

1-2020

Improving the Inhaler

Bradley Freid

Thomas Jefferson University, bradley.freid@jefferson.edu

Jesse Evensky

Thomas Jefferson University, jesse.evensky@jefferson.edu

Kabir Malkani

Thomas Jefferson University, kabir.malkani@jefferson.edu

Alex Reibstein

Thomas Jefferson University, alexander.reibstein@jefferson.edu

Gregory C. Kane, MD

Thomas Jefferson University, gregory.kane@jefferson.edu

Follow this and additional works at: https://jdc.jefferson.edu/si_des_2022_phase1

 Part of the [Pulmonology Commons](#)

[Let us know how access to this document benefits you](#)

Recommended Citation

Freid, Bradley; Evensky, Jesse; Malkani, Kabir; Reibstein, Alex; and Kane, MD, Gregory C., "Improving the Inhaler" (2020). *Phase 1*. Paper 21.

https://jdc.jefferson.edu/si_des_2022_phase1/21

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's [Center for Teaching and Learning \(CTL\)](#). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in Phase 1 by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: JeffersonDigitalCommons@jefferson.edu.

Project Title: Improving the Inhaler

Authors: Jesse Evensky, BS**; Bradley Freid, BS**; Kabir Malkani, BS**; Alex Reibstein, BS**

Project Advisor: Gregory Kane MD*

Background: Inhaled drugs play a critical role in caring for patients with respiratory disease such as COPD and asthma. It is understood that many of the patients that use inhalers to deliver these drugs to their lungs use them entirely improperly or in a sub-optimal manner. Improving the inhaler design for increased effectiveness and ease of use was the focus of this project.

Methods: A pulmonary critical care attending was interviewed regarding patient inhaler use. The attending provided information about proper inhaler use and also described patient errors in using the inhaler that were observed. Inhalers that are currently in the marketplace were obtained for careful examination with ease of use in mind.

Results: The attending illuminated several types of errors that patients commonly make which impair the effectiveness of the inhaled drug. One patient error that was frequently observed was that the drug was dispensed by the patient after they had already inhaled completely, or at total lung capacity. This prevents the drug from fully reaching the lungs. An additional noteworthy observation was that patients often inhaled too rapidly which increases the fraction of drug that is absorbed in the throat, and therefore does not reach the lungs.

Conclusions:

The results suggest that inhalers could be used more effectively if some of the common errors were addressed. A solution discussed was incorporating audible feedback into the inhaler. This would tell the user how to coordinate their breath and depressing the button to the dispense the medication. Future work could include developing a prototype that patients could trial.

Word Count: 258 words