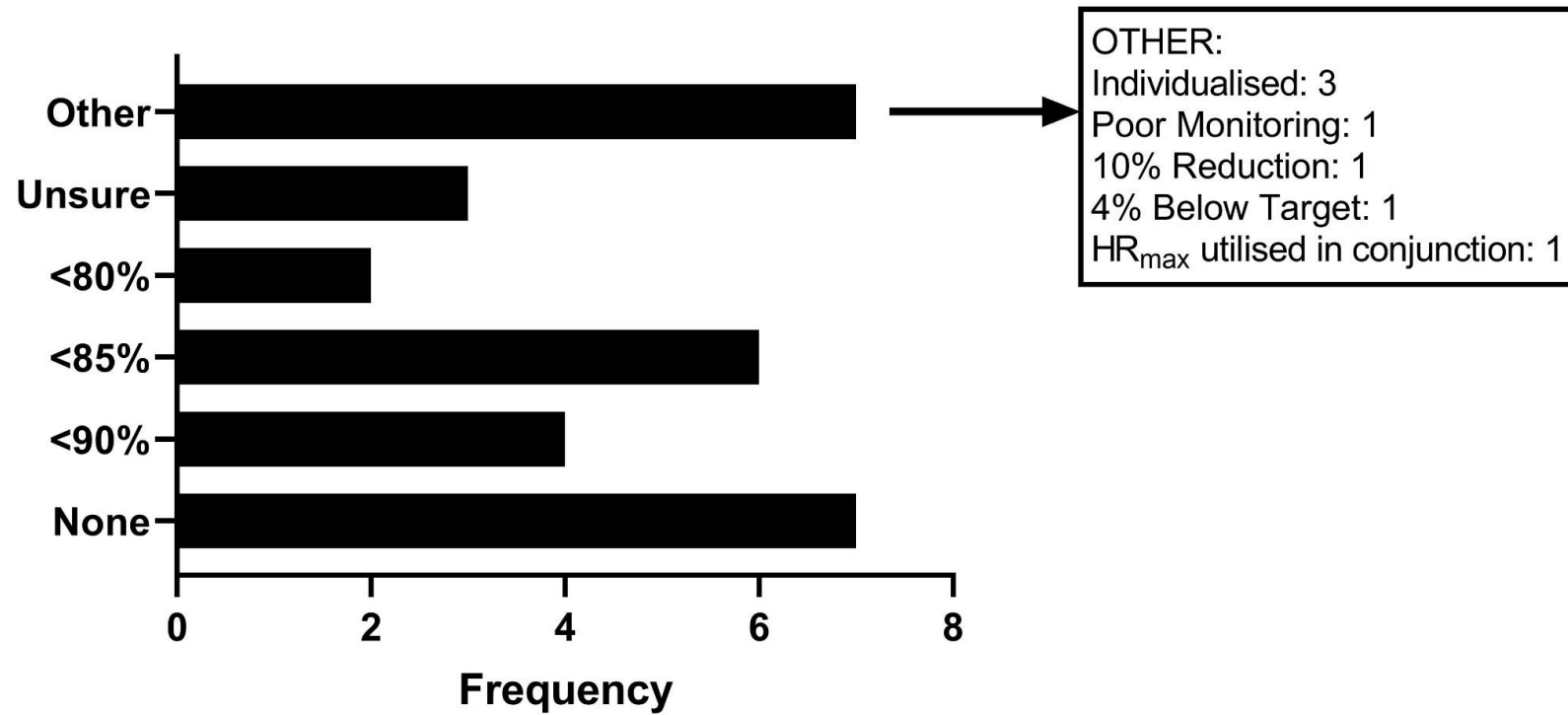


**Supplemental File 2.** Additional details on exercise testing from respondent centres.**Figure S2.1.** Frequency of desaturation criteria utilised by individual centres for exercise testing.

**Table S2.1.** Direct qualitative quotes referring to reference equations used.

Quotes
“MSWT: (15L) Pred distance -Probst VO <sub>2</sub> Peak - Cooper and Storer VO <sub>2</sub> Peak – Neves”
“All values used to evaluate test. HR, VO <sub>2</sub> , Max Watt, SpO <sub>2</sub> , Perceived effort. We are working with [Redacted] University to formulate a %predicted for the VO <sub>2</sub> to help evaluate the test with our patients and MDT”
“Compared to previous years predicted 6MWT averages”
“Wasserman”
“If child is unable to do CPET, i.e., too small, equipment not available we would do MSWT”
“Werkman et al (2013) Non gas tests Values provided by equipment for gas tests”
“We look at minimal clinical important difference for walk and shuttle testing. Norms.”
“These are done by our respiratory physiologist - different values for different parameters.”

**N.B.** 9/29 (31%) of centres stated they used reference equations, but only 8/9 (89%) provided details as above.

**Table S2.2.** Additional details on protocols used to perform CPET in respondent centres.

CPET protocol used	Ramp-Incremental, $n = 11$ Step-Incremental, $n = 2$ Other (respondent was unsure), $n = 1$
Qualitative descriptions of protocols	<p>“We have a clinic room with a bike. The tests have been carried out for us by a PhD student until exercise testing stopped with COVID. Equipment is a sats [SpO<sub>2</sub>] and HR monitor, gas exchange mask.”</p> <p>“Incremental ramp test. Starting at 50W and 10W increments every minute.”</p> <p>“All conducted by Exercise Physiologists using their own protocol and equipment.”</p> <p>“Based on the Godfrey test, using our exercise bike (now condemned as broken) increasing resistance increments every minute until failure. Now reliant on step test when able to do within clinic setting in clinic room with physio doing testing and Borg assessment of breathlessness as well as sats [SpO<sub>2</sub>] monitoring.”</p> <p>“CPET as add on to end of surgical list. 1 slot per week at set time. Small, poorly ventilated room, crowded, inconsistent test report summaries. Godfrey protocol currently but aiming to work to incremental protocol with smax [supramaximal] verification when services resume post COVID and to be physiologist and CF physio led. Mouth piece currently but will be moving to face masks. Ear lobe oximetry. Visual cadence screen. BORG/RPE Scores. ECG, spiro, BP. Physio discusses results in clinic in order to guide exercise but interpretation of results needs guidance-further support to maximise this.”</p> <p>“CPET test, specific allocated space with treadmill, protocol and physiologists.”</p> <p>“Cortex Metalyzer 3B-R3 with Lode ergometer Incremental Ramp protocol + Supramax test 1 small gym 1 staff member completing CPET's.”</p> <p>“Consultant and respiratory physiology complete the CPET testing,”</p>

---

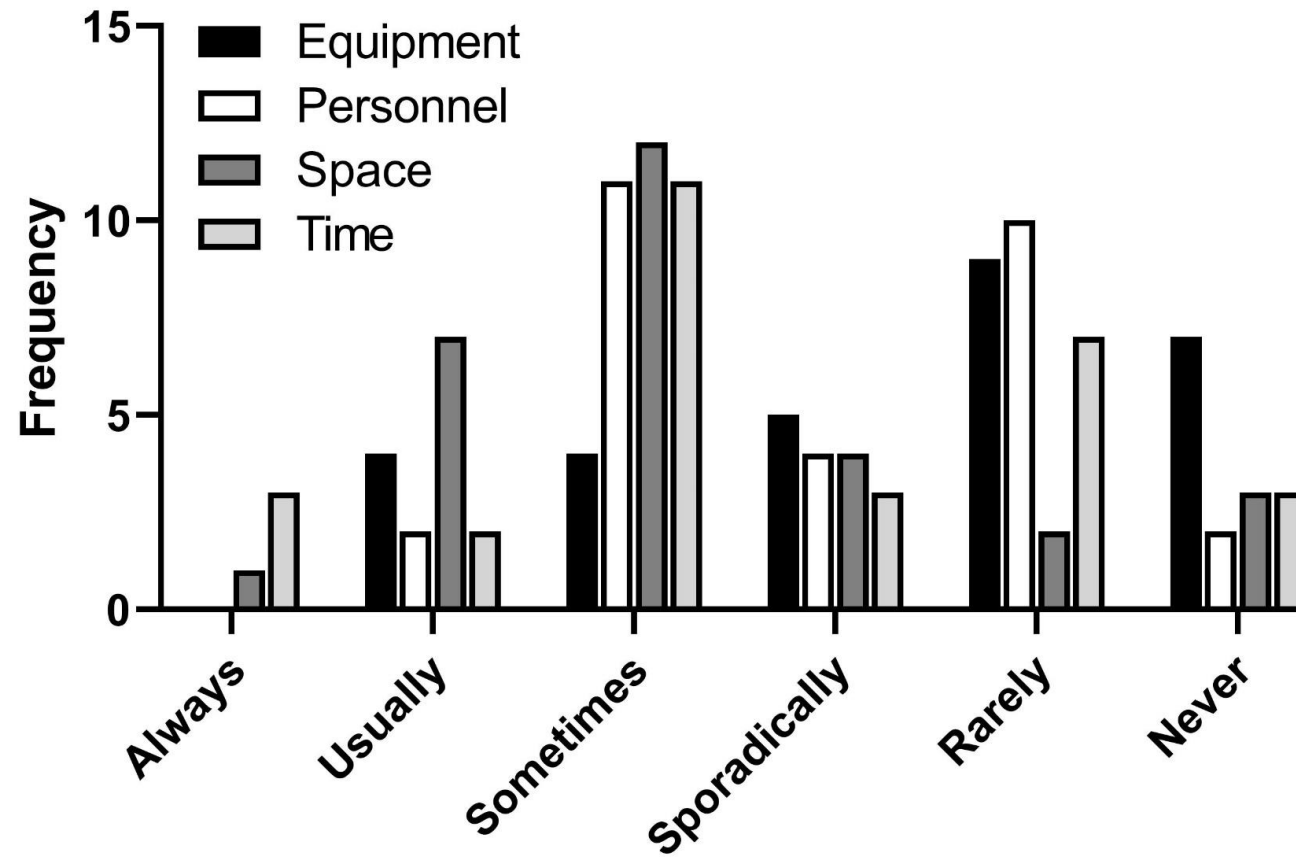
“Use of [Redacted] University facilities to carry out the CPET testing for patients. Use of [Redacted] University staff i.e., student physiologists previously.”

“Godfrey Protocol, respiratory physiology staff CPET full gas analysis Small well ventilated room.”

“Godfrey protocol 1 member of staff BP, HR, SaO<sub>2</sub> and Borg scores.”

---

BP: blood pressure; CPET: cardiopulmonary exercise test; ECG: electrocardiogram; HR: heart rate; RPE: rating of perceived exertion.



**Figure S2.2.** Frequency with which predominant barriers to exercise testing occur in respondent CF centres.

**Table S2.3.** Open comments on exercise testing in respondent cystic fibrosis centres.

---

**Quotes**

---

“We have struggled to complete any during COVID but are keen to use STS virtually and get back to CPET as soon as able.”

“We have an access to exercise lab run by respiratory physiologists. We do not use this resource however as it's deemed too expensive of a test sadly which is why Physio team have settled for second best test in our opinion - Modified Shuttle Walk Test. The pandemic required us to be more inventive and we implemented Chester Step Test as an interim monitoring tool. It appears that the uptake of patients performing the test have been much better when compared to maximal exercise test (CPET or MSWT).”

“The work we are doing to establish a percent predicted for VO<sub>2</sub> and fitness should allow for patients fitness to be more objectively understood within our centre.”

“Have previously tried to access exercise test at specialist centre but their resources limited.”

“Not specific and difficult to decide where on the scale each child should as no reference data.”

“Currently trying to implement 6MWT on admission and discharge from ward for IV antibiotics.”

“I think it is of limited value in paediatrics. It is very useful in adults.”

“We completed around 100 exercise tests in 2019 - not able to easily determine why each test was done from the data available. Majority would be for exercise prescription, evaluation of fitness and determine impact of intervention.”

“It is our aim to do better in this area but we are limited by equipment and step test does not often trigger any response in our very well children. We were previously very motivated following the Nuffield rollout in our area and other local gym involvement but COVID among other things have reduced our ability to do this at all now.”

“Even more essential with the advent of modulators to establish lung limitations vs de conditioning to maximise benefits of exercise.”

“Currently in discussions with a nearby university to see if we can use CPET with them as a joint project (they already have CPET).”

“I think our centre works well with CPETs but that's largely due to a particular consultant being very passionate about it and helping the team to

---

---

understand results in a meaningful way to be able to devise exercise plans.”

“CPET equipment issue for most of 2019 cause centre to only complete approx. 20% of patient tests, this was then followed by the pandemic which caused us to pause the CPET service.”

“Certain tests are completed by different teams, e.g., CPET by physiology and Field tests by physiotherapy.”

“New CPET service starting in 2020-2021.”

“We feel exercise testing is very important but don’t feel the incremental step test is a sufficient test within paediatrics and is sub optimal.”

“Would like more guidance/advice on exercise prescription.”

“This has been more difficult over the past 12 months which has been frustrating and I view this will continue to be an issue in 2021.”

“Aim for 2020 was to introduce CPET, had started stakeholder engagement work with Anaesthetists which was going well. Unfortunately had to put on hold due to COVID.”

---

CPET: cardiopulmonary exercise testing; MSWT: modified shuttle walk test; STS: sit to stand; VO<sub>2</sub>, volume of oxygen consumption.