



Abstract P232 Figure 1 The success rate of inhalations according to criteria presented by Kamin and Haidl for patients with asthma and COPD with Easyhaler (combi and mono), Diskus and Turbuhaler. Error bars represent 95% confidence interval. Pairwise comparison by McNemar's test. * $p < 0.0001$

Turbuhaler respectively (figure 1). The mean lungpower values varied between 7.18W and 9.65W for the four devices while the minimum power threshold calculated from the minimum flow rate was 0.58W, 1.15W, 0.29W and 4.36W for Easyhaler combi, Easyhaler mono, Diskus and Turbuhaler, respectively. In terms of lungpower, the poorest performing patients were COPD patients using Diskus. In this patient group 10th percentile cut off was 1.29W, which is sufficient for all the studied DPIs except for Turbuhaler.

For large majority of respiratory patients DPIs provide a feasible treatment option. The Turbuhaler requires largest lungpower and performed worst likely due to its built-in deagglomeration system that requires large flow rates to operate properly.¹ As for other inhalers, the lungpower requirement did not significantly limit the performance in any patient group.

REFERENCE

- Haidl P, Heindl S, Siemon K, Bernacka M, Cloes RM. Inhalation device requirements for patients' inhalation maneuvers. *Respir Med* 2016;**118**:65–75. doi:10.1016/j.rmed.2016.07.013

P233 PATIENT KNOWLEDGE AND OPINIONS OF THEIR HEALTHCARE DEVICES

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10.1136/thorax-2019-BTSAbstracts2019.376

Inhaled medications are the cornerstone of therapy for chronic obstructive pulmonary disease (COPD) patients, yet ~1/3 of patients make critical errors when using their inhaler devices that can impact on therapeutic benefit. The UK Inhaler Group (UKIG), surveyed their member organisations and identified 5 themes of concern potentially affecting patients' use of inhalers: (1) patient training and knowledge of their inhalers, (2) inhalers in the acute emergency, (3) environmental issues, (4) spacer use and (5) inhalers in schools.

The aims of this study were to assess patients' knowledge regarding use of their inhaler devices and gauge their opinions on inhalers in order to examine patient-relevant factors that influence use of their inhaled medication.

COPD patients (n=138) were individually interviewed before their clinic appointment at a tertiary care centre. A 47-

item questionnaire was devised to explore patients' knowledge and opinions related to their inhalers, and their understanding regarding inhaler themes (2 - 5).

Patients' knowledge on inhaler use was found lacking in themes (1 - 4). Of concern, 55/138 (40%) of patients had not had their inhaler technique reviewed by a healthcare professional (HCP) in the last 12 months, demonstrating a clear risk of deterioration in inhaler technique. 90/138 (65%) of patients had not been shown how to use their inhaler for when they had breathing difficulty in an acute emergency. 24/138 (17%) of patients demonstrated knowledge of environmental issues specific to inhalers. In terms of spacer use, interestingly 74/121 (61%) of patients were unable to explain why a spacer was useful. Understanding the accessibility of inhalers in schools was difficult to gauge as these were COPD rather than asthma patients; however universally high ratings of importance were given to the presence of inhalers in schools.

Patients' knowledge in inhaler use is inconsistent and lacking. Importantly, the lack of regular inhaler technique review by HCPs exposes a risk to patient health and contributes to the prevailing critical errors observed. Our data shows that deficiencies of patient knowledge in the main themes identified, particularly in the use of inhalers in an emergency, highlight significant concerns and the need for action to be taken.

P234 IMPROVING IN INHALER TECHNIQUE: A COMMUNITY PHARMACY SERVICE

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10.1136/thorax-2019-BTSAbstracts2019.377

Introduction and objectives Ensuring optimal inhaler technique is critical to the successful management of asthma and COPD, but real-life studies continue to highlight that poor inhaler technique is common. It is critical that new services are developed to improve patient care. As the majority of people with asthma and COPD are managed in primary care where community pharmacies provide front line healthcare, a feasibility project was designed to determine the extent to which inhaler technique could be optimised in this setting.

Methods Fifty community pharmacies applied to and were recruited to participate in this project. Pharmacists and pharmacy technicians attended a 2 hour training session, and were provided with a resource box including placebo inhalers, training aids and patient information leaflets. Patients were eligible for the service if they were prescribed inhalers, could speak and understand English, and consented to share information from the consultation with their GP.

Results Thirty-five pharmacies recruited a total of 380 patients (214 female); 190 (50%) used one inhaler, 175 (46.1%) used two, and 15 (3.9%) used three inhalers. Incredibly, 104 (27.4%) patients had never been shown how to use their inhalers before. The most commonly prescribed inhalers were MDI, Ellipta and Turbuhaler in 226 (59.5%), 93 (24.5%), and 32 (8.4%) patients. A mixture of aerosol (MDI or soft mist inhaler) and dry powder inhalers (DPI) were prescribed for 108 (56.8%) patients.

At baseline, good inhaler technique (defined as having no critical errors) was significantly more likely with DPIs than with aerosol inhalers ($p < 0.05$). With training, a significant improvement in inhaler technique was achieved for both

Abstract P234 Table 1 Impact of community pharmacy service on inhaler technique in patients with asthma or COPD

	Aerosol Inhaler N=360	DPI N=225	Whole Group N=585	Aerosol vs. DPI, p value
Inhaler Technique At Baseline				
Good Technique	177 (49.20%)	175 (77.80%)	352 (60.20%)	<0.05
Unsatisfactory Technique	183 (50.80%)	50 (22.20%)	233 (39.80%)	
Inhaler Technique After Training				
Good Technique	344 (95.60%)	219 (97.30%)	563 (96.20%)	ns
Unsatisfactory Technique	16 (4.40%)	6 (2.70%)	22 (3.80%)	

DPI = Dry Powder Inhaler; ns = not significant

aerosol ($p<0.05$) and DPIs ($p<0.05$); overall improving from 60.2% to 96.2% of inhalers. See table 1.

Conclusions Poor inhaler technique is common, but a dedicated service provided by community pharmacy staff is effective in improving inhaler technique for almost all patients. However uptake at many pharmacies was low and only 11 patients received the service at the weekend, suggesting that capacity for additional key services is limited in the current climate. Further work is required to determine whether good inhaler technique is maintained and the impact on disease control.

P235 OPTIMISING INHALER TECHNIQUE: WARD-BASED SERVICE FOR ASTHMA & COPD PATIENTS

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10.1136/thorax-2019-BTSabstracts2019.378

Introduction and objectives Good inhaler technique is a key component of asthma and COPD management, but many patients are unable to use their inhalers correctly, which puts them at increased risk of exacerbations and hospital admission. Inhaler technique should be checked for every patient admitted to hospital with an exacerbation of asthma or COPD, but is often poorly performed. Consequently a new dedicated service was developed and evaluated to determine the impact on optimising inhaler technique in inpatients with asthma and COPD on future exacerbation rates.

Methods Pharmacy support workers were trained to undertake inhaler technique assessments. Technique was assessed as unsatisfactory, satisfactory or optimal before and after training. In cases of poor technique, a protocol was used to recommend cost-effective treatment changes with patient consent. Follow up within 48 hours reinforced optimal technique.

Results Optimising inhaler technique resulted in a reduction in exacerbations of asthma and COPD. Between 1st October 2018 and 30th June 2019, 278 patients had 616 inhaler technique baseline assessments (303 DPI and 313 aerosol inhalers). This was assessed as optimal for 176 (28.6%), satisfactory for 304 (49.4%), and unsatisfactory for 136 (22.1%) inhalers. Following training and recommended changes of treatment, technique was assessed as optimal for 494 (91.5%), satisfactory for 46 (8.5%), and unsatisfactory for 0 (0%) of inhalers ($p<0.00001$ for both DPI and aerosol inhalers).

Abstract P235 Table 1 Impact of inhaler technique optimisation service on six-month exacerbations in patients with asthma and COPD

	Six month period prior to intervention	Six month period after intervention*
All Patients (n=99)		
Total number of exacerbations	257	220
Total Number of hospital admissions	156	136.5
Survivors (n=71)		
Total number of exacerbations	169	111
Total Number of hospital admissions	105	49

*Adjusted to incorporate length of time patients survived following the intervention

Improvements in inhaler technique were achieved through training (37.6% of inhalers), inhaler device change (19.0%), or optimising therapy with or without changing inhaler device (30.4%). 64.8% of recommendations were accepted. At follow-up, all patients were happy with the service (data available for 225 patients).

Six-month follow-up data were available for 99 patients (22 asthma, 73 COPD and 4 asthma-COPD overlap). All-cause mortality was 28% (27 COPD). Optimising inhaler technique resulted in a reduction in the total number of exacerbations and hospital admissions in all patients and in the 71 patients still alive at 6 months (see table 1).

Conclusions A dedicated inhaler technique service produces significant improvements in inhaler technique resulting in a reduction in asthma and COPD exacerbations, with high acceptability for patients, and produces financial savings.

P236 CARDIOVASCULAR RISK FOLLOWING THE USE OF LONG-ACTING BRONCHODILATORS OF THE UK'S ASTHMA POPULATION: A NESTED CASE-CONTROL STUDY

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10.1136/thorax-2019-BTSabstracts2019.379

Introduction Recently, Wang *et al* (JAMA, 2018) examined cardiovascular risk following the use of certain inhalers, specifically in incident users of long-acting beta-agonists (LABA) and long-acting antimuscarinic antagonists (LAMA) in an adult Chronic Obstructive Pulmonary Disease (COPD) population. These drugs are increasingly used in asthma patients and we sought to determine whether LABA may raise the risk of cardiovascular disease in patients with asthma in the UK.

Methods Data was derived from primary care records (Clinical Practice Research Datalink) linked to secondary care database (Hospital Episodes Statistics), from January 2004 until January 2017. A cohort of LABA-LAMA naïve asthma patients were identified from which a nested case-control (ratio of 1:4) were matched on age, sex and GP practice was utilised. The outcome was cardiovascular disease (CVD; ischaemic heart disease (IHD), stroke, heart failure, hypertension or arrhythmias). The primary exposure was LABA prescriptions in the year prior to the date of CVD or equivalent date for the controls.