



## Guidelines

# Evidence-based Guideline Recommendations on the Use of Positron Emission Tomography Imaging in Head and Neck Cancer

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## Abstract

**Aims:** To provide evidence-based practice guideline recommendations on the use of fluoro-2-deoxy-D-glucose positron emission tomography (PET) for diagnosis, staging and assessing treatment response, restaging or recurrence of head and neck cancer.

**Materials and methods:** A systematic review by Facey *et al.* (*Health Technology Assessment* 2007;11(44):iii–iv, xi–267) was used as the evidence base for recommendation development. As the review was limited to August 2005, the evidence base was updated to July 2011 using the same search strategies for MEDLINE and EMBASE used in the original review. The authors of the current systematic review drafted recommendations, which were reviewed, adapted and accepted by consensus by the Ontario provincial Head and Neck Disease Site Group and a special meeting of clinical experts.

**Results:** The results of the Facey *et al.* review for head and neck cancer included five other systematic reviews and 31 primary studies. The 2005 to 2011 update search included four additional systematic reviews and 53 primary studies. Recommendations were developed based on this evidence and accepted by consensus.

**Conclusions:** 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 the 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.

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**Key words:** Diagnosis; FDG-PET; head and neck cancer; neoadjuvant therapy; recurrence/restaging; staging

## Introduction

Cancers of the larynx, pharynx, nasal cavity, oral cavity, paranasal sinuses, salivary glands and tongue are collectively known as head and neck cancers. These tumours affect physiological functions that are essential for communication and nutrition and specifically affect

swallowing, speech and aesthetics. According to the Canadian Cancer Statistics, the estimated number of new cases in 2012 for cancers of the oral cavity and larynx were 4000 and 1050, respectively [1]. Most of these cancers affect males. Patients presenting with head and neck tumours often have significant medical co-morbidities. Specifically, tobacco use and alcohol consumption put individuals at risk for developing a head and neck malignancy.

Due to the promising results of the use of positron emission tomography (PET) for diagnosis, staging and detecting recurrence of head and neck cancers and other cancers, the Ontario PET Steering Committee made a special request to the Clinical Council of Cancer Care Ontario to co-lead the development of guidance regarding the clinical

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use of PET imaging. The Program in Evidence-Based Care (PEBC), worked with the PEBC Disease Site Groups (DSGs) to synthesise the clinical research and draft recommendations for 10 disease sites (brain, cervical, colorectal, oesophageal, head and neck, melanoma, ovarian, pancreatic, small cell lung cancer and testicular).

## Target Population

The target population for this review and clinical practice guideline is patients with head and neck cancer. Its purpose is to find answers to the following research questions:

- What benefit to clinical management does PET or positron emission tomography/computed tomography (PET/CT) contribute to:
  - The diagnosis or staging of head and neck cancer?
  - The assessment of treatment response for head and neck cancer?
  - The assessment of recurrence of head and neck cancer when recurrence is suspected but not proven?
  - The restaging at the time of the documented recurrence for head and neck cancer?

As these questions were identified to guide the development of guidelines across all cancers, they may not be equally relevant in the consideration of head and neck cancer. The objective of these questions is to provide evidence-based recommendations on the use of fluoro-2-deoxy-D-glucose (FDG) PET for diagnosis, staging, assessing treatment response and restaging or recurrence of head and neck cancer. These recommendations will be useful in informing clinical decision-making regarding the appropriate role of PET imaging and in guiding priorities for future PET imaging research.

## Materials and Methods

This practice guideline was developed by the Head and Neck Cancer DSG of Cancer Care Ontario's PEBC using the methods of the Practice Guidelines Development Cycle [2]. The practice guideline is intended to promote evidence-based practice in Ontario, Canada. The PEBC is editorially independent of Cancer Care Ontario and the Ontario Ministry of Health and Long-term Care.

In order to develop the recommendations, a systematic review was undertaken. This paper concentrates on the identification of evidence and the development of recommendations with respect to head and neck cancer.

## Systematic Review

### Literature Search

A scoping review undertaken by a PEBC methodologist to identify any existing systematic reviews on PET imaging

in the cancers of interest yielded such a review. A systematic review by Facey *et al.* [3] evaluated the effectiveness of FDG-PET imaging in several selected cancers, including head and neck cancer. It included both systematic reviews and primary studies dating from 2000 to August 2005.

Because the Facey *et al.* review [3] sufficiently covered the evidence of interest to address the questions identified above, its results were used for the evidence base from 2000 to August 2005, and its search strategies were carried out in MEDLINE and EMBASE to update the literature to July 2011. The search strategies used are available upon request from the corresponding author of this review.

### Study Selection Criteria

All systematic reviews and primary studies in the Facey *et al.* review [3] that addressed the questions of interest in this current review (diagnosis, staging, treatment response, recurrence and restaging) with respect to head and neck cancer were included. The inclusion criteria of the Facey *et al.* [3] review were used to select systematic reviews and primary studies identified in the update search. These criteria were as follows.

Other systematic reviews were included in the update if:

- They were dedicated to FDG-PET in head and neck cancers in humans;
- They contained evidence related to diagnostic accuracy, change in patient management, clinical outcomes or treatment response.

Primary studies were included in the update if:

- They were prospective clinical studies of FDG-PET in head and neck cancers;
- They were published after the end date of the search in the Facey *et al.* [3] review;
- They were published as a full article in a peer-reviewed journal;
- They reported evidence related to diagnostic accuracy, change in patient management or clinical outcomes;
- They included  $\geq 12$  patients with head and neck cancer;
- They used a suitable reference standard (pathological confirmation and clinical follow-up) when appropriate.

The citations and abstracts from the update searches were reviewed by two PEBC methodologists (CWD and SH) and marked as relevant or not according to the inclusion criteria. The methodologist and the clinical lead author reviewed the relevant citations and the full text of the articles to make the final decision on inclusion.

### Synthesising the Evidence

The Facey *et al.* review [3] did not pool individual studies, and no meta-analysis of studies from the update search was

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