

Online Supplement

High Prevalence of Suboptimal Peak Inspiratory Flow in Hospitalized Patients With COPD: A Real-world Study

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SUPPLEMENTARY TABLE S1. CATEGORIZATION OF DRY POWDER INHALERS BY INTERNAL RESISTANCE, SUBOPTIMAL PIF THRESHOLDS, AND OPTIMAL PIF THRESHOLDS

<i>Inhaler internal resistance</i>	<i>Inhalers</i>	<i>PIF threshold, L/min</i>	
		Suboptimal ^a	Optimal ^a
Low	Neohaler [®]	<60	≥60
Medium-low	Diskus [®] , Ellipta [®]		
Medium	RespiClick [®] , Aerolizer [®] , Flexhaler [®] , Pressair [®]		
Medium-high	Twisthaler [®]		
High	HandiHaler [®]	<30	≥30

^aDefined based on available reference materials.⁷⁻¹⁴

PIF, peak inspiratory flow.

**Supplementary Information: Peak inspiratory flow (PIF) assessment protocol
(Supplementary figure. S1)**





- Before June 2018
 - Chronic obstructive pulmonary disease (COPD) educators visited patients with a primary or secondary diagnosis of COPD, regardless of admission diagnosis, when an inhaled medication refill was needed.
 - COPD educators opened a new inhaler and assessed PIF using the In-Check™ DIAL G16 set to the corresponding internal resistance of the inhaler the patient was using.
 - PIF was documented in the patient's electronic health record (EHR).
 - If patients failed to meet the minimum flow required for their prescribed dry powder inhaler (DPI), they were tested for an alternative DPI.
- June 2018 to present
 - Respiratory therapists visit patients with a primary or secondary diagnosis of COPD, regardless of admission diagnosis, as soon as possible after admission when patients are stable enough to perform a PIF assessment maneuver.
 - Respiratory therapists assess PIF using the In-Check™ DIAL G16 set to the corresponding internal resistance for that inhaler before opening any metered-dose inhaler/DPI.
 - PIF is documented in patients' EHRs.
 - If patients failed to meet the minimum flow required for their prescribed DPI, they were tested for an alternative DPI.
 - PIF protocol
 - COPD educators assessed PIF using the In-Check™ DIAL G16 set to the corresponding internal resistance for that inhaler.
 - Patients using a metered-dose inhaler or soft mist inhaler were coached not to exceed 30 L/min during assessment; therefore, PIFs could not be calculated because maximum inspiratory effort was not applied.

^aRefer to the In-Check™ DIAL user manual for further details.²⁷

DPI, dry powder inhaler; LSCMC, Legacy Salmon Creek Medical Center; PIF, peak inspiratory flow; pMDI, pressurized metered-dose inhaler.

E-Figure-1

LSCMC PIF protocol

-  Patients were asked to use the In-Check™ DIAL the same way they would use their prescribed inhaler.
 - PIF was then measured for effective flow based on the manufacturer's recommendations.
-  Patients were asked to use the In-Check™ DIAL again after feedback and coaching.
 - Patients were asked to sit up straight if possible, fully exhale until they had no air to push out, and put the mouthpiece in their mouth and keep it level.
 - Patients received instructions on how to use their inhaler.
 - DPIs: breathe in as hard as possible for as long as possible, followed by a breath hold for as long as possible (minimum of 5 seconds; maximum of 10 seconds).
 - pMDIs or Respimat®: breathe in slowly and steadily, followed by a breath hold for 5 to 10 seconds if possible; patients were coached not to exceed 30 L/min.
-  PIF was then measured for effective flow based on the manufacturer's recommendations.
-  A color-coded list, with colors corresponding to the resistance settings reflective of manufacturer-recommended flow for each inhaler, was provided with each In-Check™ DIAL, which are available at each Pyxis^a.