

Clinical indications for positron emission tomography

	Indicated	Not indicated routinely (but may be helpful)	Not indicated
Oncology applications			
Brain and spinal cord	<ul style="list-style-type: none"> ▶ Suspected tumour recurrence when anatomical imaging is difficult or equivocal and management will be affected. Often a combination of methionine and FDG PET scans will need to be performed. (B) ▶ Benign versus malignant lesions, where there is uncertainty on anatomical imaging and a relative contraindication to biopsy. (B) ▶ Investigation of the extent of tumour within the brain or spinal cord. (C) 	<ul style="list-style-type: none"> ▶ Secondary tumours in the brain. (C) ▶ Assess tumour response to therapy. (C) <p>Note: See key at end of document for grade of evidence (A) (B) and (C)</p>	
Parotid	<ul style="list-style-type: none"> ▶ Identification of metastatic disease in the neck from a diagnosed malignancy. (C) 		<ul style="list-style-type: none"> ▶ Differentiation of Sjogrens Syndrome from malignancy in the salivary glands. (C) ▶ Primary tumour of the parotid to distinguish benign from malignant disease. (C)
Malignancies of the oropharynx	<ul style="list-style-type: none"> ▶ Identify extent of the primary disease with or without image registration. (C) ▶ Identify tumour recurrence in previously treated carcinoma. (C) 	<ul style="list-style-type: none"> ▶ Preoperative staging of known oropharyngeal tumours. (C) ▶ Search for primary with nodal metastases. (C) 	
Larynx	<ul style="list-style-type: none"> ▶ Identify tumour recurrence in previously treated carcinoma. (C) 	<ul style="list-style-type: none"> ▶ Staging known laryngeal tumours. (C) ▶ Identification of metastatic disease in the neck from a diagnosed malignancy. (C) 	

	Indicated	Not indicated routinely (but may be helpful)	Not indicated
Thyroid	<ul style="list-style-type: none"> ▶ Assessment of patients with elevated thyroglobulin and negative iodine scans for recurrent disease. (B) 	<ul style="list-style-type: none"> ▶ Assessment of tumour recurrence in medullary carcinoma of the thyroid. (C) 	<ul style="list-style-type: none"> ▶ Routine assessment of thyroglobulin positive recurrence with radioactive uptake. (C)
Parathyroid		<ul style="list-style-type: none"> ▶ Localisation of parathyroid adenomas with methionine when other investigations are negative. (C). 	
Lung	<ul style="list-style-type: none"> ▶ Differentiation of benign versus malignant lesions where anatomical imaging or biopsy are inconclusive or there is a relative contraindication to biopsy. (A) ▶ Preoperative staging of non small cell primary lung tumours. (A) ▶ Assessment of recurrent disease in previously treated areas where anatomical imaging is unhelpful. (C) 	<ul style="list-style-type: none"> ▶ Assessment of response to treatment. (C) 	
Oesophagus	<ul style="list-style-type: none"> ▶ Staging of primary cancer. (B) ▶ Assessment of disease recurrence in previously treated cancers. (C). 	<ul style="list-style-type: none"> ▶ Assessment of neoadjuvant chemotherapy. (C) 	
Stomach	<ul style="list-style-type: none"> ▶ No routine indication. (C) 	<ul style="list-style-type: none"> ▶ Assessment of gastro-oesophageal malignancy and local metastases. (C) 	
Small bowel	<ul style="list-style-type: none"> ▶ No routine indication. (C) 	<ul style="list-style-type: none"> ▶ Proven small bowel lymphoma to assess extent of disease. (C) 	
Breast cancer	<ul style="list-style-type: none"> ▶ Assessment & localisation of brachial plexus lesions in breast cancer. (Radiation effects versus malignant infiltration.) (C) ▶ Assessment of the extent of disseminated breast cancer. (C) 	<ul style="list-style-type: none"> ▶ Axillary node status where there is a relative contraindication to axillary dissection. (C) ▶ Assessment of multifocal disease within the difficult breast (dense breast or equivocal radiology). (C) ▶ Suspected local recurrence. (C) ▶ Assessment of chemotherapy response. (C) 	<ul style="list-style-type: none"> ▶ Routine assessment of primary breast cancer. (C)

	Indicated	Not indicated routinely (but may be helpful)	Not indicated
Liver: primary lesion			▶ Routine assessment of hepatoma. (C)
Liver: secondary lesion	<ul style="list-style-type: none"> ▶ Equivocal diagnostic imaging (CT, MRI, ultrasound). (C) ▶ Assessment pre and post therapy intervention. (C) ▶ Exclude other metastatic disease prior to metastectomy. (C) 		
Pancreas		<ul style="list-style-type: none"> ▶ Staging a known primary. (C) ▶ Differentiation of chronic pancreatitis from pancreatic carcinoma. (C) ▶ Assessment of pancreatic masses to determine benign or malignant status. (C) 	
Colon and rectum	<ul style="list-style-type: none"> ▶ Assessment of recurrent disease. (A) ▶ Prior to metastectomy for colorectal cancer. (C) 	<ul style="list-style-type: none"> ▶ Assessment of tumour response. (C) ▶ Assessment of a mass that is difficult to biopsy. (C) 	<ul style="list-style-type: none"> ▶ Assessment of polyps (C) ▶ Staging a known primary. (C)
Renal and adrenal	<ul style="list-style-type: none"> ▶ Assessment of possible adrenal metastases. (C) 	<ul style="list-style-type: none"> ▶ Paraganglionomas or metastatic phaeochromocytoma to identify sites of disease. (C) 	<ul style="list-style-type: none"> ▶ Assessment of renal carcinoma. (C) ▶ Phaeochromocytoma – MIBG scanning is usually superior. (C)
Bladder	<ul style="list-style-type: none"> ▶ No routine indication. (C) 	<ul style="list-style-type: none"> ▶ Staging a known primary in selected cases. (C) ▶ Recurrence with equivocal imaging. (C) 	
Prostate			▶ FDG in prostate cancer assessment. (C)
Testicle	<ul style="list-style-type: none"> ▶ Assessment of recurrent disease from seminomas and teratomas. (B) ▶ Assessment of residual masses. (B) 	<ul style="list-style-type: none"> ▶ Assessment of primary tumour staging. (C) 	
Ovary	<ul style="list-style-type: none"> ▶ In difficult management situations to assess local and distant spread. (C) 		

	Indicated	Not indicated routinely (but may be helpful)	Not indicated
Uterus: cervix	▶ No routine indication. (C)	▶ In difficult situations to define the extent of disease with accompanying image registration. (C)	
Uterus: body	▶ No routine indication. (C)		
Lymphoma	<ul style="list-style-type: none"> ▶ Staging of Hodgkin’s lymphoma. (B) ▶ Staging of non-Hodgkin’s lymphoma. (B) ▶ Assessment of residual masses for active disease. (B) ▶ Identification of disease sites when there is suspicion of relapse from clinical assessment. (C) ▶ Response to chemotherapy. (C) 	<ul style="list-style-type: none"> ▶ Assessment of bowel lymphoma. (C) ▶ Assessment of bone marrow to guide biopsy. (C) ▶ Assessment of remission from lymphoma. (C) 	
Musculoskeletal tumours	<ul style="list-style-type: none"> ▶ Soft tissue primary mass assessment to distinguish high grade malignancy from low or benign disease. (B) ▶ Staging of primary soft tissue malignancy to assess nonskeletal metastases. (B) ▶ Assessment of recurrent abnormalities in operative sites. (B) ▶ Assessment of osteogenic sarcomas for metastatic disease. (C) ▶ Follow up to detect recurrence of metastases. (B) 	▶ Image registration of the primary mass to identify optimum biopsy site. (C)	
Skin tumours	<ul style="list-style-type: none"> ▶ Malignant melanoma with known dissemination to assess extent of disease. (B) ▶ Malignant melanoma in whom a sentinel node biopsy was not or can not be performed in stage II. (AJCC updated classification.) (C) 	▶ Staging of skin lymphomas. (C)	▶ Malignant melanoma with negative sentinel node biopsy. (B)
Metastases from unknown primary	▶ Determining the site of an unknown primary when this influences management. (C)		▶ Widespread metastatic disease when the determination of the site is only of interest. (C)

	Indicated	Not indicated routinely (but may be helpful)	Not indicated
Cardiac applications			
	<ul style="list-style-type: none"> ▶ Diagnosis of hibernating myocardium in patients with poor left ventricular function prior to revascularisation procedure. (A) ▶ Patients with a fixed SPET deficit who might benefit from revascularisation. (B) ▶ Prior to referral for cardiac transplantation. (B) 	<ul style="list-style-type: none"> ▶ Diagnosis of coronary artery disease or assessment of known coronary stenosis where other investigations (SPECT, ECG, etc) remain equivocal. (B) ▶ Differential diagnosis of cardiomyopathy (ischaemic versus other types of dilated cardiomyopathy). (C) ▶ Medical treatment of ischaemic heart disease in high risk hyperlipidemic patients. (C) 	<ul style="list-style-type: none"> ▶ Patients with confirmed coronary artery disease in whom revascularization is not contemplated or indicated. (C) ▶ Routine screening for coronary artery disease. (C)
Neuropsychiatry applications			
	<ul style="list-style-type: none"> ▶ Presurgical evaluation of epilepsy. (B) ▶ Suspected recurrence or failed primary treatment of primary malignant brain tumours. (Most of these patients will have had MRI and CT with equivocal results). (B) ▶ Early diagnosis of dementia (especially younger patients and Alzheimer's disease) when MRI or CT is either normal, marginally abnormal or equivocally abnormal. (B) 	<ul style="list-style-type: none"> ▶ The grading of primary brain tumour. (B) ▶ Localisation of optimal biopsy site (either primary or recurrent brain tumour). (C) ▶ Differentiating malignancy from infection in HIV subjects where MRI is equivocal. (C) 	<ul style="list-style-type: none"> ▶ Diagnosis of dementia where MRI is clearly abnormal. (C) ▶ Most instances of stroke. (C) ▶ Most psychiatric disorders other than early dementia. (C) ▶ Pre-symptomatic or at risk Huntingdon's disease. (C) ▶ Diagnosis of epilepsy. (C)

	Indicated	Not indicated routinely (but may be helpful)	Not indicated
Miscellaneous applications			
Disease assessment in HIV and other immunosuppressed patients	<ul style="list-style-type: none"> ▶ Identification of sites to biopsy in patients with pyrexia. (C) ▶ Differentiating benign from malignant cerebral pathology. (B) 	<ul style="list-style-type: none"> ▶ Routine assessment of weight loss where malignancy is suspected. (C) 	
Assessment of bone infection		<ul style="list-style-type: none"> ▶ Assessment of bone infection associated with prostheses. (C) ▶ Assessment of spinal infection or problematic cases of infection. (C) 	
Assessment of bone metastases		<ul style="list-style-type: none"> ▶ When bone scan or other imaging is equivocal. (C) 	
Assessment of tumour recurrence in the pituitary		<ul style="list-style-type: none"> ▶ Identifying recurrent functional pituitary tumours when anatomical imaging has not been successful. (C) 	
Fever of unknown origin		<ul style="list-style-type: none"> ▶ Identifying source of the fever of unknown origin. (C) 	

The strength of the evidence is classified as:

- A. Randomised controlled clinical trials, meta-analysis, systematic reviews.
- B. Robust experimental or observational studies.
- C. Other evidence where the advice relies on expert opinion and has the endorsement of respected authorities.