Positron Emission Tomography (PET) Scan Indications

Adjudication Guideline

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Approved by:	Responsible:	Related Adjudication Guidelines: N/A
Daman	Medical Standards & Research	

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1. Abstract

1.1 For Members

PET stands for positron emission tomography. A PET scan produces three-dimensional, colour images of your body using radionuclides. PET scans show where cells are particularly active.

PET can be used to diagnose some medical conditions, or to find out more about how a condition is developing. It can also be used to measure how well treatment for a condition is working. It is most used for management of cancer.

Daman covers PET scan if medically justified as per the best international medical practice and as per the policy terms and conditions of each Health Insurance Plan administered by Daman.

1.2 For Medical Professionals

Positron Emission Tomography (PET) is a minimally invasive diagnostic imaging procedure used to evaluate metabolism in normal tissue as well as in diseased tissues in conditions such as cancer, ischemic heart disease, and some neurologic disorders.

Daman covers PET scan or PET/CT scan as medically necessary for all the diagnosis given further in this guideline, when all other imaging studies are inconclusive and require further conformations in order to make management plans.

In case of malignancies the given standard of diagnosis, staging/re-staging and monitoring has to be reached.

2. Scope

This guideline elaborates on the indications of various types of PET scan and coverage for all the health insurance plans administered by Daman, as per the policy terms and conditions of each plan.

3. Adjudication Policy

3.1 Eligibility / Coverage Criteria

PET scans will be covered by all health insurance plans administered by Daman, except for the Visitor's Plan, according to the indications given below.

Neurological Indications:

Condition	Coverage
Refractory Seizures	• Pre-surgical assessment only.

Cardiac Indications:

Condition	Coverage
Coronary Artery Disease	PET scans using rubidium-82 (Rb-82) or N-13 ammonia done at rest or with rest and stress are covered when it meets the following criteria: • The PET scan is used following an inconclusive SPECT, in place of SPECT, but not in addition to SPECT. • In persons with conditions that may cause attenuation problems with SPECT (obesity (BMI greater than 40), large breasts, breast implants, mastectomy, chest wall deformity, pleural or pericardial effusion). • PET myocardial perfusion imaging provided incremental cardiac risk regardless of BMI.
Assessment of Myocardial Viability	• (FDG)-PET scans are considered prior to re-vascularization, either as a primary or initial diagnostic study • PET scan can be done following an inconclusive SPECT and not vice-versa.

Oncological Indications:

Condition	Coverage	Condition	Coverage
Anal Cancer	Staging and for radiation treatment planning.	**Melanoma**	-Staging 0 to II, III and IV. -Restaging IA-IIA, IIB and IV. -Follow up every 3- 12 month as for recurrence/ metastasis till 5 years and nor recommended after 5 years.
Adrenal Cancer	Staging to distinguish primary and metastatic lesion.	**Multiple Myeloma**	-Staging -Follow up in solitary osseous and extra-osseous cancers, smouldering (asymptomatic) or stage I myeloma and active (symptomatic) all the other stages of myeloma.
Bone Cancer	Staging and restaging Ewing sarcoma and osteosarcoma	**Neuroendocrine Tumours**	-Diagnosis of poorly differentiated. -Staging and restaging of Pheochromocytoma/ Paraganglioma.
Brain Cancer	Diagnosis and staging when metastatic lesions in brain are identified but no primary is found and for identifying low grade gliomas undergoing malignant conversion. Restaging for differentiating active tumours from radiation necrosis, as this might obviate the need for surgery or the	**Oesophageal Cancer**	-Staging and restaging, for both neoadjuvant and definitive chemo-radiation, >5-6 weeks after completion of therapy. - Radiation therapy planning.

	discontinuation of an effective therapy. Potential use in radiation.		
Breast Cancer	-Staging I with HER-2 positive or TNBC, II, IIIA, IIIB, IVA, after lumpectomy or mastectomy and surgical axillary staging with >4 positive axillary nodes. -Inflammatory or non-inflammatory locally advanced breast cancers (LABC) – instead of and not in addition to CT scan and bone scan. - Equivocal CT+ bone scan results; -Restaging -Assessment of multi-focal disease or suspected recurrence in patients with dense breasts. -Detect unsuspected regional nodal disease. -Equivocal CT+ bone scan results. -Check response to therapy.	**Occult Primary Cancer**	-Diagnosis and staging only when all the other imaging studies failed to identify the primary site.
Cervical Cancer	-For staging before chemo-radiation, -Restaging if supraclavicular, pelvic and para-aortic nodes are positive. -Follow up indicated every 6-12 months for the first 2 years for local-regional failure.	**Ovarian Cancer**	Restaging Follow up for stage I-IV (clinical response) for clinical relapse and /or rising CA-125 with or without previous chemotherapy.
Colon Cancer	- Staging and restaging. - When elevated serial CEA and negative examination and conventional studies. - For documented metachronous metastasis by CT, MRI and/or biopsy (resectable type). -Assessment of treatment response in patients with rectal carcinoma post (chemo) radiotherapy with indeterminate findings on other imaging.	**Pancreatic Cancer**	-To detect extra-pancreatic metastases. -For radiation therapy treatment planning.

Gastric Cancer	-Staging If unknown M1 disease. -Restaging -Radiation treatment planning.	**Prostate Cancer**	- FDG PET/CT not to be used routinely. -11C choline PET following prostatectomy or radiation therapy.
Gall Bladder Cancer	-For gall bladder CA and cholangiocarcinoma: may be useful in detection of regional and distant nodal metastatic disease.	**Penile Cancer**	-If palpable inguinal lymph nodes. -Staging of selected patients considered for radical treatment.
Head & Neck Cancers (excluding CNS and Thyroid)	-Staging for III-IV disease. -Restaging (further cross – sectional imaging is optional) -Post –treatment evaluation (minimum 12 weeks after completion of therapy).	**Rectal Cancer**	-Restaging for elevated serial CEA, -Elevated serial CEA and negative examination & conventional studies. -For documented metachronous metastasis by CT, MRI and/or biopsy (resectable). - To assessment of response to treatment in patients who receive neoadjuvant chemo-radiotherapy prior to surgery, and in patients with metastatic disease.
Hepatobiliary System	-To evaluate metastasis. - To use for assessment of response to treatment in patients with metastatic disease.	**Soft Tissue Sarcoma**	-Staging prior to resection of a solitary metastasis, or for grading un-resectable lesions when histopathological grading is in doubt. - To determine treatment response for gastrointestinal stromal tumours after 2-4 weeks of therapy.
Lung Cancer (small cell	-Staging and restaging. - Assessment of response to chemotherapy and/Radiation therapy planning when CECT is C/I. - For routine surveillance/ recurrence.	**Solitary Pulmonary Nodule (SPN)**	-Pulmonary nodule(s) greater than 1 cm in diameter but not exceeding 4cm on CT and/or MRI. -If PET scan is negative then biopsy is not considered medically necessary. -To determine the malignancy and to plan the management of the same.
Lung Cancer (non- small cell)	-Staging with no obvious extensive disease.	**Testicular Cancer** (Seminomas only)	- Staging after orchiectomy and primary treatment 6 weeks after post-chemotherapy. - Also indicated in seminoma with LN positive disease
Lymphoma	-Staging	**Thymic Malignancies**	-Diagnosis and staging of mediastinal mass.

	-Restaging for early/interim, also after completion of chemotherapy and radiation therapy (to assess treatment response). -Assist in directing nodal biopsy if Richer's transformation is suspected in CLL/SLL.	**Thyroid Cancer**	-Staging only anaplastic thyroid carcinoma. -Restaging if thyroglobulin level is >2-5ng/ml and I-131 imaging is negative in papillary, follicular and Hurthle cell carcinoma.
Merkel Cell Carcinoma (Non-melanoma skin cancer)	-Staging only in distant metastasis and in positive lymph node.	**Uterine Neoplasm**	-Staging endometrial carcinoma and restaging as clinically indicated.
Malignant Pleural Mesothelioma	-Staging I-III to evaluate metastasis. -Radiation therapy planning, before pleurodesis. -To use for assessment of response to treatment in patients with metastatic disease.	**Vulvar Squamous Cell Carcinoma**	-Staging, restaging and treatment planning.

PET scan not recommended/recognized:

Condition	PET not recommended	Condition	PET not recommended
Blood Cancer	**Acute** and Chronic Myeloid Leukaemia(AML & CML) **Acute** Lymphocytic Leukaemia (ALL)	**Multiple Myeloma**	Systemic Light Chain Amyloidosis, Walden storm Macroglobulinemia, Lymphoblastic Lymphoma.
Breast Cancer	-Non-invasive Breast Cancer.	**Neuroendocrine**	Carcinoid Tumours and Neuroendocrine Tumours of Known Primary Site: PET not recommended for staging, restaging or routine surveillance.
Bladder Cancer	- PET CT scan is also recommended in MIBC useful in patients with ≥cT2 disease and may change management treatment in patients with ≥cT3 disease. **Exception: -** Bone scan recommended for staging if ALP elevated or symptoms, and in	**Non- melanoma**	Basal and squamous cell skin cancers Dermatofibrosarcoma protuberans.

	patients with metastatic disease.		
Kidney Cancer	**Exception:** Staging, Metastasis	**Myelodysplastic syndrome**	Not recognized.
Testicular Cancer	Non-seminoma only.	**Soft Tissue Sarcoma**	Retroperitoneal/Abdominal Sarcomas, Desmoids Tumour.
Bone Cancer	Chondrosarcoma only.	**Pancreatic Cancer**	**Exception: -** In high-risk patients to detect extra pancreatic metastasis after other inconclusive imaging results.
Pyrexia of Unknown Origin	Where conventional investigations have not revealed the source. Duration of fever should be at least one week in hospital or at least 3 outpatient visits.		

ONCOLOGICAL APPLICATIONS IN PEDIATRIC (Oncology specifically to Paediatrics)

CONDITION	PET SCAN RECOMMENDED
Hodgkin's lymphoma	• Baseline staging (routine). • Interim response assessment after two cycles of OEPA (routine). • End of treatment assessment (consider). • Clinical suspicion of relapse (consider).
Non-Hodgkin's lymphoma	• Staging. • Response assessment in selected cases. • Suspicion of relapse.
Leukaemia	Cross-sectional imaging performed in case of suspected extra-medullary disease (EMD); 20%-40% of patients with acute myeloid leukaemia have EMD at diagnosis; this is associated with high relapse rates. FDG PET-CT aids in detecting EMD, especially in the case of subclinical multifocal disease; however, the lack of definitive treatment options limits the clinical use of PET.
Osteosarcoma	• FDG PET/CT is the most accurate imaging technique for staging apart from the lungs (superior accuracy for bone metastases). • Thin slice chest CT in full inspiration required for lung metastases. • End-of-treatment FDG PET-CT usually not done, assessment based on histology. However, initial reports suggest decreased FDG avidity in primary osteosarcoma correlates with histological response. • Value of interim FDG PET-CT not proven (no alternative chemotherapy alters outcome in poorly responding osteosarcomas). • Possible role of FDG PET-CT in relapse to define extent of disease (probably more accurate than CT, especially in peri-prosthetic recurrence)
Ewing's sarcoma	• At staging, FDG PET-CT more sensitive to detect metastatic disease, apart from the lungs (chest CT required). • Conflicting results on the use of PET-CT in predicting response to chemotherapy; further research is needed.

Soft tissue sarcoma	• Rhabdomyosarcoma (RMS, four histological subtypes) includes over 50% of soft tissue sarcomas. • Sites of metastatic disease: lungs, loco-regional lymph nodes, bone marrow and cortical bone. • Outcome linked to site and number of metastases - routine FDG PET-CT at staging (lymph nodes, bone marrow and cortical bone) recommended, more sensitive than CT3,5,6; dedicated thin slice chest CT for assessment of possible lung disease required. Parametric PET factors (SUVmax, MTV, TLG) not predictive of poor prognosis.
Brain tumours	• To improve diagnostic yield from biopsy to assess the histological grade – Glioblastomas and medulloblastomas show high grade FDG uptake – Brain stem gliomas have low-grade uptake – Ependymomas have low-grade uptake. • FDG PET can improve tumour delineation when co-registered with MRI. • To distinguish between residual disease or recurrence. • Superior accuracy of amino-acid analogue PET-CT (e.g., choline, L-dihydroxyphenylalanine ([18F]fluorodopa), [18F]F-fluoroethyl-L-tyrosine, 11C-methionine), with a higher tumour-to-background ratio than FDG
Neuroblastoma	• Valuable role of FDG PET-CT in mIBG negative neuroblastoma. • FDG PET-CT: higher sensitivity but lower specificity than mIBG: biopsy may be needed for soft tissue lesions. • Small volume bone marrow involvement may be missed with both FDG PET-CT and mIBG SPECT-CT: bone marrow biopsy needed. • FDG PET-CT may be a better predictor of PFS than mIBG.13 § 123I-mIBG still gold standard after chemotherapy (FDG PET-CT less sensitive and specific for bone/bone marrow disease). • mIBG positive neuroblastomas can become mIBG negative; problem-solving role of FDG PET-CT in these cases. • [18F] F-fluorophenyl-alanine (F-DOPA) and [68Ga]Ga-somatostatin receptor (SSR) analogues are alternative PET tracers, not widely available yet, with higher sensitivity compared to FDG PET-CT and 123I-mIBG SPECT-CT. • [18F] F-meta-fluorobenzylguanidine (MFBG) new promising tracer.
Wilms' tumour	• Limited data on FDG PET-CT – May predict tumour viability after neoadjuvant chemotherapy – May detect more sites of disease at relapse versus MRI. • Current, problem-solving role for restaging relapsed patients.
Langerhans cell histiocytosis (LCH)	• Single or several lesions (involving a single or multiple body systems). • Prognosis determined by organ involvement and treatment response. • FDG PET-CT appears to be highly sensitive for staging and response assessment with a low false-positive rate.
Germ cell tumour	As a problem-solving tool at staging, biopsy guidance, assessment of residual metabolic activity and recurrence detection.
Hepatoblastoma	Currently limited role for FDG PET-CT in the detection of suspected tumour relapse with negative conventional imaging and rising blood serum alpha-fetoprotein

Stage	Coverage Criteria
Diagnosis:	PET is covered only in clinical situations in which PET results may assist: - - In avoiding an invasive diagnostic procedure. - In determining the anatomical site to perform an invasive diagnostic procedure. - For most solid tumours a tissue diagnosis is done prior to PET scan. PET scans following a tissue diagnosis are generally performed for staging rather than diagnosis.
Staging	PET is covered for staging in clinical situations in which - When the stage of cancer remains in doubt after completion of standard diagnostic workup (including conventional imaging like CT, MRI, or ultrasound. -When conventional study information is insufficient for planning the management of the patient (Management plan is dependent on the stage of cancer)
Restaging	-When conventional study information is insufficient for planning the management of the patient. -PET can potentially replace one or more conventional imaging studies. - To detect the residual disease, suspected recurrence and extend of a known recurrence or metastasis after completion of treatment (e.g., Chemotherapy or radiation therapy)
Monitoring	To monitor tumour response to treatment during the planned course of therapy.

3.2 Requirements for Coverage

ICD and CPT codes must be coded to the highest level of specificity.

3.3 Non-Coverage

- Daman does not cover PET scan for the Visitor's Plan.
- Daman does not cover all the diagnosis and services considered to experimental or investigational for doing PET scans.
- Daman does not cover PET scan in neurological conditions (e.g., Alzheimer's disease, Dementia, Parkinson's disease etc.) as it is considered experimental and investigational because of insufficient data and evidence of its effectiveness for treatment.
- PET scans are not recommended for routine screening purposes.

3.4 Payment and Coding Rules

Please apply HAAD payment rules and regulations and relevant coding manuals for ICD, CPT, etc.

4. Denial Codes

Code	Code Description
MNEC-003	Service is not clinically indicated based on good clinical practice.
MNEC-004	Service is not clinically indicated based on good clinical practice, without additional supporting diagnosis/activities.
AUTH-001	Prior approval is required and was not obtained
AUTH-005	Claim information is inconsistent with pre-certified/ authorized services
NCOV-003	Service(s) is (are) not covered.

5. Appendices

Questionnaire:

https://www.damanhealth.ae/main/pdf/support/Questionnaire/PETScanPre-AuthorizationForm.pdf

5.1 References

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5.2 Revision History

Date	Change(s)
01-07-2013	V 1.1: New template Change: Post chemo coverage Added: ICD-10 and CPT 2012
15-07-2014	1. V 2.0 2. Disclaimer updated as per system requirements 3. Ovarian cancer coverage information rephrased for easier understanding 4. Authorization requirements added.
27-11-2017	1. V 3.0 2. Oncological and Non-oncological indications revised with grading as per NCCN.
01-09-2023	Updated : 1. Oncological Indications 2. Non-oncological indications 3. Pediatric Indications