

- Title** Proton Beam Therapy for the treatment of cancer – an update
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[http://www.moh.gov.my/index.php/database\\_stores/store\\_view\\_page/30/313](http://www.moh.gov.my/index.php/database_stores/store_view_page/30/313)

**Aim**

To update the evidence on effectiveness, safety, cost-effectiveness and organisational issues of Proton Beam Therapy for the treatment of cancer.

**Conclusions and results**

There was no new high level of evidence retrieved to determine the effectiveness and safety of proton beam therapy for cancer treatment. Most of the studies were cohort or case-series with methodological limitations, yielding a low level of clinical evidence for the outcomes. Only limited RCTs were conducted in certain cancer. However, no significant differences were noticed from the studies.

In term of effectiveness, limited evidences were found on breast cancer, ocular tumour, chordomas & chondrosarcomas, non-small cell lung cancer, liver cancer and prostate cancer. In paediatric cancer, insufficient clinical evidence to support or to refuse the use of proton beam therapy.

In term of safety, no mortality and severe adverse events reported. Skin toxicities, oesophageal toxicities and other acute toxicities like fatigue, chest wall pain, and lymphedema were reported in breast cancer patients. Hearing loss and brain stem toxicities with increase volume of proton beam were reported in chordomas and chondrosarcomas.

In term of cost-effectiveness, the ICER varies from \$4,254 per QALY in head and neck cancer to \$80,596 per QALY in breast cancer. Therefore, it is highly unlikely PBT will be the most economic option for all cancers. Rather, more research that involved cost-effectiveness studies can be used to decide for whom PBT is most cost effective.

**Recommendations (if any)**

Proton Beam Therapy may be used for research purpose to provide more quality evidence on effectiveness, safety and cost-effectiveness for selective cancer treatment.

**Methods**

The following electronic databases were searched via OVID Interface: MEDLINE (1946 to present), EBM Reviews-Cochrane Database of Systematic Reviews (2005

to October 5, 2017), EBM Reviews-Cochrane Central Register of Controlled Trials (September 2017), EBM Reviews-Health Technology Assessment (2<sup>nd</sup> Quarter 2017), PubMed and INAHTA database. Google was used to search for additional web-based materials and information. Additional articles were identified from reviewing the references of retrieved articles.

**Written by**

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