Title: Positron emission tomography (PET) for lymphoma
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Aim
To assess the safety, effectiveness and cost-effectiveness of PET for lymphoma: in addition to conventional initial staging of newly diagnosed Hodgkin lymphoma (HL) or non-Hodgkin lymphoma (NHL); as a replacement to computed tomography (CT) in the assessment of response to first and second line treatment of HL or aggressive NHL; in addition to conventional reassessment methods in the evaluation of suspected recurrence of HL or NHL; and as a triage test to biopsy in the assessment of suspected histological transformation from indolent to aggressive NHL.

Results and conclusions
Safety: PET and PET/CT are considered safe procedures.
Effectiveness: No direct evidence was found reporting the health outcomes of patients with lymphoma, assessed with and without FDG-PET. Therefore, evidence for accuracy, change in management and the expected benefit of changes in treatment on health outcomes (linked evidence approach) was considered to evaluate the effectiveness of PET.

Hodgkin or aggressive non-Hodgkin lymphoma: PET detected additional true positive sites of disease over conventional staging methods (CSM), showing a TP:FP ratio of 3:1 in two studies. PET led to changes in management (ie a change in the radiotherapy field) in a minority of patients. In regard to the assessment of response within three months after first line treatment, evidence showed that PET has higher sensitivity (100% versus 70%) and specificity (78% versus 26%) than CT. PET led to changes in management (ie intensification of therapy) in a proportion of patients. Moreover, evidence suggested that PET increases the accuracy in ruling out recurrence when the baseline risk of relapse is low, and for confirming recurrence when the baseline risk of relapse is high. No evidence was found on the value of PET versus CT in the assessment of response to second line treatment prior to a decision on instigating stem cell transplantation. *Indolent non-Hodgkin lymphoma:* In relation to initial staging, CSM+PET improved the detection of additional sites of disease in up to 28% of patients over CSM alone, and led to changes in management in approximately one third of patients. In regard to suspected relapse, CSM+PET increased the detection of additional sites of disease over CSM alone. Moreover, evidence indicated that PET increases the accuracy for ruling out histological transformation from indolent to aggressive NHL.

Economic considerations: A decision analytical model of PET indicated that through correctly *assessing response during and at the end of first line treatment of HL and aggressive NHL*, PET resulted in an additional 5 out of 100 patients having potentially beneficial salvage therapy. PET also led to 14 out of 100 patients avoiding inappropriate salvage therapy, with an associated reduction of mortality in those undergoing subsequent high dose therapy (HDT) or stem cell therapy (SCT) of 4 per 1000 HL patients and 6 per 1000 NHL patients. These health consequences were associated with cost savings of $148,800 and $158,300 per 100 patients with HL depending on whether PET was undertaken during treatment or after treatment, and $209,400 and $229,200 per 100 patients with aggressive NHL respectively.
For *initial staging of indolent NHL* showed that PET would lead to the avoidance of radiotherapy in approximately 19 out of 100 patients. The estimated cost of PET for 100 patients was $515,800 compared to $448,900 in the non-PET arm. The resultant incremental cost of PET was $66,900 per 100 patients.

Methods
This report updates a previous MSAC review from 2001. A systematic review to February 2010 was undertaken to include more recent studies. In the absence of an overall measure of health outcome (eg life-years saved), a cost-consequence analysis was conducted to explore economic implications.