evaluation of indeterminate liver lesions	◆ MRI Abdomen without and with contrast (CPT® 74183)
No evidence of metastatic disease on CT or MRI AND any of the following high-risk features: ◆ Borderline resectable disease ◆ Markedly elevated CA 19-9 ◆ Large primary tumor(s) ◆ Enlarged regional lymph nodes	◆ PET/CT (CPT® 78815)

ONC-13.4: Pancreatic Cancer – Restaging/Recurrence

Indication	Imaging Study
<u>For any of the following:</u> ◆ After neoadjuvant chemoradiation ◆ Post-operative baseline ◆ Suspected recurrence	◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with (CPT® 74177) or CT Abdomen/Pelvis without and with contrast (CPT® 74178) ◆ CT with contrast of other involved or symptomatic areas
Unresectable disease or metastatic disease on chemotherapy	<u>Every 2 cycles of treatment (commonly every 6 to 8 weeks):</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with (CPT® 74177) or CT Abdomen/Pelvis without and with contrast (CPT® 74178) ◆ CT with contrast of other involved or symptomatic areas
Unexplained elevated liver enzymes or inconclusive recent CT abnormality	◆ MRI Abdomen without and with contrast (CPT® 74183)
If complete surgical resection was initial therapy	◆ See also: <u>ONC-13.5: Pancreatic Cancer – Surveillance/Follow-up</u> for surveillance imaging

ONC-13.5: Pancreatic Cancer – Surveillance/Follow-up

Indication	Imaging Study
All patients	<u>Every 3 months for 2 years, then annually:</u> ◆ CT Chest with contrast (CPT® 71260) And any one of the following: ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI Abdomen without and with contrast (CPT® 74183) and MRI Pelvis without and with contrast (CPT® 72197)
Measurable metastatic disease on maintenance therapy or being monitored off therapy	Every 3 months for up to 5 years after completion of definitive treatment: ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)

References

1. Tempero MA, Malafa MP, Al-Hawary M, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – February 25, 2021. Pancreatic Adenocarcinoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/pancreatic.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Pancreatic Adenocarcinoma V2.2021 – February 25, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Syngal S, Brand RE, Church JM, et al. ACG clinical guideline: genetic testing and management of hereditary gastrointestinal cancer syndromes. *Am. J. Gastroenterol.* 2015;110(2):223-262. doi:10.1038/ajg.2014.435.
3. Canto MI, Harinck F, Hruban RH, et al. International Cancer of the Pancreas Screening (CAPS) consortium summit on the management of patients with increased risk for familial pancreatic cancer. *Gut.* 2013;62(3):339-347. doi:10.1136/gutjnl-2012-303108.
4. U.S. Preventive Services Task Force. *Screening for pancreatic cancer: recommendation statement.* Rockville, Maryland: Agency for Healthcare Research and Quality (AHRQ); 2004.
5. Heinrich S, Goerres GW, Schafer M, et al. Positron emission tomography/computed tomography influences on the management of resectable pancreatic cancer and its cost-effectiveness. *Ann Surg.* 2005;242(2):235-243.
6. Gemmel C, Eickhoff A, Helmstädter L, Riemann JF. Pancreatic cancer screening: state of the art. *Expert Rev Gastroenterol Hepatol.* 2009;3(1):89-96. doi:10.1586/17474124.3.1.89.
7. Al-Hawary MM, Francis IR, Chari ST, et al. Pancreatic ductal adenocarcinoma radiology reporting template: consensus statement of the Society of Abdominal Radiology and the American Pancreatic Association. *Gastroenterology.* 2014;146(1):291-304. doi:10.1053/j.gastro.2013.11.004.
8. Tersmette AC, Petersen GM, Offerhaus GJ. Increased risk of incident pancreatic cancer among first-degree relatives of patients with familial pancreatic cancer. *Clin Cancer Res.* 2001;7(3):738-44.
9. Tzeng CW, Abbott DE, Cantor SB et al. Frequency and intensity of postoperative surveillance after curative treatment of pancreatic cancer: a cost-effectiveness analysis. *Ann Surg Oncol.* 2013;20(7):2197-2203. doi:10.1245/s10434-013-2889-6.
10. Furman MJ, Lambert LA, Sullivan ME, Whalen GF. Rational follow-up after curative cancer resection. *Journal of Clinical Oncology.* 2013;31(9):1130-1133. doi:10.1200/JCO.2012.46.4438.
11. Tzeng C, Fleming J, Lee J, et al. Yield of clinical and radiographic surveillance in patients with resected pancreatic adenocarcinoma following multimodal therapy. *HPB.* 2012;14(6):365-372. doi:10.1111/j.1477-2574.2012.00445.x.
12. Sharma, A, Kandlakunta H, Nagpal SJS, et.al. Model to determine risk of pancreatic cancer in patients with new-onset diabetes. *Gastroenterology.* 2018;155(3):730-739.
13. Goggins M, Overbeek KA, Brand R, et. al. Management of patients with increased risk for familial pancreatic cancer: updated recommendations from the International Cancer of the Pancreas Screening Consortium. *Gut.* 2020;69(1):7-17. doi:10.1136/gutjnl-2019-319352.

ONC-14: Upper GI Cancers**ONC-14.1: Hepatocellular Carcinoma (HCC) – General Considerations****ONC-14.2: Hepatocellular Carcinoma (HCC) – Suspected/Diagnosis****ONC-14.3: Hepatocellular Carcinoma (HCC) – Initial Work-up/Staging****ONC-14.4: Hepatocellular Carcinoma (HCC) – Restaging/Recurrence****ONC-14.5: Hepatocellular Carcinoma (HCC) – Surveillance/Follow-up****ONC-14.6: Gallbladder and Biliary Tumors – Initial Work-up/Staging****ONC-14.7: Gallbladder and Biliary Tumors – Restaging/Recurrence****ONC-14.8: Gallbladder and Biliary Tumors – Surveillance/Follow-up****ONC-14.9: Gastric Cancer – Initial Work-up/Staging****ONC-14.10: Gastric Cancer – Restaging/Recurrence****ONC-14.11: Gastric Cancer – Surveillance/Follow-up**

ONC-14.1: Hepatocellular Carcinoma (HCC) – General Considerations

- Diagnosis: A biopsy is not always required for the diagnosis of Hepatocellular carcinoma (HCC). A dedicated triple-phase CT or MRI may be obtained. MRI with contrast is the test of choice for the evaluation of liver masses and offers soft tissue contrast resolution superior to CT as well as the possibility of using two different contrast agents, one of which is more blood flow based and the other which also is blood flow based and demonstrates hepatobiliary function (Eovist). Classical imaging findings include:
 - ◆ Arterial phase hyperenhancement
 - ◆ Venous phase washout appearance
 - ◆ Capsule appearance
 - ◆ Threshold growth
- For patients who are high risk for developing HCC (cirrhosis, chronic Hepatitis B or current or prior HCC), if the liver lesion is > 1 cm with 2 classic enhancements on triple-phase CT or MRI, the diagnosis is confirmatory and biopsy is not needed.
- For lesions less than 1 cm or with less than 2 classical enhancements or for any liver lesions in patients who are not high risk, a biopsy is needed for histological confirmation.
- PET/CT scan is not indicated for diagnosis or staging of Hepatocellular carcinoma

ONC-14.2: Hepatocellular Carcinoma (HCC) – Suspected/Diagnosis

- See: **AB-26.1: Chronic Liver Disease, Cirrhosis and Screening for HCC**
- See: **AB-29.1: Liver Lesion Characterization**

ONC-14.3: Hepatocellular Carcinoma (HCC) – Initial Work-up/Staging

Indication	Imaging Study
All patients	◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) <u>One of the following:</u> ◆ CT Abdomen with contrast (CPT® 74160) ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ CT Abdomen and Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast

ONC-14.4: Hepatocellular Carcinoma (HCC) – Restaging/Recurrence

Indication	Imaging Study
<u>One of the following:</u> ◆ After initial therapy ◆ For suspected recurrence or new liver lesions ◆ Individuals receiving systemic therapy (every 2 cycles)	◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) <u>One of the following:</u> ◆ CT Abdomen with contrast (CPT® 74160) ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen/Pelvis without and with contrast (CPT® 74178) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Hepatocellular Carcinoma treated with embolization	◆ CTA Abdomen (CPT® 74175) can be approved immediately prior to embolization <u>One of the following, immediately prior to and 1 month post-ablation:</u> ◆ MRI Abdomen without and with contrast (CPT® 74183) ◆ CT Abdomen without and with contrast (CPT® 74170) See also: ONC-31.2 for imaging studies indicated prior to and post-embolization
Hepatocellular Carcinoma awaiting liver transplant	◆ See: AB-42.1: Liver Transplant, Pre-Transplant for imaging guidelines

ONC-14.5: Hepatocellular Carcinoma (HCC) – Surveillance/Follow-up

Indication	Imaging Study
Hepatocellular Carcinoma: ◆ Treated with surgical resection ◆ Treated with embolization ◆ Being monitored off therapy	<u>Every 3 months for 2 years, then annually:</u> ◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) <u>And ONE of the following:</u> ◆ CT Abdomen with contrast (CPT® 74160) ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ CT Abdomen and Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178) ◆ MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast
Hepatocellular Carcinoma treated with liver transplant	◆ See: <u>AB-42.3: Liver Transplant, Post-transplant</u>

ONC-14.6: Gallbladder and Biliary Tumors – Initial Work-up/Staging

Indication	Imaging Study
All patients	◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) <u>And one of the following:</u> ◆ CT Abdomen with contrast (CPT® 74160) ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ CT Abdomen and Pelvis with contrast (CPT® 74177) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-14.7: Gallbladder and Biliary Tumors – Restaging/Recurrence

Indication	Imaging Study
<u>Any of the following:</u> ◆ After initial therapy ◆ For suspected recurrence or new liver lesions ◆ Patients receiving systemic chemotherapy (every 2 cycles)	◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) <u>And one of the following:</u> ◆ CT Abdomen with contrast (CPT® 74160) ◆ CT Abdomen and Pelvis with contrast (CPT® 74177) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-14.8: Gallbladder and Biliary Tumors – Surveillance/Follow-up

Indication	Imaging Study
All patients	<u>Every 6 months for 2 years, and then annually up to year 5:</u> ◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) And ONE of the following: ◆ CT Abdomen with contrast (CPT® 74160) ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ CT Abdomen and Pelvis with contrast (CPT® 74177) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Biliary carcinoma treated with liver transplant	See: <u>AB-42.3: Liver Transplant, Post-transplant</u>

ONC-14.9: Gastric Cancer – Initial Work-up/Staging

Indication	Imaging Study
All patients	◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Gastric cancer ≥ T2 or higher with no metastatic disease by conventional imaging	◆ PET/CT (CPT® 78815)

ONC-14.10: Gastric Cancer – Restaging/Recurrence

Indication	Imaging Study
◆ After initial therapy for presumed surgically resectable disease ◆ Post curative chemoradiation being treated without surgery ◆ For suspected recurrence	◆ CT Chest (CPT® 71260) and ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Monitoring response to chemotherapy (every 2 cycles, ~every 6-8 weeks) for: ◆ Unresected primary disease ◆ Metastatic disease	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Chest with contrast (CPT® 71260) for: ■ New/worsening pulmonary symptoms ■ Abnormal chest x-ray findings ■ Known prior pulmonary involvement
New liver lesion(s) and primary site controlled	◆ CT Abdomen (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183)
Inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-14.11: Gastric Cancer – Surveillance/Follow-up

Indication	Imaging Study
Stage I (treated with resection alone)	No routine imaging unless clinical signs/symptoms of recurrence
<u>Any of the following:</u> - Stage I treated with systemic therapy - Stages II-III - Stage IV - Metastatic disease (post definitive treatment of all measurable disease or being observed off therapy)	CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) annually for 5 years
<u>Measurable metastatic disease on maintenance therapy or being monitored off therapy</u>	Every 3 months for up to 5 years after completion of active treatment: - CT Chest (CPT® 71260) - CT Abdomen/Pelvis with contrast (CPT® 74177)

References

1. Ajani JA, D'Amico TA, Bentrem DJ et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 4.2021 – August 3, 2021. Gastric cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/gastric.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Gastric cancer V4.2021– August 3, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Benson AB, D'Angelica MI, Abbot D et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2021 – June 15, 2021. Hepatobiliary cancers, available at: https://www.nccn.org/professionals/physician_gls/pdf/hepatobiliary.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hepatobiliary cancers, V3.2021 – June 15, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Vallböhmer D, Hölscher AH, Schnieder PM, et al. [18F]-fluorodeoxyglucose-positron emission tomography for the assessment of histopathologic response and prognosis after completion of neoadjuvant chemotherapy in gastric cancer. *J Surg Oncol*. 2010;102(2):135-140. doi:10.1002/jso.21592.
4. Zou H, Zhao Y. 18FDG PET-CT for detecting gastric cancer recurrence after surgical resection: a meta-analysis. *Surg Oncol*. 2013;22(3):162-166. doi:10.1016/j.suronc.2013.05.001.
5. Bridgewater J, Galle PR, Khan SA, et al. Guidelines for the diagnosis and management of intrahepatic cholangiocarcinoma. *J Hepatol*. 2014;60(6):1268-1289. doi:10.1016/j.jhep.2014.01.021.
6. Khan SA, Davidson BR, Goldin RD, et al. Guidelines for the diagnosis and treatment of cholangiocarcinoma: an update. *Gut*. 2012;61(12):1657-1669. doi:10.1136/gutjnl-2011-301748.
7. Benson AB 3rd, D'Angelica MI, Abrams TA, et al. Hepatobiliary cancers, version 2.2014. *J Natl Compr Canc Netw*. 2014;12(8):1152-1182.

ONC-15: Neuroendocrine Cancers and Adrenal Tumors

ONC-15.1: General Considerations

ONC-15.2: Gastrointestinal/Pancreatic Neuroendocrine Cancers – Suspected/Diagnosis

ONC-15.3: Gastrointestinal/Pancreatic Neuroendocrine Cancers – Initial Work-up/Staging

ONC-15.4: Gastrointestinal/Pancreatic Neuroendocrine Cancers – Restaging/Recurrence

ONC-15.5: Gastrointestinal/Pancreatic Neuroendocrine Cancers – Surveillance

ONC-15.6: Bronchopulmonary or Thymic Carcinoid – Initial Staging

ONC-15.7: Bronchopulmonary or Thymic Carcinoid – Restaging/Recurrence

ONC-15.8: Bronchopulmonary or Thymic Carcinoid – Surveillance

ONC-15.9: Adrenal Tumors – Suspected/Diagnosis

ONC-15.10: Adrenal Tumors – Initial Work-up/Staging

ONC-15.11: Adrenal Tumors – Restaging/Recurrence

ONC-15.12: Adrenal Tumors – Surveillance

ONC-15.13: Adrenocortical Carcinoma

ONC-15.1: General Considerations

This guideline includes low-grade or well-differentiated carcinoid and endocrine tumors of the lung, thymus, pancreas, gastrointestinal tract or unknown primary site; including insulinoma, glucagonoma, VIPoma, gastrinoma, somatostatinoma and others as well as catecholamine-secreting tumors of the adrenal gland such as pheochromocytoma, paraganglioma, adrenocortical carcinoma, and others.

- For poorly-differentiated or high-grade small cell or large cell neuroendocrine tumors arising outside the lung or from an unknown primary site see: **ONC-31.8: Extrathoracic Small Cell and Large Cell Neuroendocrine Tumors**
- For poorly-differentiated or high grade neuroendocrine tumors of the lung, refer to **ONC-7: Small Cell Lung Cancer**
- Neuroblastoma, ganglioneuroblastoma, and ganglioneuroma occurring in adults should be imaged according to **PEDONC-6: Neuroblastoma**
- Many are associated with Multiple Endocrine Neoplasia (MEN) familial syndromes. – See: **PEDONC-2.8: Multiple Endocrine Neoplasias (MEN)** for screening recommendations
- Somatostatin receptor-based imaging is more sensitive and specific for evaluation of well-differentiated neuroendocrine tumors and may be performed using ¹¹¹In DTPA Octreotide scintigraphy or PET/CT scan with SSR radiotracers (such as ⁶⁸Ga–DOTATATE, ⁶⁸Ga–DOTATOC, or ⁶⁴Cu–DOTATATE). This study is not part of evaluation of poorly-differentiated or high grade neuroendocrine tumors, which are imaged according to: **ONC-31.8: Extrathoracic Small Cell and Large Cell Neuroendocrine Tumors**

ONC-15.2: Gastrointestinal/Pancreatic Neuroendocrine Cancers – Suspected/Diagnosis

Indication	Imaging Study
◆ Systemic symptoms strongly suggestive of functioning neuroendocrine tumor ◆ Suspicious findings on other imaging studies ◆ <u>Unexplained elevation in any of the following:</u> ■ Chromogranin A ■ 5HIAA ■ Insulin ■ VIP ■ Glucagon ■ Gastrin ■ Substance P ■ Serotonin ■ Somatostatin	<u>Any or all of the following:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178) ■ If CT inconclusive, MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast is indicated ◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) ◆ CT with contrast or MRI without and with contrast of any other symptomatic body areas
◆ Continued suspicion with negative/inconclusive CT scan or MRI	<u>ONE of the following:</u> ◆ Octreotide scan (any one of the following): ■ CPT® 78802 (single day study - with add on CPT® 78803 or 78830) ■ CPT® 78804 (two day study - with add on CPT® 78831 or 78832) ◆ PET/CT scan (CPT® 78815) with any one of the following SSR radiotracers: ■ ⁶⁸Ga-DOTATATE ■ ⁶⁸Ga-DOTATOC ■ ⁶⁴Cu-DOTATATE

ONC-15.3: Gastrointestinal/Pancreatic Neuroendocrine Cancers – Initial Work-up/Staging

Indication	Imaging Study
Carcinoid, pancreatic neuroendocrine tumors	<u>If not already done:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178) ■ If CT inconclusive, MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast is indicated ◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250)
Inconclusive CT or MRI scans	<u>ONE of the following:</u> ◆ Octreotide scan (any one of the following): ■ CPT® 78802 (single day study - with add on CPT® 78803 or 78830) ■ CPT® 78804 (two day study - with add on CPT® 78831 or 78832) ◆ PET/CT scan (CPT® 78815) with any one of the following SSR radiotracers: ■ ⁶⁸Ga-DOTATATE ■ ⁶⁸Ga-DOTATOC ■ ⁶⁴Cu-DOTATATE
<u>Any of the following:</u> ◆ Markers fail to normalize after complete resection AND CT/MRI and somatostatin-receptor based study are negative ◆ Biopsy-proven neuroendocrine tumor of unknown primary site AND CT/MRI and somatostatin-receptor based study are negative	◆ FDG-PET/CT scan (CPT® 78815)

ONC-15.4: Gastrointestinal/Pancreatic Neuroendocrine Cancers – Restaging/Recurrence

Indication	Imaging Study
All after surgical resection	See: Surveillance below
Unresectable/metastatic disease on treatment with somatostatin analogues	CT of involved body area no more frequently than every 3 months
Unresectable/metastatic disease on treatment with chemotherapy	CT of involved body area every 2 cycles (6 to 8 weeks)
Progression of symptoms or elevation of tumor markers	- CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) <u>And ONE of the following:</u> - CT Abdomen/Pelvis with contrast (CPT® 74177) - CT Abdomen/Pelvis without and with contrast (CPT® 74178) - MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Continued suspicion for recurrence with negative or inconclusive CT scan or MRI	<u>ONE of the following:</u> - Octreotide scan (any one of the following): - CPT® 78802 (single day study - with add on CPT® 78803 or 78830) - CPT® 78804 (two day study - with add on CPT® 78831 or 78832) - PET/CT scan (CPT® 78815) with any one of the following SSR radiotracers: ⁶⁸Ga-DOTATATE ⁶⁸Ga-DOTATOC ⁶⁴Cu-DOTATATE
To assess candidacy for peptide receptor radionuclide therapy (PRRT) with Lutetium ¹⁷⁷ Lu-dotatate	<u>ONE of the following:</u> - Octreotide scan (any one of the following): - CPT® 78802 (single day study - with add on CPT® 78803 or 78830) - CPT® 78804 (two day study - with add on CPT® 78831 or 78832) - PET/CT scan (CPT® 78815) with any one of the following SSR radiotracers: ⁶⁸Ga-DOTATATE ⁶⁸Ga-DOTATOC ⁶⁴Cu-DOTATATE

ONC-15.5: Gastrointestinal/Pancreatic Neuroendocrine Cancers – Surveillance

Indication	Imaging Study
Any of the following: ◆ Appendix carcinoid ≤2 cm, completely resected ◆ Rectal carcinoid <1 cm, completely resected	◆ Advanced imaging is not routinely indicated for surveillance
Rectal carcinoid 1-2 cm, completely resected	◆ MRI Pelvis (CPT® 72197) without and with contrast once at 12 months post resection. If clear, no further surveillance imaging indicated
All other neuroendocrine tumors of the bowel (small/large)	◆ CT Abdomen/Pelvis (CPT® 74177) once at 3 to 12 months postoperatively and annually for 3 years and then every 2 years up to year 10
Neuroendocrine tumors of the upper abdomen (i.e., pancreas, stomach)	◆ CT Abdomen (CPT® 74160) once at 3 to 12 months postoperatively then annually for 3 years and then every 2 years up to year 10
Unresected primary tumors being monitored with observation alone	◆ CT Abdomen (CPT® 74160) once at 3 to 12 months from initial diagnosis then annually for 3 years and then every 2 years up to year 10
Measurable metastatic disease on maintenance treatment or off therapy	◆ CT of involved body area no more frequently than every 3 months

ONC-15.6: Bronchopulmonary or Thymic Carcinoid – Initial Staging

Indication	Imaging Study
Initial diagnosis	<u>If not already done:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen with contrast (CPT® 74160) or without and with contrast (CPT® 74170) ■ If CT inconclusive, MRI Abdomen (CPT® 74183) without and with contrast is indicated
Inconclusive CT or MRI scans	<u>ONE of the following:</u> ◆ Octreotide scan (any one of the following): ■ CPT® 78802 (single day study - with add on CPT® 78803 or 78830) ■ CPT® 78804 (two day study - with add on CPT® 78831 or 78832) ◆ PET/CT scan (CPT® 78815) with any one of the following SSR radiotracers: ■ ⁶⁸Ga-DOTATATE ■ ⁶⁸Ga-DOTATOC ■ ⁶⁴Cu-DOTATATE
<u>Any of the following:</u> ◆ Markers fail to normalize after complete resection AND CT/MRI and somatostatin-receptor based study are negative ◆ Biopsy-proven neuroendocrine tumor of unknown primary site AND CT/MRI and somatostatin-receptor based study are negative	◆ FDG-PET/CT scan (CPT® 78815)

ONC-15.7: Bronchopulmonary or Thymic Carcinoid – Restaging/Recurrence

Indication	Imaging Study
All after surgical resection	See: Surveillance below
Unresectable/metastatic disease on treatment with somatostatin analogues	CT of involved body area no more frequently than every 3 months
Unresectable/metastatic disease on treatment with chemotherapy	CT of involved body area every 2 cycles (6 to 8 weeks)
Progression of symptoms or elevation of tumor markers	- CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) <u>And ONE of the following:</u> - CT Abdomen/Pelvis with contrast (CPT® 74177) - CT Abdomen/Pelvis without and with contrast (CPT® 74178) - MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast
Continued suspicion for recurrence with negative or inconclusive CT scan or MRI	<u>ONE of the following:</u> - Octreotide scan (any one of the following): - CPT® 78802 (single day study - with add on CPT® 78803 or 78830) - CPT® 78804 (two day study - with add on CPT® 78831 or 78832) - PET/CT scan (CPT® 78815) with any one of the following SSR radiotracers: ⁶⁸Ga-DOTATATE ⁶⁸Ga-DOTATOC ⁶⁴Cu-DOTATATE

ONC-15.8: Bronchopulmonary or Thymic Carcinoid – Surveillance

Indication	Imaging Study
Carcinoid tumors of lung or thymus	◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) once at 3 to 12 months post resection and then annually for 3 years and then every 2 years up to year 10
Unresected primary tumors being monitored with observation alone	◆ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) once at 3 to 12 months from initial diagnosis then annually for 3 years and then every 2 years up to year 10
Measurable metastatic disease on maintenance treatment or off therapy	◆ CT of involved body area no more frequently than every 3 months

ONC-15.9: Adrenal Tumors – Suspected/Diagnosis

See: **AB-16.1: Adrenal Cortical Lesions** for imaging guidelines for evaluation of suspected adrenal malignancies

If concern for genetic predisposition syndrome such as MEN, neurofibromatosis, or Von Hippel-Lindau disease, see screening recommendations in **PEDONC-2: Screening Imaging and Cancer Predisposition Syndromes**.

ONC-15.10: Adrenal Tumors – Initial Work-up/Staging

Indication	Imaging Study
<u>For any of the following:</u> ◆ Pheochromocytoma ◆ Paraganglioma ◆ Paraganglioneuroma	<u>If not already done:</u> ◆ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) <u>And One of the following (if not already done):</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Abdomen/Pelvis without and with contrast (CPT® 74178) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast ◆ CT with contrast or MRI without and with contrast of any other symptomatic body areas
Continued suspicion with negative/inconclusive CT scan or MRI	<u>ONE of the following:</u> ◆ Octreotide scan (any one of the following): ■ CPT® 78802 (single day study - with add on CPT® 78803 or 78830) ■ CPT® 78804 (two day study - with add on CPT® 78831 or 78832) ◆ PET/CT scan (CPT® 78815) with any one of the following SSR radiotracers: ■ ⁶⁸Ga-DOTATATE ■ ⁶⁸Ga-DOTATOC ■ ⁶⁴Cu-DOTATATE
All above studies done and negative/inconclusive	◆ FDG-PET/CT scan (CPT® 78815)

ONC-15.11: Adrenal Tumors – Restaging/Recurrence

Indication	Imaging Study
If surgery is primary therapy	◆ CT Abdomen (CPT® 74160) one time within first year post resection then go to surveillance recommendations
Recurrence, progression of symptoms, or elevation of tumor markers	◆ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) <u>And ONE of the following:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Abdomen/Pelvis without and with contrast (CPT® 74178) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Continued suspicion for recurrence with negative or inconclusive CT scan or MRI	<u>ONE of the following:</u> ◆ Octreotide scan (any one of the following): ■ CPT® 78802 (single day study - with add on CPT® 78803 or 78830) ■ CPT® 78804 (two day study - with add on CPT® 78831 or 78832) ◆ PET/CT scan (CPT® 78815) with any one of the following SSR radiotracers: ■ ⁶⁸Ga-DOTATATE ■ ⁶⁸Ga-DOTATOC ■ ⁶⁴Cu-DOTATATE
All above studies done and negative/inconclusive	◆ FDG-PET/CT scan (CPT® 78815)

ONC-15.12: Adrenal Tumors – Surveillance

Indication	Imaging Study
All patients	◆ CT Abdomen with contrast (CPT® 74160) and CT of other involved body areas with contrast annually for 10 years
Measurable metastatic disease being observed off therapy or on maintenance treatment	◆ CT of involved body area no more frequently than every 3 months

ONC-15.13: Adrenocortical Carcinoma

Indication	Imaging Study
Initial Staging	◆ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) <u>And ONE of the following (if not already done):</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Abdomen/Pelvis without and with contrast (CPT® 74178) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Suspected recurrence	◆ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) <u>And ONE of the following:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Abdomen/Pelvis without and with contrast (CPT® 74178) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Surveillance after complete response to definitive treatment	◆ CT Abdomen with contrast (CPT® 74160) and CT of other involved body areas with contrast annually for 5 years
Measurable metastatic disease on maintenance therapy or being monitored off therapy	Every 3 months: ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of other involved body areas

References

1. Benson III AB, D'Angelica MI, Abbott DE, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – April 14, 2021. Neuroendocrine tumors, available at: https://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine tumors V1.2021 – April 14, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Qadan M, Ma Y, Visser BC, et al. Reassessment of the current American Joint Committee on Cancer staging system for pancreatic neuroendocrine tumors. *J Am Coll Surg*. 2014;218(2):188-195. doi:10.1016/j.jamcollsurg.2013.11.001.
3. Lenders JWM, Duh Q-Y, Eisenhofer G, et al. Pheochromocytoma and paraganglioma: an Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab*. 2014;99(6):1915-1942. doi:10.1210/jc.2014-1498.
4. Ruys AT, Bennink RJ, van Westreenen HL, et al. FDG-positron emission tomography/computed tomography and standardized uptake value in the primary diagnosis and staging of hilar cholangiocarcinoma. *HPB (Oxford)*. 2011;13(4):256-262. doi: 10.1111/j.1477-2574.2010.00280.x.
5. Ter-Minassian M, Chan JA, Hooshmand SM, et al. Clinical presentation, recurrence, and survival in patients with neuroendocrine tumors: results from a prospective institutional database. *Endocr Relat Can*. 2013;20(2):187-196. doi:10.1530/ERC-12-0340.
6. Murray SE, Lloyd RV, Sippel RS, Chen H, Olthoff SC. Postoperative surveillance of small appendiceal carcinoid tumors. *Am J Surg*. 2014;207(3):342-345. doi:10.1016/j.amjsurg.2013.08.038.
7. Thakker RV, Newey PJ, Walls GV, et al. Clinical practice guidelines for multiple endocrine neoplasia type 1 (MEN1). *J Clin Endocrinol Metab*. 2012;97(9):2990-3011. doi:10.1210/jc.2012-1230.
8. Singh S, Moody L, Chan DL, et al. Follow-up recommendations for completely resected gastroenteropancreatic neuroendocrine tumors. *JAMA Oncol*. 2018;4(11):1597-1604. doi:10.1001/jamaoncol.2018.2428.

ONC-16: Colorectal and Small Bowel Cancer**ONC-16.0: Colorectal Cancer – General Considerations****ONC-16.1: Colorectal Cancer – Suspected/Diagnosis****ONC-16.2: Colorectal Cancer – Initial Work-up/Staging****ONC-16.3: Colorectal Cancer – Restaging/Recurrence****ONC-16.4: Colorectal Cancer – Surveillance/Follow-up****ONC-16.5: Small Bowel Cancer – Initial Work-up/Staging****ONC-16.6: Small Bowel Cancer – Restaging/Recurrence****ONC-16.7: Small Bowel Cancer – Surveillance/Follow-up**

ONC-16.0: Colorectal Cancer – General Considerations

- Neuroendocrine tumors of the bowel are covered in: **ONC-15: Neuroendocrine Cancers and Adrenal Tumors**
- Appendiceal adenocarcinoma (including pseudomyxoma peritonei) follows imaging guidelines for colorectal cancer
- For squamous cell carcinoma of the rectum, see: **ONC-24: Anal Carcinoma**

ONC-16.1: Colorectal Cancer – Suspected/Diagnosis

- See: **AB-22: GI Bleeding** or **AB-25.1: CT Colonography (CTC)** for imaging guidelines for evaluation of suspected colorectal malignancies
- See: **AB-13.3** for advanced imaging to evaluate **Abnormal Findings on Endoscopy/Colonoscopy**

ONC-16.2: Colorectal Cancer – Initial Work-up/Staging

Indication	Imaging Study
Carcinoma within a polyp that is completely removed	◆ No advanced imaging needed
Invasive adenocarcinoma	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast
◆ Further evaluation of an inconclusive liver lesion seen on CT ◆ Potentially resectable liver metastases	◆ MRI Abdomen without and with contrast (CPT® 74183)
Rectal adenocarcinoma	◆ MRI Pelvis without and with contrast (CPT® 72197) or MRI Pelvis without contrast (CPT® 72195)
Rectal adenocarcinoma with any one of the following: ◆ Rectal MRI is contraindicated ◆ Rectal MRI is inconclusive ◆ Superficial lesions	◆ <u>Endorectal ultrasound (CPT® 76872)</u>
One of the following: ◆ Isolated metastatic lesion(s) on other imaging and patient is a candidate for aggressive surgical resection or other localized treatment to metastasis for curative intent ◆ Inconclusive conventional imaging	◆ <u>PET/CT (CPT® 78815)</u>

ONC-16.3: Colorectal Cancer – Restaging/Recurrence

Indication	Imaging Study
- Complete resection - Individuals receiving post-operative adjuvant chemotherapy	See Surveillance below
Recurrence suspected	CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast
After completion of planned neoadjuvant therapy	<u>Prior to surgical resection in patients with non-metastatic rectal cancer:</u> - CT Chest (CPT® 71260) and Any one of the following: - CT Abdomen/Pelvis with contrast (CPT® 74177) - CT Abdomen with contrast (CPT® 74160) and MRI Pelvis without and with contrast (CPT® 72197)
Unresected primary disease or metastatic disease on chemotherapy	<u>Every 2 cycles of chemotherapy treatment and at the completion of chemoradiotherapy:</u> - CT Chest with contrast (CPT® 71260) - CT Abdomen/Pelvis with contrast (CPT® 74177) - CT with contrast of other involved or symptomatic areas
- Further evaluation of an inconclusive liver lesion seen on CT - Potentially resectable liver metastases	MRI Abdomen without and with contrast (CPT® 74183)
<u>One of the following:</u> - Postoperative elevated or rising CEA or LFTs with negative recent conventional imaging - Isolated metastatic lesion(s) on other imaging and patient is a candidate for aggressive surgical resection or other localized treatment to metastasis for curative intent - Differentiate local tumor recurrence from postoperative and/or post-radiation scarring	PET/CT (CPT® 78815)
New or worsening pelvic pain and recent CT imaging negative or inconclusive	MRI Pelvis without and with contrast (CPT® 72197)

ONC-16.4: Colorectal Cancer – Surveillance/Follow-up

Indication	Imaging/Lab Study
<u>Colon and rectal adenocarcinoma:</u> ◆ Stage I	◆ No routine advanced imaging indicated
<u>Colon and rectal adenocarcinoma:</u> ◆ Stage II-III	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast after completion of surgery and then annually for 5 years
<u>Colon and rectal adenocarcinoma:</u> ◆ Stage IV or distant metastatic disease (post definitive treatment of all measurable disease or being observed off therapy)	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 6 months for 2 years and then annually for 3 years
Rectal cancer treated with transanal excision alone	◆ Endorectal ultrasound (CPT® 76872) every 6 months for 5 years ◆ MRI Pelvis without and with contrast (CPT® 72197) may be obtained for: ■ Abnormal findings on ultrasound ■ Endorectal ultrasound is not feasible ■ New signs/symptoms concerning for local recurrence
Stage II-III rectal cancer treated with chemoradiation alone (no surgical treatment)	In addition to the above stage-specific surveillance: ◆ MRI Pelvis (CPT® 72197) without and with contrast every 6 months for 2 years
Pseudomyxoma peritonei	<u>One of each of the following, every 3 months for first year, then every 6 months for 4 more years:</u> ◆ CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast

ONC-16.5: Small Bowel Cancer – Initial Work-up/Staging

This section provides imaging guidelines for small bowel adenocarcinoma arising from the duodenum, jejunum, and ileum.

Indication	Imaging/Lab Study
Carcinoma within a polyp that is completely removed	◆ No advanced imaging needed
Invasive adenocarcinoma	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ■ MRI Abdomen without and with contrast (CPT® 74183) and MRI Pelvis without and with contrast (CPT® 72197) if CT is inconclusive or cannot be performed

ONC-16.6: Small Bowel Cancer – Restaging/Recurrence

Indication	Imaging Study
Complete resection	◆ See Surveillance below
Recurrence suspected	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast
Unresected primary disease or metastatic disease on chemotherapy	Every 2 cycles of chemotherapy: ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Further evaluation of an inconclusive liver lesion seen on CT	◆ MRI Abdomen without and with contrast (CPT® 74183)
One of the following: ◆ Postoperative elevated or rising CEA or LFTs with negative recent conventional imaging ◆ Isolated metastatic lesion(s) on other imaging and patient is a candidate for aggressive surgical resection or other localized treatment to metastasis for curative intent	◆ PET/CT (CPT® 78815)

ONC-16.7: Small Bowel Cancer – Surveillance/Follow-up

Indication	Imaging/Lab Study
Stage I-III	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast after completion of surgery, and then annually for 5 years
Stage IV - Metastatic disease (post definitive treatment of all measurable disease, or being observed off therapy)	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 6 months for 2 years and then annually for 3 years

References

1. Benson AB, Venook AP, Al-Hawary MM, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – January 21, 2021. Colon cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/colon.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Colon cancer V2.2021 – January 21, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Benson AB, Venook AP, Al-Hawary MM, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – December 22, 2020. Rectal cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Rectal cancer V1.2021 – December 22, 2020. ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Benson AB, Venook AP, Al-Hawary MM, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – February 16, 2021. Small Bowel Adenocarcinoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/small_bowel.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Small Bowel Adenocarcinoma V1.2021 – February 16, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
4. ACR Appropriateness Criteria. Pretreatment Staging of Colorectal Cancer. Rev. 2011.
5. Bailey CE, Hu C-Y, You YN et al. Variation in positron emission tomography use after colon cancer resection. *J Oncol Pract*. 2015;11(3):e363-e372. doi:10.1200/JOP.2014.001933.
6. Lu YY, Chen JH, Ding HJ, Chien CR, Lin WY, Kao CH. A systematic review and meta-analysis of pretherapeutic lymph node staging of colorectal cancer by 18F-FDG PET or PET/CT. *Nucl Med commun*. 2012;33(11):1127-1133. doi:10.1097/MNM0b013e328357b2d9.
7. Moulton CA, Gu CS, Law CH, et al. Effect of PET before liver resection on surgical management for colorectal adenocarcinoma metastases: a randomized clinical trial. *JAMA*. 2014;311(18):1863-1869. doi:10.1001/jama.2014.3740.
8. Steele SR, Chang GJ, Hendren S, et al. Practice guideline for the surveillance of patients after curative treatment of colon and rectal cancer. *Dis Colon Rectum*. 2015;58(8):713-725. doi:10.1097/DCR.0000000000000410.
9. van de Velde CJ, Boelens PG, Borrás JM, et al. EURECCA colorectal: multidisciplinary management: European consensus conference colon & rectum. *Eur J Cancer*. 2014;50(1):e1-e34. doi:10.1016/j.ejca.2013.06.048.
10. Akce M, El-Rayes BF. Nonsurgical management of rectal cancer. *Journal of Oncology Practice*. 2019;15(3):123-131. doi:10.1200/JOP.18.00769.

ONC-17: Renal Cell Cancer (RCC)**ONC-17.0: Renal Cell Cancer (RCC) – General Considerations****ONC-17.1: Renal Cell Cancer (RCC) – Suspected/Diagnosis****ONC-17.2: Renal Cell Cancer (RCC) – Initial Work-up/Staging****ONC-17.3: Renal Cell Cancer (RCC) – Restaging/Recurrence****ONC-17.4: Renal Cell Cancer (RCC) – Surveillance**

ONC-17.0: Renal Cell Cancer (RCC) – General Considerations

- PET is not routinely indicated for initial diagnosis, staging or restaging of renal cell cancer.
- A minority of adult patients with renal cell cancer (RCC) will have translocations in TFE3 or TFEB, which have a different natural history than “adult type” RCC. Patients of any age with TFE3 or TFEB translocated RCC should be imaged according to guidelines in **PEDONC-7.4: Pediatric Renal Cell Carcinoma (RCC)**.
- Patients of any age with Wilms tumor should be imaged according to guidelines in section **PEDONC-7.2: Unilateral Wilms Tumor (UWT)** or **PEDONC-7.3: Bilateral Wilms Tumor (BWT)**.

ONC-17.1: Renal Cell Cancer (RCC) – Suspected/Diagnosis

Indication	Imaging Study
◆ Solitary renal mass suspicious for renal cell cancer	◆ See: AB-35.1: Indeterminate Renal Lesion for imaging guidelines for evaluation of suspected renal malignancies ◆ Chest x-ray ◆ CT chest with contrast with (CPT® 71260) or without contrast (CPT® 71250) may be obtained for one of the following: ■ New chest x-ray abnormalities ■ Pulmonary signs/symptoms ■ Histologically confirmed renal cell cancer

ONC-17.2: Renal Cell Cancer (RCC) – Initial Work-up/Staging

Indication	Imaging Study
All patients	<u>If not done previously:</u> ♦ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) ♦ CT Abdomen/Pelvis, contrast as requested
<u>Any of the following:</u> ♦ Extension of tumor into the vena cava by other imaging ♦ Inconclusive findings on CT	♦ MRI Abdomen without and with contrast (CPT® 74183)
Bone pain	♦ Bone scan (See: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>)
Signs/symptoms suspicious for brain metastases	♦ MRI Brain without and with contrast (CPT® 70553)

ONC-17.3: Renal Cell Cancer (RCC) – Restaging/Recurrence

Indication	Imaging Study
Unresectable disease or metastatic disease on systemic therapy	<u>Every 2 cycles of treatment (commonly every 6 to 8 weeks):</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of other involved or symptomatic areas
Recurrence suspected	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)

ONC-17.4: Renal Cell Cancer (RCC) – Surveillance

Indication	Imaging Study
Stage I RCC, on active surveillance of renal mass <1 cm	<u>One of the following, once within 6 months of surveillance initiation and annually thereafter:</u> ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ MRI Abdomen without and with contrast (CPT® 74183) ◆ Also see: <u>AB-35.1: Indeterminate Renal Lesion</u> ◆ Chest x-ray (in addition to abdominal imaging) ■ CT Chest with contrast (CPT® 71260) or without contrast (CPT® 71250) may be obtained for one of the following: ▪ New chest x-ray abnormalities ▪ Pulmonary signs/symptoms
Stage I RCC, on active surveillance of renal mass ≥1 cm	<u>One of the following, every 3 months for year 1, every 6 months for years 2 and 3 and annually thereafter:</u> ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ MRI Abdomen without and with contrast (CPT® 74183) ◆ Chest x-ray (in addition to abdominal imaging) ■ CT Chest with contrast (CPT® 71260) or without contrast (CPT® 71250) may be obtained for one of the following: ▪ New chest x-ray abnormalities ▪ Pulmonary signs/symptoms
Follow up after post-ablation therapy of RCC	<u>One of the following, at 1 to 6 months post-ablation and then annually for 5 years:</u> ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ MRI Abdomen without and with contrast (CPT® 74183) ◆ Chest x-ray (in addition to abdominal imaging) ■ CT Chest with contrast (CPT® 71260) or without contrast (CPT® 71250) may be obtained for one of the following: ▪ New chest x-ray abnormalities ▪ Pulmonary signs/symptoms
Stage I RCC, after partial or radical nephrectomy	<u>One of each of the following, 3 to 12 months post-resection:</u> ◆ CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250) ◆ CT Abdomen with (CPT® 74160) or CT Abdomen without contrast (CPT® 74150) or MRI Abdomen without and with contrast (CPT® 74183) <u>Annually for 3 years:</u> ◆ Chest x-ray or CT Chest with (CPT® 71260) or CT Chest without (CPT® 71250) contrast ◆ Abdominal imaging with any ONE of the following: ■ Abdominal ultrasound (CPT® 76770 or CPT® 76700) ■ CT Abdomen with (CPT® 74160) or CT Abdomen without (CPT® 74150) contrast ■ MRI Abdomen without and with contrast (CPT® 74183)

Indication	Imaging Study
Stage II RCC, post-nephrectomy	<u>One of each of the following, 3 to 6 months post-resection:</u> ◆ CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250) ◆ CT Abdomen with (CPT® 74160) or CT Abdomen without (CPT® 74150) contrast or MRI Abdomen without and with contrast (CPT® 74183) <u>One of each of the following, every 6 months for 3 years, then annually to year 5:</u> ◆ Chest x-ray or CT Chest with (CPT® 71260) or CT Chest without (CPT® 71250) contrast ◆ Abdominal imaging with any ONE of the following: ■ Abdominal ultrasound (CPT® 76770 or CPT® 76700) ■ CT Abdomen with (CPT® 74160) or CT Abdomen without (CPT® 74150) contrast ■ MRI Abdomen without and with contrast (CPT® 74183)
Stage III RCC, post-nephrectomy	<u>One of each of the following, 3 to 6 months post-resection:</u> ◆ CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250) ◆ CT Abdomen with (CPT® 74160) or CT Abdomen without contrast (CPT® 74150) or MRI Abdomen without and with contrast (CPT® 74183) <u>One of each of the following, every 3 months for 3 years, then annually to year 5:</u> ◆ CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250) ◆ CT Abdomen with (CPT® 74160) or CT Abdomen without contrast (CPT® 74150) or MRI Abdomen without and with contrast (CPT® 74183)
Stage IV/metastatic disease on maintenance therapy or being observed off therapy	<u>Every 3 months for up to 5 years after completion of active treatment:</u> ◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast

References

1. Motzer RJ, Jonasch E, Agarwal N, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2022 – July 1, 2021. Kidney cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/kidney.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Kidney cancer V1.2022 – July 1, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. ACR Appropriateness Criteria. *Post-treatment follow up of renal cell carcinoma*. Rev. 2013.
3. Herts BR, Silverman SG, Hindman NM, et al. *Management of the incidental renal mass on CT: a white paper of the ACR incidental findings committee*. J Am Coll Radiol. 2018;15(2):264-273. doi:10.1016/j.jacr.2017.04.028.
4. Finelli A, Ismaila N, Bro B, et al. Management of small renal masses. American Society of Clinical Oncology clinical practice guideline. *Journal of Clinical Oncology*. 2017;35(6):668-680. doi:10.1200/JCO.2016.69.9645.
5. Davenport MS, Caoili EM, Cohan RH, et al. MRI and CT characteristics of successfully ablated renal masses: imaging surveillance after radiofrequency ablation. *AJR Am J Roentgenol*. 2009;192:1571-1578. doi:10.2214/AJR.08.1303.
6. Clark TW, Millward SF, Gervais DA, et al. Reporting standards for percutaneous thermal ablation of renal cell carcinoma. *J Vasc Interv Radiol*. 2009;20(7 Suppl):S409-S416. doi:10.1016/j.jvir.2009.04.013.
7. Rais-Bahrami S, Guzzo TJ, Jarrett TW, Kavoussi LR, Allaf ME. Incidentally discovered renal masses: oncological and perioperative outcomes in patients with delayed surgical intervention. *BJU Int*. 2009;103(10):1355-1358. doi:10.1111/j.1464-410X.2008.08242.x.
8. Wang HY, Ding HJ, Chen JH, Chao CH, Lu YY, Lin WY, Kao CH. Meta-analysis of the diagnostic performance of [18F]FDG-PET and PET/CT in renal cell carcinoma. *Cancer Imaging*. 2012 October;12:464-474. doi:10.1102/1470-7330.2012.0042.
9. Kim EH, Strobe SA. Postoperative surveillance imaging for patients undergoing nephrectomy for renal cell carcinoma. *Urol Oncol*. 2015;33(12):499-502. doi:10.1016/j.urolonc.2015.08.008.
10. Sankineni S, Brown A, Cieciera M, Choyke PL, Turkbey B. Imaging of renal cell carcinoma. *Urol Oncol*. 2016;34(3):147-155. doi:10.1016/j.urolonc.2015.05.020.
11. ACR Appropriateness Criteria. *Renal cell carcinoma staging*. Rev. 2015.
12. Campbell S, Uzzo R, Allaf M, et al. Renal mass and localized renal cancer: AUA guideline. *J Urol*. 2017;198(3):520-529. doi:10.1016/j.juro.2017.04.100.

ONC-18: Transitional Cell Cancer**ONC-18.0: Transitional Cell Cancer – General Considerations****ONC-18.1: Transitional Cell Cancer – Suspected/Diagnosis****ONC-18.2: Transitional Cell Cancer – Initial Work-up/Staging****ONC-18.3: Transitional Cell Cancer – Restaging/Recurrence****ONC-18.4: Transitional Cell Cancer – Surveillance/Follow-up**

ONC-18.0: Transitional Cell Cancer – General Considerations

- Transitional cell cancers can include: tumors of the bladder, ureters, prostate, urethra, or renal pelvis. For primary cancer of the kidney, see: **ONC-17: Renal Cell Cancer (RCC)**.
- Most common histology of bladder cancer is transitional cell (TCC) or urothelial carcinoma (UCC). Rare histologies include squamous cell (imaged according to **ONC-18: Transitional Cell Cancer**) or small cell (imaged according to **ONC-31.8: Extrathoracic Small Cell and Large Cell**)
- Urachal cancer is rare type of bladder cancer; the most common histology is adenocarcinoma. These are imaged according to muscle invasive bladder cancer.
- PET not routinely indicated in transitional cell cancer with exception noted below in **ONC-18.2: Transitional Cell Cancer – Initial Work-up/Staging**

ONC-18.1: Transitional Cell Cancer – Suspected/Diagnosis

See: **AB-39: Hematuria and Hydronephrosis** for imaging guidelines for evaluation of suspected transitional cell malignancies

ONC-18.2: Transitional Cell Cancer – Initial Work-up/Staging

Indication	Imaging Study
All patients	<u>One of the following:</u> ◆ CT Abdomen/Pelvis without and with contrast (CPT® 74178) ■ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast if contraindication to CT contrast ◆ CT Abdomen/Pelvis without contrast (CPT® 74176) with retrograde pyelogram or renal ultrasound (CPT® 76770 or CPT® 76775) in patients who cannot receive either CT or MRI contrast
<u>Any of the following:</u> ◆ Muscle invasive bladder carcinoma ◆ Urethral carcinoma ◆ Urothelial carcinoma of the prostate	◆ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260)
Patients without metastatic disease, when requested by operating surgeon for operative planning	◆ CT with contrast or MRI without and with contrast of all operative sites
To evaluate inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-18.3: Transitional Cell Cancer – Restaging/Recurrence

Indication	Imaging Study
After definitive surgery	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen/Pelvis without and with contrast (CPT® 74178) for post-operative baseline
Recurrence suspicion	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or with and without contrast (CPT® 74178) ◆ CT Chest with contrast (CPT® 71260) for any of the following: ■ Signs/symptoms of pulmonary disease ■ Abnormal chest x-ray ■ Prior involvement of the chest
After neoadjuvant therapy and before resection	◆ CT Chest with contrast (CPT® 71260) and CT Urogram (CPT® 74178)
Monitoring therapy for metastatic disease	<u>Every 2 cycles of therapy:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Chest with contrast (CPT® 71260) for any of the following: ■ Signs/symptoms of pulmonary disease ■ Abnormal chest x-ray ■ Prior involvement of the chest
To evaluate inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-18.4: Transitional Cell Cancer – Surveillance/Follow-up

Indication	Imaging Study
Any of the following: ◆ Low grade lesions ◆ High grade Ta lesion ≤ 3 cm ◆ Papillary urothelial neoplasm of low malignant potential	◆ Advanced imaging is not routinely indicated for surveillance
Any of the following High-Risk non-muscle invasive transitional cell carcinoma of the bladder or upper tracts: ◆ Multifocal high grade lesions ◆ High grade lesions >3 cm ◆ Superficial and minimally invasive (Tis and T1) ◆ BCG unresponsive ◆ Lymphovascular invasion ◆ Prostatic urethral invasion	◆ CT Urogram (CPT® 74178) every 2 years for 10 years ■ MR Urogram (CPT® 74183 and CPT® 72197) may be obtained for renal insufficiency or CT dye allergy
Non-muscle-invasive transitional carcinoma of the bladder treated with cystectomy	◆ CT urogram (CPT® 74178) at 3 and 12 months post-cystectomy, and then annually for years 2-5 ■ MR Urogram (CPT® 74183 and CPT® 72197) may be obtained for renal insufficiency or CT dye allergy
Muscle invasive lower and upper genitourinary tumors treated with cystectomy or chemoradiation	Every 6 months for 2 years, then annually for 3 more years: ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178) OR ◆ MR Urogram (CPT® 74183 and CPT® 72197) AND ◆ Chest x-ray ■ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) if abnormal signs/symptoms of pulmonary disease or abnormal chest x-ray
Measurable metastatic disease on maintenance therapy or being monitored off therapy	Every 3 months for up to 5 years after completion of active treatment: ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Urethral cancers (high risk T1 or greater) and urothelial carcinoma of the prostate	Every 6 months for 2 years, then annually: ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178) OR ◆ MR Urogram (CPT® 74183 and CPT® 72197)

	AND ◆ Chest x-ray ■ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) if abnormal signs/symptoms of pulmonary disease or abnormal chest x-ray
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References

1. Flaig TW, Spiess PE, Agarwal N, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 4.2021 – July 27, 2021. Bladder cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/bladder.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bladder cancer V4.2021 – July 27, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Verma S, Rajesh A, Prasad SR et al, Urinary bladder cancer: role of MR imaging. *Radiographics*. 2012;32(2):371-387. doi:10.1148/rg.322115125.
3. Lu YY, Chen JH, Liang JA. Clinical value of FDG PET or PET/CT in urinary bladder cancer: a systematic review and meta-analysis. *Eur J Radiol*. 2012;81(9):2411-2416. doi:10.1016/j.ejrad.2011.07.018.
4. Witjes JA, Comperat E, Cowan NC, et al. EAU guidelines on muscle-invasive and metastatic bladder cancer: summary of the 2013 guidelines. *Eur Urol*. 2014;65(4):778-792. doi:10.1016/j.eururo.2013.11.046.
5. Gakis G, Witjes JA, Comperat E, et al. EAU guidelines on primary urethral carcinoma. *Eur Urol*. 2013;64(5):823-830. doi:10.1016/j.eururo.2013.03.044.
6. Rouprêt M, Babjuk M, Compérat E, et al. European guidelines on upper tract urothelial carcinomas: 2013 update. *Eur Urol*. 2013;63(6):1059-1071. doi:10.1016/j.eururo.2013.03.032.

ONC-19: Prostate Cancer

ONC-19.0: Prostate Cancer – General Considerations

ONC-19.1: Suspected Prostate Cancer

ONC-19.2: Prostate Cancer – Initial Work-up/Staging

ONC-19.3: Prostate Cancer – Restaging/Recurrence

ONC-19.4: Prostate Cancer – Follow-up On Active Surveillance

ONC-19.5: Surveillance/Follow-up For Treated Prostate Cancer

ONC-19.0: Prostate Cancer – General Considerations

- The natural history of prostate cancer is highly variable. Therapeutic options may include surgery and radiation therapy along with Active Surveillance (also called expectant management or deferred treatment).
- Prostate cancer screening begins at age 45 for individuals at average risk of prostate cancer. However, individuals at high risk may begin screening at age 40. High risk features include:
 - ◆ African ancestry
 - ◆ Germline mutations (BRCA1 or 2, HOXB13, ATM, CHEK2, or mismatch repair genes - MLH1, MSH2, MSH6, PMS2) that increase the risk of prostate cancer
 - ◆ Family history of first or second-degree relative with prostate, male breast, colorectal, pancreatic, endometrial or female breast cancer at age <45 years.
- Individuals with high-risk adverse clinical and pathological factors may benefit from a more aggressive diagnostic and therapeutic approach at the time of relapse after initial treatment. These factors include pre-treatment Gleason score of ≥ 8 , pre-treatment clinical stage of cT3b or higher, positive surgical margins, post-treatment PSA doubling time of <3 months, and an interval to biochemical failure of <3 years after initial treatment.
- PET/CT scan using ^{18}F -FDG radiotracer are considered investigational and experimental for evaluation of prostate cancer.
- Several non-FDG radiotracers such as ^{11}C Choline, ^{18}F -Fluciclovine (AXUMIN®), ^{68}Ga PSMA-11, and ^{18}F Piflufolastat PSMA (Pylarify®) have recently gained FDA approval for evaluation of prostate cancer. Optimal detection rates for these radiotracers vary greatly with PSA levels. False positive rate is high and histological confirmation of positive sites is recommended. Coverage may vary with individual health care plan.
- While early detection of low-volume recurrence after treatment of prostate cancer using PET/CT scans may influence therapeutic decisions, there is lack of evidence that this approach has any meaningful impact on overall survival.
- As laser prostate ablation is considered investigational and experimental at this time, advanced imaging for treatment planning and/or surveillance of laser prostate ablation is not indicated.
- As high intensity focused ultrasound prostate ablation is considered investigational and experimental at this time, and advanced imaging for treatment planning and/or surveillance of high intensity focused ultrasound prostate ablation is not indicated.
- MR Spectroscopy (CPT® 76390) is considered investigational and experimental in the evaluation of prostate cancer at this time.

ISUP Prostate Cancer Grade Groups³⁰

Grade Group	Gleason Score	Gleason Pattern
1	≤ 6	$\leq 3+3$
2	7	3+4
3	7	4+3
4	8	4+4, 3+5, 5+3
5	9 or 10	4+5, 5+4, or 5+5

NCCN Initial Risk Stratification

- Very Low Risk
 - ◆ ALL of the following features are present:
 - Tumor not clinically palpable, but present on one or both lobes on biopsy (cT1a, cT1b, or cT1c)
 - PSA (ng/mL) <10
 - Gleason Grade Group = 1
 - <3 prostate biopsy cores positive, ≤50% cancer in each core
 - PSA Density <0.15 ng/mL/g
- Low Risk
 - ◆ ALL of the following features are present, but does not qualify for very low risk:
 - Clinical T Stage = cT1-cT2a (palpable tumor limited to ≤1/2 of one side)
 - PSA (ng/mL) <10
 - Gleason Grade Group = 1
- Favorable Intermediate Risk
 - ◆ ALL of the following features are present:
 - Gleason Grade Group = 1 or 2
 - <50% biopsy cores positive (e.g., <6 of 12 cores)
 - And only ONE of the following features is present:
 - Clinical T Stage = cT2b-cT2c (palpable disease confined to one or both lobes of the prostate)
 - PSA (ng/mL) = 10-20
- Unfavorable Intermediate Risk
 - ◆ ALL of the following features are present:
 - Clinical T Stage = cT2b-cT2c (palpable disease confined to one or both lobes of the prostate)
 - PSA (ng/mL) = 10-20
 - And at least ONE of the following features are present:
 - Gleason Grade Group = 2 or 3
 - ≥50% biopsy cores positive (e.g., ≥6 of 12 cores)
- High Risk
 - ◆ Only ONE of the following features is present:
 - Clinical T Stage = cT3a (unilateral or bilateral extra-prostatic extension that is not fixed and does not invade the seminal vesicles)
 - PSA (ng/mL) >20
 - Gleason Grade Group = 4 or 5
- Very High Risk
 - ◆ PSA (ng/mL) >20
 - ◆ And at least ONE of the following features is present:
 - Clinical T stage = cT3b-cT4 (extension into the seminal vesicles or invasion into adjacent structures)
 - Primary Gleason Pattern = 5
 - Gleason Grade Group = 4 or 5 in >4 cores

3D Rendering of MRI for MRI / Ultrasound Fusion Biopsy:

- When specific target lesion(s) is (are) detected on mpMRI prostate and classified as PIRADS 4 or 5, then 3D Rendering at independent workstation (CPT® 76377, 3D rendering requiring image post-processing on an independent workstation) for the radiologist to generate prostate segmentation data image set for target identification on MRI/TRUS fusion biopsy is approvable either as subsequent separate standalone request or as retrospective request for medical necessity.
- If there is no target lesion identified on MRI then 3D rendering and MRI/TRUS fusion biopsy is not generally indicated. The urologist may request MRI/TRUS fusion biopsy of a PIRADS 1-3 lesion. Then approval of 3D rendering at independent workstation (CPT® 76376 or CPT® 76377) can be considered on a case-by-case basis.
- The 3D rendering for the TRUS component of the fusion is a part of the UroNav Fusion Equipment Software and an additional 3D code CPT® 76376 or CPT® 76377 should not be approved.

ONC-19.1: Suspected Prostate Cancer

Indication	Imaging Study
<u>Any of the following:</u> ◆ Age 40-75 years with PSA >3 ng/ml or very suspicious DRE and ONE of the following high risk features: ■ African ancestry ■ Germline mutations that increase the risk of prostate cancer ■ Family history of first or second-degree relative with prostate, male breast, colorectal, pancreatic, endometrial or female breast cancer at age <45 years ◆ Age 45-75 years and ONE of the following: ■ PSA >3 ng/ml ■ Very suspicious DRE ◆ Age >75 years and ONE of the following: ■ PSA ≥4 ng/ml ■ Very suspicious DRE ◆ At least one negative/non-diagnostic TRUS biopsy and any of the following: ■ Rising PSA ■ Abnormal DRE ■ Need for confirmatory MR/US fusion biopsy	<u>Any of the following:</u> ◆ Transrectal ultrasound (CPT® 76872) ◆ TRUS-guided biopsy (CPT® 76942) ◆ MRI Pelvis without and with contrast (CPT® 72197) or MRI Pelvis without contrast (CPT® 72195) may be performed if an MR/US guided fusion biopsy is feasible/planned at the requesting facility ◆ MRI/US fusion biopsy (CPT® 76942)
◆ PIRADS 4 or 5 lesion identified on recent diagnostic MRI Pelvis (CPT® 72195 or CPT® 72197) and planning for biopsy to be done by MRI/TRUS fusion technique	◆ 3D Rendering (CPT® 76376 or 76377)
<u>Any of the following:</u> ◆ Multifocal (3 or more lesions) high-grade prostatic intraepithelial neoplasia (PIN) ◆ Atypia on biopsy	◆ Extended pattern rebiopsy within 6 months by TRUS-guided biopsy (CPT® 76942)
◆ Focal PIN (1-2 lesions)	<u>One of the following may be approved:</u> ◆ MRI Pelvis without contrast (CPT® 72195) ◆ MRI Pelvis without and with contrast (CPT® 72197) ◆ MRI/US fusion biopsy (CPT® 76942) ◆ MRI guided biopsy (CPT® 77021)

ONC-19.2: Prostate Cancer – Initial Work-up/Staging

Indication	Imaging Study
Localized prostate cancer with any of the following risk groups (see: ONC-19.0 for definition of risk groups): ◆ Very low risk ◆ Low risk ◆ Favorable intermediate risk	Advanced imaging is not routinely indicated for initial staging If not already performed prior to biopsy, MRI Pelvis without and with contrast (CPT® 72197) is appropriate for any of the following: ◆ Prior to planned treatment (surgery and/or radiation therapy) ◆ To establish candidacy for active surveillance
Localized prostate cancer with any of the following risk groups (see: ONC-19.0 for definition of risk groups): ◆ Unfavorable intermediate risk ◆ High risk ◆ Very high risk	<u>Any ONE of the following combinations, not all:</u> ◆ CT Chest with contrast (CPT® 71260), CT Abdomen/Pelvis with contrast (CPT® 74177), and Bone scan ◆ CT Chest with contrast (CPT® 71260), CT Abdomen with contrast (CPT® 74160), MRI Pelvis without and with contrast (CPT® 72197), and Bone scan ◆ PET/CT scan (CPT® 78815 or CPT® 78816) using any one of the following radiotracers: ■ ⁶⁸Ga-PSMA-11 ■ ¹⁸F Piflufolastat PSMA
Known or clinically suspected metastatic prostate cancer (including prior to prostate biopsy)	CT Chest with contrast (CPT® 71260), CT Abdomen/Pelvis with contrast (CPT® 74177), and Bone scan
Inconclusive bone scan	CT with contrast or MRI without and with contrast of involved body site
For any of the following: ◆ Inconclusive bone findings on both CT/MRI and bone scan ◆ Conventional imaging studies (CT and bone scan) suggests oligo- or low volume metastatic disease that need further confirmation	◆ PET/CT scan (CPT® 78815 or CPT® 78816) using any one of the following radiotracers: ■ ¹⁸F Fluciclovine ■ ¹¹C Choline ■ ⁶⁸Ga-PSMA-11 ■ ¹⁸F Piflufolastat PSMA PET/CT scan is not indicated if conventional imaging studies suggest widespread metastatic disease

ONC-19.3: Prostate Cancer – Restaging/Recurrence

Indication	Imaging Study
<u>For any of the following:</u> ◆ Obvious progression by DRE with plans for prostatectomy or radiation therapy ◆ Repeat TRUS biopsy for rising PSA shows progression to a higher Gleason's score with plans for prostatectomy or radiation therapy ◆ Inconclusive findings on CT scan	◆ MRI Pelvis without and with contrast (CPT® 72197)
Non-metastatic prostate cancer previously treated with prostatectomy, radiation therapy, ablation, hormonal therapy or chemotherapy and any one of the following: ◆ Clinical suspicion of relapse/recurrence ◆ PSA fails to become undetectable post prostatectomy ◆ Palpable anastomotic recurrence ◆ PSA rises above post-treatment baseline to >0.2 ng/mL but <0.5 ng/mL on two consecutive measurements	<u>Any ONE of the following combinations:</u> ◆ CT Chest with contrast (CPT® 71260), CT Abdomen/Pelvis with contrast (CPT® 74177), and Bone scan ◆ CT Chest with contrast (CPT® 71260), CT Abdomen with contrast (CPT® 74160), MRI Pelvis without and with contrast (CPT® 72197), and Bone scan
Non-metastatic prostate cancer previously treated with prostatectomy or radiation therapy, and all of the following are met: ◆ PSA rises on two consecutive measurements above post-treatment baseline and ◆ PSA ≥0.5 ng/mL and ◆ Individual is a candidate for salvage local therapy	<u>Any ONE of the following combinations, not both:</u> ◆ CT Chest with contrast (CPT® 71260), CT Abdomen/Pelvis with contrast (CPT® 74177), and Bone scan ◆ CT Chest with contrast (CPT® 71260), CT Abdomen with contrast (CPT® 74160), MRI Pelvis without and with contrast (CPT® 72197), and Bone scan ◆ PET/CT scan (CPT® 78815 or CPT® 78816) using any one of the following radiotracers: ■ ⁶⁸Ga-PSMA-11 ■ ¹⁸F Piflufolastat PSMA
Non-metastatic prostate cancer previously treated with prostatectomy or radiation therapy, and all of the following are met: ◆ PSA rises on two consecutive measurements above post-treatment baseline and ◆ PSA ≥1 ng/mL and ◆ Recent CT scan and bone scan are negative for metastatic disease and ◆ Individual is a candidate for salvage local therapy	◆ PET/CT scan (CPT® 78815 or CPT® 78816) using any ONE of the following radiotracers: ■ ¹⁸F-Fluciclovine ■ ¹¹C Choline ■ ⁶⁸Ga-PSMA-11 ■ ¹⁸F Piflufolastat PSMA

Indication	Imaging Study
Metastatic prostate cancer receiving treatment with chemotherapy	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) and CT scan of any involved body part every 2 cycles (6 to 8 weeks) while on chemotherapy ◆ Bone scan may be obtained every 3-6 months
Metastatic prostate cancer receiving anti-androgen therapy	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) and CT scan of any involved body part every 3 months while on anti-androgen therapy ◆ Bone scan may be obtained every 3-6 months
Prior to start of Xofigo (Radium-223) therapy	◆ One time CT Chest/Abdomen/Pelvis with contrast (CPT® 71260 and CPT® 74177)
Inconclusive bone scan	◆ CT with contrast or MRI without and with contrast of involved body site
For any of the following: ◆ Inconclusive bone findings on both CT/MRI and bone scan ◆ Conventional imaging studies (CT and bone scan) suggests oligo- or low volume metastatic disease that needs further confirmation	◆ PET/CT scan (CPT® 78815 or CPT® 78816) using any one of the following radiotracers: ■ ¹⁸F Fluciclovine ■ ¹¹C Choline ■ ⁶⁸Ga-PSMA-11 ■ ¹⁸F Piflufolastat PSMA PET/CT scan is not indicated if conventional imaging studies suggest widespread metastatic disease

ONC-19.4: Prostate Cancer – Follow-up On Active Surveillance

Active surveillance is being increasingly utilized in prostate cancer. This therapeutic option involves regimented monitoring of an individual with known diagnosis of low risk prostate cancer for disease progression, without specific anticancer treatment. While being treated with active surveillance, an individual is generally considered a potential candidate for curative intent treatment approaches in the event that disease progression occurs.

It is important to distinguish active surveillance from watchful waiting (or observation), which is generally employed in patients with limited life expectancy. Watchful waiting involves cessation of routine monitoring and treatment is initiated only if symptoms develop.

Current active surveillance guidelines suggest the following protocol:

- PSA every 6 months
- Digital Rectal Exam (DRE) every 12 months
- Repeat prostate biopsy every 12 months
- Repeat mpMRI (CPT® 72195 or CPT® 72197) no more often than every 12 months

Indication	Imaging/Lab Study
Routine monitoring on active surveillance protocol	◆ MRI Pelvis without (CPT® 72195) or without and with contrast (CPT® 72197) at initiation of active surveillance, and every 12 months thereafter
For any of the following: ◆ Progression is suspected based on DRE changes or rising PSA and a recent TRUS biopsy was negative ◆ Repeat TRUS biopsy shows progression to a higher Gleason score	◆ MRI Pelvis without (CPT® 72195) or MRI Pelvis without and with contrast (CPT® 72197)

ONC-19.5: Surveillance/Follow-up For Treated Prostate Cancer

Indication	Imaging Study
Any of the following: ◆ Asymptomatic or stable chronic symptoms ◆ Stable DRE findings ◆ Stable PSA levels	◆ Advanced imaging is not routinely indicated for surveillance

References

- Schaeffer E, Srinivas S, Antonarakis ES, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2022 – September 10, 2021. Prostate cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/prostate.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Prostate cancer V1.2022 – September 10, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
- Carroll PR, Parsons JK, Box G, et al. National Comprehensive Cancer Network (NCCN) Guidelines V2.2021 – July 14, 2021 Prostate Cancer Early Detection available at: https://www.nccn.org/professionals/physician_gls/pdf/prostate_detection.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Prostate Cancer Early Detection V2.2021 – July 14, 2021 ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
- Jadvar H, Calais J, Fanti S, et al. Appropriate use criteria for prostate-specific membrane antigen PET imaging, Society for Nuclear Medicine and Molecular Imaging. <https://www.snm-ims.org/ClinicalPractice/content.aspx?ItemNumber=38657>.
- Hofman MS, Lawrentschuk N, Francis RJ, et al. Prostate-specific membrane antigen PET-CT in patients with high-risk prostate cancer before curative-intent surgery or radiotherapy (proPSMA): a prospective, randomised, multicentre study. *Lancet*. 2020;395(10231):1208-1216. doi:10.1016/S0140-6736(20)30314-7.
- Pienta KJ, Gorin MA, Rowe SP, et al. A phase 2/3 prospective multicenter study of the diagnostic accuracy of prostate specific membrane antigen PET/CT with ¹⁸F-DCFPyL in prostate cancer patients (OSPReY). *J Urol*. 2021;206(1):52-61. doi:10.1097/JU.0000000000001698.
- Artibani W, Porcaro AB, De Marco V, et al. Management of biochemical recurrence after primary curative treatment for prostate cancer: A review. *Urol Int*. 2018;100:251–262. doi:10.1159/000481438.
- Zumsteg ZS, Spratt DE, Romesser PB, et al. The natural history and predictors of outcome following biochemical relapse in the dose escalation era for prostate cancer patients undergoing definitive external beam radiotherapy. *Eur Urol*. 2015;67(6):1009-1016. doi:10.1016/j.eururo.2014.09.028.
- Trabulsi EJ, Rumble RB, Jadvar H, et al. Optimum imaging strategies for advanced prostate cancer: ASCO guideline. *J Clin Oncol*. 2020 Jan 15. doi:10.1200/JCO.19.02757 (Epub ahead of print).
- Andriole G, Siegel B, LOCATE Study Group. PD60-12 Sites of prostate cancer recurrence delineated with 18F-Fluciclovod positron emission tomography in patients with negative or equivocal conventional imaging. *Journal of Urology*. 2019;201(4):e1100-e1101. doi:10.1097/01.JU.0000557289.21741.20.
- ACR Appropriateness Criteria. Prostate cancer – pretreatment detection, surveillance, and staging. Rev. 2016.
- Schoots IG, Nieboer D, Giganti F, Moore CM, Bangma CH, Roobol MJ. Is magnetic resonance imaging-targeted biopsy a useful addition to systematic confirmatory biopsy in men on active surveillance for low risk prostate cancer? A systematic review and meta-analysis. *BJU Int*. 2018;122(6):946-958. doi:10.1111/bju.14358.
- Mullins J, Bodenkamp D, Landis P, et al. Multiparametric magnetic resonance imaging findings in men with low-risk prostate cancer followed by active surveillance. *BJU Int*. 2013;111(7):1037-1045. doi:10.1111/j.1464-410X.2012.11641.x.
- Sanda MG, Chen RC, Crispino T, et al. *AUA/ASTRO/SUO guidelines for clinically localized prostate cancer*. Linticum, MD: American Urological Association; 2017.
- Lu-Yao GL, Albertsen PC, Moore DF, et al. Outcomes of localized prostate cancer following conservative management. *JAMA*. 2009;302(11):1202-1209. doi:10.1001/jama.2009.1348.
- Chen RC, Rumble RB, Loblaw DA, et al. Active surveillance for the management of localized prostate cancer (Cancer Care Ontario guideline): American Society of Clinical Oncology clinical practice guideline endorsement. *J Clin Oncol*. 2016;34(18):2182-2190. doi:10.1200/JCO.2015.65.7759.
- Liu D, Lehmann HP, Frick KD, Carter HB. Active surveillance versus surgery for low risk prostate cancer: a clinical decision analysis. *J Urol*. 2012;187(4):1241-1246. doi:10.1016/j.juro.2011.12.015.
- Klotz L, Zhang L, Lam A, Nam R, Mamedov A, Loblaw A. Clinical results of long-term follow-up of a large, active surveillance cohort with localized prostate cancer. *J Clin Oncol*. 2010;28(1):126-131. doi:10.1200/JCO.2009.24.2180.
- Blomqvist L, Carlsson S, Gjerdtsson P, et al. Limited evidence for the use of imaging to detect prostate cancer: a systematic review. *Eur J Radiol*. 2014;83(9):1601–1606. doi:10.1016/j.ejrad.2014.06.028.
- Schoots IG, Petrides N, Giganti F, et al. Magnetic resonance imaging in active surveillance of prostate cancer: a systematic review. *Eur Urol*. 2015;67(4):627-636. doi:10.1016/j.eururo.2014.10.050.
- Quentin M, Blondin D, Arsov C, et al. Prospective evaluation of magnetic resonance imaging guided in-bore prostate biopsy versus systematic transrectal ultrasound guided prostate biopsy in biopsy naïve men with elevated prostate specific antigen. *J Urol*. 2014;192(5):1374-1379. doi:10.1016/j.juro.2014.05.090.
- Klotz L, Vesprini D, Sethukavalan P, et al. Long-term follow-up of a large active surveillance cohort of patients with prostate cancer. *J Clin Oncol*. 2015;33(3):272-277. doi:10.1200/JCO.2014.55.1192.

22. Cooperberg MR. Long-term active surveillance for prostate cancer: answers and questions. *J Clin Oncol*. 2015;33(3):238-240. doi:10.1200/JCO.2014.59.2329.
23. Risko R, Merdan S, Womble PR, et al. Clinical predictors and recommendations for staging CT scan among men with prostate cancer. *Urology*. 2014;84(6):1329-1334. doi:10.1016/j.urology.2014.07.051.
24. Heck MM, Souvatzoglou M, Retz M, et al. Prospective comparison of computed tomography, diffusion-weighted magnetic resonance imaging and [11C]choline positron emission tomography/computed tomography for preoperative lymph node staging in prostate cancer patients. *Eur J Nucl Med Mol Imaging*. 2014;41(4):694-701. doi:10.1007/s00259-013-2634-1.
25. Armstrong JM, Martin CR, Dechet C, et al. ¹⁸F-fluciclovine PET CT detection of biochemical recurrent prostate cancer at specific PSA thresholds after definitive treatment. *J Urol Onc*. 2020;38(7):636.e1-636.e6. doi:10.1016/j.urolonc.2020.03.021.
26. Baruch B, Lovrec P, Solanki A, et al. Fluorine 18 labeled fluciclovine PET/CT in clinical practice: factors affecting the rate of detection of recurrent prostate cancer. *AJR*. 2019;213(4):851-858. doi:10.2214/AJ.19.21153.
27. Marcus C, Butler P, Bagrodia A, et al. Fluorine-18-labeled fluciclovine PET/CT in primary and biochemical recurrent prostate cancer management. *AJR*. 2020:1-10. doi:10.2214/AJR.19.22404.
28. Trabulsi EJ, Rumble BR, Jadvar H, et al. Optimum imaging strategies for advanced prostate cancer: ASCO guideline. *J Clin Oncol*. 2020;38:1963-1996. doi:10.1200/JCO.19.02757.
29. Lowrance WT, Breau RH, Chou R, et al. Advanced Prostate Cancer: AUA/ASTRO/SUO Guideline PART I. *J Urol*. 2021;205:14.
30. Epstein JI, Egevad L, Amin MB, Delahunt B, Srigley JR, Humphrey PA. The 2014 International Society of Urological Pathology (ISUP) consensus conference on gleason grading of prostatic carcinoma: definition of grading patterns and proposal for a new grading system. *Am J Surg Pathol*. 2016;40(2):244-52. doi:10.1097/PAS.0000000000000530.

ONC-20: Testicular, Ovarian and Extragonadal Germ Cell Tumors

ONC-20.0: Testicular, Ovarian and Extragonadal Germ Cell Tumors – General Considerations

ONC-20.1: Testicular, Ovarian and Extragonadal Germ Cell Tumors – Initial Work-up/Staging

ONC-20.2: Testicular, Ovarian and Extragonadal Germ Cell Tumors – Restaging/Recurrence

ONC-20.3: Testicular, Ovarian and Extragonadal Germ Cell Tumors – Surveillance

ONC-20.0: Testicular, Ovarian and Extragenital Germ Cell Tumors – General Considerations

- This section applies to primary germ cell tumors occurring outside the central nervous system in patients age > 15 years at the time of initial diagnosis. Patients age ≤ 15 years at diagnosis should be imaged according to pediatric guidelines in: **PEDONC-10: Pediatric Germ Cell Tumors**
- These guidelines are for germ cell tumors of the testicle, ovary and extragenital sites as well as malignant sex cord stromal tumors (granulosa cell and Sertoli-Leydig cell tumors).
- Requests for imaging must state the histologic type of the cancer being evaluated.
- Classified as pure seminomas (dysgerminomas, 40%) or Non-seminomatous germ cell tumors (NSGCT, 60%).
 - ◆ Pure seminomas are defined as pure seminoma histology with a normal serum concentration of alpha fetoprotein (AFP). Seminomas with elevated AFP are by definition Mixed.
 - ◆ Required for TNM staging are the tumor marker levels indicated by “S” (TNMS)
 - ◆ Mixed tumors are treated as NSGCTs, as they tend to be more aggressive.
 - ◆ The NSGCT histologies include:
 - Yolk-Sac tumors
 - Immature (malignant) teratomas
 - Choriocarcinomas (< 1%)
 - Embryonal cell carcinomas (15% to 20%)
 - Endodermal Sinus Tumors (ovarian)
 - Combinations of all of the above (Mixed)
- MRI in place of CT scans to reduce risk of secondary malignancy is not supported by the peer-reviewed literature. CT scans are indicated for surveillance and are the preferred modality of imaging to assess for recurrence.
- PET/CT Scan is not indicated for evaluation of non-seminomatous germ cell tumors
- Active surveillance in testicular cancer refers to treatment with surgery (orchiectomy) alone without any additional post-operative treatment such as chemotherapy or radiotherapy

ONC-20.1: Testicular, Ovarian and Extragonadal Germ Cell Tumors – Initial Work-up/Staging

Indication	Imaging Study
Orchiectomy/oophorectomy is both diagnostic and therapeutic	<u>All patients, following orchiectomy or oophorectomy:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
<u>For any of the following:</u> ◆ Non-seminoma histology ◆ Ovarian germ cell tumor ◆ Abdominal lymphadenopathy noted on CT scan ◆ Abnormal CXR or signs/symptoms suggestive of chest involvement	◆ CT Chest with contrast (CPT® 71260)
Extragonadal Germ Cell Tumor	◆ CT Chest with contrast (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)

ONC-20.2: Testicular, Ovarian and Extragonadal Germ Cell Tumors – Restaging/Recurrence

Indication	Imaging Study
Treatment response for stage II-IV patients with measurable disease on CT	♦ CT with contrast of previously involved body areas every 2 cycles
Seminoma with residual mass > 3 cm after completion of chemotherapy	♦ PET/CT (CPT® 78815)
End of therapy evaluation for NSGCT post chemotherapy or post retroperitoneal lymph node dissection (RPLND)	♦ CT Abdomen/Pelvis with contrast (CPT® 74177)
Recurrence suspected, including increased tumor markers	♦ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ♦ Ultrasound (CPT® 76856 or CPT® 76857) of the remaining gonad if applicable
Unexplained pulmonary symptoms despite a negative CXR, or new findings on CXR	♦ CT Chest with contrast (CPT® 71260)
All others	♦ See Surveillance below

ONC-20.3: Testicular, Ovarian and Extragonadal Germ Cell Tumors – Surveillance

Indication	Imaging Study
Stage I Seminoma treated with orchiectomy alone (no radiotherapy or chemotherapy, also called active surveillance)	CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) at 3, 6 and 12 months post-orchiectomy, then every 6 months for years 2 and 3, and then annually until year 5
Stage I Seminoma treated with radiotherapy and/or chemotherapy	CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) annually for 3 years
Stage IIA and non-bulky Stage IIB Seminomas treated with radiotherapy or chemotherapy	CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) once at 3 months then once at 6 to 12 months after completion of therapy, then annually until year 3
Bulky Stage IIB, IIC, and III Seminomas treated with chemotherapy	<u>For patients with ≤ 3 cm residual mass:</u> - CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) every 4 months for 1 year, every 6 months for 1 year and then annually for 2 additional years <u>For patients with > 3 cm residual mass and negative PET scan:</u> - CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) at 6 and 12 months after completion of therapy, then annually until year 5 <u>For patients with thoracic disease:</u> - CT Chest with contrast (CPT® 71260) every 2 months for 1 year, then every 3 months for 1 year, then annually until year 5 after completion of therapy
Stage IA Non-Seminomatous germ cell tumors treated with orchiectomy alone (without risk factors)	CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) every 6 months for 2 years and then annually for year 3
Stage IB Non-Seminomatous germ cell tumors treated with orchiectomy alone (with risk factors – lymphovascular invasion or invasion into spermatic cord/scrotum)	CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) every 4 months for 1 year, then every 6 months for 2 years, then annually until year 4
Stage IA/IB Non-Seminomatous germ cell tumors treated with chemotherapy and/or primary RPLND	CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) annually for 2 years

Indication	Imaging Study
Stage II-III Non-Seminomatous germ cell tumors with complete response to chemotherapy +/- post-chemotherapy RPLND	- CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) once at 6, 12, 24 and 36 months after completion of therapy <u>For patients with thoracic disease:</u> - CT Chest with contrast (CPT® 71260) every 6 months for 2 years, then annually until year 4 after completion of therapy
Stage IIA or IIB Non-Seminomatous germ cell tumors treated with post-primary RPLND <u>and</u> adjuvant chemotherapy	CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) once at 4 months after completion of therapy
Stage IIA or IIB Non-Seminomatous germ cell tumors treated with post-primary RPLND <u>without</u> adjuvant chemotherapy	CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) once at 3 to 4 months after completion of therapy and repeat annually for 1 year
All stages of ovarian dysgerminoma germ cell tumors	CT Abdomen/Pelvis with contrast (CPT® 74177) every 4 months for 1 year, every 6 months for 1 year and then annually for 3 years after completion of therapy
All ovarian non-dysgerminoma germ cell tumors - Embryonal tumor - Endodermal sinus tumor - Mature or immature teratoma - Non-gestational choriocarcinoma	- CT Abdomen/Pelvis with contrast (CPT® 74177) every 4 months for 1 year, every 6 months for 1 year and then annually for 3 years after completion of therapy - CT Chest with contrast (CPT® 71260) every 4 months for 1 year and every 6 months for 1 year after completion of therapy
Sex cord stromal tumors (male and female)	No routine advanced imaging indicated unless elevated tumor markers or clinical signs/symptoms of recurrence
Extragenital germ cell tumors	CT of the involved region every 3 months for one year and every 6 months for one year.

References

1. Gilligan T, Lin DW, Aggarwal R, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – April 13, 2021. Testicular cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Testicular cancer V2.2021 – April 13, 2021.
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2. Armstrong DK, Alvarez RD, Bakkum-Gamez JN, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – February 26, 2021. Ovarian cancer, including fallopian tube cancer and primary peritoneal cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian cancer V1.2021 – February 26, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Salani R, Backes FJ, Fung MF, et al. Post treatment surveillance and diagnosis of recurrence in women with gynecologic malignancies: Society of Gynecologic Oncologists recommendations. *Am J Obstet Gynecol*. 2011;204(6):466-478. doi:10.1016/j.ajog.2011.03.008.
4. Gershenson DM. Management of ovarian germ cell tumors. *J Clin Oncol*. 2007;25(20):2938-2943. doi:10.1200/JCO.2007.10.8738.
5. Colombo N, Parma G, Zanagnolo V, Insinga A. Management of ovarian stromal cell tumors. *J Clin Oncol*. 2007;25(20):2944-2951. doi:10.1200/JCO.2007.11.1005.
6. Cadron I, Leunen K, Van Gorp T, Amant F, Neven P, Vergote I. Management of Borderline Ovarian Neoplasms. *J Clin Oncol*. 2007;25(20):2928-2937. doi:10.1200/JCO.2007.10.8076.
7. del Carmen MG, Birrer M, Schorge JO. Carcinosarcoma of the ovary: a review of the literature. *Gynecol Oncol*. 2012;125(1):271-277. Doi:10.1016/j.ygyno.2011.12.418.
8. Kollmannsberger C, Tandstad T, Bedard PL, et al. Patterns of relapse in patients with clinical stage I testicular cancer managed with active surveillance. *J Clin Oncol*. 2015;33(1):51-57. doi:10.1200/JCO.2014.56.2116.
9. Oechsle K, Hartmann M, Brenner W, et al. [18F]Fluorodeoxyglucose positron emission tomography in nonseminomatous germ cell tumors after chemotherapy: the German multicenter positron emission tomography study group. *J Clin Oncol*. 2008;26(36):5930-5935. doi:10.1200/JCO.2008.17.1157.
10. Daugard G, Gundgaard MG, Mortensen MS, et al. Surveillance for stage I non seminoma testicular cancer: outcomes and long term follow-up in a population based cohort. *J. Clin Oncol*. 2014;32(34):3817-3823. doi:10.1200/JCO.2013.53.5831.
11. Zuniga A, Kakiashvili D, Jewett MA. Surveillance in stage I nonseminomatous germ cell tumours of the testis. *BJU Int*. 2009;104:1351-1356. doi:10.1111/j.1464-410X.2009.08858.x.

ONC-21: Ovarian Cancer**ONC-21.0: Ovarian Cancer – General Considerations****ONC-21.1: Screening for Ovarian Cancer****ONC-21.2: Ovarian Cancer – Suspected/Diagnosis****ONC-21.3: Ovarian Cancer – Initial Work-up/Staging****ONC-21.4: Ovarian Cancer – Restaging/Recurrence****ONC-21.5: Ovarian Cancer – Surveillance**

ONC-21.0: Ovarian Cancer – General Considerations

- Ovarian cancers include: epithelial ovarian cancers, ovarian cancers of low malignant potential and mixed Müllerian tumors, primary peritoneal and fallopian tube cancers.
- Germ cell tumors and sex cord stromal tumors (granulosa cell tumors), are imaged according to **ONC-20: Testicular, Ovarian and Extragonadal Germ Cell Cancer**.

ONC-21.1: Screening for Ovarian Cancer

Indication	Imaging/Lab Study
High Risk Factors: ◆ Family history of BRCA 1 or BRCA 2 mutations ◆ Family history of ovarian cancer ◆ Hereditary ovarian cancer syndrome that includes ovarian, breast, and/or endometrial and gastrointestinal cancers [Lynch II syndrome] in multiple members of two to four generations ◆ Low parity ◆ Decreased fertility ◆ Delayed childbearing	◆ Ovarian cancer screening is considered experimental & investigational and is not recommended. ◆ Genetic counseling is recommended for women with an increased-risk family history (USPSTF, 2015)
Known BRCA-1 or BRCA-2 mutation	◆ Transvaginal ultrasound (CPT® 76830), combined with CA-125 for ovarian cancer screening may be considered annually starting at age 30, until risk-reducing salpingo-oophorectomy is performed

ONC-21.2: Ovarian Cancer – Suspected/Diagnosis

- See: **PV-5.3: Complex Adnexal Masses** for imaging guidelines for evaluation of suspected ovarian malignancies
- Staging of ovarian cancer is primarily surgical and routine imaging is not indicated pre-operatively, unless it is obtained to evaluate specific signs/symptoms.
- To differentiate the origin of pelvic masses that are not clearly of ovarian origin, see: **PV-5.1: Suspected Adnexal Mass.**

Indication	Imaging/Lab Study
◆ Pelvic symptoms (pelvic pain, abdominal bloating) ◆ Palpable pelvic mass	◆ Transvaginal (TV) ultrasound imaging (CPT® 76830) and/or Pelvic ultrasound (CPT® 76856 or CPT® 76857) is the initial study of choice
Ultrasound shows a complex and/or solid adnexal mass	◆ See: <u>PV-5.3: Complex Adnexal Masses</u>
Ultrasound shows complex and/or solid adnexal mass suspicious for ovarian malignancy AND any of the following signs/symptoms concerning for metastatic disease: ◆ Ascites ◆ Abdominal symptoms (distension, tenderness) ◆ Elevated CA-125 ◆ Elevated LFTs ◆ Obstructive uropathy**	◆ CT Abdomen and Pelvis with contrast (CPT® 74177) ◆ **CT Abdomen/Pelvis without and with contrast (CT Urogram – CPT® 74178) may be approved only for symptoms of obstructive uropathy

ONC-21.3: Ovarian Cancer – Initial Work-up/Staging

Indication	Imaging Study
Clinical stage II disease or higher	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Chest with contrast (CPT® 71260) for: ■ Abnormal signs/symptoms of pulmonary disease ■ Abnormal chest x-ray
<u>Any of the following:</u> ◆ Primary peritoneal disease with biopsy-proven malignancy consistent with ovarian carcinoma ◆ Elevated tumor markers with negative or inconclusive CT imaging	◆ PET/CT (CPT® 78815)

ONC-21.4: Ovarian Cancer – Restaging/Recurrence

Indication	Imaging Study
Completely resected or definitively treated with chemotherapy and normal(ized) tumor markers	◆ No advanced imaging needed
<u>Any of the following:</u> ◆ Unresected disease ◆ Unknown preoperative markers ◆ Difficult or abnormal examination ◆ Elevated LFTs ◆ Elevated tumor markers (CA-125, inhibin) ◆ Signs or symptoms of recurrence	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Chest with contrast (CPT® 71260) for any of the following: ■ Known prior thoracic disease ■ New or worsening pulmonary symptoms ■ New or worsening CXR findings ■ Rising tumor markers (CA-125, inhibin)
Monitoring response to treatment (every 2 cycles, or ~every 6 to 8 weeks)	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Chest with contrast (CPT® 71260) for any of the following: ■ Known prior thoracic disease ■ New or worsening pulmonary symptoms ■ New or worsening CXR findings
◆ CT negative or inconclusive and CA-125 continues to rise or elevated LFTs ◆ Conventional imaging failed to demonstrate tumor or if persistent radiographic mass with rising tumor markers	◆ PET/CT (CPT® 78815)

ONC-21.5: Ovarian Cancer – Surveillance

Indication	Imaging Study
Stages I-III	◆ Advanced imaging is not routinely indicated for surveillance
Measurable metastatic disease on maintenance therapy or being monitored off therapy	Every 3 months for up to 5 years after completion of active treatment: ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved body areas

References

1. Armstrong DK, Alvarez RD, Bakkum-Gamez JN, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – February 26, 2021. Ovarian Cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/ovarian.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian Cancer V1.2021 – February 26, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Daly MB, Pal T, Berry MP, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version V2.2021 – November 20, 2020. Genetic/Familial High-Risk Assessment: Breast and Ovarian, available at: https://www.nccn.org/professionals/physician_gls/pdf/genetics_screening.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Ovarian cancer V2.2021 – November 20, 2020. ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Moyer VA, U.S. Preventive Services Task Force. Screening for ovarian cancer: U.S. Preventive Services Task Force reaffirmation recommendation statement. *Ann Intern Med.* 2012;157(12):900-904. doi:10.7326/0003-4819-157-11-201212040-00539.
4. Cadron I, Leunen K, Van Gorp T, Amant F, Neven P, Vergote I. Management of borderline ovarian neoplasms. *J Clin Oncol.* 2007;25(20):2928-2937. doi:10.1200/JCO.2007.10.8076.
5. ACR Appropriateness Criteria. *Ovarian cancer screening.* Rev. 2017.
6. Rosenthal AN, Fraser LSM, Phipott S. Evidence of stage shift in women diagnosed with ovarian cancer during phase II of the United Kingdom familial ovarian cancer screening study. *J Clin Oncol.* 2017;35(13):13:1411-1420. doi:10.1200/JCO.2016.69.9330.
7. Shinagare AB, O'Neill AC, Cheng S, et al. Advanced high-grade serous ovarian cancer: frequency and timing of thoracic metastases and the implications for chest imaging follow-up. *Radiology.* 2015;277(3):733-740. doi:10.1148/radiol.2015142467.
8. Musto A, Grassetto G, Marzola MC, et al. Management of epithelial ovarian cancer from diagnosis to restaging: an overview of the role of imaging techniques with particular regard to the contribution of 18F-FDG PET/CT. *Nucl Med Commun.* 2014;35(6):588-597. doi:10.1097/MNM.0000000000000091.
9. Fischerova D, Burgetova A. Imaging techniques for the evaluation of ovarian cancer. *Best Pract Res Clin Obstet Gynaecol.* 2014;28(5):697-720. doi:10.1016/j.bpobgyn.2014.04.006.

ONC-22: Uterine Cancer**ONC-22.0: Uterine Cancer – General Considerations****ONC-22.1: Uterine Cancer – Suspected/Diagnosis****ONC-22.2: Uterine Cancer – Initial Work-up/Staging****ONC-22.3: Uterine Cancer – Restaging/Recurrence****ONC-22.4: Uterine Cancer – Surveillance**

ONC-22.0: Uterine Cancer – General Considerations

- Gestational trophoblastic neoplasia (GTN) – see: **PV-16.1: Molar Pregnancy and Gestational Trophoblastic Neoplasia (GTN)**
- Most common cell type is adenocarcinoma. Uterine sarcomas are also imaged according to this guideline.
- Staging of uterine cancer is primarily surgical. Advanced imaging is not routinely indicated pre-operatively for laparoscopic/minimally invasive surgery unless initial staging criteria are met. Pelvic and para-aortic lymphadenectomy can still be performed.

ONC-22.1: Uterine Cancer – Suspected/Diagnosis

- See: **PV-2.1: Abnormal Uterine Bleeding** for imaging guidelines for evaluation of suspected uterine malignancies

ONC-22.2: Uterine Cancer – Initial Work-up/Staging

Indication	Imaging Study
<u>Any of the following:</u> ◆ Extrauterine disease suspected ◆ To assess local extent of tumor prior to fertility-sparing surgery for well-differentiated Stage IA (grade 1) uterine cancer ◆ Poor surgical candidate (due to medical comorbidities) considering medical therapy	◆ MRI Pelvis without and with contrast (CPT® 72197) ◆ Transvaginal ultrasound (CPT® 76830) if MRI is contraindicated ◆ Chest x-ray ■ CT Chest with contrast (CPT® 71260) if chest x-ray is abnormal
<u>Any of the following:</u> ◆ Abdominal symptoms or abnormal examination findings ◆ Elevated LFTS ◆ Other imaging studies suggest liver involvement	<u>One of the following may be approved:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Abdomen with contrast (CPT® 74160)
<u>Any of the following high-risk histologies:</u> ◆ Papillary serous ◆ Clear cell ◆ High grade/poorly differentiated endometroid carcinoma ◆ Uterine sarcomas: ■ Carcinosarcoma ■ Soft tissue sarcoma of the uterus ■ Leiomyosarcoma ■ Rhabdomyosarcoma ■ Undifferentiated sarcoma ■ Endometrial stromal sarcoma	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)
Tumors detected incidentally or incompletely staged surgically AND any of the following high risk features: ◆ Myoinvasion > 50% ◆ Cervical stromal involvement ◆ Lymphovascular invasion ◆ Tumor > 2 cm	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)
Inconclusive findings on conventional imaging	◆ PET/CT scan (CPT® 78815)

ONC-22.3: Uterine Cancer – Restaging/Recurrence

Indication	Imaging Study
◆ Unresected disease ◆ Medically inoperable disease ◆ Incomplete surgical staging ◆ Difficult or abnormal examination ◆ Elevated LFTs or rising tumor markers ◆ Signs or symptoms of recurrence	◆ CT Chest (CPT® 71260) and ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Monitoring response to chemotherapy (every 2 cycles, ~every 6-8 weeks) for: ◆ Unresected primary disease ◆ Metastatic disease	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Chest with contrast (CPT® 71260) for: ■ New/worsening pulmonary symptoms ■ Abnormal chest x-ray findings ■ Known prior pulmonary involvement
Any of the following: ◆ After fertility sparing treatment ◆ Inconclusive CT scan findings	◆ MRI Pelvis without and with contrast (CPT® 72197)
◆ Inconclusive findings on conventional imaging	◆ PET/CT scan (CPT® 78815)

ONC-22.4: Uterine Cancer – Surveillance

Indication	Imaging Study
Stage I-III of uterine carcinoma	Advanced imaging is not routinely indicated for surveillance
Measurable metastatic disease on maintenance therapy or being monitored off therapy	Every 3 months for up to 5 years after completion of definitive treatment: ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved body areas
<u>All stages of uterine sarcoma:</u> ◆ Soft tissue sarcoma of the uterus ◆ Leiomyosarcoma ◆ Adenosarcoma ◆ Carcinosarcoma ◆ Rhabdomyosarcoma ◆ Undifferentiated sarcoma ◆ Endometrial stromal sarcoma	CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) every 3 months for 2 years, every 6 months for 3 years, and then every 1-2 years until year 10

References

1. Abu-Rustum NR, Yashar CM, Bradley K, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2021 – June 3, 2021. Uterine Neoplasms, available at: https://www.nccn.org/professionals/physician_gls/pdf/uterine.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Uterine Neoplasms V3.2021 – June 3, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Fader AN, Boruta D, Olawaiye AB, Gehrig PA. Updates on uterine papillary serous carcinoma. *Expert Rev Obstet Gynecol*. 2009;4(6):647-657. doi:10.1586/eog.09.49.
3. Boruta DM 2nd, Gehrig PA, Fader AN, Olawaiye AB. Management of women with uterine papillary serous cancer: A Society of Gynecologic Oncology (SGO) review. *Gynecol Oncol*. 2009;115(1):142-153. doi:10.1016/j.ygyno.2009.06.011.
4. Olawaiye AB, Boruta DM 2nd. Management of women with clear cell endometrial cancer: a Society of Gynecologic Oncology (SGO) review. *Gynecol Oncol*. 2009;113(2):277-283. doi:10.1016/j.ygyno.2009.02.003.
5. Salani R, Backes FJ, Fung MF et al. Post treatment surveillance and diagnosis of recurrence in women with gynecologic malignancies: Society of Gynecologic Oncologists recommendations. *Am J Obstet Gynecol*. 2011;204(6):466-478. doi:10.1016/j.ajog.2011.03.008.
6. Reinhold C, Ueno Y, Akin EA, et. al. ACR Appropriateness Criteria® - Evaluation and follow-up of endometrial cancer. Available at <https://acsearch.acr.org/docs/69459/Narrative/>. American College of Radiology. Accessed 7/29/2020.

ONC-23: Cervical Cancer**ONC-23.0: Cervical Cancer – General Considerations****ONC-23.1: Cervical Cancer – Suspected/Diagnosis****ONC-23.2: Cervical Cancer – Initial Work-up/Staging****ONC-23.3: Cervical Cancer – Restaging/Recurrence****ONC-23.4: Cervical Cancer – Surveillance**

ONC-23.0: Cervical Cancer – General Considerations

- Primary histology for cervical cancer is squamous cell. Other, less common histologies are adenosquamous and adenocarcinoma. If biopsy is consistent with one of these less common histologies, it is necessary to clarify that tumor is not of primary uterine origin.
- If the primary histology is uterine in origin, follow imaging recommendations for uterine cancer, see: **ONC-22: Uterine Cancer**.

ONC-23.1: Cervical Cancer – Suspected/Diagnosis

Indication	Imaging Study
All	Biopsy should be performed prior to imaging

ONC-23.2: Cervical Cancer – Initial Work-up/Staging

Indication	Imaging Study
Stage IB1 or higher stages	<u>Any of the following combinations, not both:</u> ♦ PET/CT (CPT® 78815) <u>or</u> ♦ CT Chest with contrast (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)
Any size cervical cancer incidentally found in a hysterectomy specimen	♦ CT Chest with contrast (CPT® 71260) ♦ CT Abdomen/Pelvis with contrast (CPT® 74177)
Any of the following: ♦ To assess local extent of disease prior to fertility sparing treatment ♦ To assess residual pelvic disease post-operatively ♦ Inconclusive CT findings	♦ MRI Pelvis without and with contrast (CPT® 72197)
Inconclusive findings on conventional imaging	♦ PET/CT (CPT® 78815)

ONC-23.3: Cervical Cancer – Restaging/Recurrence

Indication	Imaging Study
If primary therapy was surgery	See Surveillance guidelines: <u>ONC-23.4: Cervical Cancer – Surveillance</u>
If primary therapy radiation therapy ± chemotherapy (no surgery)	Any of the following, not both: - PET/CT (CPT® 78815) at least 12 weeks after completion of treatment OR - CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)
Unresectable disease or metastatic disease on systemic treatment	Every 2 cycles of treatment (commonly every 6 to 8 weeks): - CT Chest with contrast (CPT® 71260) - CT Abdomen/Pelvis with contrast (CPT® 74177) - CT with contrast of other involved or symptomatic areas
Suspected or biopsy proven recurrence	Any one of the following, not both: - PET/CT (CPT® 78815) OR - CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)
Inconclusive findings on CT scan	MRI Pelvis without and with contrast (CPT® 72197)

ONC-23.4: Cervical Cancer – Surveillance

Indication	Imaging Study
Stage I disease treated with fertility sparing approach	◆ MRI Pelvis without and with contrast (CPT® 72197) at 6 months after surgery and then annually for 2 years
All patients	◆ No routine advanced imaging needed in asymptomatic individuals.

References

1. Abu-Rustum NR, Yashar CM, Bradley K, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – October 2, 2020. Cervical Cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/cervical.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Cervical Cancer V1.2021 – October 2, 2020. ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Salani R, Backes FJ, Fung MF et al. Post treatment surveillance and diagnosis of recurrence in women with gynecologic malignancies: Society of Gynecologic Oncologists recommendations. *Am J Obstet Gynecol*. 2011;204(6):466-478. doi:10.1016/j.ajog.2011.03.008.
3. Zanagnolo V, Ming L, Gadducci A, et al. Surveillance procedures for patients with cervical carcinoma: a review of the literature. *Int J Gynecol Cancer*. 2009;19(3):194-201. doi:10.1111/IGC.0b013e3181a130f3.
4. Elit L, Fyles AW, Devries MC, et al. Follow-up for women after treatment for cervical cancer: A systematic review. *Gynecol Oncol*. 2009;114(3):528-535. doi:10.1016/j.ygyno.2009.06.001.
5. Schwarz JK, Siegel BA, Dehdashti F, Grigsby PW. Association of posttherapy positron emission tomography with tumor response and survival in cervical carcinoma. *JAMA*. 2007;298(19):2289-2295. doi:10.1001/jama.298.19.2289.
6. Meads C, Davenport C, Malysiak S, et al. Evaluating PET-CT in the detection and management of recurrent cervical cancer: systematic reviews of diagnostic accuracy and subjective elicitation. *BJOG*. 2014;121(4):398-407. doi:10.1111/1471-0528.12488.
7. Chu Y, Zheng A, Wang F, et al. Diagnostic value of 18F-FDG-PET or PET-CT in recurrent cervical cancer: a systematic review and meta-analysis. *Nucl Med Commun*. 2014; 35(2):144-150. doi:10.1097/MNM.0000000000000026.

ONC-24: Anal Cancer & Cancers of the External Genitalia

ONC-24.0: Anal Carcinoma – General Considerations

ONC-24.1: Anal Carcinoma – Suspected/Diagnosis

ONC-24.2: Anal Carcinoma – Initial Work-up/Staging

ONC-24.3: Anal Carcinoma – Restaging/Recurrence

ONC-24.4: Anal Carcinoma – Surveillance

ONC-24.5: Cancers of External Genitalia – General Considerations

ONC-24.6: Cancers of External Genitalia – Initial Work-up/Staging

ONC-24.7: Cancers of External Genitalia – Restaging/Recurrence

ONC-24.8: Cancers of External Genitalia – Surveillance

ONC-24.0: Anal Carcinoma – General Considerations

- Most are squamous cell carcinomas, although some transitional and cloacogenic carcinomas are seen.
- Adenocarcinoma of the anal canal is managed as rectal cancer according to **ONC-16: Colorectal and Small Bowel Cancer**
- Squamous cell carcinoma of the perianal region (up to 5 cm radius from the anal verge) are imaged according to anal carcinoma guidelines.
- Bowen's disease and Paget's disease of the perianal and perigenital skin are considered non-invasive/in-situ conditions and do not routinely require advanced imaging. See: **ONC-5.6: Non-Melanoma Skin Cancers – Initial Work-up/Staging**.

ONC-24.1: Anal Carcinoma – Suspected/Diagnosis

Indication	Imaging Study
All	◆ Advanced imaging prior to biopsy is not needed

ONC-24.2: Anal Carcinoma – Initial Work-up/Staging

Indication	Imaging Study
All patients	◆ CT Chest with contrast (CPT® 71260) and <u>Any one of the following:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Abdomen with contrast (CPT® 74160) and MRI Pelvis without and with contrast (CPT® 72197)
◆ Stage II-III Squamous Cell Carcinoma of the Anal Canal and no evidence of metastatic disease by conventional imaging ◆ Inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-24.3: Anal Carcinoma – Restaging/Recurrence

Indication	Imaging Study
Stage I treated with complete surgical resection	See: ONC-24.4: for surveillance guidelines
Stages I, II and III – post chemoradiation evaluation	<u>Any one of the following:</u> - CT Abdomen/Pelvis with contrast (CPT® 74177) - MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Metastatic (stage IV) disease	CT Abdomen/Pelvis with contrast (CPT® 74177) every 2 cycles (generally 6 to 8 weeks) during treatment CT Chest (CPT® 71260) if chest x-ray is abnormal or if symptoms of chest involvement
- Difficult or abnormal examination - Elevated LFTs - Signs or symptoms of recurrence - Biopsy proven recurrence	- CT Chest (CPT® 71260) with contrast and <u>Any one of the following:</u> - CT Abdomen/Pelvis with contrast (CPT® 74177) - MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Inconclusive findings on conventional imaging	PET/CT (CPT® 78815)

ONC-24.4: Anal Carcinoma – Surveillance

Indication	Imaging Study
Stage I	Advanced imaging is not routinely indicated for surveillance
- Stage II - Stage III - Local recurrence treated definitively	- CT Chest (CPT® 71260) with contrast or CT Chest without contrast (CPT® 71250) annually for 3 years - And <u>any one</u> of the following annually for three years: - CT Abdomen/Pelvis with contrast (CPT® 74177) - MRI Abdomen without and with contrast (CPT® 74183) and MRI Pelvis without and with contrast (CPT® 72197)
Stage IV – measurable metastatic disease on maintenance treatment or being observed off treatment	Every 3 months for up to 5 years after completion of all treatment: - CT Chest (CPT® 71260) with contrast - CT Abdomen/Pelvis with contrast (CPT® 74177)

ONC-24.5: Cancers of External Genitalia – General Considerations

- These imaging guidelines are applicable for squamous cell carcinomas arising from the vulva, vagina, penis and scrotum

ONC-24.6: Cancers of External Genitalia – Initial Work-up/Staging

Indication	Imaging Study
For vulvar cancer >1 mm (T1b) in size	For planned sentinel lymph node (SLN) biopsy: Lymph system imaging (lymphoscintigraphy, CPT® 78195)
For stage II or higher	<u>One of the following:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or ◆ CT Abdomen with contrast (CPT® 74160) and MRI Pelvis without and with contrast (CPT® 72197) ◆ CT Chest with contrast (CPT® 71260) is indicated only for: ■ Signs/symptoms suggestive of chest involvement ■ Abnormal findings on chest X-ray
Inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-24.7: Cancers of External Genitalia – Restaging/Recurrence

Indication	Imaging Study
◆ Difficult or abnormal examination ◆ Elevated LFTs ◆ Signs or symptoms of recurrence ◆ Biopsy proven recurrence	◆ CT Chest (CPT® 71260) with contrast <u>And any one of the following:</u> ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast
Individuals receiving systemic treatment	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) every 2 cycles (generally 6 to 8 weeks) during treatment and at the end of planned chemotherapy treatment ◆ CT Chest (CPT® 71260) if chest x-ray is abnormal or if symptoms of chest involvement
Inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815)

ONC-24.8: Cancers of External Genitalia – Surveillance

Indication	Imaging Study
◆ All stages of vulvar and vaginal cancers	◆ Routine advanced imaging is not indicated for asymptomatic surveillance
◆ Penile Cancer: stage I-III A	◆ Routine advanced imaging is not indicated for asymptomatic surveillance
◆ Penile cancer: stages IIIB and higher	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) every 3 months for year 1, and then every 6 months for year 2, then no further routine advanced imaging indicated

References

1. Benson AB, Venook AP, Al-Hawary MM, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – June 30, 2021. Anal Carcinoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/anal.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for anal carcinoma V2.2021– June 30, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to [NCCN.org](https://www.nccn.org).
2. Flaig TW, Spiess PE, Agarwal N. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – June 30, 2021. Penile Cancer, available at: https://www.nccn.org/professionals/physician_gls/pdf/penile.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Penile Cancer V2.2021 – June 30, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to [NCCN.org](https://www.nccn.org).
3. Abu-Rustum NR, Yashar CM, Bradley, K. et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2021 – April 26, 2021. Vulvar Cancer (Squamous Cell Carcinoma), available at: https://www.nccn.org/professionals/physician_gls/pdf/vulvar.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Vulvar Cancer (Squamous Cell Carcinoma) V3.2021 – April 26, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to [NCCN.org](https://www.nccn.org).
4. Bhuvra NJ, Glynn-Jones R, Sonoda L, Wong WL, Harrison MK. To PET or not to PET? That is the question. Staging in anal cancer. *Ann Oncol.* 2012;23(8):2078-2082. doi:10.1093/annonc/mdr599.
5. Mistrangelo M, Pelosi E, Bellò M, et al. Role of positron emission tomography-computed tomography in the management of anal cancer. *Int J Radiat Oncol Biol Phys.* 2012;84(1):66-72. doi:10.1016/j.ijrobp.2011.10.048.
6. Jones M, Hruby G, Solomon M, Rutherford N, Martin J. The role of FDG-PET in the initial staging and response assessment of anal cancer: a systematic review and meta-analysis. *Ann Surg Oncol.* 2015;22(11):3574-3581. doi:10.1245/s10434-015-4391-9.

ONC-25: Multiple Myeloma and Plasmacytomas**ONC-25.0: Multiple Myeloma and Plasmacytomas – General Considerations****ONC-25.1: Multiple Myeloma and Plasmacytomas – Suspected/Diagnosis****ONC-25.2: Multiple Myeloma and Plasmacytomas – Initial Work-up/Staging****ONC-25.3: Multiple Myeloma and Plasmacytomas – Restaging/Recurrence****ONC-25.4: Multiple Myeloma and Plasmacytomas – Surveillance**

ONC-25.0: Multiple Myeloma and Plasmacytomas – General Considerations

- Multiple myeloma (MM) is a neoplastic disorder characterized by the proliferation of a single clone of plasma cells derived from B cells which grows in the bone marrow and adjacent bone, producing skeletal destruction.
- Multiple myeloma group of disorders can be classified as below, which influence imaging modality of choice.

Condition	Monoclonal protein	Bone marrow plasma cells	CRAB criteria**
Solitary Plasmacytoma (biopsy proven tumor containing plasma cells)	< 3 gm/dL	Absent	Absent
Monoclonal Gammopathy of Unknown Significance (MGUS)	< 3 gm/dL	< 10%	Absent
Smoldering Myeloma (SMM) (stage I MM or asymptomatic MM)	≥ 3 gm/dL	10% - 60%	Absent
Multiple Myeloma (MM)	≥ 3 gm/dL	≥ 10%	Present

**CRAB criteria = hypercalcemia, renal insufficiency, anemia, lytic bony lesions

- Diagnosis and monitoring of response to therapy is primarily with laboratory studies that include urine and serum monoclonal protein levels, serum free light chain levels, LDH and beta-2 microglobulin. Routine advanced imaging to monitor response to treatment is not indicated.
- Rarely, (< 5%), an individual may have Nonsecretory Myeloma, which does not produce measurable M-protein. These patients require imaging as primary method to monitor disease.
- Other conditions that may present with Monoclonal Gammopathy include:
 - ◆ **POEMS syndrome:** Polyneuropathy, Organomegaly, Endocrinopathy, Monoclonal protein and Skin Changes – these patients may also have sclerotic bone lesions and Castleman's disease. See: **ONC-25.2: Multiple Myeloma and Plasmacytomas – Initial Work-up/Staging** for imaging recommendations.
 - ◆ **Waldenström's Macroglobulinemia:** IgM monoclonal protein along with bone marrow infiltration of small lymphocytes. See: **ONC-27.10: Waldenström Macroglobulinemia or Lymphoplasmacytic Lymphoma** for imaging recommendations.
 - ◆ **Systemic Light chain Amyloidosis:** light chain monoclonal protein in serum or urine with clonal plasma cells in bone marrow, systemic involvement of the kidneys, liver, heart, gastrointestinal tract or peripheral nerves due to amyloid deposition. See: **ONC-25.2: Multiple Myeloma and Plasmacytomas – Initial Work-up/Staging** and **CD-3.8: Cardiac Amyloidosis** for imaging recommendations for systemic light chain amyloidosis.

ONC-25.1: Multiple Myeloma and Plasmacytomas – Suspected/Diagnosis

Indication	Imaging Study
All	◆ X-ray skeletal series

ONC-25.2: Multiple Myeloma and Plasmacytomas – Initial Work-up/Staging

Indication	Imaging Study
<u>Any of the following:</u> ◆ Abnormal skeletal survey ◆ Abnormal myeloma labs ◆ Signs/symptoms of multiple myeloma	◆ Whole body low-dose skeletal CT scan (CPT® 76497)
<u>Any of the following:</u> ◆ If skeletal CT is negative, inconclusive, or not feasible ◆ Suspected solitary bone/osseous plasmacytoma	<u>Any one of the following:</u> ◆ MRI Bone Marrow Blood Supply (CPT® 77084) ◆ MRI Cervical (CPT® 72141), Thoracic (CPT® 72146), Lumbar spine (CPT® 72148), and Pelvis (CPT® 72195) without contrast ◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), Lumbar spine (CPT® 72158), and Pelvis (CPT® 72197) without and with contrast ◆ CT contrast as requested of a specific area to determine radiotherapy or surgical candidacy, or for suspected extraosseous plasmacytoma
<u>For any of the following (after the tests listed above are completed):</u> ◆ Determining if a plasmacytoma is truly solitary ◆ Suspected extraosseous plasmacytomas ◆ Suspected progression of MGUS or SMM to a more malignant form and CT/MRI imaging are negative ◆ Whole body skeletal CT and MRI Bone Marrow are negative, inconclusive, or not feasible	◆ PET/CT (CPT® 78815 or CPT® 78816)
<u>Any of the following:</u> ◆ Systemic light chain amyloidosis ◆ POEMS syndrome	◆ CT Chest with contrast (CPT® 71260) and ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)

ONC-25.3: Multiple Myeloma and Plasmacytomas – Restaging/Recurrence

Indication	Imaging Study
Extra-osseous plasmacytoma response to initial therapy	One of the following: ◆ CT of any previously involved area, contrast as requested ◆ MRI of any previously involved area, contrast as requested
Known spine involvement with new neurological signs/symptoms or worsening pain	◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), Lumbar spine (CPT® 72158) without and with contrast
<u>Treatment response assessment</u> ◆ After completion of primary therapy ◆ Non-secretory multiple myeloma ◆ To determine therapy response with inconclusive labs	<u>One of the following:</u> ◆ Whole body low-dose skeletal CT scan (CPT® 76497) ◆ MRI Bone Marrow Blood Supply (CPT® 77084) ◆ MRI Cervical (CPT® 72141), Thoracic (CPT® 72146), Lumbar spine (CPT® 72148), and Pelvis (CPT® 72195) without contrast ◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), Lumbar spine (CPT® 72158), and Pelvis (CPT® 72197) without and with contrast ◆ MRI without contrast, or MRI without and with contrast for any previously involved bony area or symptomatic area
<u>Any of the following:</u> ◆ Suspected relapse/recurrence ◆ Suspected progression of MGUS or SMM to a more malignant form	<u>One of the following:</u> ◆ Whole body low-dose skeletal CT scan (CPT® 76497) ◆ MRI Bone Marrow Blood Supply (CPT® 77084) ◆ MRI Cervical (CPT® 72141), Thoracic (CPT® 72146), Lumbar spine (CPT® 72148), and Pelvis (CPT® 72195) without contrast ◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), Lumbar spine (CPT® 72158), and Pelvis (CPT® 72197) without and with contrast ◆ MRI without contrast, or MRI without and with contrast for any previously involved bony area or symptomatic area
<u>Any of the following:</u> ◆ Negative PET will allow change in management from active treatment to maintenance or surveillance. ◆ Inconclusive findings on conventional imaging	◆ PET/CT (CPT® 78815 or CPT® 78816)

Indication	Imaging Study
Stem cell transplant recipients	<u>One of the following, once before transplant and once within 30-100 days after transplant:</u> ◆ Whole body low-dose skeletal CT scan (CPT® 76497) ◆ MRI Bone Marrow Blood Supply (CPT® 77084) ◆ MRI Cervical (CPT® 72141), Thoracic (CPT® 72146), Lumbar spine (CPT® 72148), and Pelvis (CPT® 72195) without Contrast ◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), Lumbar spine (CPT® 72158), and Pelvis (CPT® 72197) without and with contrast

ONC-25.4: Multiple Myeloma and Plasmacytomas – Surveillance

Indication	Study
◆ Plasmacytomas ◆ Smoldering myeloma ◆ Non-secretory Multiple myeloma	<u>Any one of the following annually for 5 years:</u> ◆ Whole body low-dose skeletal CT scan (CPT® 76497) ◆ MRI Bone Marrow Blood Supply (CPT® 77084) ◆ Skeletal survey
Multiple myeloma surveillance for any of the following: ◆ After primary treatment ◆ After stem cell transplant ◆ On or off maintenance therapy	◆ Myeloma labs are primarily used for follow up ◆ Advanced imaging is not routinely indicated for surveillance in asymptomatic individuals

References

1. Kumar SK, Callander NS, Alsina M, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 7.2021 – April 26, 2021. Myeloma, available at: https://www.nccn.org/professionals/physician_gls/pdf/myeloma.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Myeloma V7.2021 – April 26, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Hillengass J, Usmani S, Rajkumar SV, Durie BGM, Mateos M, Lonial S. International myeloma working group consensus recommendations on imaging in monoclonal plasma cell disorders. *The Lancet*. 2019;20(6):PE302-E312. doi:10.1016/S1470-2045(19)30309-2.
3. Kyle RA, Remstein ED, Therneau TM, et al. Clinical course and prognosis of smoldering (asymptomatic) multiple myeloma. *N Engl J Med*. 2007;356:2582-2590. doi:10.1056/NEJMoa070389.
4. Dimopoulos M, Terpos E, Comenzo RL, et al. International myeloma working group consensus statement and guidelines regarding the current role of imaging techniques in the diagnosis and monitoring of multiple myeloma. *Leukemia*. 2009;23(9):1545-1556. doi:10.1038/leu.2009.89.
5. ACR Committee on Drugs and Contrast Media. ACR Manual on Contrast Media, version 10.3. Reston, VA: American College of Radiology; 2018.
6. Mulligan ME, Badros AZ. PET/CR and MR imaging in myeloma. *Skeletal Radiol*. 2007;36(1):5-16. doi:10.1007/s00256-006-0184-3.
7. Dimopoulos MA, Hillengrass J, Usmani S, et al. Role of magnetic resonance imaging in the management of patients with multiple myeloma: a consensus statement. *J Clin Oncol*. 2015;33(6):657-664. doi:10.1200/JCO.2014.57.9961.
8. Dimopoulos M, Terpos E, Comenzo RL, et al. International myeloma working group consensus statement and guidelines regarding the current role of imaging techniques in the diagnosis and monitoring of multiple myeloma. *Leukemia*. 2009;23(9):1545-1556. doi:10.1038/leu.2008.89.
9. Dammacco F, Rubini G, Ferrari C, Vacca A, Racanelli V. 18F-FDG PET/CT: a review of diagnostic and prognostic features in multiple myeloma and related disorders. *Clin Exp Med*. 2015;15(1):1-18. doi:10.1007/s10238-014-0308-3.
10. Ferraro R, Agarwal A, Martin-Macintosh EL, Peller PJ, Subramaniam RM. MR imaging and PET/CT in diagnosis and management of multiple myeloma. *Radiographics*. 2015;35(2):438-454. doi:10.1148/rg.352140112.
11. Rajkumar SV, Kumar S. Multiple myeloma: diagnosis and treatment. *Mayo Clin Proc*. 2016;91(1):101-119. doi:10.1016/j.mayocp.2015.11.007.
12. Westerland O, Amlani A, Kelly-Morland C, et. al. Comparison of the diagnostic performance and impact on management of 18F-FDG PET/CT and whole-body MRI in multiple myeloma. *Eur J Nucl ed Mol Imaging*. 2021. doi:10.1007/s00259-020-05182-2

ONC-26: Leukemias, Myelodysplasia and Myeloproliferative Neoplasms

ONC-26.1: Leukemias, Myelodysplasia and Myeloproliferative Neoplasms – General Considerations

ONC-26.2: Acute Leukemias

ONC-26.3: Chronic Myeloid Leukemias, Myelodysplastic Syndrome and Myeloproliferative Disorders

ONC-26.4: Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL)

ONC-26.1: Leukemias, Myelodysplasia and Myeloproliferative Neoplasms – General Considerations

- PET imaging is considered investigational and experimental for all indications in acute lymphoblastic leukemia, acute myeloid leukemia, and chronic myeloid leukemia.
- Routine advanced imaging is not indicated in the evaluation and management of Hairy cell leukemia in the absence of specific localizing clinical symptoms.

ONC-26.2: Acute Leukemias

- Imaging indications for acute lymphoblastic leukemia in adult patients are identical to those for pediatric patients. See: **PEDONC-3.2: Acute Lymphoblastic Leukemia (ALL)** for imaging guidelines.
- Imaging indications for acute myeloid leukemia in adult patients are identical to those for pediatric patients. See: **PEDONC-3.3: Acute Myeloid Leukemia (AML)** for imaging guidelines.

ONC-26.3: Chronic Myeloid Leukemias, Myelodysplastic Syndrome and Myeloproliferative Disorders

- Routine advanced imaging is not indicated in the evaluation and management of chronic myeloid leukemias, myelodysplastic syndromes or myeloproliferative disorders in the absence of specific localizing clinical symptoms or clearance for hematopoietic stem cell transplantation.
- See: **ONC-29: Hematopoietic Stem Cell Transplantation** for imaging guidelines related to transplant.
- For work-up of elevated blood counts, see: **ONC-30.3: Paraneoplastic Syndromes – General Considerations**

ONC-26.4: Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL)

- PET imaging is not indicated in the evaluation of CLL/SLL with the exception of suspected Richter's transformation (see Suspected transformation, below)
- CLL/SLL is monitored with serial laboratory studies. Routine advanced imaging is not indicated for monitoring treatment response or surveillance, except when initial studies reveal bulky disease involvement.
- Bulky disease is defined as lymph node mass > 10 cm or spleen > 6 cm below costal margin

Indication	Imaging Study
Initial Staging/Diagnosis	◆ Advanced imaging is not routinely indicated for initial evaluation of asymptomatic patients
For any of the following: ◆ Bulky lymph node mass (>10 cm) ◆ Splenomegaly >6 cm below costal margin ◆ Presence of B symptoms ◆ Progressive anemia and thrombocytopenia ◆ Prior to planned systemic therapy	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Treatment Response	◆ For patients with bulky nodal disease at diagnosis, CT with contrast of previously involved area(s) every 2 cycles of therapy ◆ Routine imaging is not indicated for patients without bulky nodal disease at diagnosis
End of Therapy Evaluation	◆ For patients with bulky nodal disease at diagnosis, CT with contrast of previously involved area(s)
Suspected progression	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)
Suspected transformation (Richter's) from a low grade lymphoma to a more aggressive type based on one or more of the following: ◆ New B symptoms ◆ Rapidly growing lymph nodes ◆ Extranodal disease develops ◆ Significant recent rise in LDH above normal range	◆ PET/CT (CPT® 78815)

Surveillance	◆ For patients with bulky nodal disease at diagnosis, every 6 months for two years, then annually: ■ CT Chest with contrast (CPT® 71260) ■ CT Abdomen/Pelvis with contrast (CPT® 74177) ■ CT with contrast of previously involved area(s) ◆ Routine imaging is not indicated for patients without bulky nodal disease at diagnosis
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References

1. Zelenetz AD, Gordon LI, Wierda WG, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 4.2021 – April 29, 2021. CLL/SLL, available at: https://www.nccn.org/professionals/physician_gls/pdf/cll.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for CLL/SLL V4.2021 – April 29, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Conte MJ, Bowen DA, Wiseman GA, et al. Use of positron emission tomography-computed tomography in the management of patients with chronic lymphocytic leukemia/small lymphocytic lymphoma. *Leuk Lymphoma*. 2014;55(9):2079-2084. doi:10.3109/10428194.2013.869801.
3. Mauro FR, Chauvie S, Paoloni F, et al. Diagnostic and prognostic role of PET/CT in patients with chronic lymphocytic leukemia and progressive disease. *Leukemia*. 2015;29(6):1360-1365. doi:10.1038/leu.2015.21.
4. Nabhan C, Rosen ST. Chronic lymphocytic leukemia: a clinical review. *JAMA*. 2014;312(21):2265-2276. doi:10.1001/jama.2014.14553.
5. Patnaik MM, Tefferi A. Chronic myelomonocytic leukemia: focus on clinical practice. *Mayo Clin Proc*. 2016;91(2):259-272. doi:10.1016/j.mayocp.2015.11.011.
6. American Society of Hematology. Choosing Wisely: Don't perform baseline or routine surveillance computed tomography (CT) scans in patients with asymptomatic, early-stage chronic lymphocytic leukemia (CLL). 2014. <https://www.choosingwisely.org/clinician-lists/american-society-hematology-baseline-or-routine-surveillance-ct-scans-for-asymptomatic-early-stage-chronic-lymphocytic-leukemia/>.

ONC-27: Non-Hodgkin Lymphomas**ONC-27.1: Non-Hodgkin Lymphomas – General Considerations****ONC-27.2: Diffuse Large B Cell Lymphoma (DLBCL)****ONC-27.3: Follicular Lymphoma****ONC-27.4: Marginal Zone Lymphomas****ONC-27.5: Mantle Cell Lymphoma****ONC-27.6: Burkitt's Lymphomas****ONC-27.7: Lymphoblastic Lymphomas****ONC-27.8: Cutaneous Lymphoma and T Cell Lymphomas****ONC-27.9: Post-Transplant Lymphoproliferative Disorders****ONC-27.10: Waldenström Macroglobulinemia or
Lymphoplasmacytic Lymphoma**

ONC-27.1: Non-Hodgkin Lymphomas – General Considerations

- Lymphoma is often suspected when patients have any of the following:
 - ◆ Bulky lymphadenopathy (lymph node mass > 10 cm in size), hepatomegaly or splenomegaly
 - ◆ The presence of systemic symptoms (fever, drenching night sweats or unintended weight loss of > 10%, called “B symptoms”)
- Patients with AIDS-related lymphoma should be imaged according to the primary lymphoma histology
- See: **ONC-31.11: Castleman’s Disease (Unicentric and Multicentric)** for guidelines covering Castleman’s disease.
- See: **ONC-26.4: Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL)** for guidelines covering Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL).

Indication	Imaging Study
Biopsy proven lymphoma or suspected lymphoma with one of the following: ◆ Bulky lymphadenopathy (LN mass > 10 cm) ◆ Hepatomegaly ◆ Splenomegaly ◆ B symptom: Unexplained fever, drenching night sweats, unintended weight loss > 10% total body weight	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ■ MRI without and with contrast for individuals who cannot tolerate CT contrast due to allergy or impaired renal function
Signs or symptoms of disease involving the neck	◆ CT Neck with contrast (CPT® 70491)
Signs or symptoms suggesting CNS involvement with lymphoma.	◆ MRI Brain without and with contrast (CPT® 70553) ◆ See: <u>ONC-2.7: CNS Lymphoma (also known as Microglioma)</u>
Known or suspected bone involvement with lymphoma	◆ MRI without and with contrast of symptomatic or previously involved bony areas ■ Bone scan is inferior to MRI for evaluation of known or suspected bone involvement with lymphoma
Determine a more favorable site for biopsy when a relatively inaccessible site is contemplated	◆ PET/CT (CPT® 78815 or CPT® 78816) ■ PET/CT is not medically necessary for all other indications prior to histological confirmation of lymphoma

ONC-27.2: Diffuse Large B Cell Lymphoma (DLBCL)

- Grey zone lymphomas, primary mediastinal B cell lymphomas, grade 3 (high) follicular lymphoma and double-hit or triple-hit lymphomas should also be imaged according to these guidelines
- PET/CT scan is not generally supported for interim restaging (monitoring response to treatment) due to increased false-positive results. Treatment intensification based on positive interim PET/CT scan does not improve outcomes. Any positive findings noted on an interim PET/CT scan should be biopsied before changing treatment.

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Treatment response for stages I and II	<u>Any one of the following may be approved, not both:</u> ◆ CT with contrast of previously involved area(s) may be approved every 2 cycles (6-8 weeks) of therapy - Or ◆ PET/CT (CPT® 78815 or CPT® 78816) after 3-4 cycles of chemotherapy ■ If PET/CT scan shows complete response, it serves as end of therapy evaluation and may not be repeated after completion of all planned chemotherapy
Treatment response for stages III and IV	◆ CT with contrast of previously involved area(s) may be approved every 2 cycles (6-8 weeks) of therapy ◆ PET/CT is not routinely indicated for monitoring response, but can be considered in rare circumstances when CT did not show disease (e.g. bone).
End of Chemotherapy and/or Radiation Therapy Evaluation	<u>Any or all of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) may be approved at the end of chemo and again at the end of radiation ◆ CT with contrast of previously involved area(s)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s) ◆ PET/CT can be considered in rare circumstances (e.g. bone involvement).
Biopsy-proven recurrence	◆ PET/CT (CPT® 78815 or CPT® 78816)

Indication	Imaging Study
CAR-T cell therapy	Once before treatment and once 30-60 days after completion of treatment: ◆ PET/CT (CPT® 78815 or CPT® 78816)
Surveillance	◆ <u>Stage I and II:</u> ■ No routine advanced imaging indicated ◆ <u>Stage III, stage IV, relapsed lymphoma, or any stage primary cutaneous diffuse large B cell lymphoma – every 6 months for 2 years after completion of treatment:</u> ■ CT Chest with contrast (CPT® 71260) ■ CT Abdomen/Pelvis with contrast (CPT® 74177) ■ CT with contrast of previously involved area(s)

ONC-27.3: Follicular Lymphoma

This section applies to follicular lymphomas with WHO grade of 1 (low) or 2 (intermediate). Grade 3 (high) follicular lymphomas should be imaged according to

ONC-27.2: Diffuse Large B Cell Lymphoma (DLBCL)

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
For any of the following: ◆ If radiation therapy is being considered for stage I or II disease ◆ Pediatric-type follicular lymphoma in adults	◆ PET/CT (CPT® 78815 or CPT® 78816)
Treatment Response	◆ CT with contrast of previously involved area(s) every 2 cycles of therapy
End of Therapy Evaluation	<u>One of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) - OR ◆ CT Chest with contrast (CPT® 71260) and ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)
Suspected transformation (Richter's) from a low grade lymphoma to a more aggressive type based on one or more of the following: ◆ New B symptoms ◆ Rapidly growing lymph nodes ◆ Extranodal disease develops ◆ Significant recent rise in LDH above normal range	◆ PET/CT (CPT® 78815)
Surveillance for any of the following: ◆ After completion of active treatment ◆ On maintenance treatment ◆ Observation without any treatment	<u>For all stages, every 6 months for two years, then annually:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)
Surveillance of pediatric-type follicular lymphoma in adults	<u>Advanced imaging is not indicated routinely after complete response</u>

ONC-27.4: Marginal Zone Lymphomas

- MALT lymphomas in any location should also be imaged according to these guidelines
- Splenic Marginal Zone Lymphoma is diagnosed with splenomegaly, peripheral blood flow cytometry and bone marrow biopsy. Splenectomy is diagnostic and therapeutic. PET scan is not routinely indicated prior to splenectomy.

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) If radiation therapy is being considered for stage I or II disease: ◆ PET/CT (CPT® 78815 or CPT® 78816)
Treatment Response	◆ CT with contrast of previously involved area(s) every 2 cycles of therapy
End of Therapy Evaluation	<u>One of the following may be approved:</u> ◆ CT with contrast of previously involved area(s) ◆ PET/CT (CPT® 78815 or CPT® 78816)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s) ◆ PET/CT can be considered in rare circumstances (e.g. bone involvement).
Surveillance of all stages of nodal marginal zone lymphoma for any of the following: ◆ After completion of active treatment ◆ On maintenance treatment ◆ Observation without any treatment	<u>Every 6 months for two years, then annually:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)
Surveillance of all stages of extranodal marginal zone lymphoma	<u>Advanced imaging is not routinely indicated for surveillance of asymptomatic individuals</u>

ONC-27.5: Mantle Cell Lymphoma

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) If radiation therapy is being considered for stage I or II disease: ◆ PET/CT (CPT® 78815 or CPT® 78816)
Treatment Response	◆ CT with contrast of previously involved area(s) every 2 cycles of therapy ◆ PET/CT is not indicated for monitoring treatment response, but can be considered in rare circumstances when CT did not show disease (e.g. bone).
End of Therapy Evaluation	<u>One of the following may be approved:</u> ◆ CT with contrast of previously involved area(s) ◆ PET/CT (CPT® 78815 or CPT® 78816)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s) ◆ PET/CT can be considered in rare circumstances (e.g. bone involvement).
Surveillance for all stages	<u>Every 6 months for 2 years, and then annually:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)

ONC-27.6: Burkitt's Lymphomas

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Treatment Response	◆ CT with contrast of previously involved area(s) every 2 cycles of therapy ◆ PET/CT is not indicated for monitoring treatment response, but can be considered in rare circumstances when CT did not show disease (e.g. bone).
End of Therapy Evaluation	<u>Any or all of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) may be approved at the end of chemo and again at the end of radiation ◆ CT with contrast of previously involved area(s)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s) ◆ PET/CT can be considered in rare circumstances (e.g bone involvement).
Surveillance	<u>Every 6 months for 2 years after completion of treatment:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)

ONC-27.7: Lymphoblastic Lymphomas

- Patients with lymphoblastic lymphoma (even those with bulky nodal disease) are treated using the leukemia treatment plan appropriate to the cell type (B or T cell). Imaging indications in adult patients are identical to those for pediatric patients. See: **PEDONC-3.2: Acute Lymphoblastic Leukemia (ALL)** for imaging guidelines.

ONC-27.8: Cutaneous Lymphoma and T Cell Lymphomas

- Includes Primary Cutaneous B Cell Lymphomas, Peripheral T-Cell Lymphomas, Mycosis Fungoides/Sézary Syndrome, Anaplastic Large Cell Lymphoma, Angioimmunoblastic lymphoma, and Primary Cutaneous CD30+T Cell Lymphoproliferative Disorders

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Treatment Response	Any one of the following may be approved after 3-4 cycles: ◆ PET/CT (CPT® 78815 or 78816) or ◆ CT Chest with contrast (CPT® 71260), ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) and ◆ CT with contrast of previously involved area(s)
End of Therapy Evaluation	<u>Any one of the following may be approved at the end of chemotherapy and again at the end of radiation therapy:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) or ◆ CT Chest with contrast (CPT® 71260), ◆ CT Abdomen/Pelvis with contrast (CPT® 74177), and ◆ CT with contrast of previously involved area(s)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s) ◆ PET/CT can be considered in rare circumstances (e.g bone involvement).
Surveillance	◆ <u>Stage I and II:</u> ■ No routine advanced imaging indicated ◆ <u>Stage III and IV:</u> ■ CT with contrast of previously involved area(s) every 6 months for two years, then no further routine advanced imaging

ONC-27.9: Post-Transplant Lymphoproliferative Disorders

- Post-transplant lymphoproliferative disorder (PTLD) or viral-associated lymphoproliferative disorder can rarely occur following solid organ or hematopoietic stem cell transplantation, or in primary immunodeficiency. When reduction of immunosuppression is unsuccessful, these are often treated with chemoimmunotherapy similar to high grade NHL.
- This section applies to Monomorphic (B-cell type) PTLD and Polymorphic PTLD.
- For Hodgkin-lymphoma subtype of PTLD, see: **ONC-28** for imaging recommendations.

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Treatment Response	Any or all of the following may be approved after 4 weeks of reducing immunosuppression or every 2 cycles (6-8 weeks) of chemo/immunotherapy: ◆ CT Chest with contrast (CPT® 71260), ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) and ◆ CT with contrast of previously involved area(s)
End of Therapy Evaluation	<u>Any one of the following may be approved at the end of treatment:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) or ◆ CT Chest with contrast (CPT® 71260), ◆ CT Abdomen/Pelvis with contrast (CPT® 74177), and ◆ CT with contrast of previously involved area(s)
Suspected recurrence	◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Surveillance	<u>Advanced imaging is not routinely indicated for surveillance</u>

ONC-27.10: Waldenström Macroglobulinemia or Lymphoplasmacytic Lymphoma

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Treatment Response	◆ CT with contrast of previously involved area(s) every 2 cycles of therapy
End of Therapy Evaluation	◆ CT with contrast of previously involved area(s)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)
Surveillance	<u>Advanced imaging is not routinely indicated for surveillance</u>

References

1. Zelenetz AD, Gordon LI, Abramson JS, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 4.2021 – May 5, 2021. B-cell lymphomas, available at: https://www.nccn.org/professionals/physician_gls/pdf/B-CELL.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for B-cell lymphomas V4.2021 – May 5, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Zelenetz AD, Gordon LI, Wierda WG, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – October 5, 2020. T-cell lymphomas, available at: https://www.nccn.org/professionals/physician_gls/pdf/T-CELL.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for T-cell lymphomas V1.2021 – October 5, 2020. ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Cheson BD, Fisher RI, Barrington SF, et al. Recommendations for initial evaluation, staging, and response assessment for Hodgkin and Non-Hodgkin lymphoma: the Lugano classification. *J Clin Oncol*. 2014;32(27):3059-3067. doi:10.1200/JCO.2013.54.8800.
4. Barrington SF, Mikhaeel NG, Kostakoglu L, et al. Role of imaging in the staging and response assessment of lymphoma: consensus of the International Conference on Malignant Lymphomas Imaging Working Group. *J Clin Oncol*. 2014;32(27):3048-3058. doi:10.1200/JCO.2013.53.5229.
5. Thompson CA, Ghesquieres H, Maurer MJ, et al. Utility of routine post-therapy surveillance imaging in diffuse Large B-Cell Lymphoma. *J Clin Oncol*. 2014;32(31):3506-3512. doi:10.1200/JCO.2014.55.7561.
6. El-Galaly TC, Jakobsen LH, Hutchings M, et al. Routine imaging for diffuse Large B-Cell Lymphoma in first complete remission does not improve post-treatment survival: a Danish-Swedish population-based study. *J Clin Oncol*. 2015;33(34):3993-3998. doi:10.1200/JCO.2015.62.0229.
7. Huntington SF, Svoboda J, Doshi JA. Cost-effectiveness analysis of routine surveillance imaging of patients with diffuse Large B-Cell Lymphoma in first remission. *J Clin Oncol*. 2015;33(13):1467-1474. doi:10.1200/JCO.2014.58.5729.
8. Mamot C, Klingbiel D, Hitz F, et al. Final results of a prospective evaluation of the predictive value of interim positron emission tomography in patients with diffuse large B-cell lymphoma treated with R-CHOP-14 (SAKK 38/07). *J Clin Oncol*. 2015;33(23):2523-2529. doi:10.1200/JCO.2014.58.9846.
9. Mylam KJ, Nielsen AL, Pedersen LM, Hutchings M. Fluorine-18-fluorodeoxyglucose positron emission tomography in diffuse large B-cell lymphoma. *PET Clin*. 2014;9(4):443-455. doi:10.1016/j.cpet.2014.06.001.
10. Avivi I, Zilberlicht A, Dann EJ, et al. Strikingly high false positivity of surveillance FDG-PET/CT scanning among patients with diffuse large cell lymphoma in the rituximab era. *Am J Hematol*. 2013;88(5):400-405. doi:10.1002/ajh.23423.
11. Ulrich Dührsen, Stefan Müller, Bernd Hertenstein, et al. Positron emission tomography-guided therapy of aggressive non-Hodgkin lymphomas (PETAL): a multicenter, randomized phase III trial. *J Clin Oncol*. 2018;36(20):2024-2034. doi:10.1200/JCO.2017.76.8093.

ONC-28: Hodgkin Lymphoma**ONC-28.1: Hodgkin Lymphoma – General Considerations****ONC-28.2: Classical Hodgkin Lymphoma****ONC-28.3: Nodular Lymphocyte – Predominant Hodgkin Lymphoma**

ONC-28.1: Hodgkin Lymphoma – General Considerations

- Lymphoma is often suspected when patients have any of the following:
 - ◆ Bulky lymphadenopathy (lymph node mass > 5 cm in size), hepatomegaly or splenomegaly
 - ◆ The presence of systemic symptoms (fever, drenching night sweats or unintended weight loss of > 10%, called “B symptoms”)
- Patients with AIDS-related lymphoma should be imaged according to the primary lymphoma histology
- The **Deauville Criteria** are internationally accepted criteria, which utilize a five-point scoring system for the FDG avidity of a Hodgkin's lymphoma or Non-Hodgkin's lymphoma tumor mass as seen on FDG PET.
 - ◆ Score 1: No uptake above the background
 - ◆ Score 2: Uptake ≤ mediastinum
 - ◆ Score 3: Uptake > mediastinum but ≤ liver
 - ◆ Score 4: Uptake moderately increased compared to the liver at any site
 - ◆ Score 5: Uptake markedly increased compared to the liver at any site
 - ◆ Score X: New areas of uptake unlikely to be related to lymphoma

Indication	Imaging Study
Biopsy proven lymphoma or suspected lymphoma with one of the following: ◆ Bulky lymphadenopathy (LN mass > 5 cm) ◆ Hepatomegaly ◆ Splenomegaly ◆ B symptom: Unexplained fever, drenching night sweats, unintended weight loss > 10% total body weight	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ■ MRI without and with contrast for individuals who cannot tolerate CT contrast due to allergy or impaired renal function
Signs or symptoms of disease involving the neck	◆ CT Neck with contrast (CPT® 70491)
Signs or symptoms suggesting CNS involvement with lymphoma.	◆ MRI Brain without and with contrast (CPT® 70553) ◆ See: ONC-2.7: CNS Lymphoma (also known as Microglioma)
Known or suspected bone involvement with lymphoma	◆ MRI without and with contrast of symptomatic or previously involved bony areas ■ Bone scan is inferior to MRI for evaluation of known or suspected bone involvement with lymphoma
Determine a more favorable site for biopsy when a relatively inaccessible site is contemplated	◆ PET/CT (CPT® 78815 or CPT® 78816) ■ PET/CT is medically unnecessary for all other indications prior to histological confirmation of lymphoma

ONC-28.2: Classical Hodgkin Lymphoma

- This section applies to nodular sclerosis, mixed cellularity, lymphocyte-depleted and lymphocyte-rich subtypes of Hodgkin lymphoma.

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Treatment Response	◆ PET/CT (CPT® 78815 or CPT® 78816) as frequently as every 2 cycles
End of Chemotherapy and/or Radiation Therapy Evaluation	◆ PET/CT (CPT® 78815 or CPT® 78816) may be approved at the end of chemo and again at the end of radiation (after 12 weeks of completion of radiation therapy)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)
Biopsy proven recurrence	◆ PET/CT (CPT® 78815 or CPT® 78816)
Surveillance	<u>Any or all of the following may be approved every 6 months for 2 years after completion of therapy:</u> ◆ CT Neck with contrast (CPT® 70491) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s) <u>In addition to the above studies:</u> ◆ A single follow-up PET/CT may be approved > 12 weeks after radiation therapy if end of therapy PET/CT report documents Deauville 4 or 5 FDG avidity

ONC-28.3: Nodular Lymphocyte – Predominant Hodgkin Lymphoma

Indication	Imaging Study
Initial Staging/Diagnosis	<u>Any or all of the following may be approved:</u> ◆ PET/CT (CPT® 78815 or CPT® 78816) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177)
Treatment Response	◆ CT with contrast of previously involved areas as frequently as every 2 cycles
End of Chemotherapy and/or Radiation Therapy Evaluation	◆ PET/CT (CPT® 78815 or CPT® 78816) may be approved at the end of chemo and again at the end of radiation (after 12 weeks of completion of radiation therapy)
Suspected Recurrence	<u>Any or all of the following may be approved:</u> ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s)
Biopsy proven recurrence	<u>PET/CT (CPT® 78815 or CPT® 78816)</u>
Suspected transformation (Richter's) from a low grade lymphoma to a more aggressive type based on one or more of the following: ◆ New B symptoms ◆ Rapidly growing lymph nodes ◆ Extranodal disease develops ◆ Significant recent rise in LDH above normal range	◆ PET/CT (CPT® 78815)
Surveillance	<u>Any or all of the following may be approved every 6 months for 2 years after completion of therapy:</u> ◆ CT Neck with contrast (CPT® 70491) ◆ CT Chest with contrast (CPT® 71260) ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT with contrast of previously involved area(s) <u>In addition to the above studies:</u> ◆ A single follow-up PET/CT may be approved > 12 weeks after radiation therapy if end of therapy PET/CT report documents Deauville 4 or 5 FDG avidity

References

1. Hoppe RT, Advani RH, Ai WZ, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 4.2021 – April 20, 2021. Hodgkin lymphoma, available at: https://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Hodgkins Lymphoma V4.2021 – April 20, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Cheson BD, Fisher RI, Barrington SF, et al. Recommendations for initial evaluation, staging, and response assessment for Hodgkin and Non-Hodgkin lymphoma: the Lugano classification. *J Clin Oncol*. 2014;32(27):3059-3067. doi:10.1200/JCO.2013.54.8800.
3. Barrington SF, Mikhaeel NG, Kostakoglu L, et al. Role of imaging in the staging and response assessment of lymphoma: consensus of the International Conference on Malignant Lymphomas Imaging Working Group. *J Clin Oncol*. 2014;32(27):3048-3058. doi:10.1200/JCO.2013.53.5229.
4. Pingali SR, Jewell SW, Havlat L, et al. Limited utility of routine surveillance imaging for classical Hodgkin lymphoma patients in first complete remission. *Cancer*. 2014;120:2122-2129.
5. Ha CS, Hodgson DC, Advani R, et al. Follow-up of Hodgkin lymphoma. ACR Appropriateness Criteria® 2014;1-16.
6. Picardi M, Pugliese N, Cirillo, M et al. Advanced-stage Hodgkin lymphoma: US/Chest radiography for detection of relapse in patients in first complete remission—a randomized trial of routine surveillance imaging procedures. *Radiology*. 2014;272:262-274.
7. Gallamini A, and Kostakoglu L. Interim FDG-PET in Hodgkin lymphoma: a compass of a safe navigation in clinical trials? *Blood*. 2012;120(25):4913-4920.
8. Biggi A, Gallamini A, Chauvie S, et al. International validation study for interim PET in ABVD-treated, advanced-stage Hodgkin lymphoma: interpretation criteria and concordance rate among reviewers. *J Nucl Med*. 2013; 54(5):683-690.
9. Gallamini A, Barrington SF, Biggi, et al. The predictive role of interim positron emission tomography for Hodgkin lymphoma treatment outcome is confirmed using the interpretation criteria of the Deauville five-point scale. *Haematologica*. 2014; 99(6):1107-1113.
10. El-Galaly TC, Mylam KJ, Brown P, et al. Positron emission tomography/computed tomography surveillance in patients with Hodgkin lymphoma in first remission has a low positive predictive value and high costs. *Haematologica*. 2012;97(6):931-936.

ONC-29: Hematopoietic Stem Cell Transplantation

ONC-29.1: General Considerations for Stem Cell Transplant

ONC-29.1: General Considerations for Stem Cell Transplant

Transplant types:

Allogeneic (“allo”): The donor and recipient are different people, and there are multiple types depending on the source of the stem cells and degree of match between donor and recipient. This is most commonly used in diseases originating in the hematopoietic system, such as leukemias and lymphomas, and bone marrow failure syndromes or metabolic disorders. Common types are:

Matched sibling donor (MSD or MRD): Donor and recipient are full siblings and HLA-matched

Matched unrelated donor (MUD): Donor and recipient are HLA matched but not related to each other

Cord blood: Donor stem cells come from frozen umbilical cord blood not related to the recipient, sometimes from multiple different donors at once

Haploidentical transplant (haplo): Donor is a half-HLA match to the recipient, usually a parent

Autologous (“auto”): The donor and recipient are the same person. The process involves delivery of high dose chemotherapy that is ablative to the bone marrow, followed by an infusion of one’s own harvested stem cells.

Allogeneic HSCT results in a much greater degree of immunosuppression than autologous HSCT because of the need to allow the new immune system to chimerize with the recipient’s body. Immune reconstitution commonly takes more than a year for individuals who receive allogeneic HSCT, and individuals remain at high risk for invasive infections until that has occurred.

Pre-Transplant Imaging in HSCT:

Pre-transplant imaging in HSCT generally takes place within 30 days prior to transplant and involves a reassessment of the individual's disease status as well as infectious disease clearance

Indication	Imaging
Immediate pre-transplant period	Chest x-ray CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) for new findings on CXR, or new/worsening signs/symptoms. CT Sinus (CPT® 70486) for any clinical signs or symptoms
Assess cardiac function	Echocardiogram (CPT® 93306, CPT® 93307 or CPT® 93308) MUGA scan (CPT® 78472) may be indicated in specific circumstances, see: <u>CD-12.1: Oncologic Indications for Cancer Therapeutics-Related Cardiac Dysfunction (CTRCD)</u>
Assess pulmonary function	Pulmonary function tests
Assess primary disease status	See disease-specific guidelines for end of therapy response assessment

Post-Transplant Imaging in HSCT:

There are many common complications from HSCT, including infection, acute and chronic graft versus host disease (GVHD), hepatic sinusoidal obstruction syndrome, restrictive lung disease, among others.

Disease response generally takes place at ~Day +30 (autos and some allos) or ~Day +100 (allos) post-transplant.

Indication	Imaging
Assess known or suspected HSCT complications	Site-specific imaging should generally be approved
Suspected hepatic GVHD (elevated liver enzymes)	Abdominal US (CPT® 76700 or CPT® 76705)
Suspected Bronchiolitis Obliterans Syndrome (BOS)	CT Chest without contrast (CPT® 71250)
Assess primary disease status post-transplant	See disease-specific guidelines for end of therapy evaluation and surveillance
Individuals receiving tandem auto transplants (2-4 autos back-to-back, spaced 6 to 8 weeks apart)	Guideline recommended imaging can be repeated after each transplant

Reference

1. National Comprehensive Cancer Network (NCCN) Guidelines Version 3.2021 – July 26, 2021. Hematopoietic Cell Transplantation, available at: https://www.nccn.org/professionals/physician_gls/pdf/hct.pdf. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Hematopoietic Cell Transplantation V3.2021 – July 26, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines® and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines®, go online to NCCN.org.

ONC-30: Medical Conditions with Cancer in the Differential Diagnosis

ONC-30.1: Fever of Unknown Origin (FUO)

ONC-30.2: Unexplained Weight Loss

ONC-30.3: Paraneoplastic Syndromes

ONC-30.1: Fever of Unknown Origin (FUO)

- FUO is defined as a persistent fever $\geq 101^{\circ}\text{F}$ and ≥ 3 weeks with unidentified cause.
- While fever is a classic “B” symptom of advanced lymphoma, a cancer- related fever presenting in isolation without any other signs or symptoms of neoplastic disease is rare.

Indication	Imaging Study
In addition to physical examination, based on suspected location, one can consider:	◆ Chest x-ray ◆ Echocardiogram (CPT® 93306) ◆ Abdominal ultrasound (CPT® 76700) ◆ MRI Brain without and with contrast (CPT® 70553)
Above studies (including PE/ENT exam, pelvic exam, and DRE with laboratory studies) have failed to demonstrate site of infection	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ Radiopharmaceutical localization of tumor or distribution of radiopharmaceutical agent(s): CPT® 78800, 78801, or 78802, CPT® 78804, CPT® 78803 or 78831 (SPECT), or CPT® 78830, or 78832 (SPECT/CT)
“B” symptoms	◆ See: <u>ONC-27: Non-Hodgkin Lymphomas</u>
Any CNS sign/symptom accompanied by fever	◆ MRI Brain without and with contrast (CPT® 70553)
All patients	◆ PET is not indicated in the work-up of patients with FUO

ONC-30.2: Unexplained Weight Loss

- Unintentional weight loss is defined as loss of ≥ 10 lbs. or $\geq 5\%$ of body weight over 6 months or less, without an identifiable reason.

Potential causes of weight loss and initial evaluation	
Dysphagia and early satiety	Endoscopy and/or barium swallow
Panhypopituitarism or hyperthyroidism	Endocrine evaluation, including tests for TSH and ACTH
Hypogonadism	Endocrine evaluations for gonadal function
Occult GI bleeding	Serial tests for heme in stools
Depression and early dementia	Detailed neurological examination

Advanced imaging, as follows, may be indicated if the initial evaluations did not identify the cause of weight loss.

Indication	Imaging Study
Any abnormality of pituitary hormones	◆ MRI of the sella turcica without and with contrast (CPT® 70553)
Elevated thyroglobulin level	◆ Nuclear thyroid scan, or ◆ Thyroid ultrasound (CPT® 76536)
Rule out renal, hepatic pathologies	◆ Abdominal ultrasound (CPT® 76700)
Rule out cardiac pathologies	◆ Echocardiogram (CPT® 93306)
For non-smokers	◆ Chest x-ray should be performed initially
For current or former smokers	◆ CT Chest with contrast (CPT® 71260)
If all of the above do not identify cause of weight loss	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast
PET is not appropriate in the work-up of individuals with unexplained weight loss.	

ONC-30.3: Paraneoplastic Syndromes

General Considerations

- Paraneoplastic syndromes are metabolic and neuromuscular disturbances. These syndromes are not directly related to a tumor or to metastatic disease. There may be a lead time between initial finding of a possible paraneoplastic syndrome and appearance of the cancer with imaging. Limited studies suggest annual imaging for 2 years after diagnosis of possible paraneoplastic syndrome may detect cancer, however benefit after 2 years is not well documented.
- The following are the most common symptoms of paraneoplastic syndromes known to arise from various malignancies:
 - ◆ Hypertrophic Pulmonary Osteoarthropathy: Often presents as a constellation of rheumatoid-like polyarthritis, periostitis of long bones, and clubbing of fingers and toes
 - ◆ Amyloidosis
 - ◆ Hypercalcemia
 - ◆ Hypophosphatemia
 - ◆ Cushing's Syndrome
 - ◆ Somatostatinoma syndrome (vomiting, abdominal pain, diarrhea, cholelithiasis)
 - ◆ Syndrome of inappropriate antidiuretic hormone secretion (SIADH)
 - ◆ Polymyositis/dermatomyositis
 - ◆ Opsoclonus
 - ◆ Paraneoplastic sensory neuropathy
 - ◆ Subacute cerebellar degeneration
 - ◆ Eaton-Lambert syndrome (a myasthenia-like syndrome)
 - ◆ Second event of unprovoked thrombosis
 - ◆ Disseminated Intravascular Coagulation
 - ◆ Migratory thrombophlebitis
 - ◆ Polycythemia
 - ◆ Chronic leukocytosis and/or thrombocytosis
 - ◆ Elevated tumor markers
 - ◆ Cryptogenic stroke (see also: **HD-21.3**)

See also: **PN-6: Muscle Disorders** in the Peripheral Nerve Disorders Guidelines

See also: **ONC-25: Multiple Myeloma and Plasmacytomas** for evaluation of possible multiple myeloma.

Indication	Imaging Study
Initial evaluation	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast
<u>Any of the following:</u> ◆ Abnormality on conventional imaging difficult to biopsy ◆ Inconclusive conventional imaging ◆ Documented paraneoplastic antibody and conventional imaging fails to demonstrate primary site	◆ PET/CT (CPT® 78815 or CPT® 78816)
Subsequent evaluation for known paraneoplastic syndrome	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast may be repeated every 6 months for 2 years after initial imaging for Lambert-Eaton Myasthenia syndrome ◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast may be repeated every 6 months for 4 years for all other paraneoplastic syndromes
Systemic mastocytosis	Any one of the following: ◆ CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast is indicated ◆ PET/CT scan is not indicated for evaluation of mastocytosis
First episode of unprovoked DVT/VTE	◆ Imaging to evaluate for malignancy is not indicated
Second unprovoked DVT/PE	◆ Imaging may be considered in the setting of a negative work-up for inherited thrombophilia and antiphospholipid syndrome
In addition thyroid US is recommended for elevated CEA, and upper/lower endoscopy is recommended for elevated CEA or CA 19-9.	

References

1. Carrier M, Lazo-Langner A, Shivakumar S, et al. Screening for occult cancer in unprovoked venous thromboembolism. *N Engl J Med*. 2015 June;373:697-704. doi:10.1056/NEJMoa1506623.
2. Sioka C, Fotopoulos A, Kyritsis AP. Paraneoplastic neurological syndromes and the role of PET imaging. *Oncology*. 2010;78(2):150–156. doi:10.1159/000312657.
3. Schramm N, Rominger A, Schmidt C, et al. Detection of underlying malignancy in patients with paraneoplastic neurological syndromes: comparison of 18F-FDG PET/CT and contrast-enhanced CT. *Eur J Nucl Med Mol Imaging*. 2013;40(7):1014-1024. doi:10.1007/s00259-013-2372-4.
4. Qiu L, Chen Y. The role of 18F-FDG PET or PET/CT in the detection of fever of unknown origin. *Eur J Radiol*. 2012;81(11):3524-3529. doi:10.1016/j.ejrad.2012.05.025.
5. Pelosof LC, Gerber DE. Paraneoplastic syndromes: an approach to diagnosis and treatment. *Mayo Clin Proc*. 2010;85(9):838-854. doi:10.4065/mcp.2010.0099.
6. Wong CJ. Involuntary weight loss. *Med Clin North Am*. 2014;98(3):625-43. doi:10.1016/j.mcna.2014.01.012.
7. Titulaer MJ, Soffieti R, Dalmau J, et al. Screening of tumours in paraneoplastic syndromes: report of an EFNS task force. *Eur J Neurol*. 2011;18(1):19–e3. doi:10.1111/j.1468-1331.2010.03220.x.
8. Lancaster E. Paraneoplastic disorders. *Continuum (Minneapolis)*. 2017;23(6, Neuro-oncology):1653-1679. doi:10.1212/CON.0000000000000542.
9. Gerds AT, Gotlib J et al, National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2020 – May 21, 2020. Systemic Mastocytosis, available at: https://www.nccn.org/professionals/physician_gls/pdf/mastocytosis.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Systemic Mastocytosis V1.2020 – May 21, 2020. ©2020 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
10. Saver JL. Cryptogenic stroke. *N Engl J Med*. 2016;374:2065-2074. doi:10.1056/NEJMcp1503946.
11. Schwarzbach CJ, Schaefer A, Ebert A, et. al. Stroke and cancer: the importance of cancer-associated hypercoagulation as a possible stroke etiology. *Stroke*. 2012;43(11):3029-3034. doi:10.1161/STROKEAHA.112.658625.
12. Kamel H, Merkler AE, Iadecola C, Gupta A, Navi B. Tailoring the approach to embolic stroke of undetermined source: a review. *JAMA Neurol*. 2019;76(7):855-861. doi:10.1001/jamaneurol.2019.0591.

ONC-31: Metastatic Cancer, Carcinoma of Unknown Primary Site, and Other Types of Cancer

ONC-31.0: General Guidelines

ONC-31.1: Lung Metastases

ONC-31.2: Liver Metastases

ONC-31.3: Brain Metastases

ONC-31.4: Adrenal Gland Metastases

ONC-31.5: Bone (including Vertebral) Metastases

ONC-31.6: Spinal Cord Compression

ONC-31.7: Carcinoma of Unknown Primary Site

**ONC-31.8: Extrathoracic Small Cell and Large Cell
Neuroendocrine Tumors**

ONC-31.9: Primary Peritoneal Mesothelioma

ONC-31.10: Kaposi's Sarcoma

ONC-31.11: Castleman's Disease (Unicentric and Multicentric)

ONC-31.0: General Guidelines

- Guideline sections **ONC-31.1: Lung Metastases** through **ONC-31.5: Bone (including Vertebral) Metastases** should only be used for patients with metastatic cancer in the following circumstances:
 - ◆ The primary diagnosis section does not address a particular metastatic site that is addressed in these sections
 - ◆ The cancer type is rare and does not have its own diagnosis-specific imaging guidelines

ONC-31.1: Lung Metastases

Indication	Imaging Study
New or worsening signs or symptoms suggestive of metastatic lung involvement or new or worsening chest x-ray abnormality	◆ CT Chest with contrast (CPT® 71260) ◆ CT Chest without contrast (CPT® 71250) can be approved if there is a contraindication to CT contrast or only parenchymal lesions are being evaluated
Chest wall or brachial plexus involvement	◆ MRI Chest without and with contrast (CPT® 71552)
<u>One of the following and no diagnosis-specific guideline regarding PET imaging:</u> ◆ Lung nodule(s) ≥ 8 mm ◆ Confirm solitary metastasis amenable to resection on conventional imaging	◆ PET/CT (CPT® 78815) When primary cancer known, PET request should be reviewed by primary cancer guideline
Previous or current malignancy and pulmonary nodule(s) that would reasonably metastasize to the lungs	◆ CT Chest with contrast (CPT® 71260) at 3, 6, 12 and 24 months from the first study

ONC-31.2: Liver Metastases

Ablation of liver metastases or primary HCC may be performed utilizing chemical, chemotherapeutic, radiofrequency, or radioactive isotope methods. **Regardless of the modality of ablation, PET is not indicated for assessing response to this mode of therapy.**

Indication	Imaging Study
New or worsening signs or symptoms suggestive of metastatic liver involvement or new elevation in LFTs.	CT Abdomen with (CPT® 74160) or without and with contrast (CPT® 74170)
<u>Any of the following:</u> - Considering limited resection - Inconclusive CT findings	MRI Abdomen without and with contrast (CPT® 74183)
<u>One of the following and no diagnosis-specific guideline regarding PET imaging:</u> - Confirm solitary metastasis amenable to resection on conventional imaging - LFT's and/or tumor markers continue to rise and CT and MRI are negative	PET/CT (CPT® 78815) When primary cancer known, PET request should be reviewed by primary cancer guideline
Monitoring of liver metastases that have been surgically resected	Review according to primary cancer guideline

Indication	Imaging Study
Evaluation for hepatic artery chemotherapy infusion or chemoembolization with radioactive spheres (TheraSphere or SIR Spheres) for liver metastases or primary liver tumors:	◆ CTA Abdomen (CPT® 74175) can be approved immediately prior to procedure <u>One of the following studies may be approved PRE-treatment based upon provider preference:</u> ◆ Liver Imaging Planar (CPT® 78201) or with liver flow (CPT® 78202) ◆ Radiopharmaceutical Localization Limited Area (CPT® 78800) ◆ Liver Imaging SPECT (CPT® 78803) <u>One of the following studies may be approved POST-treatment based upon provider preference:</u> ◆ Liver Planar Imaging (CPT® 78201) or with liver flow (CPT® 78202) ◆ Radiopharmaceutical Localization Limited Area (CPT® 78800) ◆ Liver Imaging SPECT (CPT® 78803) Please note: liver-lung shunt calculation is included in the pre-treatment Liver Scan and does not require additional Lung Perfusion Scan
Monitoring of ablated liver metastases or primary tumors	<u>One of the following, immediately prior to ablation, 1 month post-ablation, then every 3 months for 2 years, and then annually</u> ◆ CT Abdomen without and with contrast (CPT® 74170) ◆ MRI Abdomen without and with contrast (CPT® 74183)

ONC-31.3: Brain Metastases

Indication	Imaging Study
Individual with cancer and signs or symptoms of CNS disease or known brain metastasis with new signs or symptoms.	◆ MRI Brain without and with contrast (CPT® 70553)
To determine candidacy for SRS, and a diagnostic thin-slice MRI brain has not been performed in the preceding 30 days	◆ MRI Brain without and with contrast (CPT® 70553)
Stereotactic radiosurgery planning	◆ Unlisted MRI for treatment planning purposes (CPT® 76498)
Monitoring of brain metastases treated with surgery or radiation therapy	<u>Post-treatment, then every 3 months for 1 year and every 6 months thereafter:</u> ◆ MRI Brain without and with contrast (CPT® 70553) ***Individuals treated with stereotactic radiosurgery alone may have MRI Brain without and with contrast (CPT® 70553) every 2 months for the first year and then every 6 months thereafter
Brain metastases treated with radiation therapy, with recent MRI Brain indeterminate in distinguishing radiation necrosis vs. tumor progression	◆ MRI Perfusion imaging (CPT® 70553)
Brain metastases treated with radiation therapy, with recent MRI Brain and MR Perfusion studies both unable to distinguish radiation necrosis vs. tumor progression	◆ PET Metabolic Brain (CPT® 78608)
<u>Any of the following:</u> ◆ Solitary brain metastasis suspected in patient with prior diagnosis of cancer <u>and no diagnosis-specific guideline regarding PET imaging</u> ◆ Brain metastases and no known primary tumor	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast ◆ Mammography for female patients ◆ PET/CT (CPT® 78815 or CPT® 78816) is indicated for any of the following: ■ Inconclusive conventional imaging ■ Confirm either stable systemic disease or absence of other metastatic disease ■ When primary cancer known, PET request should be reviewed by primary cancer guideline
Primary brain tumors	See: <u>ONC-2: Primary Central Nervous System Tumors</u>
MR Spectroscopy (CPT® 76390) is considered investigational and experimental for evaluation of metastatic brain cancer	

ONC-31.4: Adrenal Gland Metastases

Indication	Imaging Study
Differentiate benign adrenal adenoma from metastatic disease	See: <u>AB-16.1: Adrenal Cortical Lesions</u>
<u>Known cancer and no known systemic metastases:</u> - New adrenal mass - Enlarging adrenal mass - Inconclusive findings on recent CT scan	<u>If not done previously, any of the following may be obtained:</u> - CT Abdomen without contrast (CPT® 74150) - CT Abdomen without and with contrast (CPT® 74170, adrenal protocol) - MRI Abdomen without contrast (CPT® 74181) - MRI Abdomen without and with contrast (CPT® 74183) - CT-directed needle biopsy (CPT® 77012)
<u>One of the following and no diagnosis-specific guideline regarding PET imaging:</u> - Biopsy is not feasible or is non-diagnostic - Isolated metastasis on conventional imaging and patient is a candidate for aggressive surgical management	PET/CT (CPT® 78815) When primary cancer known, PET request should be reviewed by primary cancer guideline
Known extra-adrenal malignancy and undiagnosed adrenal mass being monitored off treatment	See: <u>ONC-1.2: Phases of Oncology Imaging and General Phase-Related Considerations</u>

ONC-31.5: Bone (including Vertebral) Metastases

Patients with Stage IV cancer with new onset back pain can forgo a bone scan (and plain films) in lieu of an MRI with and without contrast of the spine.

Indication	Imaging Study
<u>Any of the following in a patient with a current or prior malignancy:</u> ◆ Bone pain ◆ Rising tumor markers ◆ Elevated alkaline phosphatase	◆ Bone scan (see: ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology) supplemented by plain x-rays is the initial diagnostic imaging study of choice
<u>Any of the following:</u> ◆ Any patient with stage IV cancer with new onset back pain ◆ Bone scan is not feasible or readily available ◆ Continued suspicion despite inconclusive or negative bone scan or other imaging modalities ◆ Neurological compromise ◆ Soft tissue component suggested on other imaging modalities or physical exam ◆ Differentiate neoplastic disease from Paget's disease of bone ◆ Suspected leptomeningeal involvement	<u>Any of the following may be approved:</u> ◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast ◆ CT Cervical (CPT® 72127), Thoracic (CPT® 72130), and Lumbar spine (CPT® 72133) without and with contrast can be approved if MRI is contraindicated or not readily available ◆ CT without contrast can be approved if there is a contraindication to CT contrast
Monitoring untreated spinal metastases	◆ MRI without and with contrast or CT without and with contrast of the involved spinal level every 3 months for 1 year. **Imaging beyond 1 year is based on any new clinical signs/symptoms
Monitoring metastases within the spine treated with surgery and/or radiation therapy	◆ MRI without and with contrast or CT without and with contrast of the involved spinal level once within 3 months post treatment and then every 3 months for 1 year. **Imaging beyond 1 year is based on any new clinical signs/symptoms

Indication	Imaging Study
Leptomeningeal involvement with cancer	<u>On active treatment:</u> ◆ MRI Brain without and with contrast (CPT® 70553) ◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast every 2 cycles <u>Once treatment completed:</u> ◆ Routine advanced imaging not indicated for surveillance in asymptomatic individuals
Bone pain when both bone scan and either CT or MRI are inconclusive	◆ ¹⁸F-FDG-PET/CT (CPT® 78815 or CPT® 78816) on a case-by-case basis NOTE: ¹⁸F-NaF PET imaging (sodium fluoride, or “PET bone scan”) is investigational. See: <u>ONC-1.4: PET Imaging in Oncology</u>
Suspected metastatic bone disease and negative work-up for myeloma	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast
No prior cancer history with suspected pathologic fracture on plain x-ray	◆ See: <u>ONC-31.7: Carcinoma of Unknown Primary Site</u>
Signs/symptoms concerning for spinal cord compression	◆ See: <u>ONC-31.6: Spinal Cord Compression</u>

ONC-31.6: Spinal Cord Compression

Indication	Imaging Study
<u>Any of the following in a current or former cancer patient:</u> ◆ Any patient with stage IV cancer with new onset back pain ◆ New back pain persisting over two weeks ◆ Back pain that is rapidly progressive or refractory to aggressive pain management ◆ Signs or symptoms of neurological compromise at the spinal cord level ◆ Unexpected, sudden loss of bowel or bladder control ◆ Sudden loss of ability to ambulate ◆ Complete loss of pinprick sensation corresponding to a specific vertebral level ◆ Loss of pain at a site that had previously been refractory to pain management	<u>Any or all of the following may be approved:</u> ◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast ◆ Post myelogram CT of the Cervical (CPT® 72126), Thoracic (CPT® 72129), and Lumbar spine (CPT® 72132)
Any current or former cancer patient with radicular symptoms suggestive of nerve root involvement but not consistent with cord compression and one of the following: ◆ Unilateral weakness ◆ Unilateral change of reflexes ◆ Pain unrelieved by change in position ◆ Age > 70 years ◆ Unintentional weight loss ◆ Night pain	<u>One of the following:</u> ◆ MRI without and with contrast of involved spinal level ◆ MRI without contrast of the involved spinal level ◆ CT without contrast of the involved spinal level if MRI contraindicated

ONC-31.7: Carcinoma of Unknown Primary Site

General Considerations

- Defined as carcinoma found in a lymph node or in an organ known not to be the primary for that cell type (e.g., adenocarcinoma arising in the brain or in a neck lymph node).
- This guideline also applies to a pathologic fracture that is clearly due to metastatic neoplastic disease in a patient without a previous cancer history.
- Detailed history and physical examination including pelvic and rectal exams and laboratory tests to be performed before advanced imaging.
- Patients presenting with a thoracic squamous cell carcinoma described as metastatic appearing on chest imaging, or in lymph nodes above the clavicle, should undergo a detailed head and neck examination by a clinician skilled in laryngeal and pharyngeal examinations, especially in smokers.
- Patients with suspected unknown primary carcinomas based on only suspicious lytic bone lesions should be considered for serum protein electrophoresis (SPEP); urine protein electrophoresis (UPEP) and serum free light chains prior to consideration of extensive imaging

Indication	Imaging Study
Carcinoma found in a lymph node or in an organ known not to be primary	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Neck with contrast (CPT® 70491) if cervical or supraclavicular involvement ◆ CT with contrast or MRI without and with contrast of any other symptomatic site ◆ For female patients: ■ Diagnostic (not screening) mammogram and full pelvic exam ■ MRI Bilateral Breasts (CPT® 77049) if pathology consistent with breast primary and mammogram is inconclusive
Sebaceous carcinoma of the skin (can be associated with underlying primary malignancy)	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ CT Neck with contrast (CPT® 70491) if cervical or supraclavicular involvement ◆ CT with contrast or MRI without and with contrast of any other symptomatic site
Axillary adenocarcinoma	◆ Diagnostic (not screening) mammogram and full pelvic exam ◆ MRI Bilateral Breasts (CPT® 77049) if pathology consistent with breast primary and mammogram is inconclusive ◆ If the above are non-diagnostic for primary site: ■ CT Neck (CPT® 70491), CT Chest (CPT® 71260), and CT Abdomen with contrast (CPT® 74160) ■ CT with contrast or MRI without and with contrast of any other symptomatic site
Carcinoma found within a bone lesion	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ Bone Scan (see: ONC-1.3) ◆ CT with contrast or MRI without and with contrast of any symptomatic site
Any of the following: ◆ Above studies have failed to demonstrate site of primary ◆ CT scans reveal isolated metastatic disease for which definitive curative therapy is planned	◆ PET/CT (CPT® 78815 or CPT® 78816)
Post-treatment surveillance	◆ Advanced imaging is not indicated for routine surveillance of asymptomatic individuals after treatment completion

ONC-31.8: Extrathoracic Small Cell and Large Cell Neuroendocrine Tumors

All poorly-differentiated or high-grade, small cell and large cell neuroendocrine tumors arising outside the lungs or of unknown primary origin are imaged according to these guidelines.

Indication	Imaging Study
Initial staging	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)
Inconclusive findings on conventional imaging studies	◆ PET/CT (CPT® 78815)
Any of the following: ◆ Poorly differentiated neuroendocrine cancers of the head or neck ◆ Signs or symptoms of CNS involvement	◆ MRI Brain without and with contrast (CPT® 70553)
Restaging during treatment	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) and any known sites of disease with contrast every 2 cycles
Suspected Recurrence	<u>Any or all of the following are indicated:</u> ◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ MRI brain without and with contrast (CPT® 70553) ◆ Bone scan (See: <u>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</u>) ◆ PET imaging is generally not indicated but can be considered for rare circumstances.
Surveillance	◆ CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177) every 3 months for 1 year, then every 6 months for 4 additional years and then annually

ONC-31.9: Primary Peritoneal Mesothelioma

Indication	Imaging Study
Initial staging	◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) ◆ PET/CT (CPT® 78815) if there is no evidence of metastatic disease or conventional imaging is inconclusive
Recurrence/ Restaging	◆ If there is known prior disease, CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177) ◆ PET for inconclusive finding on conventional imaging
Surveillance	◆ CT Abdomen/Pelvis with contrast (CPT® 74177) every 3 months for 2 years, then every year of life

ONC-31.10: Kaposi's Sarcoma

Indication	Imaging Study
Kaposi's Sarcoma	◆ Advanced imaging is not generally indicated since disease is generally localized to skin. ◆ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) can be approved at initial diagnosis. If initial scans are negative then future imaging would be based on signs or symptoms.

ONC-31.11: Castleman's Disease (Unicentric and Multicentric)

Indication	Imaging Study
Initial staging	◆ Either CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) or PET/CT (CPT® 78815) ◆ CT Neck with contrast (CPT® 70491) if cervical or supraclavicular involvement ◆ If CT scans were utilized initially and suggested unicentric disease, and surgical resection is being considered, PET/CT (CPT® 78815) can be approved to confirm unicentric disease. ◆ If unicentric disease is surgically removed, proceed to Surveillance section.
<u>Restaging:</u> ◆ Multicentric disease or surgically unresected unicentric disease on chemotherapy	<u>One of the following every 2 cycles:</u> ◆ CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177) ◆ PET/CT (CPT® 78815)
<u>Any of the following:</u> ◆ Suspected recurrence ◆ Recurrent B symptoms ◆ Rising LDH/IL-6/VEGF levels	<u>One of the following:</u> ◆ CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177) ◆ PET/CT (CPT® 78815)
Surveillance	◆ CT with contrast of involved areas no more than every 6 months up to 5 years

References

1. Ettinger DS, Varadhachary GR, Bajor D, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – February 8, 2021. Occult primary, available at: https://www.nccn.org/professionals/physician_gls/pdf/occult.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Occult Primary V2.2021 – February 8, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
2. Nabors BL, Portnow J, Baehring J, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 1.2021 – June 4, 2021. Central Nervous System Cancers, available at: https://www.nccn.org/professionals/physician_gls/pdf/cns.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for CNS Cancer V1.2021 – June 4, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
3. Zelenetz AD, Gordon LI, Abramson JS, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 4.2021 – May 5, 2021. B-cell lymphomas, available at: https://www.nccn.org/professionals/physician_gls/pdf/B-CELL.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for B-cell lymphomas V4.2021 – May 5, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
4. Mayo-Smith WM, Song JH, Boland GL, et al. Management of incidental adrenal masses: a white paper of the ACR Incidental Findings Committee. *J Am Coll Radiol*. 2017;14(8):1038-1044. doi:10.1016/j.jacr.2017.05.001.
5. ACR Appropriateness Criteria®. *Incidentally discovered adrenal mass*. Rev. 2012.
6. Braat AJ, Smits ML, Braat MN, et al. 90Y hepatic radioembolization: an update on current practice and recent developments. *J Nucl Med*. 2015;56(7):1079–1087. doi:10.2967/jnumed.115.157446.
7. Pawaskar AS, Basu S. Role of 2-fluoro-2-deoxyglucose PET/computed tomography in carcinoma of unknown primary. *PET Clin*. 2015;10(3):297-310. doi:10.1016/j.cpet.2015.03.004.
8. Avram AM. Radioiodine scintigraphy with SPECT/CT: an important diagnostic tool for thyroid cancer staging and risk stratification. *J Nucl Med*. 2012;53(5): 754-764. doi:10.2967/jnumed.111.104133.
9. Mayo-Smith WW, Song JH, Boland GL, et al. Management of incidental adrenal masses: a white paper of the ACR Incidental Findings Committee. *J Am Coll Radiol*. 2017;14(8):1038-1044. doi:10.1016/j.jacr.2017.05.001.
10. Vaidya A, Hamrahian A, Bancos I, Fleseriu M, Ghayee HK. The evaluation of incidentally discovered adrenal masses. *Endocrine Practice*. 2019;25(2):178-192. doi: 10.4158/DSCR-2018-0565.
11. Shah MH, Goldner WS, Benson III AB, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2021 – June 18, 2021. Neuroendocrine and Adrenal Tumors, available at: https://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Neuroendocrine and Adrenal Tumors V2.2021 – June 18, 2021. ©2021 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
12. Furuse M, Nonoguchi N, Yamada K, et. al. Radiological diagnosis of brain radiation necrosis after cranial irradiation for brain tumor: a systematic review. *Radiat Oncol*. 2019;14(28). doi:10.1186/s13014-019-1228-x.
13. American College of Radiology. ACR practice parameter for the performance of stereotactic radiosurgery. 2016; <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/stereobrain.pdf>
14. Soffietti R, Abacioglu U, Baumert B, et. al. Diagnosis and treatment of brain metastases from solid tumors: guidelines from the European Association of Neuro-Oncology (EANO). *Neuro-Oncology*. 2017;19(2):162-174. doi:10.1093/neuonc/now241.
15. Mehrabian H, Detsky J, Soliman H, Sahgal A, Stanis GJ. Advanced magnetic resonance imaging techniques in management of brain metastases. *Front Oncol*. 2019;9(440). doi:10.3389/fonc.2019.00440.

ONC-32: Medicare Coverage Policies for PET**ONC-32.1: Oncologic FDG PET****ONC-32.2: Oncologic Non-FDG PET****ONC-32.3: This section left intentionally blank****ONC-32.4: This section left intentionally blank****ONC-32.5: This section left intentionally blank**

ONC-32.1: Oncologic FDG PET

The complete coverage policy is found in the Medicare National Coverage Determinations (NCD) Manual, Section 220.6.17:

(see: http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/ncd103c1_Part4.pdf)

220.6.17 – Positron Emission Tomography (FDG PET) for Oncologic Conditions

General

FDG ($^{2-}[F^{18}]$ fluoro-2-deoxy-D-glucose) PET is a minimally invasive diagnostic imaging procedure used to evaluate glucose metabolism in normal tissue, as well as in diseased tissues, in conditions such as cancer, ischemic heart disease, and some neurologic disorders. FDG is an injected radionuclide (or radiopharmaceutical that emits sub-atomic particles, known as positrons, as it decays. FDG PET uses a positron camera (tomograph) to measure the decay of FDG. The rate of FDG decay provides biochemical information on glucose metabolism in the tissue being studied. As malignancies can cause abnormalities of metabolism and blood flow, FDG PET evaluation may indicate the probable presence or absence of a majority of cancer types based upon observed differences in biologic activity compared to adjacent tissues.

The Centers for Medicare and Medicaid Services (CMS) was asked by the National Oncologic PET Registry (NOPR) to reconsider section 220.6 of the National Coverage Determination (NCD) Manual to end the prospective data collection requirements under Coverage with Evidence Development (CED) across all oncologic indications of FDG PET imaging. The CMS received public input indicating that the current framework of prospective data collection under CED be ended for all oncologic uses of FDG PET imaging

1. Framework

Effective for claims with dates of service on and after June 11, 2013, CMS is adopting a coverage framework that ends the prospective data collection requirements by NOPR under CED for all oncologic uses of FDG PET imaging. CMS is making this change for all NCDs that address coverage of FDG PET for oncologic uses addressed in this decision. This decision does not change coverage for any use of PET imaging using radiopharmaceuticals ammonia N-¹³, or rubidium-⁸² (Rb-⁸²).

2. Initial Anti-Tumor Treatment Strategy

CMS continues to believe that the evidence is adequate to determine that the results of FDG PET imaging are useful in determining the appropriate initial anti-tumor treatment strategy for beneficiaries with suspected cancer and improve health outcomes and thus are reasonable and necessary under §1862(a)(1)(A) of the Social Security Act (the “Act”).

Therefore, CMS continues to nationally cover **ONE** FDG PET study for beneficiaries who have cancers that are biopsy proven or strongly suspected based on other diagnostic testing when the beneficiary's treating physician determines that the FDG PET study is needed to determine the location and/or extent of the tumor for the following therapeutic purposes related to the initial anti-tumor treatment strategy:

- To determine whether or not the beneficiary is an appropriate candidate for an invasive diagnostic or therapeutic procedure; or
- To determine the optimal anatomic location for an invasive procedure; or
- To determine the anatomic extent of tumor when the recommended anti-tumor treatment reasonably depends on the extent of the tumor.

See the table at the end of this section for a synopsis of all nationally covered and non-covered oncologic uses of FDG PET imaging.

Initial Anti-Tumor Treatment Strategy Nationally Covered Indication

Effective: June 11, 2013

- CMS continues to nationally cover FDG PET imaging for the initial anti-tumor treatment strategy for male and female breast cancer only when used in staging distant metastasis.
- CMS continues to nationally cover FDG PET to determine initial anti-tumor treatment strategy for melanoma other than for the evaluation of regional lymph nodes.
- CMS continues to nationally cover FDG PET imaging for the detection of pre-treatment metastasis (i.e., staging) in newly diagnosed cervical cancers following conventional imaging.

Initial Anti-Tumor Treatment Strategy Nationally Non-Covered Indication

Effective: June 11, 2013

- CMS continues to nationally non-cover initial anti-tumor treatment strategy in Medicare beneficiaries who have adenocarcinoma of the prostate.
- CMS continues to nationally non-cover FDG PET imaging for diagnosis of breast cancer and initial staging of axillary nodes.
- CMS continues to nationally non-cover FDG PET imaging for initial anti-tumor treatment strategy for the evaluation of regional lymph nodes in melanoma.
- CMS continues to nationally non-cover FDG PET imaging for the diagnosis (no biopsy result) of cervical cancer related to initial anti-tumor treatment strategy.

3. Subsequent Anti-Tumor Treatment Strategy

Subsequent Anti-Tumor Treatment Strategy Nationally Covered Indication,

Effective: June 11, 2013

THREE FDG PET scans are nationally covered when used to guide subsequent management of anti-tumor treatment strategy after completion of initial anti-tumor therapy. Coverage of more than three FDG PET scans to guide subsequent management of anti-tumor treatment strategy after completion of initial anti-tumor therapy shall be determined by the local Medicare Administrative Contractors.

4. Synopsis of Coverage of FDGPET for Oncologic Conditions, Effective: June 11, 2013

Effective for claims with dates of service on and after June 11, 2013, the chart below summarizes national FDG PET coverage for oncologic conditions. Additional details may be obtained at

https://www.cms.gov/medicare/coverage/determinationprocess/downloads/petforsolidtumorsoncologicdxcodesattachment_NCD220_6_17.pdf

FDG PET for Solid Tumors and Myeloma Tumor Type	Initial Treatment Strategy (formerly “diagnosis” & “staging”)	Subsequent Treatment Strategy (formerly “restaging” & “monitoring response to) treatment”)
Colorectal	Cover	Cover
Esophagus	Cover	Cover
Head and Neck (not thyroid or CNS)	Cover	Cover
Lymphoma	Cover	Cover
Non-small cell lung	Cover	Cover
Ovary	Cover	Cover
Brain	Cover	Cover
Cervix	Cover with exceptions	Cover
Small cell lung	Cover	Cover
Soft tissue sarcoma	Cover	Cover
Pancreas	Cover	Cover
Testes	Cover	Cover
Prostate	Non-cover	Cover
Thyroid	Cover	Cover
Breast (male and female)	Cover with exceptions	Cover
Melanoma	Cover with exceptions	Cover
All other solid tumors	Cover	Cover
Myeloma	Cover	Cover
All other cancers not listed	Cover	Cover

Invasive Breast Cancer:

Nationally non-covered for initial diagnosis and/or staging of axillary lymph nodes. Nationally covered for initial staging of known or suspected metastatic disease. All other indications for initial anti-tumor strategy for breast cancer are nationally covered.

- ◆ Prior to surgical lymph node sampling: **NOT indicated**
- ◆ Metastatic disease or suspicious lesions seen on CT and/or bone scan: **Indicated**
- ◆ After completion of surgical lymph node sampling: **Indicated**

Melanoma:

Nationally non-covered for initial staging of regional lymph nodes. All other indications for initial anti-tumor treatment strategy for melanoma are nationally covered.

- ◆ Prior to surgical lymph node sampling: **NOT indicated**
- ◆ Metastatic disease or suspicious lesions seen on CT and/or bone scan: **Indicated**
- ◆ After completion of surgical lymph node sampling: **Indicated**

5. CPT codes for FDG-PET scan for Oncologic Conditions

- The decision whether to use skull base to mid-femur (“eyes to thighs”: procedure code for PET (CPT® 78812 or CPT® 78815) or whole body PET (CPT® 78813 or CPT® 78816) is addressed in the diagnosis-specific guideline sections.
- Tumor imaging by Positron Emission Tomography (PET) may be reported with CPT® codes 78811-78816. CPT® codes 78811-78813 refer to PET imaging alone without localization CT scan and by itself, may not be the most appropriate study to evaluate oncologic conditions.
- A PET/CT fusion study should be reported with CPT® codes 78814-78816. CT obtained for localization should not be reported separately with PET codes.
- If a cancer-specific guideline considers a diagnostic CT scan to be medically necessary in addition to a PET/CT scan, and if this study is obtained concurrently with PET imaging on the same piece of equipment, the diagnostic CT codes may be reported separately along with CPT® codes 78811–78813. In this instance, CPT® codes 78814-78816 should not be reported along with diagnostic CT codes.
- However, if a cancer-specific guideline considers a diagnostic CT scan to be medically necessary in addition to a PET/CT scan, and these studies are obtained on separate pieces of equipment, the diagnostic CT codes may be reported separately along with CPT® codes 78814–78816.
- Additional details are available here: Medicare National Coverage Determinations Manual (https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/ncd103c1_Part4.pdf)
- CPT® 78608 (FDG Metabolic PET of the Brain) is still covered and appropriate for evaluation of CNS malignancies, and is covered under the NCD

ONC-32.2: Oncologic Non-FDG PET

PET/CT Scan using non-FDG Radiotracers:

- Medicare National Coverage Determination for PET (NCD 220.6.17) has recently included coverage of PET-CT scans with three new non-FDG radiotracers. Local Medicare contractors have the authority to make coverage decisions about oncologic studies performed with other agents.

Additional details are available at:

<https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/Downloads/R1755OTN.pdf>

<https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/Downloads/R1753OTN.pdf>

- PET/CT scan using non-FDG radiotracers is reported with the same CPT codes (CPT® 78815 and CPT® 78816)
- Either FDG or non-FDG PET/CT scan may be approved to assess the disease status, both may not be obtained simultaneously.
- Per NCD 220.6.17, one PET scan for initial treatment strategy and up to three additional PET scans for subsequent treatment strategy may be obtained regardless of the radiotracer used. Coverage of more than three PET scans to guide subsequent management of anti-tumor treatment strategy after completion of initial anti-tumor therapy shall be determined by the local Medicare Administrative Contractors.

11C Choline, ¹⁸F-Fluciclovine (AXUMIN®), ¹⁸F Piflufolastat (Pylarify®), and ⁶⁸Ga PSMA-11 for Prostate cancer

- COVERED FOR:
 - ◆ Subsequent treatment strategy for patients with prostate cancer who have a rising PSA after prior treatment
- NOT COVERED FOR:
 - ◆ Initial treatment strategy for newly diagnosed prostate cancer
 - ◆ Surveillance of patients with localized/advanced prostate cancer, who have completed definitive therapy or are receiving maintenance therapy

⁶⁸Gallium DOTATATE (NETSPOT®) or ⁶⁴Cu-DOTATATE (DETECTNET®)

- COVERED FOR:
 - ◆ Initial treatment strategy for newly diagnosed low-grade neuroendocrine tumors and medullary carcinoma of the thyroid
 - ◆ Subsequent treatment strategy for low-grade neuroendocrine tumors and medullary carcinoma of the thyroid
- NOT COVERED FOR:
 - ◆ Surveillance of patients with localized/advanced low-grade neuroendocrine tumors or medullary carcinoma of the thyroid, who have completed definitive therapy or are receiving maintenance therapy

¹⁸F Na Fluoride PET/CT Scan for Bone Metastases

- PET/CT using F-18 sodium fluoride (NaF-18) has been studied to identify bone metastases. At this time, Medicare NCD **excludes** coverage for PET/CT scan using Na fluoride radiotracer.

Coverage with Evidence Development (CED)

- CED is a program designed to make PET/CT available to Medicare beneficiaries while at the same time gathering data regarding PET's effectiveness.
- Under CED, Medicare will reimburse the claim if the beneficiary is enrolled in, and the PET provider is participating in, a qualifying prospective clinical trial or registry.
- Full details regarding qualifying clinical trials, including the list of required scientific integrity standards and relevance to the Medicare population are available in the Medicare NCD Manual, Section 220.6.17.
- Qualifying research trials must be registered on the www.ClinicalTrials.gov website by the principal sponsor/investigator, prior to the enrollment of the first study subject.

ONC-32.3

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ONC-32.4

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ONC-32.5

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