

Comorbidities and recommendations before altitude expositions









Disease	Traffic lights	Restrictions	Advice
Mild Asthma (8) (9)		No restriction up to 5000m	<ul style="list-style-type: none"> • Use a spacer • Take a push of aerosol (Beta2-agonist) before effort • Protect your mouth and nose (with a balaclava), • Carry peak-flow meter and emergency set (oral prednisone)
Moderate Asthma		No restriction up to 3000m	
Severe/uncontrolled Asthma		Avoid altitude	
Chronic Obstructive Pulmonary Disease (COPD)* (9)		Avoid altitude >3000 m Max. altitude allowed depends on the $P_{A}O_{2,Alt}$: patients with a $FEV_1 < 1.5$ L need specialized consultation (hypoxia simulation, assessment for supplemental oxygen)	<ul style="list-style-type: none"> • Take emergency set (oral steroids, antibiotics, oxygen) • Evaluate pulmonary hypertension prophylaxis
Heart failure (2) (10)		No restriction until 3000-3500 m if: <ul style="list-style-type: none"> • disease is stable • LVF is preserved • above-normal exercise capacity 	
Pulmonary embolism, Deep vein thrombosis, Coagulopathy (9) (11)		Pursue pre-existing therapeutic anticoagulation Stop oral contraceptive in females with coagulopathy	
Pulmonary Hypertension (9)		Avoid altitude >3000 m	Evaluate use of supplemental oxygen and pulmonary vasodilators if stay in altitude unavoidable (from 2000 m)
Obstructive and central sleep apnea (12)		Look for pulmonary arterial hypertension before departure. Travel with CPAP and adjust it before departure, eventually mandibular advancement device. Evaluate acetazolamide for central sleep apnea	

Table 1 : Comorbidities and recommendations before altitude exposition

$P_{A}O_{2,Alt}$: Alveolar oxygen partial pressure

P_aO_2 : arterial oxygen tension LVF: Left Ventricular Function

FEV_1 : Forced Expiratory Volume in 1 second

LVF: left ventricular function

CPAP: Continuous Positive Airway Pressure

* For COPD patient, a $P_aO_2 > 50-55$ mmHg (6.6 kPa) is needed. $PaO_2 \text{ Altitude} = ((0.519 \times PaO_2 \text{ SL}) + 11.85 \times FEV_1) - 1.76$ (13)

REF: David Eidenbenz, 2017. BJSM. Mountain sports: what should a sports doctor check before authorizing patients to go at high altitudes? <https://blogs.bmj.com/bjism/2017/06/03/mountain-sports-sports-doctor-check-authorizing-patients-go-high-altitudes/>