

## COMPARISON OF 4 PORTABLE OXYGEN CONCENTRATORS

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Technical trade-offs are necessary in the design of a portable oxygen concentrator (POC). As a result, performance of POCs might vary widely among brands. The purpose of this study was to compare performance variables among POCs. **METHODS:** We tested: Invacare XPO2, Respironics EverGo, AirSep FreeStyle, and Inogen One. Pulse (oxygen bolus) characteristics and oxygen purity were measured with the Automated Test System for Oxygen Conserving Devices (Integrated Control Systems, Inc.). Relative FiO<sub>2</sub> (rFiO<sub>2</sub>) was measured with a simulated nose and breathing lung simulator (Ingmar ASV 5000) set to a tidal volume of 500 mL and frequency of 15-35 breaths/min and sinusoidal volume waveform. Mean values were compared with one way ANOVA with  $p < 0.05$  considered significant. **RESULTS:** All POCs increased pulse volume (mL) as the POC setting was increased (XPO2: 23-65, EverGo: 11-65, FreeStyle: 9-27, Inogen: 11-53). Pulse volume decreased with frequency at a given setting for all POCs except the FreeStyle. Trigger sensitivity (cm H<sub>2</sub>O) across all settings was significantly different ( $p < 0.03$ ), FreeStyle: 0.15, EverGo: 0.16, XPO2: 0.18, Inogen: 0.21. The Inogen One would not trigger faster than 30 cycles/min. The XPO2 and the EverGo had the highest oxygen purity (average 93% and 92% respectively) and the output was not affected by the setting or trigger frequency. The average FreeStyle purity (82%) was considerably lower and decreased significantly as the setting increased and as trigger frequency increased. The Inogen varied from 95% to 86% at different settings. Because oxygen purity was fairly constant, oxygen production (mL/min) reflected mainly the pulse volume versus frequency results. The rFiO<sub>2</sub> results for setting of 2 (15 cycles/min) compared to constant oxygen flow are shown in Figure 1. **CONCLUSIONS:** POC performance varies greatly among brands. No device yielded a rFiO<sub>2</sub> identical to constant flow, devices with high purity and large boluses (XPO2 and EverGo) produced the highest rFiO<sub>2</sub>. Patients must be titrated to a particular POC to assure that their oxygen prescriptions are properly filled.

