



## Topic Exploration Report

Topic explorations are designed to provide a high-level briefing on new topics submitted for consideration by Health Technology Wales. The main objectives of this report are to:

1. Inform discussions on new topics received by HTW.
2. Determine the quantity and type of evidence available on a topic.
3. Assess the topic against HTW selection criteria.

Topic:	Pre-operative cardiopulmonary exercise testing
Topic exploration report number:	TER074
Referrer:	Anthony Funnell, Cwm Taf Morgannwg University Health Board
Topic exploration undertaken by:	Health Technology Wales

### Aim of Search

Health Technology Wales researchers searched for evidence on the effectiveness of pre-operative cardiopulmonary exercise testing (CPET) as a method of predicting and improving post-operative outcomes in people undergoing major colorectal surgery.

### Summary of Findings

We did not identify any existing technology assessments, guideline recommendations or economic evaluations on the use of pre-operative CPET in the population of interest.

Several potentially relevant systematic reviews were identified. Three of these studied pre-operative CPET directly, reporting either its predictive power as a risk assessment method, or its influence on treatment decisions and post-surgical outcomes. One further systematic review is ongoing. Four further systematic reviews studied the effectiveness of prehabilitation programmes on post-surgical outcomes and could inform an analysis of how treatment decisions made based pre-operative CPET influence patient outcomes.

The systematic reviews identified did not all focus on colorectal surgery: some reviews included other types of abdominal surgery.

## Conclusions

The use of pre-operative CPET to assess risk before surgery does not appear to have been subject to technology assessment by any other body. Several recent systematic reviews were identified that tentatively suggest that this intervention could help with the identification of risk factors before surgery and improve post-surgical outcomes. It is unclear if all the evidence is relevant to the exact type of surgery of interest, or whether it would be appropriate to extrapolate evidence from other types of surgery. Further scrutiny of the evidence would be needed to draw specific conclusions about the use of CPET for risk assessment in colorectal surgery.

## Areas of Uncertainty

There is recent published evidence on the effectiveness of this technology, although its reliability and relevance needs to be fully assessed, particular with regards to cost-effectiveness.

The topic proposer states that this technology is currently used at several hospitals within Wales. It is unclear whether there is variation in how the technology is used (for example, in people undergoing different types of surgery).

## Feasibility of Technology Assessment

HTW's Assessment Group concluded to progress this topic to Evidence Appraisal. This will be published as EAR016.

There is recent evidence on the effectiveness of this technology, and uptake appears to be increasing within NHS Wales. An assessment of the effectiveness pre-operative CPET could inform its effective deployment.

The original proposal was to assess the effectiveness of CPET in major colorectal surgery. Following topic exploration and discussion with the topic proposer, the scope of the appraisal has been widened to include any major abdominal surgery.

## Brief literature search results

Resource	Results
<a href="#">Healthcare Improvement Scotland:</a>	We did not identify any evaluations of CPET from this source.
<a href="#">Health Technology Assessment Group</a>	We did not identify any evaluations of CPET from this source.
<a href="#">Health Information and Quality Authority</a>	We did not identify any evaluations of CPET from this source.
<b>UK guidelines and guidance</b>	
<a href="#">SIGN</a>	No guidelines make recommendations about the use of CPET in this context. SIGN have published Diagnosis and management of colorectal cancer (SIGN126), but this does not include any recommendations on pre-operative assessment.
<a href="#">NICE</a>	No guidelines make recommendations about the use of CPET in this context.  NICE have published guidelines on Colorectal cancer: diagnosis and management (Clinical guideline CG131) and Routine preoperative tests for elective surgery (NICE guideline NG45). The latter reviewed evidence on the use of CPET (searches were conducted in 2015), but did not make any specific recommendations about its use.
<b>Secondary literature and economic evaluations</b>	
<a href="#">EUnetHTA</a>	We did not identify any evaluations of CPET from this source.
<a href="#">ECRI</a>	We did not identify any evaluations of CPET from this source.
<a href="#">Cochrane library</a>	We did not identify any Cochrane Reviews of CPET from this source.
Medline	<ul style="list-style-type: none"> <li>• Bruns ER, van den Heuvel B, Buskens CJ, et al. (2016). The effects of physical prehabilitation in elderly patients undergoing colorectal surgery: a systematic review. <i>Colorectal Dis.</i> 18(8): O267-77. doi: 10.1111/codi.13429</li> <li>• Gillis C, Buhler K, Bresee L, et al. (2018). Effects of Nutritional Prehabilitation, With and Without Exercise, on Outcomes of Patients Who Undergo Colorectal Surgery: A Systematic Review and Meta-analysis. <i>Gastroenterology.</i> 155(2): 391-410.e4. doi: 10.1053/j.gastro.2018.05.012</li> <li>• Hijazi Y, Gondal U, Aziz O. (2017). A systematic review of prehabilitation programs in abdominal cancer surgery. <i>Int J Surg.</i> 39: 156-62. doi: 10.1016/j.ijsu.2017.01.111</li> <li>• Hughes MJ, Hackney RJ, Lamb PJ, et al. (2019). Prehabilitation Before Major Abdominal Surgery: A Systematic Review and Meta-analysis. <i>World J Surg.</i> doi: 10.1007/s00268-019-04950-y</li> <li>• Kumar R, Garcea G. (2018). Cardiopulmonary exercise testing in hepato-biliary &amp; pancreas cancer surgery - A systematic review: Are we any further than walking up a flight of stairs? <i>Int J Surg.</i> 52: 201-7. doi: 10.1016/j.ijsu.2018.02.019</li> </ul>

	<ul style="list-style-type: none"> <li>• Moran J, Wilson F, Guinan E, et al. (2016). Role of cardiopulmonary exercise testing as a risk-assessment method in patients undergoing intra-abdominal surgery: a systematic review. <i>Br J Anaesth.</i> 116(2): 177-91. doi: 10.1093/bja/aev454</li> <li>• Smith TB, Stonell C, Purkayastha S, et al. (2009). Cardiopulmonary exercise testing as a risk assessment method in non cardio-pulmonary surgery: a systematic review. <i>Anaesthesia.</i> 64(8): 883-93. doi: 10.1111/j.1365-2044.2009.05983.x</li> </ul>
Ongoing secondary research <a href="#">PROSPERO database</a>	<ul style="list-style-type: none"> <li>• Krzowski J, Sargeant T, Harikrishnan A. (2018). The role of cardiopulmonary exercise testing as a risk stratification tool in colorectal cancer resections: a systematic review. PROSPERO 2018 CRD42018081605.</li> </ul>
Other	
Evidence provided by the topic proposer (in addition to sources already identified above)	<ul style="list-style-type: none"> <li>• Swart M, Carlisle JB, Goddard J. (2017). Using predicted 30 day mortality to plan postoperative colorectal surgery care: a cohort study. <i>Br J Anaesth.</i> 118(1): 100-4. doi: 10.1093/bja/aew402</li> <li>• West MA, Asher R, Browning M, et al. (2016). Validation of preoperative cardiopulmonary exercise testing-derived variables to predict in-hospital morbidity after major colorectal surgery. <i>Br J Surg.</i> 103(6): 744-52. doi: 10.1002/bjs.10112</li> </ul>

Date of search:	April 2019
Concepts used:	cardiopulmonary exercise testing, CPET, CPEX