# Introduction to Cardio-Pulmonary Exercise Testing (CPET): Summary

## What is CPET?

CPET measures the cardiopulmonary system response to increasing work/exercise to assess fitness.

It can be used to identify cardiac, respiratory, muscular and metabolic abnormalities.

## What is VO2 ?

VO2 is the volume of oxygen consumed and is measured throughout CPET.

Measured in either ml/min or l/min.

Peak VO2 is sometimes mistakenly referred to VO2 max which is a true physiological limit and not always achieved in a patient population. Best to always say Peak VO2

## What are 3 determinants of fitness? Fit = High peak VO2 & VO2 @AT, low VE/VCO2

* Peak VO2 = the highest recorded O2 consumption at peak exercise (usually averaged over 30s)
  + Expressed in l/min (absolute) or ml/kg/min (relative)
* VO2 at the Anaerobic threshold (AT)= When oxygen supply does not meet demand and a person’s muscles add anaerobic metabolism to aerobic metabolism. Oxygen consumption is measured at this threshold
  + Expressed in l/min (absolute) or ml/kg/min (relative)
* Ventilatory Equivalents for carbon dioxide (VE/VCO2)= A marker of lung efficiency, how much (in L/min) a person would need to breathe to eliminate 1L of CO2.

**Fit = High peak VO2 & VO2 @AT, low VE/VCO2**

## A close up of a map Description automatically generatedPanel 3: Test Overview

This panel can show you:

* Whether it was an adequate test (duration, work achieved)
* Peak VO2 (blue line)
* Peak work rate (green triangle)
* If there is an appropriate increase in oxygen consumption parallel to the ramp.
* Comparison to predicted values

## What do we do with the information?

* Identify the ‘high-risk’ patient- may benefit from ICU care postoperatively
* Estimate risk of morbidity and mortality- low fitness optimise the patient preoperatively?
* Identify unanticipated disorders e.g. Ischaemia may refer for echo/MPS
* Inform and aid in shared decision-making- surgical techniques and anaesthetic plans.
* Guide prehabilitation programmes to improve fitness.