

# GUIDE TO PET/CT



SIEMENS



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# PET/CT STUDIES EXPLAINED

**A PET/CT is a nuclear medicine scan which shows the metabolic function of an organ or tissue as well as structural images of the organ in 3D. This makes detecting even the smallest lesion a lot easier for our nuclear medicine specialists.**

In 2009 Queensland X-Ray installed its first PET/CT camera at Mater Private Hospital Brisbane. This was one of very few cameras that existed in Brisbane at the time.

PET stands for Positron Emission Tomography. It uses a small amount of radioactive material, known as a tracer which is injected into a vein and is absorbed into organs and tissues. The combination of PET and CT has been proven to be extremely sensitive for detecting the early stages of disease, and can pick up abnormalities even in the absence of structural change. Small tumours may be found even if they are undetectable by other imaging procedures or CT alone. This can have a major impact on choosing the best treatment for patients. PET/CT information can be used to determine what combination of surgery, radiation therapy and chemotherapy is most likely to be effective in managing a patient's cancer. PET/CT can also help to monitor the effectiveness of therapy and assist planning for surgery and radiotherapy.



**To find out more about the PET procedures we offer, please scan the QR code or visit [www.qldxray.com.au/services/pet-ct](http://www.qldxray.com.au/services/pet-ct)**

## RADIOPHARMACEUTICALS

Type of Radiopharmaceutical	Imaging
<b>18F-FDG</b>	Various types of cancers, tumours, infection, epilepsy, Alzheimer's disease/dementia
<b>68Ga-PSMA</b>	Prostate cancer
<b>18F-PSR</b>	Prostate cancer
<b>68Ga-DOTATATE</b>	Neuroendocrine tumours
<b>18F-FET</b>	Glioma, radiation induced necrosis

# CONTRAST ENHANCED DIAGNOSTIC CT

At Queensland X-Ray our nuclear medicine specialists strive for service excellence and aim to provide the most accurate diagnostic reports for our PET/CT patients. Alongside the convenience of a 'one-stop-shop' for patients, we recognise a significant increase in the sensitivity and specificity of PET studies performed with contrast enhanced diagnostic CT, when compared with low dose CT only. Furthermore, the risk of missing crucial oncological diagnostic information far exceeds any risks associated with additional radiation exposure from CT. Thus, we look to perform relevant contrast enhanced diagnostic CT series with most PET studies.

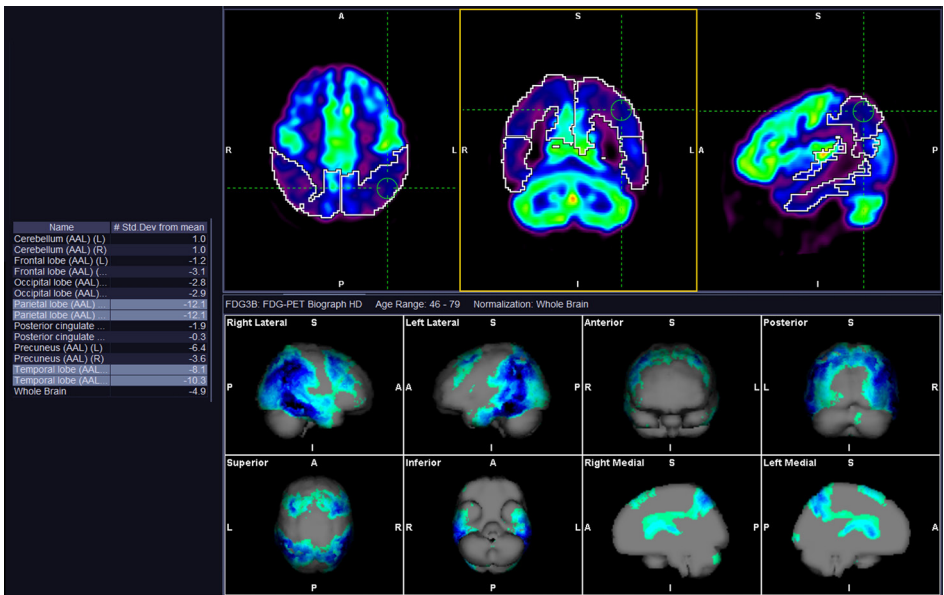
## TYPES OF PET/CT SCANS

### Brain

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61559	Epilepsy	2.5	Performed for the evaluation of refractory epilepsy which is being evaluated for surgery
61538	Brain tumour - restaging/ recurrence	2.5	Evaluation of suspected residual or recurrent malignant brain tumour based on anatomical imaging findings, after definitive therapy (or during ongoing chemotherapy) in patients who are considered suitable for further active therapy
61560	Alzheimer's disease	2.5	Performed for the diagnosis of Alzheimer's disease if: a) Clinical evaluation of the patient by a specialist, or in consultation with a specialist, is equivocal b) The service includes a quantitative comparison of the results of the study with the results of an FDG PET from a normal database c) An FDG PET (Alzheimer's 61560) service has not been performed in the last 12 months d) A service to which item 61402 (Ceretek brain scan) has not been performed in the last 12 months e) Patient has not had an Alzheimer's FDG scan more than 3 times in their lifetime

## Brain (cont.)

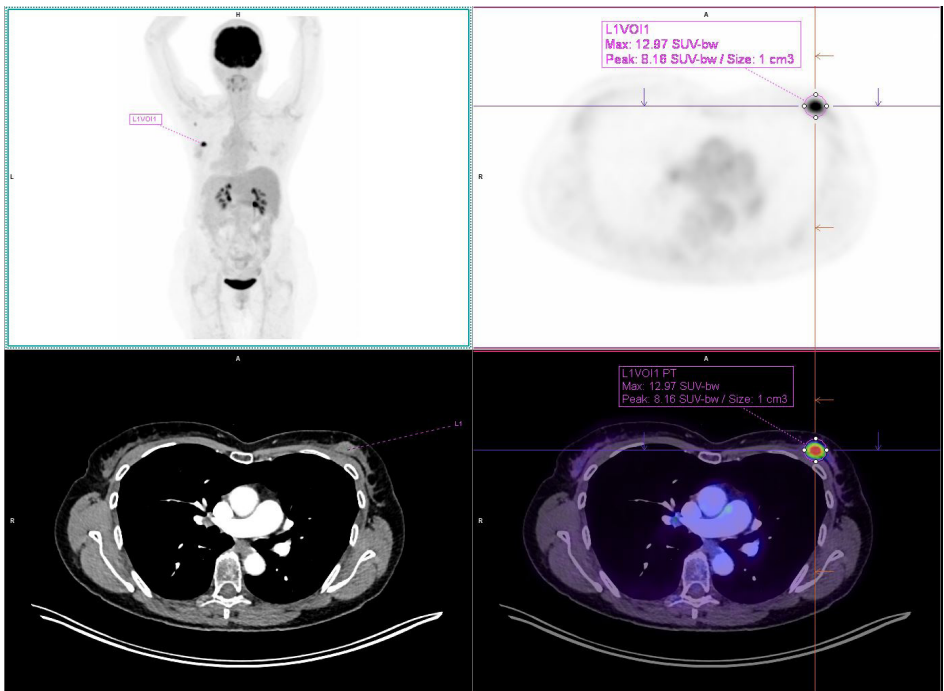
Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
<b>FDOPA (No rebate)</b>	Parkinson's disease, NETs	2.5	FDOPA PET (fluorodopa) is a specialised imaging technique that allows visualisation of dopamine synthesis and transport in the brain, crucial for evaluating dopaminergic function in conditions like Parkinson's disease
<b>Amyloid (No rebate)</b>	Early Alzheimer's	2.5	Amyloid PET is a neuroimaging technique utilised to detect the accumulation of amyloid plaques in the brain, aiding in the diagnosis and monitoring of neurodegenerative diseases such as Alzheimer's
<b>PET FET (No rebate)</b>	Glioma, radiation induced necrosis	2.5	Performed for the differentiate of recurrent glioma and surgical scarring/ radiation induced necrosis



PET/CT brain Alzheimer's database comparison screenshot

# Breast

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61524	Initial staging Stage 3—local spread	2.5	For staging of locally advanced ( <b>stage III only</b> ) breast cancer in a patient considered suitable for active therapy
61525	Restaging, recurrence	2.5	Evaluation of suspected metastatic or suspected locally or regionally recurrent breast carcinoma in a patient considered suitable for active therapy. <b>Patient must be having treatment or is being considered for treatment—must NOT be palliative</b>



PET/CT Imaging for Breast Cancer with SUV Uptake

## Cervix

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61571	Initial staging	2.5	Primary staging of patients with <b>biopsy proven carcinoma of the uterine cervix</b> , at FIGO stage IB2 or greater by conventional staging, prior to planned radical radiation therapy or combined modality therapy with curative intent
61575	Restaging after confirmed recurrence	2.5	<b>Further staging of patients with confirmed local recurrence of carcinoma of the uterine cervix</b> considered suitable for salvage pelvic chemoradiotherapy or pelvic exenteration with curative intent

## Colorectal

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61541	Staging, restaging, recurrence,	2.5	<b>Evaluation of suspected residual, metastatic, or recurrent colorectal carcinoma</b> in patients considered suitable for active therapy

## Head/Neck

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61598	Initial staging/ recurrence	2.5	<b>Staging of biopsy proven</b> newly diagnosed or recurrent head and neck cancer
61604	Restaging following initial therapy	2.5	Evaluation of patients with <b>suspected residual head and neck cancer</b> after definitive treatment, and are suitable for active therapy
61610	Metastatic SCC of cervical nodes	2.5	Evaluation of <b>metastatic squamous cell carcinoma of an unknown primary site</b> involving cervical nodes



## Lung

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61529	Non small cell lung carcinoma (NSCLC)	2.5	<b>Staging, restaging or recurrence of proven NSCLC</b> where curative radiotherapy is planned
61523	Solitary pulmonary nodule	2.5	Lesion must be <b>unsuitable for biopsy</b> , or for which pathological characterisation has failed

## Lymphoma

Includes chronic lymphocytic leukaemia (CLL) and small lymphocytic leukaemia (SLL)

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61620	Initial staging	2.5	<b>Initial staging</b> newly diagnosed or previously untreated Hodgkin's or non-Hodgkin's lymphoma (excludes indolent non-Hodgkin's lymphoma)
61622	Restaging—following therapy response	2.5	<b>Assess response to first line therapy</b> either during treatment or within 3 months of completing definitive first line treatment for Hodgkin's or non-Hodgkin's lymphoma (excludes indolent non-Hodgkin's lymphoma)
61632	Restaging—following chemotherapy	2.5	<b>Assess response to second line chemotherapy where stem cell transplantation is being considered</b> for Hodgkin's or non-Hodgkin's lymphoma (excluding indolent non-Hodgkin's lymphoma)
61628	Recurrence	2.5	<b>Restaging following confirmation or recurrence</b> of Hodgkin's or non-Hodgkin's lymphoma (excludes indolent non-Hodgkin's lymphoma)

## Rare or Uncommon Cancer

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61612	Initial Staging	2.5	Initial staging of a rare or uncommon cancer (less than 12 cases per 100,000 persons per year) for a patient who is considered suitable for active therapy

## Melanoma

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61553	Following initial therapy for restaging or recurrence	2.5	<b>Evaluation of suspected metastatic or recurrent malignant melanoma</b> in patients considered suitable for active therapy

## Neuroendocrine tumours (DOTATATE)

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61647	Staging, restaging	2.5	Investigation of <b>suspected gastroenteropancreatic neuroendocrine tumour</b> (i.e liver, stomach, pancreas, colon, small intestine, appendix and rectum). Additionally for <b>excluding additional disease sites</b>
PETDOTA	Staging, restaging, recurrence	2.5	Any other part of the body that is not gastroenteropancreatic (e.g carcinoid of the lung, pheochromocytoma)

## Oesophageal

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61577	Staging, restaging, recurrence	2.5	<b>Staging of biopsy proven oesophageal or GEJ carcinoma</b> in patients considered suitable for active therapy

# Ovarian

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61565	Following initial therapy for staging, restaging, recurrence	2.5	<b>Evaluation of suspected residual metastatic or recurrent ovarian carcinoma</b> in patients considered suitable for active therapy

# Prostate (PSMA)

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61563	Initial staging	2.5	Patient must have: <ul style="list-style-type: none"> <li>a) <b>Intermediate to high risk prostate adenocarcinoma</b></li> <li>b) Has previously been untreated; AND</li> <li>c) Is considered suitable for locoregional therapy with curative intent</li> </ul>
61564	Restaging	2.5	Patient must have: <ul style="list-style-type: none"> <li>a) <b>Intermediate to high risk prostate adenocarcinoma</b></li> <li>b) Has undergone prior locoregional therapy and is considered suitable for further locoregional therapy</li> </ul>

**Intermediate risk prostate adenocarcinoma is defined as having at least one of the following risk factors:**

- ▷ PSA of 10-20ng/ml
- ▷ Gleason score of 7
- ▷ International Society of Urological Pathology (ISUP) grade group 2, 3, or stage T2b

**High risk prostate adenocarcinoma is defined as having at least one of the following risk factors:**

- ▷ PSA >20ng/ml
- ▷ Gleason score > 7
- ▷ ISUP grade group 4, 5, or stage T2c or ≥T3

## Sarcoma—bone/soft tissue

Item number (MBS)	Reason to refer	Procedure duration (hrs)	Condition
61640	Initial staging	2.5	<b>Staging of biopsy proven bone or soft tissue sarcoma</b> (excluding gastrointestinal stromal tumour (GIST)) considered by conventional staging to be potentially curable
61646	Restaging, recurrence	2.5	<b>Suspected residual or recurrent sarcoma</b> (excluding gastrointestinal stromal tumour (GIST)) after the initial course of definite therapy to determine suitability for subsequent therapy with curative intent

## CONTRAST ADMINISTRATION

CT contrast is given for all PET/CT scans unless indicated otherwise. Contradictions include allergies to contrast (mild-moderate allergies can be given pre-medication to manage) or severely impaired renal function. An eGFR  $\geq 25$  is required for contrast injection. If the patient is on dialysis, contrast can be administered if dialysis is done later that day.

## CLAUSTROPHOBIC PATIENTS

Patients can be scanned 'head first' so that their head is not within the machine for as long. Diazepam (Valium) or Lorazepam (Ativan) can be prescribed by the doctor, however the patient will need a driver to take them home after the procedure has ended.

*Sedative cannot be prescribed to brain patients as this can affect FDG uptake.*

## DIABETIC PATIENTS

It is important to note there is some dietary preparation required prior to the scan (which includes fasting).

Diabetic patients will be contacted by our department to discuss their treatment and dietary preparation as the PET/CT study requires stable blood sugar levels.

# RADIATION DOSE EXPLAINED

## Natural levels of radiation

Radiation is naturally occurring and is everywhere, e.g. sand at the beach, the stones in the ground, the food that we eat, the light from the sun. Every day we are exposed to small amounts of radiation and we don't even know it.

## Is radiation safe?

Radiation can be dangerous in large quantities. In PET/CT the amount of radiation that is received by the patient for the PET component is approximately 5mSv.

The amount of radiation that is deemed to be dangerous are doses above 100mSv in one event.

Activity	Radiation Dose
<b>Daily natural background radiation in Australia</b> (From minerals in the ground, and light from the sun etc.)	0.0055mSv
<b>Annual natural background radiation in Australia</b> (From minerals in the ground, and light from the sun etc.)	2mSv
<b>Cosmic radiation exposure during a return flight to the UK</b> (Radiation from space that would normally be blocked by the earth's atmosphere)	0.200mSv
<b>Patient dose for a PET scan</b>	5mSv
<b>Chest/Abdomen/Pelvis CT scan</b>	25mSv

## Queensland X-Ray employs a number of highly experienced nuclear medicine specialists across the state.

Please feel free to contact them to discuss results or the best imaging pathways for your patients.



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**Director of Nuclear Medicine**  
**MBBS, FRACP, FAANMS**

**(07) 3840 6259**

Dr Webb graduated from the University of Queensland in 1993. He completed his medical registrar training and advanced physician training in nuclear medicine at Royal Brisbane and Women's Hospital. Dr Webb is a fellow of the Australasian Association of Nuclear Medicine Specialists (AANMS) and has PET credentials and full accreditation with RACP JSAC Nuclear Medicine. Dr Webb joined Queensland X-Ray in 2008.

**AREAS OF SPECIAL INTEREST:**

Nuclear medicine, oncology imaging, nuclear cardiology, PET/CT and theranostics.



To find a full list of our highly experienced nuclear medicine specialists, please scan the QR code or visit [www.qldxray.com.au/services/nuclear-medicine](http://www.qldxray.com.au/services/nuclear-medicine)

Welcome to  
**QueenslandXRay**  
Taringa PET/CT



## PET/CT LOCATIONS



**Townsville**



**Toowoomba**



**Cairns**



**Brisbane**



For detailed information on locations and billing,  
please scan the QR code or visit  
[qldxray.com.au/billing-guide](http://qldxray.com.au/billing-guide)

For fast and direct access to Queensland X-Ray,  
please contact our Referrer Help Desk on  
**1800 77 99 77**



