PET Six-Month Monitoring Report 2012-1

Evidence from Primary Studies and Systematic Reviews and Recommendations from Clinical Practice Guidelines June 2011 to July 2012

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QUESTION

What is the role of positron emission tomography (PET) in clinical management of patients with cancer, with respect to:

- Diagnosis and staging
- Assessment of treatment response
- Detection and restaging of recurrence
- Evaluation of metastasis

Outcomes of interest are survival, quality of life, prognostic indicators, time until recurrence, safety outcomes (e.g., avoidance of unnecessary surgery), and change in clinical management.

INTRODUCTION

In 2010, the Ontario Positron Emission Tomography (PET) Steering Committee (the Committee) requested that Program in Evidence-Based Care (PEBC) provide regular updates to the Committee of recently published literature reporting on the use of PET in patients with cancer. The PEBC recommended a regular monitoring program be implemented, with a systematic review of recent evidence conducted every 6 months. The PET Steering Committee approved this proposal, and this report is the third of what will be many 6-month monitoring reports. This report is intended to be a high-level, brief summary of the identified evidence, and not a detailed evaluation of its quality and relevance.

METHODS

Literature Search Strategy

Full articles and abstracts published between June 2011 and July 2012 were systematically searched through MEDLINE and EMBASE for evidence from primary studies and systematic reviews. The search strategies used are available on request to the PEBC.

Inclusion Criteria for Clinical Practice Guidelines
Any clinical practice guidelines that contained recommendations with respect to PET were included.

Inclusion Criteria for Primary Studies
Articles were selected for inclusion in the systematic review of the evidence if they were fully published English-language reports of studies that met the following criteria:
1. Studied the use of 18-flurodeoxy-glucose (FDG) PET in cancer in humans
2. Published as a full article in a peer review journal
3. Reported evidence related to change in patient clinical management, or clinical outcomes *OR* reported diagnostic accuracy of PET compared to an alternative diagnostic modality
4. Used a suitable reference standard (pathological and clinical follow-up) when appropriate
5. Included ≥12 patients for prospective study/RCT or ≥50 patients for retrospective study with the cancer of interest.

Inclusion Criteria for Systematic Reviews
1. Reviewed the use of FDG PET/CT in cancer or sarcoidosis
2. Contained evidence related to diagnostic accuracy, change in patient clinical management, clinical outcomes, or treatment response, survival, quality of life, prognostic indicators, time until recurrence, or safety outcome (e.g., avoidance of unnecessary surgery).

Exclusion Criteria
1. Letters and editorials.
2. Studies of non-FDG PET

Study design was not a criterion for inclusion or exclusion.

It should be noted that paediatric studies were included in this report and will be included in subsequent reports. The decision was made by the Ontario PET Steering Committee based on the formation of a Paediatric PET Sub-committee that will explore and report on indications relating to PET in paediatric cancer.

RESULTS
Literature Search Results
Primary studies and systematic reviews
July-Dec 2011
Ninety-nine studies from July to December 2011 met the inclusion criteria. Of these, three were systematic reviews. A summary of the evidence from the 99 studies can be found in Appendix 1A: Summary of Studies from July to December 2011.

Jan-June 2012
Thirty-four studies met the inclusion criteria. A summary of the evidence from the 34 primary studies is presented in the Appendix 1B: Summary of Evidence from January to June 2012. No systematic reviews met the inclusion criteria.

Anal Cancer
July-Dec 2011

Three studies met the inclusion criteria (1-3). When compared to conventional staging [MRI, CT, ultrasound (US)], the addition of FDG PET/CT modified management in 12.5% to 20% of patients. The majority of staging changes were upstaging due to the identification of additional FDG-avid lymph nodes.

Jan-June 2012
One study (4) met the inclusion criteria. The addition of FDG PET/CT upstaged the disease stage in 14% of cases and changed the treatment plan in 17% of cases.

Neuro-Oncology
July-Dec 2011
Two studies met the inclusion criteria (5,8). In primary brain tumours, the addition of new information provided by PET/CT changed the management of patients of 38.2% in a primary brain tumour subgroup and of 35.2% in a brain metastasis subgroup (5). In glioma, FDG uptake on PET/CT scans provided prognostic information on survival (8). Patients with a higher uptake of FDG had a poorer survival compared to patients with a lower uptake.

Jan-June 2012
Two studies met the inclusion criteria (10,11). In the detection of glioma recurrence, when compared to MRI, PET/CT had good specificity and low sensitivity, which was opposite to that of MRI (10). For paragangliomas, FDG PET/CT and 123I-MIBG/SPECT diagnostic accuracies were comparable.

Breast Cancer
July-Dec 2011
Seven studies met the inclusion criteria (12-18). In one well-designed prospective study (13), the addition of FDG PET/CT provided significant management changes in 5.6% of stage IIA patients, for 14.6% of stage IIB patients, and for 27.6% of stage IIIA patients. In two additional studies, PET/CT was found to identify distant metastasis that was not identified with conventional imaging (14,15).

Jan-June 2012
Six studies met the inclusion criteria (19-24). FDG PET/CT identified additional lesions in several cases and led to major treatment changes in 8% to 41% of cases (20,21,24). PET/CT was shown to be superior or comparable to conventional imaging in staging (20,21,24); however, in predicting treatment response, PET/CT's diagnostic accuracy was comparable to conventional imaging (22).

Colorectal Cancer
July-Dec 2011
Nine primary studies and one systematic review met in the inclusion criteria (25-34). Additional information obtained from FDG PET/CT studies changed the management in 8% to 30% of cases (26,29,32). The changes in management were due to the identification of previously unsuspected metastasis and/or correctly clarifying indeterminate lesions. The diagnostic accuracy of FDG PET/CT was superior or comparable to conventional practices (27,28). PET/CT was also shown to be an accurate and non-invasive modality in the postoperative detection of recurrence (25,28,31,34).

Jan-June 2012

Two studies met the inclusion criteria (35,36). PET/CT modified patient management at staging in 34% of cases (35). In the detection of recurrence, PET/CT was shown to be superior to abdominal pelvic CT (37).

Esophageal Cancer

July-Dec 2011

Three primary studies and one systematic review evaluated the role of FDG PET/CT in esophageal cancer (38-41). Additional information provided by FDG PET/CT lead to management changes in 17% to 24% of cases (38,41). When compared to conventional imaging techniques, FDG PET/CT had a superior or comparable performance and was shown to have value in M staging of esophageal cancer.

Jan-June 2012

Two studies met the inclusion criteria (42,43). PET/CT correctly changed the patient management in 18% of cases (42). In T and N staging, PET/CT was found to be more accurate than pathological in patients with and without chemoradiotherapy.

Head and Neck Cancer

July-Dec 2011

The literature encompassed in this timeframe was included in the 2012 update of the Head and Neck Recommendation Report. It can be found at:
https://www.cancercare.on.ca/toolbox/qualityguidelines/other-reports/petrecs/

Jan-June 2012

Three studies evaluated the use of FDG PET/CT in head and neck cancers (44-46). PET/CT was superior to conventional imaging techniques (CT, MRI) in the detection of the primary tumour site (44,46).

Gynaecologic Cancer

July-Dec 2011

Nine studies met the inclusion criteria (47-55). The overall diagnostic accuracy of FDG PET/CT was comparable to conventional methods in the initial staging of ovarian and cervical cancer. In recurrence, one study found the diagnostic accuracy of FDG PET/CT was superior to CT in cervical cancer (51). In the staging of uterine cancer, FDG PET/CT had a higher diagnostic accuracy than did CT (49).

Jan-June 2012

Two studies met the inclusion criteria (56,57). When compared to MRI, both studies found that FDG PET/CT had comparable diagnostic accuracy in ovarian and cervical cancer. However, one study found that PET/CT was superior to MRI in detecting small-to-medium sized (<2 cm) peritoneal implants in ovarian cancer (57).

Haematology

July-Dec 2011

The literature encompassed within this timeframe was included in the 2013 Recommendation Report for PET in Lymphoma. The report can be found at:
https://www.cancercare.on.ca/toolbox/qualityguidelines/other-reports/petrecs/

Jan-June 2012

Two studies met the inclusion criteria (58,59). When compared to conventional bone marrow biopsy, the results obtained from PET/CT scan may omit the need for an invasive bone marrow biopsy (58).

Melanoma

July-Dec 2011

Two studies met the inclusion criteria (60,61). In both studies, FDG PET/CT had a higher diagnostic accuracy and better prognostic power than did conventional tumour markers (S100B).

Jan-June 2012

One study met the inclusion criteria (62). In the clinical management of stage IV and III melanoma, PET/CT revealed metastases in 12% of scans that were not detected by conventional imaging modalities.

Mesothelioma

July-Dec 2011

One study and two systematic reviews met the inclusion criteria (63-65). In diagnosis and staging, PET/CT was shown to have a high diagnostic accuracy when compared to PET alone and other conventional imaging modalities (CT or MRI) (65). However, PET/CT had low sensitivity for stage N2 and T4 disease (65). In the second systematic review, PET accurately upstaged 13% and downstaged 27% of cases initially staged with CT. SUV values were able to predict survival and recurrence (64).

Jan-June 2012

No studies from this timeframe met the inclusion criteria.

Non-small-Cell Lung Cancer (NSCLC)

July-Dec 2011

Six studies met the inclusion criteria (66-71). The addition of FDG PET/CT in the diagnosis and staging of NSCLC improved the detection of metastases and led to treatment changes in 27% to 63% of cases (69-71).

Jan-June 2012

Three studies met the inclusion criteria for FDG PET/CT in NSCLC (72-74). FDG PET/CT was found to have a better diagnostic accuracy to stage NSCLC than did CT (73). In radiation treatment planning, the addition of FDG PET/CT was able to focus nodal gross-tumour volume (GTV) treatment contours in 51% of patients (72).

Pancreatic Cancer

July-Dec 2011

Seven studies met the inclusion criteria (75-81). In all studies, when compared to conventional imaging or other conventional staging techniques, PET/CT had a higher diagnostic accuracy. Standard uptake values (SUVs) were also found to be correlated with metabolic response assessment and clinical outcomes (81).

Jan-June 2012

No studies from this timeframe met the inclusion criteria.

Paediatric Cancer

July-Dec 2011
Four studies in this timeframe met the inclusion criteria (6,7,9,82). One study evaluated FDG PET/CT in Hodgkin's Lymphoma (HL) (82) and three in neuro-oncology (6,7,9). In paediatric neuroblastoma, FDG PET/CT was found to have a higher diagnostic accuracy than 123I-MIBG (6-7). In diffuse intrinsic brain stem glioma, the addition of FDG PET/CT changed the intended management of patients in more than 80% of cases. In the primary brain tumour subgroup, the change from the pre-PET plan from treatment to non-treatment was more common than in the converse (9). In HL, the addition of FDG PET/CT showed bone marrow involvement in all cases (82).

Jan-June 2012
Three studies met the inclusion criteria (83-85). Two evaluated FDG PET/CT in Hodgkin's lymphoma (HL) (83,85), and one in paediatric head and neck cancer (84). In HL, PET/CT was found to have superior diagnostic accuracy than did CT and changed patient management in 9.4% to 17% of cases. In head and neck cancer, the addition of PET/CT added additional information to 50% of patients and was superior to CT.

Thyroid Cancer
July-Dec 2011
Two studies met the inclusion criteria (86,87). In the detection of metastatic thyroid cancer, FDG PET/CT was found to have a comparable diagnostic accuracy to other imaging modalities (131I-whole body scintigraphy, 131I-SPECT) (86). In the detection of disease extent in patients with advanced stage thyroid cancer, the addition of FDG PET/CT modified the patient treatment plans in 55% of patients (87).

Jan-June 2012
Two studies met the inclusion criteria (88,89). When compared to ultrasonography, FDG PET/CT did not add any additional information and diagnostic accuracies were comparable.

Non-FDG Radiopharmaceutical Tracers
July-Dec 2011
Four studies met the inclusion criteria (90,91,93,94). Two studies evaluated 11C-Choline PET/CT (90,93) and two evaluated 68Ga-DOTA-NOC PET/CT (91,94). In the lymph node staging of prostate cancer patients, 11C-Choline PET/CT was not recommended when compared to MR diffusion weighted imaging (90); however, in the detection of recurrent brain tumours, 11C-Choline PET/CT was able to detect and effectively distinguish recurrent tumours from radionecrosis (93). 68Ga-DOTA-NOC was found to be superior to conventional imaging (CT) in the diagnosis of neuroendocrine tumours (91,94).

Jan-June 2012
Five studies met the inclusion criteria (95-99). Three studies evaluated 18F-DOPA PET/CT (95,98,99), one evaluated 11C-Choline PET/CT (96), and one evaluated 68Ga-DOTA-NOC PET/CT (97). 18F-DOPA PET/CT was shown to have a superior diagnostic accuracy when compared to conventional imaging modalities in both neuroblastoma (95,99) and carcinoid tumours (98). 11C-Choline PET/CT was not able to improve the diagnostic accuracy in bladder cancer scheduled for radical cystectomy (96). 68Ga-DOTA-NOC contributed to a change in management in 6 patients with phaeochromocytoma and paraganglioma due to the additional detection of 12 lesions not previously known (97).

Impact of New Evidence and Disease Site Group (DSG) Reviews

Breast Cancer

Current Recommendations for PET/CT in breast cancer:

- No recommendations currently exist for the utilization of PET/CT in breast cancer.

Based on the literature identified in this 12-month review, the Ontario PET Steering Committee indicated that there may be a potential use for FDG PET/CT in late-stage breast cancer.

Colorectal Cancer

Current Recommendations for PET/CT in colorectal cancer:

- The routine use of PET is not recommended for the diagnosis or staging of clinical Stage I-III colorectal cancers.
- PET is recommended for determining management and prognosis if conventional imaging is equivocal for the presence of metastatic disease.
- The routine use of PET is not recommended for the measurement of treatment response in locally advanced rectal cancer before and after preoperative chemotherapy.
- PET is not recommended for routine surveillance in patients with colorectal cancer treated with curative surgery at high risk for recurrence.
- PET is recommended in the preoperative assessment of colorectal cancer liver metastasis prior to surgical resection.

Based on a request by members of the clinical community, the literature around the preoperative assessment of colorectal cancer metastasis to sites other than the liver will be evaluated upon request by the PET Steering Committee. In six studies included in this monitoring report, additional information provided by PET/CT had an impact on the patient management. These studies support the recommendation that PET/CT is recommended for determining management in patients where conventional imaging is equivocal.

Esophageal Cancer

Current Recommendations for PET/CT in esophageal cancer:

- For the staging workup of patients with esophageal cancer who are potential candidates for curative therapy, PET is recommended to improve the accuracy of M staging.
- A recommendation cannot be made for or against the use of PET (post or neo-adjuvant therapy) for the purpose of predicting response to neo-adjuvant therapy due to insufficient evidence.
- A recommendation cannot be made for or against the use of PET for the evaluation of suspected recurrence due to insufficient evidence.

A review was not completed by a member of the gastrointestinal DSG for this disease site. Four articles included in this monitoring report support recommendations that PET may

provide additional information when patients are candidates for curative surgery. It is particularity helpful in the M staging of patients.

Gynecological Cancer – review by Dr. Anthony Fyles, Gynecology DSG
Current Recommendations on PET/CT in cervical and ovarian cancer:
Cervical Cancer:

- PET is not recommended for diagnosis of cervical cancer.
- PET is not recommended for staging early-stage cervical cancer.
- A recommendation cannot be made for or against the use of PET for staging advanced-stage cervical cancer due to insufficient evidence. However, ongoing studies will clarify the role of PET in advanced disease.
- PET is not recommended (following or early during therapy) for the purpose of predicting response to chemoradiation therapy.
- A recommendation cannot be made for or against the use of PET for evaluation of suspected recurrence due to insufficient evidence.
- PET is recommended for women with recurrence who are candidates for pelvic exenteration or chemoradiation with curative intent.

The current PET recommendations for cervical cancer remain valid and up to date in light of these publications.

Ovarian Cancer:

- PET is not recommended in the diagnosis of ovarian cancer.
- A recommendation cannot be made for or against the use of PET in the evaluation of asymptomatic ovarian mass due to insufficient evidence.
- PET is not recommended for staging of ovarian cancer.
- PET is not recommended for detecting recurrence or restaging patients not being considered for surgery.
- A recommendation cannot be made for or against the use of PET for patients being considered for secondary cytoreduction due to insufficient evidence.

The current PET recommendations for ovarian cancer remains valid and up-to-date in light of these publications.

Head and Neck Cancer
Current Recommendations for PET/CT in head and neck cancer:

- PET is recommended in the M and bilateral nodal staging of all patients with head and neck squamous cell carcinoma where conventional imaging is equivocal, or where treatment may be significantly modified.

- PET is recommended in all patients after conventional imaging and in addition to, or prior to, diagnostic panendoscopy where the primary site is unknown.

- PET is recommended for staging and assessment of recurrence of patients with nasopharyngeal carcinoma if conventional imaging is equivocal.

- PET is recommended for restaging patients who are being considered for major salvage treatment, including neck dissection.

A review was not completed by a member of the Head and Neck DSG for this disease site. Three studies included in this monitoring report demonstrate that PET was superior to conventional imaging techniques in the detection of the primary tumour site.

Haematology

Current Recommendations for PET/CT in Lymphoma:

- When functional imaging is considered to be important in situations where anatomical imaging is equivocal and/or in potentially curable cases, a FDG PET/CT scan is recommended.

- When functional imaging is considered to be important in situations where anatomical imaging is equivocal and treatment choices may be affected in limited stage indolent lymphomas, a FDG PET/CT scan is recommended.

- An FDG PET/CT scan is recommended for the assessment of early response in early-stage (I or II) Hodgkin's lymphoma following two or three cycles of chemotherapy when chemotherapy is being considered as the definitive single-modality therapy, to inform completion of therapy or if more therapy is warranted.

- In potentially curable cases, when functional imaging is considered to be important and conventional imaging is equivocal, a FDG PET/CT scan is recommended to investigate recurrence of HL or NHL.

- An FDG PET/CT scan is recommended for the evaluation of residual mass(es) following chemotherapy in a patient with Hodgkin's or non-Hodgkin's lymphoma when further potentially curative therapy (such as radiation or stem cell transplantation) is being considered and when biopsy cannot be safely or readily performed.

- An FDG PET/CT scan is not recommended for the routine monitoring and surveillance of lymphoma.

A review was not completed by a member of the Haematology DSG for this disease site. Two studies indicate that the addition of PET/CT in the staging of lymphoma patients may omit the need for an invasive bone marrow biopsy.

Pancreatic Cancer

Current Recommendations for PET/CT in pancreatic cancer:

- PET is not recommended for primary diagnosis of pancreatic cancer.
- PET is recommended for staging if a patient is a candidate for potentially curative surgical resection as determined by conventional staging.
- A recommendation cannot be made for or against the use of PET to guide clinical management based on assessment of treatment response due to insufficient evidence.
- PET is not recommended for clinical management of suspected recurrence, or for restaging at the time of recurrence, due to insufficient evidence and lack of effective therapeutic options.
- A recommendation cannot be made for or against the use of PET for staging if a solitary metastasis is identified at recurrence as there are no trials that identify the utility of PET scanning in this setting.

A review was not completed by a member of the Gastrointestinal DSG for this disease site. Seven studies demonstrated that the diagnostic accuracy of PET was comparable or superior to conventional imaging modalities in staging pancreatic cancer.

Melanoma – review by Dr. Tara Baetz, Melanoma DSG
Current Recommendations for PET/CT in melanoma:

- PET is recommended for staging of high-risk patients with potentially resectable disease.
- PET is not recommended for the diagnosis of sentinel lymph node micrometastatic disease or for staging of I, IIa, or IIb melanoma.
- The routine use of PET or PET/CT is not recommended for the diagnosis of brain metastases.
- The routine use of PET is not recommended for the detection of primary uveal malignant melanoma.
- A recommendation cannot be made for or against the use of PET for the assessment of treatment response in malignant melanoma due to insufficient evidence.
- A recommendation cannot be made for or against the use of PET for routine surveillance due to insufficient evidence.
- PET is recommended for isolated metastases at time of recurrence or when contemplating metastectomy.

Upon review of the evidence included in this monitoring report, the current recommendations for the utilization of PET in melanoma remain valid and no changes are required.

Neuro-oncology
Current Recommendations for PET/CT in neuro-oncology:

- PET is not recommended for the determination of diagnosis or grading in gliomas.
- A recommendation cannot be made for or against the use of PET for the assessment of treatment response in gliomas due to insufficient evidence.
- A recommendation cannot be made for or against the use of PET or PET/CT in the assessment of patients with recurrent gliomas due to insufficient evidence.

A review by a member of the Neuro-oncology DSG was not completed for this disease site. One study in this monitoring report indicated that FDG PET/CT may provide comparable diagnostic accuracy when compared to conventional imaging modalities in the detection of glioma recurrence.

Non–Small-Cell Lung Cancer
Current Insured Indication for PET/CT in small cell lung cancer:

- PET/CT is recommended where curative surgical resection is being considered.
- Clinical stage III non–small-cell lung cancer: PET/CT is recommended where potentially curative combined-modality therapy with chemotherapy and radiotherapy is being considered.

A review was not completed by a member of the Lung DSG for this disease site. In this monitoring report, the addition of PET to staging led to changes in patient management in 27% to 63% of patients in three studies. The diagnostic accuracy was also

superior to conventional imaging modalities in two studies and was able to more accurately stage NSCLC.

Thyroid Cancer

Current Insured Indication for PET/CT in thyroid cancer:

- PET/CT is recommended where recurrent or persistent disease is suspected on the basis of an elevated and/or rising thyroglobulin but standard imaging studies are negative or equivocal.

No studies included in the current monitoring report evaluated the use of PET/CT in the evaluation of recurrent thyroid cancer.

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Contact Information

For information about the PEBC and the most current version of all reports,
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REFERENCES

1. Braendengen M, Hansson K, Radu C, Siegbahn A, Jacobsson H, Glimelius B. Delineation of gross tumor volume (GTV) for radiation treatment planning of locally advanced rectal cancer using information from MRI or FDG-PET/CT: A prospective study. Int J Radiation Oncol Biol Physics. 2011;81(4):e439-e45.
2. Engledow AH, Skipworth JR, Blackman G, Groves A, Bomanji J, Warren SJ, et al. The role of 1fluoro-deoxy glucose combined position emission and computed tomography in the clinical management of anal squamous cell carcinoma. Colorect Dis. 2011;13(5):532-7.
3. Vercellino L, Montravers F, De Parades V, Huchet V, Kerrou K, Bauer P, et al. Impact of FDG PET/CT in the staging and the follow-up of anal carcinoma. Int J Colorect Dis. 2011;26(2):201-10.
4. Sveistrup J, Loft A, Berthelsen AK, Henriksen BM, Nielsen MB, Engelholm SA. Positron emission tomography/computed tomography in the staging and treatment of anal cancer. International J Radiation Oncol Biol Physics. 2012;83(1):134-41.
5. Hillner BE, Siegel BA, Shields AF, Duan F, Gareen IF, Hanna L, et al. Impact of dedicated brain PET on intended patient management in participants of the national oncologic PET registry. Mol Imag Biol. 2011;13(1):161-5.
6. Melzer HI, Coppenrath E, Schmid I, Albert MH, von Schweinitz D, Tudball C, et al. 123I-MIBG scintigraphy/SPECT versus 18F-FDG PET in paediatric neuroblastoma. Eur J Nucl Med Mol Imag. 2011;38(9):1648-58.
7. Nikolaos DP, Gaze MN, Sullivan K, Aldridge M, Waddington W, Almuhaideb A, et al. 18F-FDG PET/CT and 123I-metaiodobenzylguanidine imaging in high-risk neuroblastoma: Diagnostic comparison and survival analysis. J Nucl Med. 2011;52(4):519-25.
8. Santra A, Kumar R, Sharma P, Bal C, Julka PK, Malhotra A. F18-FDG PET-CT for predicting survival in patients with recurrent glioma: A prospective study. Neuroradiology. 2011;53(12):1017-24.
9. Zukotynski KA, Fahey FH, Kocak M, Alavi A, Wong TZ, Treves ST, et al. Evaluation of 18F-FDG PET and MRI associations in pediatric diffuse intrinsic brain stem glioma: a report from the Pediatric Brain Tumor Consortium. J Nucl Med. 2011;52(2):188-95.
10. Santra A, Kumar R, Sharma P, Bal C, Kumar A, Julka PK, et al. F18-FDG PET-CT in patients with recurrent glioma: Comparison with contrast enhanced MRI. Eur J Radiol. 2012;81(3):508-13.
11. Timmers HJLM, Chen CC, Carrasquillo JA, Whatley M, Ling A, Eisenhofer G, et al. Staging and functional characterization of pheochromocytoma and paraganglioma by 18F-fluorodeoxyglucose (18F-FDG) positron emission tomography. J Natl Cancer Instit. 2012;104(9):700-8.
12. Grassetto G, Fornasiero A, Otello D, Bonciarelli G, Rossi E, Nashimben O, et al. 18F-FDG-PET/CT in patients with breast cancer and rising Ca 15-3 with negative conventional imaging: A multicentre study. Eur J Radiol. 2011;80(3):828-33.
13. Groheux D, Giacchetti S, Espie M, Vercellino L, Hamy AS, Delord M, et al. The yield of 18F-FDG PET/CT in patients with clinical stage IIA, IIB, or IIIA breast cancer: A prospective study. J Nucl Med. 2011;52(10):1526-34.
14. Niikura N, Costelloe CM, Madewell JE, Hayashi N, Tse-Kuan Y, Liu J, et al. FDG-PET/CT compared with conventional imaging in the detection of distant metastases of primary breast cancer. Oncologist. 2011;16(8):1111-9.
15. Niikura N, Liu J, Costelloe CM, Palla SL, Madewell JE, Hayashi N, et al. Initial staging impact of fluorideoxyglucose positron emission tomography/computed tomography in locally advanced breast cancer. Oncologist. 2011;16(6):772-82.
16. Ohsumi S, Inoue T, Kiyoto S, Hara F, Takahashi M, Takabatake D, et al. Detection of isolated ipsilateral regional lymph node recurrences by F18-fluorodeoxyglucose positron

emission tomography-CT in follow-up of postoperative breast cancer patients. Breast Cancer Res Treat. 2011;130(1):267-72.
17. Park JS, Moon WK, Lyou CY, Cho N, Kang KW, Chung J-K. The assessment of breast cancer response to neoadjuvant chemotherapy: comparison of magnetic resonance imaging and 18F-fluorodeoxyglucose positron emission tomography. Acta Radiol. 2011;52(1):21-8.
18. Rousseau C, Devillers A, Campone M, Campion L, Ferrer L, Sagan C, et al. FDG PET evaluation of early axillary lymph node response to neoadjuvant chemotherapy in stage II and III breast cancer patients. Eur J Nucl Med Mol Imaging. 2011;38(6):1029-36.
19. Groves AM, Shastry M, Ben-Haim S, Kayani I, Malhotra A, Davidson T, et al. Defining the role of PET-CT in staging early breast cancer. Oncologist. 2012;17(5):613-9.
20. Koolen BB, Vrancken Peeters MJTFD, Aukema TS, Vogel WV, Oldenburg HSA, Van Der Hage JA, et al. 18F-FDG PET/CT as a staging procedure in primary stage II and III breast cancer: Comparison with conventional imaging techniques. Breast Cancer Res Treat. 2012;131(1):117-26.
21. Manohar K, Mittal BR, Senthil R, Kashyap R, Bhattacharya A, Singh G. Clinical utility of F-18 FDG PET/CT in recurrent breast carcinoma. Nucl Med Commun. 2012;33(6):591-6.
22. Park SH, Moon WK, Cho N, Chang JM, Im SA, Park IA, et al. Comparison of diffusion-weighted MR imaging and FDG PET/CT to predict pathological complete response to neoadjuvant chemotherapy in patients with breast cancer. Eur Radiol. 2012;22(1):18-25.
23. Pritchard KI, Julian JA, Holloway CM, McCready D, Gulenchyn KY, George R, et al. Prospective study of 2-[18F]fluorodeoxyglucose positron emission tomography in the assessment of regional nodal spread of disease in patients with breast cancer: an Ontario clinical oncology group study. J Clin Oncol. 2012;30(12):1274-9.
24. Garami Z, Hascsi Z, Varga J, Dinya T, Tanyi M, Garai I, et al. The value of 18-FDG PET/CT in early-stage breast cancer compared to traditional diagnostic modalities with an emphasis on changes in disease stage designation and treatment plan. Eur J Surgl Oncol. 2012;38(1):31-7.
25. Bamba Y, Itabashi M, Kameoka S. Management of local recurrence of colorectal cancer: the role of PET/CT. Abdom Imaging. 2011;36(3):322-6.
26. Briggs RH, Chowdhury FU, Lodge JPA, Scarsbrook AF. Clinical impact of FDG PET-CT in patients with potentially operable metastatic colorectal cancer. Clin Radiol. 2011;66(12):1167-74.
27. Fiocchi F, Iotti V, Ligabue G, Malavasi N, Luppi G, Bagni B, et al. Role of carcinoembryonic antigen, magnetic resonance imaging, and positron emission tomography-computed tomography in the evaluation of patients with suspected local recurrence of colorectal cancer. Clin Imaging. 2011;35(4):266-73.
28. Han A, Xue J, Zhu D, Zheng J, Yue J, Yu J. Clinical value of 18F-FDG PET/CT in postoperative monitoring for patients with colorectal carcinoma. Cancer Epidemiol. 2011;35(5):497-500.
29. Kim EY, Lee WJ, Choi D, Lee SJ, Choi JY, Kim BT, et al. The value of PET/CT for preoperative staging of advanced gastric cancer: Comparison with contrast-enhanced CT. Eur J Radiol. 2011;79(2):183-8.
30. Mainenti PP, Iodice D, Segreto S, Storto G, Magliulo M, De Palma GD, et al. Colorectal cancer and 18FDG-PET/CT: what about adding the T to the N parameter in loco-regional staging? World J Gastroenterol. 2011;17(11):1427-33.
31. Mittal BR, Senthil R, Kashyap R, Bhattacharya A, Singh B, Kapoor R, et al. 18F-FDG PET-CT in evaluation of postoperative colorectal cancer patients with rising CEA level. Nucl Med Commun. 2011;32(9):789-93.
32. Ramos E, Valls C, Martinez L, Llado L, Torras J, Ruiz S, et al. Preoperative staging of patients with liver metastases of colorectal carcinoma. Does PET/CT really add something to multidetector CT? Ann Surg Oncol. 2011;18(9):2654-61.

33. Shie P. Incidental focal hypermetabolic colorectal lesions identified by positron emission tomography: Prevalence of malignancy. Abdom Imaging. 2011;36(2):165-9.
34. Yoon HJ, Lee JJ, Kim YK, Kim SE. FDG-PET/CT is superior to enhanced CT in detecting recurrent subcentimeter lesions in the abdominopelvic cavity in colorectal cancer. Nucl Med Mol Imaging. 2011;45(2):132-8.
35. Engledow AH, Skipworth JRA, Pakzad F, Imber C, Ell PJ, Groves AM. The role of 18FDG PET/CT in the management of colorectal liver metastases. Hpb. 2012;14(1):20-5.
36. Ozkan E, Soydal C, Araz M, Kir KM, Ibis E. The role of 18F-FDG PET/CT in detecting colorectal cancer recurrence in patients with elevated CEA levels. Nucl Med Commun. 2012;33(4):395-402.
37. Ozkan E, Araz M, Soydal C, Kucuk NO, Ibis E. Detection of intraluminal tracheal metastasis of thyroid papillary carcinoma by 18F-FDG PET/CT. Clin Nucl Med. 2012;37(6):e160-e1.
38. Gillies RS, Middleton MR, Maynard ND, Bradley KM, Gleeson FV. Additional benefit of 1&x2078;F-fluorodeoxyglucose integrated positron emission tomography/computed tomography in the staging of oesophageal cancer. Eur Radiol. 2011;21(2):274-80.
39. Hsu PK, Lin KH, Wang SJ, Huang CS, Wu YC, Hsu WH. Preoperative positron emission tomography/computed tomography predicts advanced lymph node metastasis in esophageal squamous cell carcinoma patients. World J Surg. 2011;35(6):1321-6.
40. Omloo JMT, Van Heijl M, Hoekstra OS, Van Berge Henegouwen MI, Van Lanschot JJB, Sloof GW. FDG-PET parameters as prognostic factor in esophageal cancer patients: A review. Ann Surg Oncol. 2011;18(12):3338-52.
41. Walker AJ, Spier BJ, Perlman SB, Stangl JR, Frick TJ, Gopal DV, et al. Integrated PET/CT fusion imaging and endoscopic ultrasound in the pre-operative staging and evaluation of esophageal cancer. Molr Imaging Biol. 2011;13(1):166-71.
42. Barber TW, Duong CP, Leong T, Bressel M, Drummond EG, Hicks RJ. 18F-FDG PET/CT has a high impact on patient management and provides powerful prognostic stratification in the primary staging of esophageal cancer: A prospective study with mature survival data. J Nucl Med. 2012;53(6):864-71.
43. Yen TJ, Chung CS, Wu YW, Yen RF, Cheng MF, Lee JM, et al. Comparative study between endoscopic ultrasonography and positron emission tomography-computed tomography in staging patients with esophageal squamous cell carcinoma. Dis Esophagus. 2012;25(1):40-7.
44. Kim JY, Lee SW, Kim JS, Kim SY, Nam SY, Choi SH, et al. Diagnostic value of neck node status using 18F-FDG PET for salivary duct carcinoma of the major salivary glands. J Nucl Med. 2012;53(6):881-6.
45. Stoeckli SJ, Haerle SK, Strobel K, Haile SR, Hany TF, Schuknecht B. Initial staging of the neck in head and neck squamous cell carcinoma: A comparison of CT, PET/CT, and ultrasound-guided fine-needle aspiration cytology. Head Neck. 2012;34(4):469-76.
46. Wong WL, Sonoda LI, Gharpurhy A, Gollub F, Wellsted D, Goodchild K, et al. 18F-fluorodeoxyglucose Positron Emission Tomography/Computed Tomography in the Assessment of Occult Primary Head and Neck Cancers - An Audit and Review of Published Studies. Clin Oncol. 2012;24(3):190-5.
47. De Iaco P, Musto A, Orazi L, Zamagni C, Rosati M, Allegri V, et al. FDG-PET/CT in advanced ovarian cancer staging: Value and pitfalls in detecting lesions in different abdominal and pelvic quadrants compared with laparoscopy. Eur J Radiol. 2011;80(2):e98-e103.
48. Fastrez M, Nogarede C, Tondeur M, Sirtaine N, Rozenberg S. Evaluation of 18FDG PET-CT in the diagnosis of endometriosis: a prospective study. Reprod Sci. 2011;18(6):540-4.
49. Kitajima K, Suzuki K, Senda M, Kita M, Nakamoto Y, Sakamoto S, et al. Preoperative nodal staging of uterine cancer: Is contrast-enhanced PET/CT more accurate than non-enhanced PET/CT or enhanced CT alone? Ann Nucl Med. 2011;25(7):511-9.
50. Leblanc E, Gauthier H, Querleu D, Ferron G, Zerdoud S, Morice P, et al. Accuracy of 18-Fluoro-2-deoxy-d-glucose positron emission tomography in the pretherapeutic detection of

occult para-aortic node involvement in patients with a locally advanced cervical carcinoma. Ann Surg Oncol. 2011;18(8):2302-9.
51. Lee M, Lee Y, Hwang KH, Choe W, Park CY. Usefulness of F-18 FDG PET/CT in assessment of recurrence of cervical cancer after treatment. Nucl Med Mol Imaging. 2011;45(2):111-6.
52. Nasu K, Abe W, Takai N, Tomonari K, Narahara H. Impact of positron emission tomography/computed tomography in the management of patients with epithelial ovarian carcinoma after treatment. Arch Gynecol Obstet. 2011;283(5):1121-6.
53. Ramirez PT, Jhingran A, Macapinlac HA, Euscher ED, Munsell MF, Coleman RL, et al. Laparoscopic extraperitoneal para-aortic lymphadenectomy in locally advanced cervical cancer: a prospective correlation of surgical findings with positron emission tomography/computed tomography findings. Cancer. 2011;117(9):1928-34.
54. Signorelli M, Guerra L, Montanelli L, Crivellaro C, Buda A, Dell'Anna T, et al. Preoperative staging of cervical cancer: Is 18-FDG-PET/CT really effective in patients with early stage disease? Gynecol Oncol. 2011;123(2):236-40.
55. Suga T, Nakamoto Y, Saga T, Higashi T, Hamanaka Y, Tatsumi M, et al. Clinical value of FDG-PET for preoperative evaluation of endometrial cancer. Ann Nucl Med. 2011;25(4):269-75.
56. Ferrandina G, Petrillo M, Restaino G, Rufini V, Macchia G, Carbone A, et al. Can radicality of surgery be safely modulated on the basis of MRI and PET/CT imaging in locally advanced cervical cancer patients administered preoperative treatment? Cancer. 2012;118(2):392-403.
57. Sanli Y, Turkmen C, Bakir B, Iyibozkurt C, Ozel S, Has D, et al. Diagnostic value of PET/CT is similar to that of conventional MRI and even better for detecting small peritoneal implants in patients with recurrent ovarian cancer. Nucl Med Commun. 2012;33(5):509-15.
58. Richardson SE, Sudak J, Warbey V, Ramsay A, McNamara CJ. Routine bone marrow biopsy is not necessary in the staging of patients with classical Hodgkin lymphoma in the 18F-fluoro-2-deoxyglucose positron emission tomography era. Leukemia Lymphoma. 2012;53(3):381-5.
59. Safar V, Dupuis J, Itti E, Jardin F, Fruchart C, Bardet S, et al. Interim [18F]fluorodeoxyglucose positron emission tomography scan in diffuse large B-cell lymphoma treated with anthracycline-based chemotherapy plus rituximab. J Clin Oncol. 2012;30(2):184-90.
60. Essler M, Link A, Belloni B, Mirceva V, Souvatzoglou M, Thaler M, et al. Prognostic value of [18F]-fluoro-deoxy-glucose PET/CT, S100 or MIA for assessment of cancer-associated mortality in patients with high risk melanoma. PLoS ONE. 2011;6(9).
61. Peric B, Zagar I, Novakovic S, Zgajnar J, Hocevar M. Role of serum S100B and PET-CT in follow-up of patients with cutaneous melanoma. BMC Cancer. 2011;11(328).
62. Bronstein Y, Ng CS, Rohren E, Ross MI, Lee JE, Cormier J, et al. PET/CT in the management of patients with stage IIIC and IV metastatic melanoma considered candidates for surgery: evaluation of the additive value after conventional imaging. AJR Am J Roentgenol. 2012;198(4):902-8.
63. Gerbaudo VH, Mamede M, Trotman-Dickenson B, Hatabu H, Sugarbaker DJ. FDG PET/CT patterns of treatment failure of malignant pleural mesothelioma: relationship to histologic type, treatment algorithm, and survival. Eur J Nucl Med Mol Imaging. 2011;38(5):810-21.
64. Sharif S, Zahid I, Routledge T, Scarci M. Does positron emission tomography offer prognostic information in malignant pleural mesothelioma? Interact Cardiovasc Thorac Surg. 2011;12(5):806-10.
65. Zahid I, Sharif S, Routledge T, Scarci M. What is the best way to diagnose and stage malignant pleural mesothelioma? Interact Cardiovasc Thorac Surg. 2011;12(2):254-9.
66. Choi SH, Kim YT, Kim SK, Kang KW, Goo JM, Kang CH, et al. Positron emission tomography-computed tomography for postoperative surveillance in non-small cell lung cancer. Ann Thorac Surg. 2011;92(5):1826-32.

67. Darling GE, Maziak DE, Inculet RI, Gulenchyn KY, Driedger AA, Ung YC, et al. Positron emission tomography-computed tomography compared with invasive mediastinal staging in non-small cell lung cancer: Results of mediastinal staging in the early lung positron emission tomography trial. J Thorac Oncol. 2011;6(8):1367-72.
68. Fontaine E, McShane J, Carr M, Shackcloth M, Mediratta N, Page R, et al. Does positron emission tomography scanning improve survival in patients undergoing potentially curative lung resections for non-small-cell lung cancer? Eur J Cardiothorac Surg. 2011;40(3):642-6.
69. Kolodziejczyk M, Kepka L, Dziuk M, Zawadzka A, Szalus N, Gizewska A, et al. Impact of [18F]fluorodeoxyglucose PET-CT staging on treatment planning in radiotherapy incorporating elective nodal irradiation for non-small-cell lung cancer: a prospective study. Int J Radiat Oncol Biol Phys. 2011;80(4):1008-14.
70. Kubota K, Murakami K, Inoue T, Itoh H, Saga T, Shiomi S, et al. Additional value of FDG-PET to contrast enhanced-computed tomography (CT) for the diagnosis of mediastinal lymph node metastasis in non-small cell lung cancer: A Japanese multicenter clinical study. Ann Nucl Med. 2011;25(10):777-86.
71. Lin P, Koh ES, Lin M, Vinod SK, Ho-Shon I, Yap J, et al. Diagnostic and staging impact of radiotherapy planning FDG-PET-CT in non-small-cell lung cancer. Radiother Oncol. 2011;101(2):284-90.
72. Bradley J, Bae K, Choi N, Forster K, Siegel BA, Brunetti J, et al. A phase II comparative study of gross tumor volume definition with or without PET/CT fusion in dosimetric planning for non-small-cell lung cancer (NSCLC): primary analysis of Radiation Therapy Oncology Group (RTOG) 0515. Int J Radiat Oncol Biol Phys. 2012;82(1):435-41.e1.
73. Collaud S, Lardinois D, Tischler V, Steinert HC, Stahel R, Weder W. Significance of a new fluorodeoxyglucose-positive lesion on restaging positron emission tomography/computed tomography after induction therapy for non-small-cell lung cancer. Eur J Cardiothorac Surg. 2012;41(3):612-6.
74. Geraldson CT, Stephenson JE, Lagrew JP, Schammel CM, Schammel DP, Greene RA, et al. Use of positron emission tomography in initial staging of nonsmall cell lung carcinoma: A regional teaching hospital experience. Am Surgeon. 2012;78(3):305-8.
75. Abgral R, Leboulleux S, Deandreis D, Auperin A, Lumbroso J, Dromain C, et al. Performance of 18fluorodeoxyglucose-positron emission tomography and somatostatin receptor scintigraphy for high Ki67 (>=10%) well-differentiated endocrine carcinoma staging. J Clin Endocrinol Metabol. 2011;96(3):665-71.
76. Buchs NC, Buhler L, Bucher P, Willi JP, Frossard JL, Roth AD, et al. Value of contrast-enhanced 18F-fluorodeoxyglucose positron emission tomography/computed tomography in detection and presurgical assessment of pancreatic cancer: A prospective study. J Gastroenterol Hepatol. 2011;26(4):657-62.
77. Kitano M, Millo C, Rahbari R, Herscovitch P, Gesuwan K, Webb RC, et al. Comparison of 6-18F-Fluoro-l-DOPA, 18F-2-deoxy-d- glucose, CT, and MRI in patients with pancreatic neuroendocrine neoplasms with von Hippel-Lindau disease. Surgery. 2011;150(6):1122-8.
78. Lin JL, Barthel JS, Keshishian J, Eikman EA, Klapman JB. Negative predictive value of positron emission tomography/computed tomography in patients with a clinical suspicion of pancreatic cancer. Pancreas. 2011;40(5):653-6.
79. Okano K, Kakinoki K, Akamoto S, Hagiike M, Usuki H, Yamamoto Y, et al. 18F-fluorodeoxyglucose positron emission tomography in the diagnosis of small pancreatic cancer. World J Gastroenterol. 2011;17(2):231-5.
80. Pedrazzoli S, Sperti C, Pasquali C, Bissoli S, Chierichetti F. Comparison of international consensus guidelines versus 18-FDG PET in detecting malignancy of intraductal papillary mucinous neoplasms of the pancreas. Ann Surgery. 2011;254(6):971-6.
81. Topkan E, Parlak C, Kotek A, Yapar AF, Pehlivan B. Predictive value of metabolic 18FDG-PET response on outcomes in patients with locally advanced pancreatic carcinoma treated with definitive concurrent chemoradiotherapy. BMC Gastroenterol. 2011;11(123).

82. Purz S, Mauz-Korholz C, Korholz D, Hasenclever D, Krausse A, Sorge I, et al. [18F]Fluorodeoxyglucose positron emission tomography for detection of bone marrow involvement in children and adolescents with Hodgkin's lymphoma. J Clin Oncol. 2011;29(26):3523-8.
83. Bakhshi S, Radhakrishnan V, Sharma P, Kumar R, Thulkar S, Vishnubhatla S, et al. Pediatric nonlymphoblastic non-Hodgkin lymphoma: baseline, interim, and posttreatment PET/CT versus contrast-enhanced CT for evaluation--a prospective study. Radiology. 2012;262(3):956-68.
84. Boktor RR, Omar WS, Mousa E, Attia I, Refaat A, Eltawdy MH, et al. A preliminary report on the impact of 18F-FDG PET/CT in the management of paediatric head and neck cancer. Nucl Med Commun. 2012;33(1):21-8.
85. Paulino AC, Margolin J, Dreyer Z, Teh BS, Chiang S. Impact of PET-CT on involved field radiotherapy design for pediatric Hodgkin lymphoma. Pediatr Blood Cancer. 2012;58(6):860-4.
86. Oh JR, Byun BH, Hong SP, Chong A, Kim J, Yoo SW, et al. Comparison of 131I whole-body imaging, 131I SPECT/CT, and 1F-FDG PET/CT in the detection of metastatic thyroid cancer. Eur J Nucl Med Mol imaging. 2011;38(8):1459-68.
87. Piccardo A, Foppiani L, Morbelli S, Bianchi P, Barbera F, Biscaldi E, et al. Could [18]F-fluorodeoxyglucose PET/CT change the therapeutic management of stage IV thyroid cancer with positive (131)I whole body scan? Q J Nucl Med Mol Imaging. 2011;55(1):57-65.
88. Deandreis D, Al Ghuzlan A, Leboulleux S, Lacroix L, Garsi JP, Talbot M, et al. Do histological, immunohistochemical, and metabolic (radioiodine and fluorodeoxyglucose uptakes) patterns of metastatic thyroid cancer correlate with patient outcome? Endocrine-Related Cancer. 2011;18(1):159-69.
89. Kim MH, Joo Hyun O, Ko SH, Bae JS, Lim DJ, Kim SH, et al. Role of [18F]-fluorodeoxy-D-glucose positron emission tomography and computed tomography in the early detection of persistent/recurrent thyroid carcinoma in intermediate-to-high risk patients following initial radioactive iodine ablation therapy. Thyroid. 2012;22(2):157-64.
90. Budiharto T, Joniau S, Lerut E, Van den Bergh L, Mottaghy F, Deroose CM, et al. Prospective evaluation of 11C-choline positron emission tomography/computed tomography and diffusion-weighted magnetic resonance imaging for the nodal staging of prostate cancer with a high risk of lymph node metastases. Eur Urol. 2011;60(1):125-30.
91. Kumar R, Sharma P, Garg P, Karunanithi S, Naswa N, Sharma R, et al. Role of 68Ga-DOTATOC PET-CT in the diagnosis and staging of pancreatic neuroendocrine tumours. Eur Radiol. 2011;21(11):2408-16.
92. Langsteger W, Balogova S, Huchet V, Beheshti M, Paycha F, Egrot C, et al. Fluorocholine (18F) and sodium fluoride (18F) PET/CT in the detection of prostate cancer: Prospective comparison of diagnostic performance determined by masked reading. Quart J Nucl Med Mol Imaging. 2011;55(4):448-57.
93. Tan H, Chen L, Guan Y, Lin X. Comparison of MRI, F-18 FDG, and 11C-choline PET/CT for their potentials in differentiating brain tumor recurrence from brain tumor necrosis following radiotherapy. Clin Nucl Med. 2011;36(11):978-81.
94. Naswa N, Sharma P, Kumar A, Nazar AH, Kumar R, Chumber S, et al. Gallium-68-DOTA-NOC PET/CT of patients with gastroenteropancreatic neuroendocrine tumors: A prospective single-center study. Am Jf Roentgenol. 2011;197(5):1221-8.
95. Lopci E, Piccardo A, Nanni C, Altrinetti V, Garaventa A, Pession A, et al. 18F-DOPA PET/CT in neuroblastoma: Comparison of conventional imaging with CT/MR. Clin Nucl Med. 2012;37(4):e73-e8.
96. Maurer T, Souvatzoglou M, Kubler H, Opercan K, Schmidt S, Herrmann K, et al. Diagnostic efficacy of [11C]choline positron emission tomography/computed tomography compared with conventional computed tomography in lymph node staging of patients with bladder cancer prior to radical cystectomy. Eur Urol. 2012;61(5):1031-8.

97. Naswa N, Sharma P, Nazar AH, Agarwal KK, Kumar R, Ammini AC, et al. Prospective evaluation of 68Ga-DOTA-NOC PET-CT in phaeochromocytoma and paraganglioma: preliminary results from a single centre study. Eur Radiol. 2012;22(3):710-9.
98. Yakemchuk VN, Jager PL, Chirakal R, Reid R, Major P, Gulenchyn KY. PET/CT using 18F-FDOPA provides improved staging of carcinoid tumor patients in a Canadian setting. Nucl Med Commun. 2012;33(3):322-30.
99. Piccardo A, Lopci E, Conte M, Garaventa A, Foppiani L, Altrinetti V, et al. Comparison of 18F-dopa PET/CT and 123I-MIBG scintigraphy in stage 3 and 4 neuroblastoma: a pilot study. Eur J Nucl Med Mol Imaging. 2012;39(1):57-71.
100. Abd El-Hafez YG, Chen CC, Ng SH, Lin CY, Wang HM, Chan SC, et al. Comparison of PET/CT and MRI for the detection of bone marrow invasion in patients with squamous cell carcinoma of the oral cavity. Oral Oncol. 2011;47(4):288-95.
101. Chan SC, Wang HM, Yen TC, Lin CY, Chin SC, Liao CT, et al. 18F-FDG PET/CT and 3.0-T whole-body MRI for the detection of distant metastases and second primary tumours in patients with untreated oropharyngeal/hypopharyngeal carcinoma: A comparative study. Eur J Nucl Med Mol Imaging. 2011;38(9):1607-19.
102. Cho A, Hur J, Kang WJ, Cho HJ, Lee JH, Yun M, et al. Usefulness of FDG PET/CT in determining benign from malignant endobronchial obstruction. Eur Radiol. 2011;21(5):1077-87.
103. Delouya G, Igidbashian L, Houle A, Belair M, Boucher L, Cohade C, et al. 18F-FDG-PET imaging in radiotherapy tumor volume delineation in treatment of head and neck cancer. Radiother Oncol. 2011;101(3):362-8.
104. Deron PB, Bonte KM, Vermeersch HF, Van De Wiele C. Lymph node metastasis of squamous cell carcinoma from an unknown primary in the upper and middle neck: Impact of 18F-fluorodeoxyglucose positron emission tomography/computed tomography. Cancer Biother Radiopharm. 2011;26(3):331-4.
105. El-Khodary M, Tabashy R, Omar W, Mousa A, Mostafa A. The role of PET/CT in the management of head and neck squamous cell carcinoma. Egyptian J Radiol Nucl Med. 2011;42(2):157-67.
106. Huang SH, Chien CY, Lin WC, Fang FM, Wang PW, Lui CC, et al. A comparative study of fused FDG PET/MRI, PET/CT, MRI, and CT imaging for assessing surrounding tissue invasion of advanced buccal squamous cell carcinoma. Clin Nucl Med. 2011;36(7):518-25.
107. Kim SY, Kim JS, Doo H, Lee H, Lee JH, Cho KJ, et al. Combined [18F]fluorodeoxyglucose positron emission tomography and computed tomography for detecting contralateral neck metastases in patients with head and neck squamous cell carcinoma. Oral Oncol. 2011;47(5):376-80.
108. Kim SY, Kim JS, Yi JS, Lee JH, Choi SH, Nam SY, et al. Evaluation of 18F-FDG PET/CT and CT/MRI with histopathologic correlation in patients undergoing salvage surgery for head and neck squamous cell carcinoma. Ann Surg Oncol. 2011;18(9):2579-84.
109. Krabbe CA, Balink H, Roodenburg JLN, Dol J, De Visscher JGAM. Performance of 18F-FDG PET/contrast-enhanced CT in the staging of squamous cell carcinoma of the oral cavity and oropharynx. Int J Oral Maxillofac Surg. 2011;40(11):1263-70.
110. Law A, Peters LJ, Dutu G, Rischin D, Lau E, Drummond E, et al. The utility of PET/CT in staging and assessment of treatment response of nasopharyngeal cancer. J Med Imaging Radiat Oncol. 2011;55(2):199-205.
111. Liao CT, Wang HM, Huang SF, Chen IH, Kang CJ, Lin CY, et al. PET and PET/CT of the neck lymph nodes improves risk prediction in patients with squamous cell carcinoma of the oral cavity. J Nucl Med. 2011;52(2):180-7.
112. Mori M, Tsukuda M, Horiuchi C, Matsuda H, Taguchi T, Takahashi M, et al. Efficacy of fluoro-2-deoxy-d-glucose positron emission tomography to evaluate responses to concurrent chemoradiotherapy for head and neck squamous cell carcinoma. Auris Nasus Larynx. 2011;38(6):724-9.

113. Wierzbicka M, Popko M, Piskadlo K, Czepczynski R, Stankowska A, Pietka T, et al. Comparison of positron emission tomography/computed tomography imaging and ultrasound in surveillance of head and neck cancer - The 3-year experience of the ENT Department in Poznan. Reports Practical Oncol Radiother. 2011;16(5):184-8.
114. Zundel MT, Michel MA, Schultz CJ, Maheshwari M, Wong SJ, Campbell BH, et al. Comparison of physical examination and fluorodeoxyglucose positron emission tomography/computed tomography 4-6 months after radiotherapy to assess residual head-and-neck cancer. Int J Radiat Oncol Biol Physics. 2011;81(5):e825-e32.
115. Abdulqadhr G, Molin D, Astrom G, Suurkula M, Johansson L, Hagberg H, et al. Whole-body diffusion-weighted imaging compared with FDG-PET/CT in staging of lymphoma patients. Acta Radiologica (Stockholm, Sweden: 1987). 2011;52(2):173-80.
116. Barnes JA, LaCasce AS, Zukotynski K, Israel D, Feng Y, Neuberg D, et al. End-of-treatment but not interim PET scan predicts outcome in nonbulky limited-stage Hodgkin's lymphoma. Ann Oncol. 2011;22(4):910-5.
117. Cahu X, Bodet-Milin C, Brissot E, Maisonneuve H, Houot R, Morineau N, et al. 18F-fluorodeoxyglucose-positron emission tomography before, during and after treatment in mature T/NK lymphomas: a study from the GOELAMS group. Ann Oncol. 2011;22(3):705-11.
118. Cashen AF, Dehdashti F, Luo J, Homb A, Siegel BA, Bartlett NL. 18F-FDG PET/CT for early response assessment in diffuse large B-cell lymphoma: poor predictive value of international harmonization project interpretation. J Nucl Med. 2011;52(3):386-92.
119. El-Galaly T, Prakash V, Christiansen I, Madsen J, Johansen P, Boegsted M, et al. Efficacy of routine surveillance with positron emission tomography/computed tomography in aggressive non-Hodgkin lymphoma in complete remission: Status in a single center. Leukemia Lymphoma. 2011;52(4):597-603.
120. Fujiwara H, Maeda Y, Nawa Y, Yamakura M, Ennishi D, Miyazaki Y, et al. The utility of positron emission tomography/computed tomography in the staging of extranodal natural killer/T-cell lymphoma. Eur J Haematol. 2011;87(2):123-9.
121. Hosein PJ, Pastorini VH, Paes FM, Eber D, Chapman JR, Serafini AN, et al. Utility of positron emission tomography scans in mantle cell lymphoma. Am J Hematol. 2011;86(10):841-5.
122. Huang YY, You DL, Liu MC, Tan TD, Lee PI, Lee MY. Underperformance of gallium-67 scan is greater in relapse than in initial staging, compared with FDG PET. Clin Nucl Med. 2011;36(10):867-71.
123. London K, Cross S, Onikul E, Dalla-Pozza L, Howman-Giles R. 18F-FDG PET/CT in paediatric lymphoma: comparison with conventional imaging. Eur J Nucl Med Mol imaging. 2011;38(2):274-84.
124. Lopci E, Burnelli R, Guerra L, Cistaro A, Piccardo A, Zucchetta P, et al. Postchemotherapy PET evaluation correlates with patient outcome in paediatric Hodgkin's disease. Eur J Nucl Med Mol Imaging. 2011;38(9):1620-7.
125. Papajik T, Myslivecek M, Skopalova M, Malan A, Buriankova E, Koza V, et al. Determining the extent and stage of disease in patients with newly diagnosed non-Hodgkin's lymphoma using 18F-FDG-PET/CT. Neoplasma. 2011;58(4):291-7.
126. Pelosi E, Penna D, Douroukas A, Bello M, Amati A, Arena V, et al. Bone marrow disease detection with FDG-PET/CT and bone marrow biopsy during the staging of malignant lymphoma: Results from a large multicentre study. Quarterly J Nucl Med Mol Imaging. 2011;55(4):469-75.
127. Picardi M, Soricelli A, Grimaldi F, Nicolai E, Gallamini A, Pane F. Fused FDG-PET/contrast-enhanced CT detects occult subdiaphragmatic involvement of Hodgkin's lymphoma thereby identifying patients requiring six cycles of anthracycline-containing chemotherapy and consolidation radiation of spleen. Ann Oncol. 2011;22(3):671-80.
128. Pommier P, Dussart S, Girinsky T, Chabaud S, Lagrange JL, Nguyen TD, et al. Impact of 18F-fluoro-2-deoxyglucose positron emission tomography on treatment strategy and

radiotherapy planning for stage I-II hodgkin disease: A prospective multicenter study. International J Radiat Oncol Biol Physics. 2011;79(3):823-8.
129. Quarles Van Ufford HME, Kwee TC, Beek FJ, Van Leeuwen MS, Takahara T, Fijnheer R, et al. Newly diagnosed lymphoma: Initial results with whole-body T1-weighted, STIR, and diffusion-weighted MRI compared with 18F-FDG PET/CT. Am J Roentgenol. 2011;196(3):662-9.
130. Sager S, Ergul N, Ciftci H, Cetin G, Guner SI, Cermik TF. The value of FDG PET/CT in the initial staging and bone marrow involvement of patients with multiple myeloma. Skeletal Radiol. 2011;40(7):843-7.
131. Smeltzer JP, Cashen AF, Zhang Q, Homb A, Dehdashti F, Abboud CN, et al. Prognostic significance of FDG-PET in relapsed or refractory classical hodgkin lymphoma treated with standard salvage chemotherapy and autologous stem cell transplantation. Biol Blood Marrow Transplant. 2011;17(11):1646-52.
132. Terezakis SA, Hunt MA, Kowalski A, McCann P, Schmidtlein CR, Reiner A, et al. [18F]FDG-positron emission tomography coregistration with computed tomography scans for radiation treatment planning of lymphoma and hematologic malignancies. Int J Radiat Oncol Biol Physics. 2011;81(3):615-22.
133. Trotman J, Fournier M, Lamy T, Seymour JF, Sonet A, Janikova A, et al. Positron emission tomography-computed tomography (PET-CT) after induction therapy is highly predictive of patient outcome in follicular lymphoma: Analysis of PET-CT in a subset of PRIMA trial participants. J Clin Oncol. 2011;29(23):3194-200.
134. Zinzani PL, Gandolfi L, Broccoli A, Argnani L, Fanti S, Pellegrini C, et al. Midtreatment 18F-fluorodeoxyglucose positron-emission tomography in aggressive non-Hodgkin lymphoma. Cancer. 2011;117(5):1010-8.
135. Vant Westeinde SC, De Koning HJ, Thunnissen FB, Oudkerk M, Groen HJM, Lammers JWJ, et al. The role of the (18)F-fluorodeoxyglucose-positron emission tomography scan in the Nederlands Leuvens Longkanker Screenings Onderzoek lung cancer screening trial. J Thorac Oncol. 2011;6(10):1704-12.
136. Dandekar MR, Kannan S, Rangarajan V, Purandare NC, Chaukar DA, Deshmukh A, et al. Utility of PET in unknown primary with cervical metastasis: a retrospective study. Indian J Cancer. 2011;48(2):181-6.
137. Hu M, Zhao W, Zhang PL, Ju GF, Fu Z, Zhang GL, et al. Clinical applications of 18F-fluorodeoxyglucose positron emission tomography/computed tomography in carcinoma of unknown primary. Chin Med J. 2011;124(7):1010-4.
138. Moller AKH, Loft A, Berthelsen AK, Pedersen KD, Graff J, Christensen CB, et al. 18F-FDG PET/CT as a diagnostic tool in patients with extracervical carcinoma of unknown primary site: A literature review. Oncologist. 2011;16(4):445-51.
139. Pak K, Kim SJ, Kim IJ, Nam HY, Kim BS, Kim K, et al. Clinical implication of (18)F-FDG PET/CT in carcinoma of unknown primary. Neoplasma. 2011;58(2):135-9.
140. Schmidt GP, Paprottka P, Jakobs TF, Hoffmann RT, Haug A, Notohamiprodjo M, et al. FDG-PET-CT and whole-body MRI for triage in patients planned for radioembolisation therapy. Eur J Radiol. 2012;81(3):e269-e76.
141. Bachner M, Loriot Y, Gross-goupil M, Zucali PA, Horwich A, Germa-lluch JR, et al. 2-18fluoro-deoxy-D-glucose positron emission tomography (FDG-PET) for postchemotherapy seminoma residual lesions: A retrospective validation of the sempet trial. Ann Oncol. 2012;23(1):59-64.
142. Kumar R, Sharma P, Kumari A, Halanaik D, Malhotra A. Role of 18F-FDG PET/CT in detecting recurrent gallbladder carcinoma. Clin Nucl Med. 2012;37(5):431-5.
143. Panagiotidis E, Datseris IE, Exarhos D, Skilakaki M, Skoura E, Bamias A. High incidence of peritoneal implants in recurrence of intra-abdominal cancer revealed by 18F-FDG PET/CT in patients with increased tumor markers and negative findings on conventional imaging. Nucl Med Commun. 2012;33(4):431-8.

144. Deandreis D, Al Ghuzlan A, Auperin A, Vielh P, Caillou B, Chami L, et al. Is 18F-fluorodeoxyglucose-PET/CT useful for the presurgical characterization of thyroid nodules with indeterminate fine needle aspiration cytology? Thyroid. 2012;22(2):165-72.
145. Chen YH, Yang XM, Li SS, Wang YH, He JJ, Yang YD, et al. Value of fused positron emission tomography CT in detecting primaries in patients with primary unknown cervical lymph node metastasis. J Med Imag Radiat Oncol. 2012;56(1):66-74.

Appendix 1A: Summary of Studies from July to December 2011

Author, year	Objective	# of pts	PET study type	Comparison Test	Reference Test	Results	Conclusions of the author
Anal Cancer							
Braendengen et al, 2011 (1)	Evaluate whether FDG-PET/ CT could give additional information to standard pretreatment evaluation	68	FDG PET/CT	MRI	Histologic verification	FDG PET/CT detected new lesions as pathologic FDG uptake in regional (3 pts) and distant lymph nodes and/or in distant metastatic sites (liver and lungs) (5 pts) (15% of pts). One patient was restaged from Stage cTIII to Stage cTIV, and 1 patient was downstaged from M1 to M0, having no FDG uptake in enlarged and thus suggestive lymph nodes close to the renal artery.	FDG PET/CT adds important information to the standard delineation procedure of locally advanced rectal cancer. New lesions were sometimes seed resulting in changes to the patient treatment strategies.
Engledow et al, 2011 (2)	Investigated pre-treatment staging of anal SCC by PET/CT and whether it could alter the staging of local or distant disease and management	40	PET/CT	Conventional Staging	Histology	PETCT did not alter the T stage but did result in disease upstaging (N and M stages). Management was altered in five (12.5%) patients: one patient was identified to have an isolated distant metastasis, and four patients had 18F-DG-avid lymph nodes not otherwise detected, all of which were tumour positive on fine-needle aspiration cytology / biopsy.	PET/CT upstages anal SCC and influences subsequent management. PETCT should be considered in the staging of anal SCC, although the definitive benefit of such a strategy requires further evaluation.
Vercellino et al, 2011 (3)	Diagnostic performance of FDG PET/CT for staging and monitoring of anal carcinoma	44	FDG PET/CT	Conventional Staging	Clinical Follow-up	On a per-examination basis, sensitivity of PET/CT for the detection of recurrent or persistent anal cancer tissue was 93% (14 of 15), specificity was 81% (17 of 21), accuracy was 86% (31 of 36), positive predictive value (PPV) was 78% (14 of 18) and negative predictive value (NPV) was 94% (17 of 18). On a per-site basis, sensitivity was 86%, specificity 97%, accuracy 96%, PPV 79%, and NPV 98%. FDG PET/CT results induced a change in patient management in nine patients (9,of 44 = 20%), and the modification was relevant in 8 of them (8 of 9 = 89%).	FDG PET/CT is an accurate imaging modality in anal cancer. It has an interesting added value during post treatment follow-up, especially when persistence or recurrence of disease is suspected. Further studies are needed to evaluate whether surveillance by means of FDG PET/CT might have a positive impact on overall survival.
Breast cancer							
Grassetto et al, 2011 (12)	Investigate the role of 18-FDG-PET/CT in the assessment of patients with treated breast cancer	89	FDG PET/Ct	Conventional Imaging	Pathology	Tumour deposits were detected in 40/89 patients in chest wall, internal mammary nodes, lungs, liver and skeleton. The mean SUVmax value calculated in these lesions was 6.6 ± 1.7 (range 3.1–12.8). In 23 of 40 patients, solitary small lesion were amenable to radical therapy. In 7 of these 23 patients, a complete disease remission lasting more than 1 year was observed.	18F-FDG-PET/CT may have a potential role in asymptomatic patients with rising markers and negative conventional imaging.
Groheux et al, 2011 (13)	Role of FDG PET/CT in stage IIA, IIB and IIIA breast carcinoma.	131	FDG PET/CT	Conventional Imaging	Histology	Of the 131 examined patients, 36 had clinical stage IIA (34 T2N0 and 2 T1N1), 48 stage IIB (20 T3N0 and 28 T2N1), and 47 stage IIIA (29 T3N1, 9 T2N2, and 9 T3N2). 18F-FDG PET/CT modified staging for 5.6% of stage IIA patients, for 14.6% of stage IIB patients,	18F-FDG PET/CT provided useful information in 13% of patients with clinical T3N0, T2N1, or T3N1 disease. The yield was more modest in patients with stage IIA. The high yield in the case of N2 disease demonstrates that stage IIIA comprises 2

						and for 27.6% of stage IIIA patients. Within stage IIIA, the yield was specifically high among the 18 patients with N2 disease (56% stage modification). When considering stage IIB and primary operable IIIA (T3N1) together, the yield of 18F-FDG PET/CT was 13% (10/77); extra-auxiliary regional lymph nodes were detected in 5 and distant metastases in 7 patients. In this series, 18F-FDG PET/CT outperformed bone scanning, with only 1 misclassification versus 8 for bone scanning (p=0.036).	quite distinct groups of patients
Niikura et al, 2011 (15)	Utility of PET/CT in the initial staging of breast cancer as compared to conventional imaging	225	FDG-PET/CT	Conventional Imaging	Pathology and follow-up	The sensitivity and specificity in the detection of distant metastases were 97.4% and 91.2%, respectively, for PET/CT and 85.9% and 67.3%, respectively, for conventional imaging. The sensitivity and specificity of PET/CT were significantly higher than those of conventional imaging (p=_<.009 and p < .001, respectively). Eleven cases of distant metastases detected by PET/CT were clinically occult and not evident on conventional imaging.	PET/CT has higher sensitivity and specificity than conventional imaging in the detection of distant metastases of breast cancer. A prospective study is needed to determine whether PET/CT could replace conventional imaging to detect distant metastases in patients with primary breast cancer.
Niikura et al, 2001 (14)	FDG PET/CT in the identification of distant metastasis as compared to conventional imaging.	935	FDG PET/CT	Conventional Imaging (CT, skeletal scintigraphy, chest radiography)	Pathology	RS and OS times were not significantly different between patients imaged with PET/CT and those imaged without PET/CT. However, the RFS time in inflammatory breast cancer patients was significantly different between patients imaged with PET/CT and those imaged without PET/CT on both univariate and multivariate analysis. There was a trend for a longer OS duration in inflammatory breast cancer (IBC) patients imaged with PET/CT.	Adding PET/CT to staging based on conventional imaging might detect patients with metastases that were not detected by conventional imaging. The use of conventional imaging with PET/CT for staging in non-IBC patients is not justified on the basis of these retrospective data. The use of conventional imaging plus PET/CT in staging IBC needs to be studied prospectively to determine whether it will improve prognosis.
Ohsumi et al, 2011 (16)	FDG PET/CT to follow postoperative breast cancer patients in order to determine whether it is possible to detect isolated small regional lymph node recurrences	1907	FDG PET/CT	Palpation (or were non-palpable)	Pathology	Twenty-two patients were found to have isolated ipsilateral regional recurrences only by PET-CT (axillary node recurrences in 6, infraclavicular node recurrences in 5, supraclavicular node recurrences in 6, and parasternal node recurrences in 5). All of those recurrences were missed by palpation or were nonpalpable	The use of PET/CT in follow-up of postoperative node-positive breast cancer patients may improve their survival because of early detection of isolated regional lymph node recurrences which are still potentially curable, and screening of other asymptomatic cancers.
Park et al, 2011 (17)	Compare MRI and PET in assessment of the tumour response after neoadjuvant chemotherapy to the pathologic response as the reference standard in patients with breast cancer.	32	FDG PET/CT	MRI	Pathologic Response	The pathologic assessment of tumour response to neoadjuvant chemotherapy identified eight complete responses (25.0%), 10 partial responses (31.2%), and 14 nonresponses (43.8%). The change in size on MRI was moderately correlated with the change in SUV on PET (r<0.574, p<0.001). The correspondence rate of response assessment was 75.0% (24/32) between MRI and pathologic response and 53.1% (17/32) between PET and pathologic response. For the pCR, specificity (95.8% vs. 62.5%) and PPV (83.3% vs.	Before and after neoadjuvant chemotherapy for breast cancer, the DDmax of MRI correlated moderately with the DSUV on PET. For prediction of the pCR, MRI proved to be a more specific modality than PET.

						47.1%) were statistically higher on MRI than on PET (p= 0.05), while sensitivity (100.0% vs. 62.5%) and NPV (100.0% vs. 88.5%) on PET tended to be higher than MRI.	
Rosseau et al, 2011 (18)	Sequential FDG PET imaging for early prediction of the pathological response to neo-adjuvant chemotherapy on axillary nodes in patients with stage II and III breast cancer.	52	FDG PET/CT	Conventional Imaging (ultrasound)	Histopath-ology	The sensitivity, specificity and accuracy of axillary node staging was higher with PET (75, 87 and 80%) than with US (50, 83 and 65%), and even more so when PET images were corrected for partial volume effects (86, 83 and 84%).	The pathological status of regional axillary lymph nodes in stage II and III breast cancer patients could be accurately predicted after one course of neo-adjuvant chemotherapy based on FDG PET images
Esophageal cancer							
Gillies et al, 2011 (38)	Assess any additional benefit of PET/CT over conventional staging with CT and EUS when used routinely in the staging of esophageal cancer	200	FDG PET/CT	EUS and CT	Histology or additional imaging	PET/CT provided additional information in 37 patients (18.5%) and directly altered management in 34 (17%): 22 (11%) were upstaged; 15 (7.5%) were downstaged, 12 of whom (6%) received radical treatment. There were 11 false negatives (5.5%) and 1 false positive (0.5%). SUVmax was significantly lower for adenocarcinoma than for squamous cell carcinoma (median 9.1 vs. 13.5, p=0.003).	Staging with PET/CT offers additional benefit over conventional imaging and should form part of routine staging for oesophageal cancer. Adenocarcinoma and squamous cell carcinoma display significantly different FDG-avidity.
Hsu, 2011 (39)	PET/CT to investigate the relation between FDG uptake and the extent of lymph node metastasis. In addition, we studied the application of PET/CT to preoperative identification of patients with advanced (N2/N3) lymph node metastasis	76	FDG PET/CT	None specified	Pathology	The SUVmax of extra-tumour uptake, but not that of the main tumour, was significantly associated with the N classification. N2/N3 disease was observed in 61.1% of patients with an SUVmax for extra-tumour uptake of [4.9, whereas only 17.2% of patients with an SUVmax of extratumour uptake of >4.9 were classified as N2/N3. The number of PET abnormalities (NPAs) was also significantly associated with the N classification. Patients with three or more NPAs had a 65% chance of being classified as N2/N3, whereas patients with one or two NPAs had less than a 20% chance of being classified as N2/N3.	PET/CT does help identify patients with advanced lymph node metastasis (N2/N3 stage) instead of simply indicating nodal involvement.
Omloo et al, 2011 (40)	Evaluate the literature available to date concerning the potential prognostic value of FDG uptake in esophageal cancer patients, in terms of absolute pretreatment values and of decrease in FDG uptake during or after neoadjuvant	N/A	FDG PET	N/A	N/A	Results. In total, 31 studies met the predefined criteria. Two main groups were identified based on the tested prognostic parameter: (1) FDG uptake and (2) decrease in FDG uptake. Most studies showed that pretreatment FDG uptake and postneoadjuvant treatment FDG uptake, as absolute values, are predictors for survival in univariate analysis. Moreover, early decrease in FDG uptake during neoadjuvant therapy is predictive for response and survival in most studies described. However, late decrease in FDG uptake after completion of neoadjuvant therapy was predictive for pathological response and survival in only 2 of 6 studies. Conclusions. Measuring decrease in FDG uptake early during neoadjuvant therapy is useful because the observed range of values expressed as relative decrease to discriminate responding from nonresponding patients is very small. At present inter-institutional comparison of results is difficult because several different normalization factors for FDG uptake are in use. Therefore, more research focusing on standardization of protocols and inter-institutional differences should be performed, before a PET-guided algorithm can be universally advocated.	

	therapy.						
Walker, 2011 (41)	Assess the role of PET/CT when used in combination with EUS in the pretherapeutic staging of esophageal cancer and to address the impact that EUS and PET/CT has on management in esophageal cancer.	81	FDG PET/CT	EUS	Histopathology	PET/CT detected metastatic disease and directed the care to either chemoradiation therapy or palliative care in 17 of 69 cases (24.6%). EUS re-directed patient care to neo-adjuvant therapy prior to surgical resection in 26 of 69 cases (37.7%). Among these 26 patients who underwent neoadjuvant therapy due to EUS staging, six had nodal involvement or locoregional disease on PET/CT. Thus, EUS improved the ability to provide locoregional staging in an additional 20 patients as compared to PET/CT.	In ECA, EUS is superior to PET/CT for T staging and in identifying locoregional nodes, while PET/CT provides M staging. EUS and integrated PET/CT appear to independently affect treatment decisions, indicating complimentary and necessary roles in the staging of ECA.
Colorectal Cancer							
Bamba, 2011 (25)	Examine the clinical applicability of FDG PET/CT for diagnosing local recurrence of colorectal cancer.	256	FDG PET/CT	CT scan and MRI	Follow-up, biopsy or surgery	The sensitivity, specificity, positive predictive value, and negative predictive value for local recurrence were 95.5%, 100%, 100%, and 99.6%, respectively. One case negative by CT/MRI was positive by PET/CT, and was associated with very early detection of recurrence from the anastomosis. After 3 months, the CT/MRI images indicated the presence of soft tissue beside the anastomosis.	PET/CT has high sensitivity and specificity for locally recurrent tumour detection and would be useful for detecting local recurrence especially in the case of local recurrence of colorectal cancer suspected to be positive by CT/MRI.
Briggs, 2011 (26)	FDG PET/CT into the preoperative work-up of patients with potentially resectable metastatic CRC in a large-volume tertiary-referral centre	102	FDG PET/CT	Conventional Imaging	Histology or follow-up imaging	In 31 patients (30%), PET/CT had a major impact on subsequent management, by correctly clarifying indeterminate lesions on conventional imaging as inoperable metastatic disease in 16 patients, detecting previously unsuspected metastatic disease in 9 patients, identifying occult second primary tumours in 3 patients, and correctly down-staging three patients. PET-CT had a minor impact in 12 patients, no impact in 49 cases, and a potentially negative impact in 10 cases. Following PET/CT, 36 patients were no longer considered for surgery. Of those remaining operative, 45 of 66 underwent potentially curative metastatic surgery. In this cohort, PET-CT saved 16 futile laparotomies.	FDG PET/CT has a valuable role in selected patients with metastatic colorectal cancer by improving staging accuracy and characterizing indeterminate lesions and helps triage patients to the appropriate treatment.
Fiocchi, 2011 (27)	Compare the role of carcino-embryonic Antigen (CEA) in relation to MRI and PET/CT in the detection of local recurrence of CRC	243	FDG PET/CT	CEA and MRI	Histological biopsy	CEA sensitivity, specificity, PPV, NPV, and accuracy were 44.4%, 92.5%, 66.7%, 83.1%, and 80.3%, respectively. MRI sensitivity, specificity, PPV, NPV, and accuracy were 88.9%, 73.6%, 53.3%, 95.1%, and 77.5%, respectively. PET/CT sensitivity, specificity, PPV, NPV, and accuracy were 94.4%, 73.6%, 54.8%, 97.5%, and 78.9%, respectively.	Integrated intensive imaging follow-up and concomitant CEA evaluation can be useful in monitoring patients with suspicious findings of local relapse at standard surveillance program, since the high sensitivity of MRI and PET/CT and the high specificity of CEA can lead to punctual patient management.
Han, 2011 (28)	FDG PET in detecting loco-regional recurrence and metastasis in postoperative patients with	66	FDG PET/CT	CECT	Pathology or clinical follow-up	The sensitivity and specificity of FDG PET/CT in detecting recurrence are 96.30% and 94.87%, respectively (while those of enhanced CT are 70.37% and 87.18%, respectively). The sensitivity and specificity of FDG PET/CT in detecting metastasis are 95.35% and 82.61%, respectively (while those of	Whole-body FDG PET/CT appears to be a precise, high efficient and noninvasive detection method in postoperative monitoring for patients with colorectal carcinoma for its higher sensitivity and specificity.

	colorectal carcinoma.					CT are 61.90% and 75.00%, respectively). Three of 10 cases prepared for secondary operation were cancelled-operative scheme due to PET/CT findings of distant metastasis in other body parts. Operation of one case was performed due to PET/CT findings of isolated hepatic metastasis,	
Kim, 2011 (29)	PET/CT for preoperative staging of advanced gastric cancer and to compare the use of PET/CT with contrast-enhanced CT (CECT).	71	FDG PET/CT	CECT	Pathology	Regional lymph node metastases: sensitivity (p=0.00019) and accuracy (p = 0.00089) of PET/CT was significantly inferior to that of CECT, specificity (p=0.31); and positive predictive value (p=0.46) for PET/CT was higher than for CECT. The negative predictive values for PET/CT and CECT were also comparable (p=0.14). Among 11 patients who had distant metastasis, PET/CT diagnosed all of the four distant lymph node metastasis and two cases of peritoneal seeding (20%). CECT missed one case of distant lymph node metastasis, of which the size had not increased sufficiently , and could suggest the presence of peritoneal seeding in five patients (50%).	PET/CT showed a comparable performance for the diagnosis of primary tumors and regional lymph node metastases as compared with CECT. The use of PET/CT was inferior to CECT in terms of sensitivity and accuracy for the detection of regional lymph node metastases.
Mainenti, 2011 (30)	To evaluate FDG-PET/CT in the assessment of the T stage in patients with colorectal cancer.	34	FDG PET/CT	None Specified	Histology	35/37 (94.6%) adenocarcinomas were identified and correctly located on PET/CT images. PET/CT correctly staged the T of 33/35 lesions identified showing an accuracy of 94.3% (95%CI: 87%-100%). All T1, T3 and T4 lesions were correctly staged, while two T2 neoplasms were overstated as T3.	FDG-PET/CT may be an accurate modality for identifying primary tumour and defining its local extent in patients with colorectal cancer.
Mittal, 2011 (31)	PET/CT in the follow-up of postoperative CRC patients with rising CEA level definitely	73	FDG PET/CT	Conventional Imaging	Histopath-ology	Of the total of 51 patients, CT showed recurrence in 23; PET/CT was positive in 36 patients. Among 23 patients in whom both CT and PET/CT were positive, PET/CT showed extra lesions in 17 (73%) patients and changed the management in 11 (47%) patients. According to lesion-based analysis, CT detected 44 lesions and PET/CT detected total of 84 lesions.	PET/CT changes the management in nearly half of the patients, highlighting the superior role of FDG PET/CT scan over CT scan.
Ramos, 2011 (32)	Prospectively determine whether the systematic use of PET/CT associated with conventional techniques could improve the accuracy of staging in patients with liver metastases of colorectal carcinoma, both overall and by anatomic locations.	97	FDG PET/CT	Conventional Imaging	Histology	Additional information provided by FDG-PET/CT after standard workup with CT/MR would have changed the therapeutic decision in 17 cases (17%): in 11 patients due to the identification of new metastatic disease, and in the remaining 6, the presence of tumour was ruled out in one or more areas. There was a true-positive finding in only six patients (three LR, one carcinomatosis, one costal metastasis, one splenic metastasis). Verification of the data revealed that the decision based on the additional results of FDG-PET/CT would have been the most appropriate only in eight patients	Data from FDG-PET/CT in the preoperative study of LMCRC imply a modification of therapeutic strategy in a limited percentage of cases (17%). This modification would be erroneous in half of these cases, due to misleading up- or downstaging, and therefore, this change of therapeutic strategy based on additional data by PET/CT would only benefit 8% of the patients.

Shie, 2011 (33)	Systematic review	N/A	FDG PET/CT	N/A		Current literature of incidental colorectal FDG uptake on PET and PET/CT indicate that the incidence of unexpected colorectal FDG uptake is low at 1.6%. However the risk of malignancy and pre-malignancy was calculated to be 61.5% in the group of 286 patients with further evaluation. Incidental FDG lesions in the colorectal should warrant further evaluation when encountered on PET if the discovery of a second primary malignancy will impact patient management and survival.	
Yoon (34)	Compared the performance of FDG PET/CT and CT in detecting abdominal-pelvic cavity recurrences according to tumour implant and lymph node size.	16	FDG PET/CT	CT	Clinical follow-up, image analysis or Pathology	CeCT identified 38 lesions in 12 patients, all of which were detected by PET/CT. PET/CT found 27 additional lesions in 8 patients, comprising 9 seeding nodules (2 in the right upper quadrant of the abdomen and 7 in the pelvic cavity) and 18 LNs (2 celiac, 2 paraaortic, 2 hepatic hilar, 11 common iliac, 1 external iliac). PET/CT-only detected lesions were significantly smaller than those detected by CeCT	PET/CT is superior to CeCT in detected seeding nodules and metastatic LNs in patients with recurrent colorectal cancer.
Head and Neck Cancer							
Abd El-Hafez (100)	FDG PET/CT for the detection of bone marrow invasion of the mandible or maxilla in patients with oral cavity squamous cell carcinoma	140	FDG PET/CT	MRI	Histology	The sensitivity for (18)F-FDG PET/CT with regard to the detection of distant metastasis was 96.8%, the specificity 95.4%, the PPV 69.8%, and the NPV 99.6%.	(18)F-FDG PET/CT is highly accurate for initial staging and follow-up
Chan, 2011 (101)	FDG PET/CT assessment of distant metastases and second primary cancer (SPC) in patients with untreated oropharyngeal or hypopharyngeal squamous cell carcinoma (OHSCC).	103	FDG PET/CT	MRI	Pathology	On a lesion-based analysis, FDG PET/CT showed a trend toward a higher sensitivity than did WB-MRI (81.0% vs. 61.9%, p=0.125). On a patient-based analysis, the sensitivity of WB-MRI was lower than that of PET/CT (66.7% vs. 83.3%, p=0.625).	FDG PET/CT showed a consistent trend toward higher sensitivity and diagnostic capability than 3.0-Tesla WB-MRI for the detection of distant metastases and SPCs in patients with untreated OHSCC
Cho, 2011 (102)	FDG PET/CT differentiate malignant endobronchial lesions with distance atelectasis from benign bronchial stenosis	34	FDG PET/CT	CT or high resolution CT	Histology	he sensitivity, specificity and accuracy of chest CT was 95%, 48% and 84%, compared with 95%, 91% and 94% for PET/CT.	Increased FDG PET/CT uptake at the obstruction site indicates a high probability of malignancy, while benign lesions show low FDG uptake
Delouya, 2011 (103)	FDG-PET/CT in radiotherapy target delineation and patient management for HNSCC as	29	FDG PET/CT	CT	Pathology	18F-FDG-PET/CT modified treatment management in 10% of the patients, including two patients for which no curative radiotherapy was attempted because of metastatic disease revealed by 18F-FDG-PET/CT.	

	compared to CT alone						
Deron (104)	FDG-PET/CT imaging for detection of the primary tumour and its impact on treatment planning in patients presenting with CUP and SCC-positive cervical lymph nodes of the upper and middle neck	18	FDG PET/CT	CI	Pathology	In none of the patients, FDG-PET/CT was able to indicate a primary tumour localization. Although FDG-PET/CT did identify all sites of known lymph node involvement, neither additional sites of lymph node involvement nor sites of distant metastases were identified. Accordingly, FDG-PET/CT did not impact patient treatment planning.	Small patient population
El Khodary (105)	Role of FDG PET/CT in patients with H&N SCC and to assess the impact on clinical management	63	FDG PET/CT	CI	Histology	First group (pre-treatment staging): FDG-PET/CT yielded additional diagnostic information in 44.4% of patients, with subsequent modification of treatment strategy in 11.1% and implementation of further curative therapy in 6.6%. Second group (had treatment): PET/CT altered further clinical management in 18.4% patients and induced a change in the planned therapeutic approach in 23.6%	High diagnostic performance in the assessment of head and squamous cell carcinoma, and induced a significant change in the management of the study population.
Huang, 2011 (106)	Compare FDG PET/CT and CT in buccal squamous cell carcinoma	17	FDG PET/CT	CT and Fused PET/MRI	Pathology	Sens, Spec, PPV, NPV of PET/CT 80%; 84%, 69%, 90% Sens, Spec, PPV, NPV of CT: 55%, 81%, 58%, 80%	
Kim, 2011 (107)	FDG PET/CT and CT/MRI in identifying nodal diseases in the contralateral neck of patients with HNSCC	139	FDG PET/CT	CT, MRI	Histopathology	FDG PET/CT was significantly more sensitive and accurate than was CT/MRI in the ipsilateral (88% vs. 70%, $p<0.01$ and 93% vs. 89%, $p<0.01$, respectively) and contralateral (52% vs. 36%, $p<0.01$ and 91% vs. 90%, $p=0.039$, respectively) neck	Combined PET/CT superior to CT/MRI
Kim, 2011 (108)	Usefulness of FDg PET/CT and CT/MRI in identifying residual disease	39	FDG PET/CT	CT/ MRI	Clinical and pathologic confirmation	Sensitivity, specificity and accuracy of FDG PET/CT for detecting primary tumors were 91, 65, and 79%, respectively. Of 56 dissected heminecks, 37 (66%) had residual metastatic lymph nodes. FDG PET/CT and CT/MRI had accuracies for positive heminecks of 91 and 75%, respectively ($p = 0.004$).	PET/CT is superior to CT/MRI in detecting residual nodal disease in head and neck squamous cell carcinoma patients undergoing salvage surgery
Krabbe, 2011 (109),	Diagnostic value of PET/CT in the initial staging of oropharayngeal squamous cell carcinoma (OOSC)	73	FDG PET/CT		Histology	For detecting the primary tumour, PET/CT showed a sensitivity of 96%, and for detecting cervical metastases, a sensitivity and specificity of 89% and 81%, respectively. In the clinically N0 subgroup (n = 37), PET/CT showed a sensitivity and specificity of 64% and 81%, respectively. In five of six patients PET/CECT detected a second primary tumour.	PET/CECT as a one-step examination is a reliable alternative for PET/CT in combination with a separate diagnostic CT in patients with OOSC for initial staging.
Law, 2011 (110),	PET/CTas an adjunct to CI in the management of NPC	48	FDG PET/CT	MRI and/or CT	Cytology/ histology and or	Forty-eight patients underwent a staging PET/CT. The clinical impact was high in 8%, medium in 25% and low in 66% of patients. Twenty-one patients	PET/CT is a valuable staging tool for the detection of occult metastatic disease and defining the extent of neck nodal disease. Post-treatment, a

	both for initial staging and assessment of post-treatment response.				clinical or radiologic follow-up	were scanned for post-treatment response. PET/CT was less frequently equivocal than was MRI (3 vs. 8/21). A complete metabolic response on PET/CT was associated with a 93% negative predictive value for subsequent recurrence.	complete metabolic response on PET/CT has a very high negative predictive value with fewer equivocal results than MRI.
Liao, 2011 (111)	FDG PET/CT detecting neck lymph node metastases in patients with OSCC.	211	FDG PET/CT	CT	Pathology	18F-FDG PET correctly diagnosed 164 of 211 patients with neck metastases and 152 of 262 subjects without pathologic neck metastases, resulting in a patient-based sensitivity and specificity of 77.7% and 58.0%, respectively. In Cox models, PET results at the neck lymph nodes were significantly and independently associated with rates of neck control, distant metastasis, disease-free survival, disease-specific survival, and overall survival.	PET findings at the neck lymph nodes have limited sensitivity and specificity for primary staging of OSCC but improve risk stratification beyond that of traditional risk factors.
Mori, 2011 (112)	Utility of FDG-PET in patients with HNSCC who received concurrent chemoradiotherapy	65	FDG PET/CT	Non-Comparator		The sensitivity of FDG-PET for the diagnosis of primary tumor site was 98%. The sensitivity, specificity, and accuracy of FDG-PET for the diagnosis of primary tumor site after treatment were 100%, 40%, and 46%, respectively.	Useful imaging method for evaluating the response of concurrent chemotherapy in patients with HNSCC
Wierzbicka, 2011 (113)	Post-treatment surveillance for local and regional recurrence of HNSCC	83	FDG PET/CT	Ultrason-ography	Pathology (pre-treatment)	The sensitivity and specificity of PET/CT were 86% and 82%, respectively; US values were 81% and 87%, respectively. PPV was 79% for PET/CT, and 83% for US. NPV was 89% for PET/CT, and 85% for US. The overall accuracy for PET/CT and US was 84% for both methods	Both methods are complementary
Zundel, 2011 (114)	FDG PET/CT for assessing residual cancer	52	FDG PET/CT	Physical Examination		Sensitivities of PET/CT vs. physical examination for early detection of treatment failure were 100% vs. 50%, whereas the specificities of the two modalities were 64.6% vs. 89.6%, respectively	A negative result on PET/CT obtained 4-6 months after radiotherapy is sensitive and correlates with successful locoregional control. Patients with negative scans may be spared invasive diagnostic procedures unless recurrent disease is suspected on clinical grounds
Hematology							
Abdulqadhr, 2011 (115)	Whole-body DWI vs. PET.CT in the staging of lymphoma patients	31: 8 HL, 23 NHL	FDG PET/CT	Whole-body DWI	Histology and clinical follow-up	The staging was the same for DWI and FDG-PET/CT in 28 (90.3%) patients and different in three (9.7%). Of the 28 patients with the same staging, 11 had stage IV in both techniques and 17 had stages 0-III. No HL or aggressive non-Hodgkin's lymphoma patients had different staging. Three indolent small lymphocytic lymphoma/chronic lymphocytic leukemia (SLL/CLL) lymphoma had higher staging with DWI when compared with FDG-PET/CT.	Both methods are comparable for both HL and NHL

Barnes,2011 (116)	The prognostic value of interim PET in limited-stage patients with nonbulky disease	96	FDG PET/CT	Interim and post-therapy PET scans	Clinical Follow-up	Interim PET did not predict outcome, with PFS in positive and negative patients 87% versus 91% (p=0.57), respectively. End-of-treatment PET result was predictive of outcome, with PFS of 94% in end PET-negative patients versus 54% in end PET-positive patients (p<0.0001). Four-year OS was 100% in end PET-negative patients and 84% in end PET-positive patients (p<0.0001).	Interim PET scans were not predictive of outcome, compared with scans carried out at completion of therapy.
Cahu, 2011 (117)	Prognostic value of interim and post-therapy FDG/PET in T/NK lymphomas	54	FDG PET/CT	Interim and post-therapy PET scans	Clinical Follow-up	Interim FDG-PET was negative in 25 of 44 cases. After completion of therapy, 19 of 31 patients reached complete remission with negative FDG-PET. In ALK+ anaplastic large-cell lymphomas, the 4-year progression-free survival (PFS) was 80% and the negative predictive value of post-therapy FDG-PET was 83%. In ALK- T/NK lymphomas, the 4-year PFS was 59% for patients with a negative interim FDG-PET versus 46% for patients with a positive interim FDG-PET (p = 0.28). No statistical difference in 4-year PFS between negative and positive post-therapy FDG-PET in these lymphomas (p=0.96)	Although T/NK lymphomas are FDG-avid at diagnosis, a negative interim or post-therapy FDG-PET does not translate into an improved PFS in ALK- T/NK lymphomas.
Cashen, 2011 (118)	Prognostic value of interim and post-therapy FDG/PET in diffuse large-B-cell lymphomas	50	FDG PET/CT	Interim and post-therapy PET scans	Clinical follow-up	Interim (18)F-FDG PET/CT was significantly associated with event-free survival (p=0.017) and with progression-free survival (p=0.04) but not with overall survival (p=0.08). End-of-therapy (18)F-FDG PET/CT had high PPV and NPV (71% and 80%, respectively) and was significantly associated with event-free survival, progression-free survival, and overall survival (p<0.001).	
El-Galaly, 2011 (119)	Routine surveillance with positron emission tomography/computed tomography in aggressive non-Hodgkin lymphoma in complete remission	52	FDG PET/CT	Routine CT surveillance	Clinical follow-up	The specificity and sensitivity of surveillance PET/CT were 89% and 100%, respectively. The predictive values of positive and negative PET/CTs were 21% and 100%, respectively.	PET/CT was effective in detecting unexpected relapse and normal PET/CT supported continuous CR. However, the impact of PET/CT was limited by the high number of false-positive results and PET/CT surveillance was costly compared to CT surveillance.
Fujiwara, 2011 (120)	Utility of positron emission tomography/computed tomography in the staging of extranodal natural killer/T-cell lymphoma	19	FDG PET/CT	Conventional staging methods	Pathology	PET/CT was superior to CMs in detecting cutaneous lesions [31/31 lesions (100%) vs. 20/31 lesions (65%), respectively; p=0.042]. PET/CT findings altered the stage and treatment strategy in two cases (11%).	PET/CT is a useful tool for detecting extranodal lesions in NK/T-cell lymphoma, particularly cutaneous lesions.
Hosein, 2011 (121)	FDG PET/CT utility in mantle cell lymphoma	52	FDG PET/CT	Conventional imaging	Clinical follow-up	A negative interim or end-of-therapy PET scan was not significantly associated with better EFS or OS, but no deaths were observed in patients who had a negative interim or end-of-therapy PET. Surveillance PET scans had a high false-positive rate (35%) and low positive predictive value (8%).	PET scans did not meaningfully contribute to staging or surveillance of MCL patients in this study. There was a trend toward improved survival in patients who had a negative end-of-therapy PET scan.

Huang, 2011 (122)	Gallium versus PET in staging and recurrence	42	FDG PET/CT	Gallium scanning (GS)	Clinical follow-up	FDG PET detected 230 lesion sites, whereas GS detected 85 lesion sites. All of the lesions detected by GS were noted on FDG PET. Among the 27 studies for staging, FDG PET detected 120 lesions, whereas GS detected 68 lesions (56.7%). In the 19 images taken for relapse, FDG PET detected 110 lesions, whereas GS detected only 17 (15.5%).	FDG PET is superior to GS in staging and detecting all types of lymphoma. The difference is notably more significant in recurrence detection.
London, 2011 (123)	18F-FDG PET/CT in paediatric lymphoma:	209 scans	FDG PET/CT	Conventional imaging	Histopath-ology or clinical follow-up	PET/CT performed significantly better than did CI in the detection of malignant lesions with sensitivity and specificity of 95.9 and 99.7% compared to 70.1 and 99.0%, respectively.	PET/CT is more accurate than CI in detecting malignant lesions in childhood lymphoma and in predicting poor lesion response to treatment. In lesions with discordant findings, PET/CT results are more likely to be correct.
Lopci, 2011 (124)	Postchemotherapy FDG PET compared with other predictive factors in paediatric HL	98	FDG PET/CT	Conventional imaging	Clinical follow-up or histology	Kaplan-Meier analysis demonstrated significant correlations between PFS and the postchemotherapy PET result (p=0.0001). Multivariate analysis confirmed a statistically significant correlation with PFS only for the postchemotherapy PET findings (p=0.0009).	postchemotherapy PET results are the main predictors of patient outcome and PFS, with FDG PET being the only independent predictive factor for PFS.
Papajik, 2011 (125)	Utility of PET/CT in determining extent and stage of disease in patients with newly diagnosed non-Hodgkin's lymphoma	118	FDG PET/CT	CT, PET alone		When compared with CT alone, PET/CT changed staging of the disease in 11 patients (9%) and was able to detect a total of 82 discrepancies in 67 of the 117 patients (57%).	PET/CT is a new standard in imaging the involvement of lymph nodes and extranodal organs in NHL patients regardless of their histopathological types. Both sensitivity and specificity of the examination are higher than those of CT as well as PET alone
Pelosi, 2011 (126)	Compare the accuracy of bone marrow biopsy (BMB) PET in bone marrow disease detection in HL and NHL	337	FDG PET	BMB	Histopath-ology	PET vs. BMb were: sensitivity: 69% vs. 59.8%; specificity: 99.2% vs. 100%; accuracy: 91.4% vs. 89.6%; positive predictive value: 96.8% vs. 100%; negative predictive value: 90.2% vs. 87.7%.	87 patients with confirmed BMD only 25 are positive at both exams, while 27 only at the BMB and 35 only at the PET exam; the integration of PET findings with BMb ones increases the diagnostic accuracy.
Picardi, 2011 (127)	PET/CT in the detection of occult subdiaphragamtic involvement of HL	103	FDG PET/CT	CT or PET alone	Histology	FDG-PET/contrast-enhanced CT-guided treatment resulted in a 95% EFS, whereas separate FDG-PET and diagnostic CT-guided treatment resulted in an 81% EFS (p=0.002).	FDG-PET/contrast-enhanced CT is an accurate frontline single imaging diagnostic tool enabling effective tailored treatment in HL patients.
Pommier, 2011 (128)	Impact of FDG PET/CT on treatment strategy and radiotherapy planning for stage I-II HL	137	FDG PET/CT	CT	Histopath-ology	Based on preradiotherapy FDG-PET data, the radiotherapy was cancelled in 6 patients (4.8%), and treatment plan modifications occurred in 16 patients (12.9%): total dose (11 patients), CTV volume (5 patients), number of beam incidences (6 patients), and number of CTV (6 patients). The concordance between the treatment strategies with or without preradiotherapy FDG-PET was 82.3%.	FDG-PET for treatment planning in Hodgkin's lymphoma may lead to significant modification of the treatment strategy and the radiotherapy planning in patients with Stage I or II HL.
Quarles VanUfford, 2011 (129)	Staging newly diagnosed lymphoma with FDG PET/CT	22	FDG PET/CT	Whole body MRI-DWI	Pathology	Ann Arbor stage according to whole-body MRI-DWI findings was concordant with that of FDG PET/CT findings in 77% (17/22) of patients. Understaging and overstaging relative to the findings with FDG PET/CT occurred in 0% (0/22) and 23% (5/22) of cases. In the	Overall agreement between whole-body MRI-DWI and FDG PET/CT is moderate. In the care of patients with newly diagnosed lymphoma, staging with whole-body MRI-DWI does not result in underestimation of stage relative to the results

						care of 9% (2/22) of patients, overstaging with whole-body MRI-DWI relative to staging with FDG PET/CT would have had therapeutic consequences.	with FDG PET/CT.
Sager, 2011 (130)	FDG PET/CT in evaluating bone marrow involvement at initial staging	30	FDG PET/CT	CI	Pathology	Conventional radiological methods were negative in 3 of 30 FDG PET/CT-positive patients and these methods did not show any pathological finding in 12 FDG PET/CT-negative patients. The sensitivity of FDG PET in detecting bone marrow involvement at initial diagnosis was 90%.	FDG-PET is a useful technique for the assessment of MM
Smeltzer, 2011(131)	Prognostic value of PET/CT in relapsed or refractory classical HL treated with standard salvage chemotherapy and ASCT	46	FDG PET/CT	No comparator	Clinical follow-up	Overall, 3-year EFS was 62% and OS was 78%, with a median follow-up of 38 months. Pre-ASCT FDG-PET response significantly predicted 3-year EFS in FDG-PET-negative (82%) versus FDG-PET-positive (41%) patients (p=0.02).	Pre-ASCT FDG-PET scans predict EFS in patients with relapsed cHL patients treated with modern salvage/ASCT
Terezakis, 2011 (132)	PET/CT in radiation treatment planning of lymphoma and haematologic malignancies	29	FDG PET/CT	CT	Pathology	The addition of PET changed the volume of 23 sites (72%). The PTV was increased in 15 sites (47%) by a median of 11% (range, 6-40%) and reduced in 8 sites (25%) by a median of 20% (range, 6%-75%). In six (19%) replanned sites, the CT-based treatment plan would not have adequately covered the PTV defined by PET/CT.	Incorporation of FDG-PET into CT-based treatment planning for lymphoma patients resulted in considerable changes in management, volume definition, and normal tissue dosimetry for a significant number of patients.
Trotman, 2011 (133)	PET-CT performed after first-line therapy in patients with FL	122 (scans)	FDG PET/CT	Conventional response criteria	Pathology	Patients remaining PET positive had a significantly (p<.001) inferior progression-free survival at 42 months of 32.9% (95%CI, 17.2-49.5%) compared with 70.7% (95%CI, 59.3-79.4%) in those who became PET negative.	FDG PET-CT status at the end of immunochemotherapy induction in patients with FL is strongly predictive of outcome.
Zinzani, 2011 (134)	Midtreatment FDG PET/CT in aggressive NHL	91	FDG PET/CT	None	Clinical follow-up	35 patients showed a persistently positive PET scan; only 6 (17%) of these patients achieved a continuous complete response (CCR). However, 56 patients presented with a negative interim PET, and 50 (89%) of these patients achieved and maintained a CCR.	
Lung Cancer							
Vant Westeinde, 2011 (135)	Preoperative FDG PET/CT after a conclusive or inconclusive nonsurgical workup will reduce the resection rate for benign disease in test-positive participants of a lung cancer screening program.	220 test posit-ives	FDG PET		Clinical follow-up	The sensitivity of PET to detect cancer was 84.2% (95%CI: 77.6-90.7%), the specificity 75.2% (95%CI: 67.1-83.3), the positive predictive value 78.9% (95%CI: 71.8-86.0%), and the NPV 81.2% (95%CI: 73.6-88.8%). A preoperative PET after an inconclusive nonsurgical workup reduced the resection rate for benign lesions by 11% to 15%, at the expense of missing 12% to 18% lung cancer cases. A preoperative PET after a conclusive nonsurgical workup reduced the resection rate by 78% at the expense of missing 3% lung cancer cases.	A preoperative PET scan in participants with an inconclusive nonsurgical workup is not recommended because of the very low NPV, but after a conclusive nonsurgical workup, the resection rate for benign disease can be decreased by 72%.
Gynecological Cancer: Ovarian/Cervical cancer							
De Iaco, 2011 (47)	Assess the value of FDG PETCT in staging advanced ovarian	40	FDG PET/CT	Laparoscopy	Histo-patho-logical	Tumour was found in 308 quadrants (38 quadrants free of disease). PET/CT was positive in all 40 patients with true negative results in 26/346 quadrants (7.5%), and	PET/CT may prove a useful tool for pre-surgical staging of ovarian cancer with a sensitivity and specificity of 78% and 68%, respectively.

	cancer.				evaluation	true positives results in 243/346 quadrants (70.2%). False positive and negative PET/CT results were found in 12/346 and 65/346 quadrants, respectively.	
Fastrez, 2011 (48)	18F-DG PET-CT in the diagnosis of endometriosis	10	FDG PET/CT	Laparoscopy	Histo-patho-logic evaluat-ion	None of the FDG PET/CT scans performed preoperatively detected any hypermetabolic lesions.	FDG PET/CT is not recommended as a diagnostic tool for endometriosis.
Kitajima, 2011 (49)	PET/CT scan for nodal staging of uterine cancer	40	FDG PET/CT	CT	Histo-pathol-ogy	Region-based analysis showed that the sensitivity, specificity, and accuracy of PET/CT (enhanced) were 61.4%, 98.1%, and 93.6%, respectively, whereas those of PET/CT (unenhanced) were 52.3%, 96.8%, and 91.3%, respectively, and those of enhanced CT were 40.9%, 97.8%, and 90.8%, respectively.	Contrast enhanced PET/CT is not significantly superior to non enhanced FDG PET/CT; however, enhanced PET/CT is significantly superior to CT only in the staging of uterine cancer.
LeBlanc, 2011 (50)	Valuate the accuracy of PET at detecting para-aortic lymph node metastases in locally advanced cervical carcinoma (LACC)	125	FDG PET/CT	MRI or CT	Pathol-ogy	Sensitivity, specificity, and positive and negative predictive value of the PET/CT were 33.3%, 94.2%, 53.8%, and 87.5%, respectively, for the detection of microscopic lymph node metastases.	Laparoscopic staging surgery appears to be warranted in patients with a negative PET scan who are candidates for definitive concurrent chemoradiotherapy or extension.
Lee, 2011 (51)	Evaluate the usefulness of FDG PET/CT for assessing suspected recurrences during follow-up in patients who have been treated for cervical cancer	51	FDG PET/CT	Conventional imaging (ultrason-ography. CT. MRI)		Measured across all patients, PET/CT scored 97.3% on sensitivity, 71.4% on specificity, a positive predictive value of 90%, a negative predictive value of 90.9%, and an accuracy of 90.2%. PET/CT yielded only one false negative diagnosis and four false positives.	FDG PET/CT has a high sensitivity and specificity and is useful in the clinical determination or recurrence and prevention of unnecessary additional treatments.
Nasu, 2011 (52)	Compare FDG PET/CT with CT during regular follow-up in patients after initial treatment of ovarian cancer	19	FDG PET/CT	Multidetecto r CT, Ca-125 Assay	Surgery or clinical follow-up	PPV, NPV, sensitivity, and specificity of the CA 125 assay were 11.1%, 33.3%, 36.4%, and 87.5%, respectively. The PPV, NPV, sensitivity, and specificity of contrast-enhanced multidetector CT were 100%, 88.9%, 95.5%, and 100%, respectively. The PPV, NPV, sensitivity, and specificity of FDG PET/CT were 100%, 66.7%, 81.8%, and 100%, respectively. In most of the 30 imaging analyses, the management plans obtained from FDG–PET/CT results were similar to those based on the contrast-enhanced multidetector CT results. Nine of 11 patients (81.8%) in whom surgery was recommended by both PET/CT and contrast-enhanced CT findings achieved the complete resection of the recurrent tumour.	Multidetector CT system with contrast enhancement can achieve satisfactory images of recurrent lesions with high sensitivity, specificity, and accuracy similar to those of the images obtained from FDG–PET/CT.
Ramirez (53)	Utility of preoperative PET/CT in detecting metastasis to the	60	FDG PET/CT	Preoperative CT or MRI	Pathol-ogy	The sensitivity and specificity of PET/CT in detecting positive para-aortic nodes when nodes were negative on CT or MRI were 36% and 96%, respectively. Eleven	Surgical staging of patients with locally advanced cervical cancer should be considered before planned radiation and chemotherapy.

	para-aortic lymph nodes					(18.3%) patients had a treatment modification based on surgical findings.	
Signorelli (54)	FDG PET/CT in pelvic nodal assessment in patients with cervical cancer	159	FDG PET/CT	Chest x-ray, abdominal MRI	Histo-pathol-ogy	Overall patient-based sensitivity, specificity, positive and negative predictive value of 18F-FDG-PET/CT for detection of nodal disease were 32.1%, 96.9%, 69.2% and 87.0% respectively.	18F-FDG-PET/CT had low sensitivity and had a minimal clinical impact in the pretreatment planning of stage Ib1-IIa < 4 cm cervical cancer.
Suga (55)	FDG PET/CT in the preoperative evaluation of patients with endometrial cancer	41	FDG PET/CT		Histo-patho-logic evaluat-ion and clinical follow-up	Additional findings from FDG PET/CT scans altered the therapeutic management in 4 patients.	FGD PET/CT has a reasonable high diagnostic performance in preoperative staging.
Melanoma							
Essler, 2011 (60)	Prognostic value of FDG PET/CT in patients with high-risk melanoma	125	FDG PET/CT	Tumour markers S100B, melanoma inhibitory activity (MIA)	Histo-logy and imaging follow-up	PET had better diagnostic accuracy then did S100B and MIA. Patients with elevated S100B- or MIA values or PET/CT positive findings showed a significantly ($p<0.001$ each, univariate Cox regression models) higher risk of melanoma associated death.	PET/CT has a higher prognostic power in the assessment of cancer-associated mortality in melanoma patients compared with S100 and MIA
Peric, 2011 (61)	PET/CT versus S100B in cutaneous melanoma	115	FDG PET/CT	S100B	Histopat hology	Sensitivity, specificity, PPV and NPV of S100B were: 50%, 47.6%, 81%, 17.5%, respectively. Sensitivity, specificity, PPV and NPV of PET/CT were: 98.9%, 90.4%, 97.8%, 95%, respectively.	PET/CT had a higher diagnostic accuracy
Mesothelioma							
Gerbaudo, 2011 (63)	Performance and prognostic value of PET/CT in malignant pleural mesothelioma	50	FDG PET/CT	None	Pathol-ogy	Sensitivity, specificity, accuracy, negative predictive value, and positive predictive value for FDG PET/CT were 97.6%, 75%, 94%, 86%, and 95.3%, respectively. FDG PET/CT helped in the selection of 12 patients (29%) who benefited from additional previously unplanned treatment at the time of failure.	FDG PET/CT is an accurate modality to diagnose and to estimate the extent of locoregional and distant MPM recurrence, and it carries independent prognostic value.
Sharif, 2011 (64)	Systematic review of the prognostic value of PET in malignant pleural mesothelioma	15	FDG PET or FDG PET/CT	Various	Various	15 (papers from 1950-2010) Malignant disease had a higher standardised uptake value (SUV) (6.53.4 vs. 0.80.6; p=0.001) than benign pleural disease. Shorter median survival (9.7 vs. 21 months; p=0.02) was associated with high SUV (10) than low SUV (-10). PET accurately upstaged 13% and downstaged 27% of cases initially staged with computed tomography (CT). PET accurately diagnoses MPM, predicts survival and disease recurrence. It can guide further management by predicting the response to chemotherapy and excluding surgery in patients with extrathoracic disease.	
Zahid (65), 2011	Value of PET/CT in diagnosis and staging of malignant pleural mesothelioma	14	FDG PET or FDG PET/CT	Various	Various	14 (papers from 1950 to 2010) PET diagnosed MPM with high sensitivity (92%) and specificity (87.9%). MPM was diagnosed by PET/CT with high sensitivity (88.2%), specificity (92.9%) and accuracy (88.9%). PET/CT had low sensitivity for stage N2 (38%) and T4 (67%) disease. Overall, the high specificity and sensitivity rates seen with open pleural biopsy make it a superior diagnostic modality to CT, MRI or PET for diagnosing patients with MPM.	
Neuro-oncology							
Hillner, 2011 (5)	Impact of dedicated brain PET on intended	479	FDG PET/CT	Conventional staging	Pathol-ogy	The frequency of change in intended management associated with PET was 38.2% in the primary brain	Dedicated brain PET was associated with similar net changes in intended management as in the

	patient management					tumour subgroup and 35.2% in the brain metastasis subgroup. The frequency of change in the primary brain tumour subgroup was similar to that in the overall National Oncologic PET Registry cohort (37.0%; OR=1.1, 95%CI 0.8%–1.3%).	overall National Oncologic PET Registry cohort.
Santra, 2011 (8)	FDG PET/CT for predicting survival in patients with recurrent glioma	81	FDG PET/CT	CI	Histo-pathol-ogy and clinical follow-up	Based on tumour to white matter (T/W) and tumour to grey matter (T/G) ratios, all lesions were scored on PET-CT (PET scores 0, 1 and 2). PET score was found to be the most significant predictor of survival in univariate and multivariate analysis (p=0.003). Patients having PET score 2 had poorer survival compared to both PET score 0 (p=0.001) and PET score 1 (p=0.004). Other covariates found to have significant correlation with survival were primary treatment modality and clinical symptoms at the time of recurrence.	FDG uptake on PET-CT is a strong predictor of survival in patients with suspected recurrent glioma
Non-Small-Cell Lung Cancer (NSCLC)							
Choi, 2011 (66)	PET/CT for postoperative surveillance and recurrence in non-small cell lung cancer.	358	FDG PET/CT	Chest CT	Histol-ogy, clinical follow-up	Recurrences were detected in 111 patients (31%). In 60 of these patients, recurrence was detected with conventional methods, and in the remaining 51 patients recurrences were detected with simultaneous PETCT and chest CT.	When the two methods were used simultaneously, PETCT seemed superior to chest CT for detecting recurrences of NSCLC.
Darling, 2011 (67)	FDG EPT/CT compared with invasive mediastinal staging in non-small cell lung cancer	149	FDG PET/CT	Conventional Staging	Histo-pathol-ogy and clinical follow-up	The sensitivity of PET-CT was 70% and specificity was 94%. 22 patients with a PET-CT interpreted as positive for mediastinal nodes, 8 did not have tumour. The PPV and NPV were 64% and 95%, respectively.	PET-CT assessment of the mediastinum is associated with a clinically relevant false-positive rate.
Fontaine, 2011 (68)	FDG PET/CT in short and long term survival of NSCLC patients	1999	FDG PET/CT	No PET	Pathol-ogy	The introduction of routine PET scanning did not result in improved survival in the short or long term, for patients undergoing resections for stage Ia p=0.74, stage Ib, p=0.43 and stage II, p=0.06, significant increased survival for patients undergoing resections for stage III primary lung cancer, p=0.03.	Use of PET scanning for stage III non-small-cell lung cancer.
Kolodziejczy, 2011 (69)	FDG PET/CT information changes treatment plans for NSCLC patients receiving or not receiving elective nodal irradiation	100	FDG PET/CT	CT	Histo-pathol-ogy	75 patients for whom the decision about curative radiotherapy was maintained after PET/CT, there would have been 20 cases (27%) with potential geographical misses by using the CT data set alone.	PET/CT should be incorporated in the planning of radiotherapy for NSCLC, even in the setting of elective nodal irradiation.
Kubota, 2011 (70)	diagnostic effects of additional FDG-PET to contrast-enhanced CT for mediastinal lymph node metastasis	99	FDG PET/CT	CT	Patho-logy	Accuracy improved from 69.1% (56/81) for CT alone to 75.3% (61/81) for CT and PET (p=0.404). These findings contributed to treatment decisions in 63.0% (51/81) of the cases, mainly with regard to the selection of the operative procedure.	Addition of FDG-PET to contrast-enhanced CT imaging for the staging of NSCLC improved the diagnostic accuracy for mediastinal lymph node metastasis.
Lin, 2011 (71)	Diagnostic and staging impact of	26	FDG PET/CT	CT	Histolog y	The planning PET detected PD in 16 patients (61%), compared to 4 patients (15%) by CT. Planning PET	RT-planning FDG-PET can provide incremental diagnostic information and may impact on staging

	radiotherapy planning FDG-PET/CT					detected PD in primary metabolic volume in 7 patients, 20 new nodal sites in 12 new nodal stations and nine patients, 5 extra-nodal sites in 5 patients. This resulted in upstaging in 9 patients (35%): stage IIIA in 3, IIIB in 3 and IV in 3.	in a significant number of patients.
Pancreatic Cancer							
Abgral et al, 2011 (75)	Compare the performance of FDG PET/CT and somatostatin receptor scintigraphy (SRS) for aggressive well-differentiated endocrine carcinoma (defined by high Ki67)	18	FDG PET/CT	SRS, CT	Pathol-ogy	FDG-PET, SRS, and CT detected 195 (77%), 109 (43%), and 195 (77%) lesions in 53 (90%), 30 (51%), and 39 (66%) organs, respectively. FDG-PET, compared to SRS, detected more, the same as, and less lesions in 14 (78%), one (6%), and three (17%) patients, respectively.	FDG PET/CT is more sensitive than SRS for high Ki67 WDEC staging.
Buchs et al, (76)	Performance of FDG PET associated with contrast-enhanced CT in detection of pancreatic cancer	45	FDG PET/CT	EUS	Surgical resection or biopsy confirm-ation	PET/CT in the detection of pancreatic cancer was 96% vs. 72% (p=0.076), the specificity 66.6% vs. 33.3% (p=0.52), the positive predictive value 92.3% vs. 80% (p=0.3), the negative predictive value 80% vs. 25% (p=0.2), and the accuracy 90.3% vs. 64% (p=0.085)	Enhanced PET/CT appears to be superior to unenhanced PET/CT.
Kitano (77)	evaluate the accuracy of 18F-FDG and 18F-DOPA compared with CT and MRI to detect PNETs in patients with vHL		FDG PET/CT	DOPA PET/CT, MRI, CT	Histology	Sensitivities: CT (96%); MRI (54%); FDG PET (44%); DOPA (11%).	18F-DOPA has very limited utility in detecting PNETs and metastatic PNETs in the setting of vHL. Although MRI and 18F-FDG did not identify all the PNETs identified by CT scans, they may identify additional PNETs and metastatic PNETs that were missed initially by CT.
Lin, 2011 (78)	Determine the NPV of a PET/CT scan for patients with a lesion suggestive of pancreatic cancer.	56	FDG PET/CT	CT. MRI, abdominal ultrasound	EUS fine-needle aspirat-ion, surgical pathol-ogy	The negative predictive value of PET/CT was 75%. Fourteen (25%) of the 56 patients with a negative PET/CT had a malignant lesion.	Negative integrated PET/CT in a pancreatic lesion clinically suggestive of malignancy does not exclude pancreatic cancer.
Okano, 2011 (79)	Can small cancers of the pancreas be detected by FDG PET/CT	31	FDG PET/CT	CT, MRI	Clinical-pathol-ogical profiles	sensitivity of FDG-PET, computed tomography (CT) and magnetic resonance imaging (MRI) were 100%, 40%, 0% in tumour size(TS) 1, 93%, 93%, 89% in TS2 and 100%, 100%, 100% in TS3-4.	FGD PET/CT has a superior sensitivity for pancreatic cancers less than 20 mm.
Pedrazzoli, 2011 (80)	Compare the role of the international consensus guidelines (ICG) and FDG PET/CT in the clinical management of malignant intraductal papillary mucinous neoplasms (IPMNs)	162	FDG PET	ICG	Histol-ogical diagnos-is	Sensitivity, specificity, positive and negative predictive value, and accuracy of the ICG in detecting malignancy were 93.2%, 22.2%, 59.4%, 72.7%, and 61.2%, whereas for PET, they were 83.3%, 100%, 100%, 84.6%, and 91.3%.	PET is more accurate than the ICG in distinguishing benign from malignant (invasive and noninvasive) IPMNs.
Topkan, 2011(81)	Evaluate the predicted value of	32	FDG PET/CT	CT, chest CT, cranial	Histology	At a median follow-up of 16.1 months, 16 (50.0%) patients experienced local/regional failures, 6 of	Significantly higher OS, PFS, and LRPFS in patients with greater SUV_{max} difference suggest that FDG

	FDG PET/CT on outcomes in locally advanced pancreatic carcinoma in patients treated with concurrent chemotherapy			MRI		which were detected on the first follow-up FDG-PET-CT. Median overall survival, progression free survival, and local regional progression-free survival for those with greater (N = 16) versus lesser (N = 16) SUV_{max} change were 17.0 vs. 9.8 (p=0.001), 8.4 vs. 3.8 (p=0.005), and 12.3 vs. 6.9 months (p=0.02), respectively.	PET/CT-based metabolic response assessment is an independent predictor of clinical outcomes in LAPC patients treated with definitive concurrent chemotherapy.
Paediatric Cancer							
Melzer, 2011 (6)	123I-MIBG/SPECT vs. FDG PET/CT in paediatric neuroblastoma	19	FDG PET/CT	123I-MIBG/ SPECT	Pathol-ogy	The sensitivities of 123I-MIBG scintigraphy and FDG PET were 50% and 78% and the specificities were 75% and 92%, respectively.	FDG PET was more sensitive and specific for the detection of neuroblastoma lesions. The findings suggest that a FDG PET scan may be useful in the event of discrepant or inconclusive findings on 123I-MIBG /SPECT and morphological imaging.
Nikolaos, 2011 (7)	FDG PET/CT and 123I-MIBG imaging in high-risk neuroblastoma	28	FDG PET/CT	123I-MIBG/ SPECT	Pathol-ogy	FDG PET/CT results were positive in 86% patients, whereas 123I-MIBG imaging results were positive in all patients. FDG PET/CT was superior in mapping tumour load in 14% patients, whereas 123I-MIBG was better in 43% patients. Cox regression and Kaplan-Meier survival curves indicated that the group of patients in whom FDG was superior to 123I-MIBG had a significantly lower survival rate than did the others.	123I-MIBG imaging is superior to FDG PET/CT in the assessment of disease extent in high-risk neuroblastoma. However, FDG PET/CT has significant prognostic implications in these patients
Zukotynski, 2011 (9)	FDG PET and MRI associations in pediatric diffuse intrinsic brain stem glioma	40	FDG PET/CT	MRI		Survival was poor, irrespective of intensity of FDG uptake, with no association between intensity of FDG uptake and PFS or OS. Post-PET, the intended management was revised in more than 80% of cases to either observation or treatment. These revised post-PET plans were about equally divided between observation and treatment. For the primary brain tumour subgroup, a change in the pre-PET plan from treatment to non-treatment was more common (46.7%) than the converse (34.7%). Of the primary brain tumour patients with a pre-PET plan of treatment, the post-PET plan had a treatment goal change in 28.6%.	FDG PET/CT may provide important prognostic information that may affect clinical management. Further studies needed.
Purz, 2011 (82)	FDG PET/CT for detection of bone marrow involvement in children and adolescents with HL	175	FDG PET/CT	BMB	Pathol-ogy and clinical follow-up	BMB results were positive in seven of 175 patients and were identified by FDG-PET. FDG-PET scans showed BM involvement in 45 patients. In addition, the lesions of 32 of these 45 patients had a typical multifocal pattern. In 38 of 39 follow-up positron emission tomography scans, most of the skeletal lesions disappeared after chemotherapy.	FDG-PET is a sensitive and specific method for the detection of BM involvement in paediatric HL.
Thyroid Cancer							
Oh, 2011 (86)	FDG PET/CT in the detection of metastatic thyroid cancer.	114	FDG PET/CT	131I-whole body scintigraphy (WBS), 131I-	Pathol-ogy, imaging follow-	The sensitivity, specificity, and diagnostic accuracy of each imaging modality were 65%, 55%, and 59%, respectively, for (131)I WBS; 65%, 95%, and 85% for (131)I SPECT/CT, respectively; and 61%, 98%, and 86%,	131I WBS, preferably with SPECT/CT, and 18F-FDG PET/ CT are the methods of choice for evaluating patients with DTC.

				SPECT/CT	up	respectively, for (18)F-FDG PET/CT in patient-based analyses.	
Piccardo, 2011 (87)	FDG-PET/CT in the assessment of overall extent of the disease and the therapeutic management in a group of stage-IV differentiated 20 thyroid cancer patients	20	FDG PET/CT	CI	Histo-pathol-ogy and clinical follow-up	FDG PET/CT findings prompted modification of the management of 11 patients (55%), in whom surgery or external radiotherapy were eventually considered more appropriate than radioactive iodine therapy.	FDG-PET/CT can detect new radioiodine-negative metastases in advanced DTC patients
Carcinoma of an Unknown Primary (CUP)							
Dandekar, 2011 (136)	Utility of PET in unknown primary with cervical metastasis	112	FDG PET	CI	Histopat hology	Sensitivity and specificity for conventional modalities was 92.3% and 50%, respectively, and sensitivity and specificity of FDG-PET was 92.8% and 71.4%, respectively. FDG-PET detected metastasis in 52.54% of patients.	FDG-PET is a valuable tool influencing change of management in unknown primary with cervical metastasis.
Hu, 2011 (137)	Clinical application of FDG PET/CT in carcinoma of unknown primary	149	FDG PET/CT	CI	Histol-ogy	Overall sensitivity, specificity, and accuracy rates of FDG PET/CT in detecting unknown primary tumours were 86.0%, 87.7%, and 87.2%, respectively. FDG PET/CT imaging led to the detection of previously unrecognized metastases in 29.5% of patients. Forty-seven (31.5%) patients underwent a change in therapeutic management.	FDG PET/CT is a valuable tool in patients with CUP
Moller, 2011 (138)	Literature review of FDG PET/CT in CUP	4 stud -ies	FDG PET/CT	Various	Various	FDG PET/CT detected the primary tumour in 39.5% of patients with extracervical CUP. The lung was the most commonly detected primary tumour site (~50%). The pooled estimates of sensitivity, specificity, and accuracy of FDG PET/CT in the detection of the primary tumour site were 87%, 88%, and 87.5%, respectively.	FDG PET/CT might contribute to the identification of the primary tumor site in extracervical CUP
Pak, 2011 (139)	Role of FDG PET/CT in CUP patients	51	FDG PET/CT	Conventional workup	Histolog y or clinical follow-up	Primary tumour sites were detected in 5 of 51 patients (9.6%). No primary tumour was discovered in the remaining 46 patients (90.4%) during the follow-up. The sensitivity, specificity, and accuracy of (18)F-FDG PET/CT were 100%, 80.4%, and 82.4%, respectively. The positive and negative predictive values were 35.7 and 100%, respectively.	FDG PET/CT has a clinical implicative value in detecting the primary tumor of CUP
Non-FDG Tracer							
Budiharto, 2011 (90)	LN staging in prostate cancer by (11)C-choline positron emission tomography	36	11C-Choline FDG PET/CT	MR diffusion-weighted imaging (DWI)	Histology	(11)C-choline PET-CT were 9.4%, 99.7%, 75.0%, 91.0%, and 7.9%, respectively, and at DWI, these numbers were 18.8%, 97.6%, 46.2%, 91.7%, and 15.8%, respectively.	11C-Choline FDG PET/CT and MR DWI cannot be recommended to detect occult LN metastases before initial treatment.
Kumar, 2011 (91)	68Ga-DOTATOC PET/CT in the diagnosis and staging of pancreatic NETs	20	68Ga-DOTATOC PET/CT	CT	Histopat hology	68Ga-DOTATOC PET-CT correctly localised primary in all 20, CECT in 15 and FDG PET/CT in 2. 68Ga-DOTATOC PET-CT demonstrated metastases in 13 patients, CECT in 7 and 18F-FDG PET-CT in 2.	Ga-DOTATOC PET/CT was a useful imaging investigation for diagnosing and staging pancreatic NET.
Nasawa, 2011	68Ga-	109	68Ga-	CI	Histopat	68Ga-DOTA-NOC PET/CT showed sensitivity and	68Ga-DOTANOC PET/CT appears to be a highly

(94)	DOTANOC)PET/CT in the diagnosis and management of gastroentero-pancreatic NETs		DOTATOC PET/CT		hology	specificity of 78.3% and 92.5%, respectively, for primary tumour and 97.4% and 100% for metastases. It was better than a conventional imaging modality for the detection of both primary tumour ($p<0.001$) and metastases ($p<0.0001$). It changed the management strategy in 21 patients (19%) and supported management decisions in 32 patients (29%).	sensitive and specific modality for the detection of gastroenteropancreatic NET.
Tan, 2011 (93)	To compare potentials of MRI, F-18 FDG, and 11C-Choline PET/CT in differentiating brain tumour recurrence from necrosis after radiotherapy	55	11C-choline PET/CT	MRI	Pathol-ogy or follow-up	The sensitivities of MRI, F-18 FDG PET/CT, and 11C-Choline PET/CT in lesion diagnosis were 87.2%, 76.9%, and 92.3%, respectively, and their specificities were 81.3%, 62.5%, and 87.5%, respectively.	The results suggest that 11C-Choline PET/CT with higher sensitivity and specificity may be better in distinguishing recurrent brain tumour from radionecrosis compared with F-18 FDG PET/CT and MRI.

Appendix 1B: Summary of Evidence from January to June 2012

Author, year	Objective	# of pts	PET study type	Comparison Test	Reference Test	Results	Conclusions of the author
Anal Cancer							
Sveistrup, 2011 (4)	PET/CT in the staging of anal cancer	91	FDG PET/CT	Transanal ultrasound (TAUS)	Histology	PET/CT upstaged the disease in 14% of the cases and changed the treatment plan proposed by TAUS/US in 17%. PET/CT diagnosed eight metastatic sites, whereas TAUS/US diagnosed three.	PET/CT has great potential influence on the staging and treatment of anal cancer. TAUS is important in the staging of the primary tumour and N1-stage, whereas PET/CT seems necessary for the N2/3-stage, the M-stage and synchronous cancers.
Breast cancer							
Groves, 2012 (19)	FDG-PET/CT in the staging of patients with early primary breast carcinoma.	70	FDG PET/CT	CT	Histology	The primary tumour was identified with PET/CT in 64 of 70 patients. Of the unidentified lesions, surgical pathology revealed two intraductal carcinomas, one invasive tubular carcinoma, and three invasive lobular carcinomas. Undiagnosed multifocal breast disease was shown in 7 of 70 patients.	PET/CT may have a role in staging patients presenting with early breast cancer.
Koolen, 2012 (20)	PET/CT as a staging procedure in primary stage II and III breast cancer	154	FDG PET/CT	CI	Histology, follow-up imaging	Forty-two additional distant lesions were seen in 25 patients with PET/CT and could be confirmed in 20 (13%) of 154 patients. PET/CT was false positive for 8 additional lesions (19%) and misclassified the presence of metastatic disease in 5 (3%) of 154 patients. In 16 (80%) of 20 patients, additional lesions were exclusively seen with PET/CT, leading to a change in treatment in 13 (8%) of 154 patients. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of PET/CT in the detection of additional distant lesions in patients with stage II or III breast cancer are 100%, 96%, 80%, 100%, and 97%	FDG PET/CT is superior to conventional imaging techniques in the detection of distant metastases in patients with untreated stage II or III breast cancer and is associated with a low false positive rate.
Manohar,, 2012 (21)	PET/CT in recurrent breast carcinoma	111	FDG PET/CT	CI	Histopathol-ogy	FDG PET/CT was true positive in 75 patients, false positive in 6 patients, true negative in 35 patients and false negative in 1 patient, with a sensitivity, specificity, positive predictive value and a negative predictive value of 98.7%, 85.3%, 92.5% and 97.2%. FDG PET/CT also accurately restaged 22/23 patients with proven locoregional recurrence with an accuracy of 95.45%. F-18 FDG PET/CT had a major impact on management in 41% of the 103 patients being analysed for a major change in treatment.	PET/CT was a sensitive and specific imaging tool in detecting and restaging recurrent breast carcinoma. It can be a very useful imaging tool for restaging locoregional recurrences, and as an imaging technique to confirm suspicious metastatic disease on conventional imaging and to define the total burden of disease.
Park, 2012 (22)	PET/CT to predict pathological complete response to neoadjuvant	34	FDG PET/CT	DWI	Pathology	PET/CT:100%, 77.8%, 53.8%, 100%, 82.4% (Sensitiviy, Specificity, PPV, NPV, Accuracy) DWI: 100%, 70.4%, 46.7%, 100%, 76.5% (Sensitivity, Specificity, PPV, NPV, Accuracy).	DWI and FDG PET/CT showed similar diagnostic accuracy for predicting pCR to neoadjuvant chemotherapy in breast cancer patients. The combined use of DWI and FDG PET/CT had the

	chemotherapy in patients with breast cancer.						potential to improve specificity in predicting pCR.
Pritchard, 2012 (23)	FDG PET/CT assessment of regional nodal spread of disease in patients with breast cancer	336	FDG PET/CT		Pathology, auxiliary lymph node assessment (ALNA)	Sensitivity for PET was 23.7%, specificity was 99.6%, PPV was 95.8%, NPV was 75.4%, and prevalence was 29.8%.	FDG-PET is not sufficiently sensitive to detect positive axillary lymph nodes, nor is it sufficiently specific to appropriately identify distant metastases. However, the very high positive predictive value (96%) suggests that PET when positive is indicative of disease in axillary nodes, which may influence surgical care.
Garami, 2012 (24)	FDG PET/CT in early-stage breast cancer	115	FDG PET/CT	CI	Histopathol-ogy	The sensitivity of PET/CT in the detection of the primary tumour was 93%. The sensitivity of the traditional diagnostic modalities in the detection of multifocality was 43.8% while that of PET/CT was 100%. PET/CT data changed the treatment plan established upon the results of traditional imaging modalities in 18 patients (15.6%).	PET/CT is able to assess primary tumour size and axillary lymphatic status more accurately than CI. It can detect distant metastases in 7-8% of those patients who were declared free of metastasis by clinical investigations. PET/CT scan modifies the disease stage determined by traditional diagnostic modalities in almost half of the patients and leads to a change in the treatment plan in every 6th patient.
Colorectal Cancer							
Engledow, 2012 (35)	PET/CT in the staging of colorectal lover metastases	64	FDG PET/CT	CI	Histopathol-ogy	Inclusion of PET/CT in the staging protocol resulted in additional information in 28 patients (43%) and a change of management in 22 patients (34%). Management changes occurred secondary to disease upstaging in 20 patients (31%) and downstaging in 2 patients (3%).	The addition of PET/CT led to management changes in over one-third of patients.
Ozkan, 2012 (36)	18F-FDG PET/CT in detecting colorectal cancer recurrence	76	FDG PET/CT	Abdominal pelvic CT	Histology or clinical follow-up	Patient based sensitivity and specificity of PET/CT for the detection of disease recurrence was 97% and 61% compared with CT at 51% and 60%.	FDG PET/CT can be used in the determination of CRC recurrence in patients with elevated CEA levels, regardless of the CEA level.
Cholangeocarcinoma/ Hepatocellular carcinoma							
Schmidt, 2012 (140)	FDG PET/CT	76	FDG PET/CT	Whole-body MRI	Follow-up	Patient-based sensitivity for detection of extra-hepatic disease was 94% for PET-CT and 91% for WB-MRI.	Both FDG PET/CT and WB-MRI are efficient diagnostic triage methods for patients planned for radio-embolisation of liver metastases.
Esophageal cancer							
Barber, 2012 (42)	Impact of FDG PET/CT in patient management in esophageal cancer	139	FDG PET/CT	Conventional staging methods	Clinical follow-up	PET/CT changed the stage group in 56 of 139 (40%) patients and changed management in 47 of 139 (34%) patients. Of the 47 patients with management change, imaging results could be validated in 31 patients, and PET/CT correctly changed management in 26 (84%) of these. Of the remaining 5 patients, CSI stage was also incorrect in 4 and correct in 1.	PET/CT provides incremental staging information compared with CSI, changes management in one third of patients, and has powerful prognostic stratification in the primary staging of esophageal cancer.
Yen, 2012 (43)	PET/CT in restaging patients with esophageal squamous cell carcinoma	118	FDG PET/CT	EUS	Pathology	PET/CT was compared with one of pathological staging. The accuracies of T staging by EUS in groups 1(without CRT) and 2 (with CRT) were 85.2% and 34.9%, respectively. The accuracies of N staging by EUS in groups 1 and 2 were 55.6%	PET/CT is a more reliable modality for monitoring treatment response and restaging.

						and 39.8%, respectively. The accuracies of T and N staging by means of PET-CT scan were 100% and 54.5% in group 1, and were 69.4% and 86.1% in group 2, respectively.	
Head and Neck Cancer							
Kim, 2012 (44)	FDG PET/CT for preoperative staging, determination of extent and surgical planning	18	FDG PET/CT	CT	Pathology	Sensitivities of FDG PET and CT for predicting the primary tumour site were 100% and 94.4%, cervical lymph nodes at 73 dissected neck levels, FDG PET had a sensitivity of 76.1%, a specificity of 96.3%, a PPV of 97.2%, and an NPV of 70.3%; the corresponding values for CT were 39.1%, 92.6%, 90.0%, and 47.2%, respectively. FDG PET determination of the extent of neck node involvement changed the neck dissection regimen in 5 patients	FDG PET is useful for evaluating neck node status and for determining surgical planning in patients with major salivary gland SDC.
Stoeckli, 2012 (45)	FDG PET/CT in the initial staging of H&N SCC	76	FDG PET/CT	CT, FNAC	Histology	Ultrasound-guided FNAC showed the highest level of agreement with histology for exact N classification. Ultrasound-guided FNAC showed the smallest percentage of overstaged patients, 7%, versus 16% with PET/CT, 13% with CT, and 13% with ultrasound.	
Wong, 2012 (46)	FDG PET/CT in the detection of occult cancers in patients with SCC and undifferentiated cancer neck nodes	76	FDG PET/CT	Clinical assessment and imaging (CT, MRI) – Not standardized	Clinical follow-up	FDG PET/CT increased the detection of primary cancer by 30/78 (38.5%); sensitivity, specificity, PPV and NPV were 100.0%, 66.6%, 65.2% and 100.0%, respectively. PET/CT detected additional disease in four patients: contralateral nodal disease in two, mediastinal nodal disease in one and liver metastases in one.	FDG PET/CT is of value in the assessment of patients with occult neck primary cancers. There was a prevalence of FP results.
Hematology							
Richardson, 2012 (58)	FDG PET/CT vs. BMB in staging patients with HL	50	FDG PET/CT	BMB	Clinical follow-up	Ten of 50 patients were BM+, all of which were identified by FDG-PET/CT (PET+). Conventional BMB, therefore, changed management in one patient, from early unfavourable stage to stage IV. FDG-PET/CT identified diffuse bone marrow involvement in this case. There were no clinically significant FDG-PET/CT false positives.	Data suggest that the insensitive and invasive investigation of routine BM biopsy can be safely omitted if there is no evidence of FDG-PET/CT bony uptake.
Safar, 2012 (59)	FDG PET/CT in predicting survival of DCBL patients	112	FDG PET/CT	No Comparator	Clinical follow-up	3-year PFS and OS rates were 84% and 88%, respectively, in patients with PET-negative results versus 47% and 62%, respectively, in patients with PET-positive results	Early PET scan after 2 cycles of treatment can effectively predict the outcome of patients with DCBL.
Genitourinary Cancer							
Bachner, 2012 (141)	FDG-PET for postchemotherapy seminoma residual lesions:	127	FDG PET	CI	Histology, clinical follow-up	PET sensitivity, specificity, negative predictive value (NPV), positive predictive value (PPV), and accuracy were 67%, 82%, 93%, 42%, and 80%, respectively. This was superior to CT discrimination based on the size of the residual	High specificity, sensitivity, and NPV of FDG-PET for evaluating postchemotherapy seminoma residuals.

						tumour in all variables.	
Kumar, 2012 (142)	FDG PET/CT in detecting recurrent gallbladder carcinoma	118 (only 24 with com-par-able CI)	FDG PET/CT	CI	Radiologic follow-up and/or histopatholog y	Sensitivity, Specificity, PPV, NPV and accuracy of PET/CT: 93.7%, 100%, 100%, 88.8%, 95.8%, respectively. Sensitivity, Specificity, PPV, NPV and accuracy of CI: 87.5%, 50%, 77.7%, 66.6%, 75%, respectively.	FDG PET/CT is more specific than CI for detecting suspected recurrent gallbladder carcinoma.
Panagiotidis, 2012 (143)	PET/CT in the diagnosis of recurrent intra-abdominal cancer	73	FDG PET/CT	CI		In 73 cancer patients, FDG PET/CT identified recurrent disease in 52 patients and ruled out in 21 patients. FDG PET/CT scan was true positive in 49 patients, false positive in 3 patients, false negative in 4 patients, and true negative in 17 patients.	PET/CT is useful in the diagnosis of recurrent intra-abdominal cancer in patients when CI is negative.
Gynecological Cancer: Ovarian/Cervical cancer							
Ferrandina, 2012 (56)	PET/CT imaging in locally advanced cervical cancer patients	96	FDG PET/CT	MRI	Histopathol-ogy	For residual disease in the cervix, sensitivity was higher for MRI than for PET/CT (86.1% vs. 63.1%; p=.002), while specificity was significantly higher for PET/CT compared with MRI (p=.002). For MRI analysis of lymph node groups, sensitivity, specificity, and accuracy were 35.7%, 95.9%, and 88.0%, respectively. Conversely, sensitivity, specificity, and accuracy for PET/CT were 28.6%, 97.8%, and 88.7%, respectively.	Neither MRI nor PET/CT accurately detected residual disease in LACC patients triaged to radical surgery after neo-adjuvant treatment, disallowing the option of avoiding or modulating completion surgery.
Sanli, 2012 (57)	FDG PET/CT in the detection on recurrent ovarian cancer	47	FDG PET/CT	MRI	Pathology and clinical follow-up	Overall sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of PET/CT were 97.5%, 100%, 100%, 87.5%, and 97.8%, respectively, whereas those of MRI were 95%, 85.7%, 97.4%, 75%, and 93.6%, respectively. For the peritoneal implants in groups 2 (0.5-1cm) and 3 (1-2cm), the sensitivity, negative predictive value, and diagnostic accuracy values of PET/CT were significantly better than those of MRI (p<0.05).	PET/CT is similar to conventional MRI for the detection of recurrent ovarian cancer. PET/CT has greater accuracy in the detection of small-to-medium-sized (<2 cm) peritoneal implants compared with MRI.
Melanoma							
Bronstein, 2012 (62)	FDG PET/CT in clinical management of stage IV and III melanoma	32	FDG PET/CT	CE-CT or MRI (not standardized)	Clinical follow-up	PET/CT revealed unexpected melanoma metastases in 12% of scans (4/33). As a result, the surgery was cancelled for 2 patients, and the planned approach was altered for another 2 patients to address the unexpected sites. In 6% of scans (2/33), the unexpected metastases were detected in the extremities, which were not included in conventional imaging. Three scans (9%) showed FP FDG-avid findings that proved to be benign by subsequent stability or resolution with no therapy.	In patients with surgically treatable metastatic melanoma, FDG PET/CT can detect unexpected metastases that are missed or not imaged with conventional imaging, and can be considered as part of preoperative workup.

Neuro-oncology							
Santra, 2012 (10)	FDG PET/CT in the detection of glioma recurrence	90	FDG PET/CT	MRI	Clinical follow-up, imaging, histopathol-ogy	MRI was highly sensitive (95%) and with poor specificity (23%) for detection of recurrence. In contrast, FDG PET/CT has lower sensitivity (70%) and higher specificity (97%).	Combination of these two modalities or better still hybrid imaging in the form of PET-MRI might be more useful in these group of patients.
Timmers, 2012 (11)	FDG PET/CT for pheochromocytomas and paragangliomas (PPGLs)	216	FDG PET/CT	CT, MRI, 123I-MIBG SPECT	Follow-up	Nonmetastatic tumours, the sensitivity of FDG was similar to that of 123I-MIBG but less than that of CT/MRI (sensitivity of FDG = 76.8%; of 123I-MIBG = 75.0%; of CT/MRI = 95.7%; FDG vs. 123I-MIBG: difference = 1.8%, 95%CI = 214.8%-14.8%, p=0.210; FDG vs. CT/MRI: difference = 18.9%, 95%CI = 9.4%-28.3%, p<.001). The specificity was 90.2% for FDG, 91.8% for 123I-MIBG, and 90.2% for CT/MRI.	123I-MIBG SPECT, 18F-FDG PET allows better detection of metastases, provides a high specificity, and enables functional characterization of PPGL.
Non-Small-Cell Lung Cancer (NSCLC)							
Bradley, 2012 (72)	FDG PET/Ct in radiation treatment planning	47	FDG PET/CT	CT	Clinical follow-up	The GTV was statistically significantly smaller for PET/CT-derived volumes (p<0.0001). There was no significant difference in the number of involved nodes (2.1 vs. 2.4), vs. 20 (32% vs. 30.8%). Nodal contours were altered by PET/CT for 51% of patients. One patient (2%) developed an elective nodal failure.	PET/CT-derived tumour volumes for radiotherapy planning of patients with Stages II and III NSCLC were smaller than those derived from CT alone. PET/CT changed nodal GTV contours in 51% of patients.
Collaud, 2012 (73)	FDG PET/CT in restaging NSCLC	31	FDG PET/CT	Conventional staging (history, physical findings, blood test, bronchoscopy and contrast medium-enhanced CT scan)	Histology	Restaging PET/CT revealed a new FDG-positive lesion in 6 of 31 (20%) patients (2-ipsilateral cervical lymph node, 1-contralateral mediastinal, 1-ipsilateral mammary internal lymph node, 2-lesion on contralateral lung). Malignant lymph node infiltrations were excluded following fine-needle puncture, intra-operative biopsy or follow-up PET/CT.	New solitary FDG-positive lesions on restaging PET/CT after induction chemotherapy for NSCLC were not rare in good responders to chemotherapy. Lesions were not associated with malignancy.
Geraldson, 2012 (74)	FDG PET/CT in mediastinal staging in patients with NSCLC	117	FDG PET	CT	Pathology	The overall accuracy was 81.2% for CT and 91.5% for PET. Sensitivity was 42.1% for CT and 52.6% for PET. Specificity was 88.8% for CT and 99.0% for PET. Positive predictive values were 42.1% for CT and 90.9% for PET; negative predictive values were 88.8% for CT and 91.5% for PET.	FDG PET was significantly better for staging patients with NSCLC.
Paediatric Cancer							
Bakhshi, 2012 (83)	PET/CT at baseline, after two cycles of chemotherapy, and after completion of	34	FDG PET/CT	CT	Histology	PET/CT depicted 18 more disease sites and 2 fewer disease sites than contrast-enhanced CT (p=.0003). Disease in 5 of 34 patients was upstaged, and disease in no patient was downstaged at PET/CT. There was 100% (4/4)	PET/CT depicts additional sites compared with contrast-enhanced CT and results in upstaging of disease.

	chemotherapy in pediatric patients with nonlymphoblastic NHL					concordance between bone marrow involvement at biopsy and stage at PET/CT.	
Boktor, 2012 (84)	FDG PET/CT in paediatric head and neck cancer	36	FDG PET/CT	CT	Histopathol-ogy	The sensitivity, specificity, accuracy, positive and negative predictive values of PET/CT against the conventional imaging were as follows: sensitivity 100% and 53%, specificity 89.5% and 47%, accuracy 94.5% and 50%, positive predictive value 89.5% and 47% and negative predictive value 100% and 53% respectively. PET/CT changed patient management in 50% of the cases.	PET/CT in paediatric head and neck carcinoma is more accurate than conventional imaging.
Paulino, 2012 (85)	PET/CT in radiotherapy design for paediatric HL	53	FDG PET/CT	Conventional staging (gallium, bone scan)	Histopathol-ogy	In 19 of the 53 patients, there was discordance between CI and FDG PET/CT. A change in stage occurred in 5 (9.4%) as a result of PET-CT imaging.	Incorporation of PET-CT information was found to influence IFRT design in 17% of patients, with most having more extensive radiotherapy fields.
Thyroid Cancer							
Deandreis, 2012 (144)	FDG PET/CT in the presurgical characterization of thyroid nodules	55	FDG PET/CT	Ultrasono-graphy (US)	Pathology	Sensitivity, specificity, PPV, and NPV of US in detecting cancer were 82%, 47%, 50%, and 80%, respectively. Sensitivity, specificity, PPV and NPV of FDG-PET in detecting cancer were 77%, 62%, 57%, and 81%, respectively.	Adding FDG-PET findings to neck US provided no diagnostic benefit.
Kim, 2012 (89)	FDG PET/CT in the early detection of persistent high-risk thyroid carcinoma	71	FDG PET/CT	Ultrasono-graphy (US)		Persistence/recurrence was detected in nine (12.7%) patients by conventional methods, including US. Sensitivity, specificity, PPV, NPV, and diagnostic accuracy of PET/CT scan for detecting persistent/recurrent thyroid carcinoma were 50%, 98.4%, 83.3%, 92.3%, and 91.5%, respectively.	There is almost no complementary role for adding a PET/CT scan to conventional follow-up methods.
Carcinoma of an Unknown Primary (CUP)							
Chen, 2012 (145)	FDG PET/CT in primary unknown cervical lymph node metastasis	27	FDG PET/CT	CT- 25 US- 2	Pathology	Sensitivity, specificity, accuracy PPV of FDG PET-CT were 91.7%, 86.7%, 88.9% and 84.6%, respectively. Therapeutic changes in treatments were made in 11 (40.7%) cases as a consequence of FDG PET-CT findings.	FDG PET/CT is a useful tool to help search for unknown primaries in patients with cervical lymph node metastasis and has an acceptable diagnostic yield for the detection of distant malignancies.
Non-FDG Tracer							
Lopci, 2012 (95)	18F-DOPA PET/CT in neuroblastoma (NB) compared with CT/MR	37	18F DOPA	CT/MRI	I-MIBG, selective biopsy, and clinical-instrumental monitoring	F-DOPA PET and CT/MR showed the following rates: sensitivity, specificity, NPV, PPV, and accuracy were 100%, 92.3%, 100%, 96%, and 97.3% versus 91.7%, 61.5%, 80%, 81.5%, and 81.1%, respectively.	18F-DOPA PET/CT results more accurate than CT/MR in advanced stage NB.
Maurer, 2012	[11C]choline PET/CT	44	[11C]choline	CT	Histopathol-	LN metastases were found in 12 of 44 patients.	In patients with bladder cancer who were

(96)	for LN staging of patients with bladder cancer patients scheduled for radical cystectomy		PET/CT		ogy	On patient-based analysis, sensitivity, specificity, PPV, NPV, and accuracy for [11C]choline PET/CT were calculated as 58%, 66%, 39%, 81%, and 64%, respectively; for CT, the calculated percentages were 75%, 56%, 39%, 86%, and 61%, respectively	scheduled for radical cystectomy, preoperative LN staging with [11C]choline PET/CT was not able to improve diagnostic efficacy compared with conventional CT alone.
Naswa, 2012 (97)	68Ga-DOTANOC PET/CT in phaeochromocytoma and paraganglioma	35	68Ga-DOTANOC PET/CT	(131)I MIBG scintigraphy	Histopathol-ogy and/or conventional imaging	44 lesions were detected on 68Ga-DOTA-NOC PET-CT imaging with an additional detection of 12 lesions not previously known, leading to a change in management of 6 patients.	68Ga-DOTA-NOC PET-CT seems useful in patients with phaeochromocytoma and paraganglioma.
Yakemchuk, 2012 (98)	18F-FDOPA PET/CT provides improved staging of carcinoid tumour patients	27	18F-FDOPA PET/CT	CT, somatostatin receptor scintigraphy (SRS)	Imaging, biochemistry, surgery, and follow-up data	18F-FDOPA PET/CT identified disease in 20 of 21 patients (patient-based sensitivity, 95%) . 18F-FDOPA PET contributed to patient management in 12/21 patients (57%).	F-FDOPA PET/CT proved to be a superior modality for staging of carcinoid tumour patients, with superior performance compared with currently applied methods.
Piccardo, 2012 (99)	18F-DOPA PET/CT and 123I-MIBG scintigraphy in stage 3 and 4 neuroblastoma	19	18F-DOPA PET/CT	123I-MIBG scintigraphy	Clinical, imaging and histological data	(18)F-DOPA PET/CT and (123)I-MIBG scintigraphy properly detected disease in 16 (94%) and 11 (65%), respectively. In 9 of 28 paired scans (32%), PET/CT results influenced the patient management. PET/CT showed a sensitivity and accuracy of 90%, whereas (123)I-MIBG scintigraphy showed a sensitivity and accuracy of 56% and 57%, respectively ($p<0.001$)	(18)F-DOPA PET/CT may be a new modality in neuroblastoma assessment.