regression in figure 1 shows, on average, patients perceive their inhaler to be empty when 82 doses remain.

Conclusions Hospital inpatients use ineffective methods to determine how many doses remain in Ventolin Evohalers, with most patients underestimating the number of remaining doses. 12% use more than 200 actuations, potentially getting sub-therapeutic doses. Our analysis suggests patients perceive their inhaler to be empty when 82 doses remain. This correlates with recycling data, showing that on average 96 doses remain in discarded pMDIs. Prescribers should consider switching to salbutamol dry-powder inhalers which have dose-counters, could reduce waste and greenhouse gas emissions, prevent on-going use of empty inhalers and may be more cost-effective.

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P170 AN EVALUATION OF THE EFFECT OF VARIOUS BARRIERS ON THE ABILITY OF ELDERLY INPATIENTS TO USE THEIR INHALED MEDICATION

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Introduction Respiratory conditions are very common amongst the older population with asthma and chronic obstructive pulmonary disease (COPD) potentially co-existing in more than 50% of elderly patients.[1] With inhaled therapy as the primary pharmacological management of both conditions, we aimed to evaluate inhaler competence amongst elderly inpatients and identify the impact of inhaler devices, cognitive function, inspiratory flow and specific comorbidities on inhaler technique, whilst also investigating patients' perceptions of their inhaled medication.

Methods Forty-four patients with COPD and asthma were recruited from a UK teaching hospital in November 2013. Patients were given an inhaler technique score (ITS) using a seven-step checklist which was then compared to potential barriers of inhaler use. The patient's inspiratory flow for their inhaler(s) was measured using the In-Check Dial. The inhalers covered were the metered dose inhaler (MDI) (±spacer devices) and dry powder inhalers (DPI) including the Accuhaler, Turbohaler and Handihaler. Associations were considered significant at $p<0.05$ for Mann-Whitney *U* tests.

Results Only 10 (23%) patients demonstrated at least one perfect ITS. A significantly lower ITS was found amongst MDIs compared to DPIs ($p=0.032$) and also in cognitively impaired patients ($p=0.038$). No significant difference in ITS was found between patients with at least one comorbidity and those with none ($p=0.289$). Twenty-eight (64%) patients were not inhaling within the clinically effective flow range for at least one of their inhalers. Twenty (80%) MDI users, a larger proportion than DPI users, rated their device easy to use and clinically beneficial.

Conclusion Many elderly inpatients demonstrated poor inhaler technique which could result in suboptimal management of their condition, leading to increased costs, doses and health implications. Inhaled therapy must be carefully selected after assessing individual patient characteristics such as cognitive impairment. Healthcare professionals must provide regular reviews of inhaler technique. It is recommended for a repeat study to be completed following the introduction of newer inhaler devices available to patients.

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P171 CAN THE TURBU+™ ADHERENCE PROGRAMME CONTRIBUTE TO IMPROVED ADHERENCE TO ASTHMA CONTROLLER TREATMENT IN ITALY?

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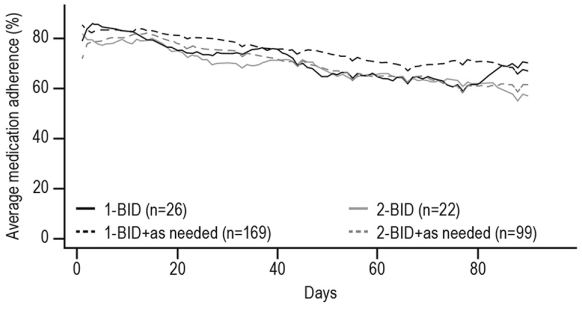
Introduction and objective Electronic inhalers providing reminders and adherence feedback have improved adherence to asthma controller medication in clinical trials. We investigated a community implementation of the Turbu+™ programme, designed to support adherence to budesonide/formoterol (BUD/FORM, Symbicort®) Turbuhaler®.

Methods Asthma patients prescribed BUD/FORM maintenance therapy (1-BID or 2-BID) or maintenance and reliever therapy (1-BID+as needed or 2-BID+as needed) received training on Turbu+™ in secondary care centres across Italy. An electronic device attached to their inhaler for ≥90 days securely uploaded adherence data to a smartphone app enabling patients to view their controller use. Average medication adherence was calculated based on maintenance regimens (2 puffs/day for 1-BID regimens, 4 puffs/day for 2-BID regimens) and defined as proportion of daily maintenance inhalations taken as prescribed (number recorded actuations per day/number maintenance puffs prescribed per day) averaged over the monitoring period. Proportion of adherent days was defined as the proportion of days that all prescribed maintenance doses were taken in a given day. A Wilcoxon test compared proportion of adherent days between patients in the



	All patients (n=316)	1-BID (n=26)	1-BID+as needed (n=169)	2-BID (n=22)	2-BID+as needed (n=99)
Average medication adherence, %	71	70	75	68	69
Proportion of adherent days, %	57	47	64	39	51

Abstract P171 Figure 1 Average medication adherence by regimen and time in patients with ≥90 days' electronic monitoring

maintenance vs maintenance and reliever treatment regimens of a given dose (1-BID or 2-BID).

Results In 316 patients, mean (±SD) number of days monitored was 156.9 (±53.7): 1-BID, 158.8 (±50.9); 1-BID+as needed, 154.2 (±53.2); 2-BID, 149.4 (±62.7) and 2-BID+as needed, 162.3 (±53.5). Median (IQR) number of doses/day were: 1-BID, 2 doses (1–2); 1-BID+as needed, 2 doses (1–2); 2-BID, 4 doses (2–4) and 2-BID+as needed, 4 doses (2–4). Average medication adherence was 71% overall and similar across treatment groups (figure 1). Proportion of adherent days was 57% of days overall and higher with maintenance and reliever therapy (1-BID+as needed vs 1-BID; p<0.00001; 2-BID+as needed vs 2-BID; p=0.00011). Of 61 402 person-days in the programme, high-use days (>12 doses/day) were low (~0.05% person-days).

Conclusion Observed controller adherence rate of patients in the Turbu+™ programme (71%) was higher than that previously reported in Italy,[1] although comparisons between this small study in selected sites and a large unselected national survey are difficult. Further prospective research of the Turbu+™ programme will determine its contribution to improved adherence.

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P172 SAFETY PROFILE OF TIOTROPIUM ADD-ON THERAPY IN PAEDIATRIC PATIENTS BY GENDER

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Introduction Tiotropium Respimat® has a safety profile comparable with placebo when given as add-on therapy to at least inhaled corticosteroids (ICS) in paediatric patients with symptomatic asthma. We aimed to determine whether the safety and tolerability of tiotropium add-on in paediatric patients is independent of gender.

Methods Data were pooled from all parallel-group, randomised, double-blinded, placebo-controlled studies of ≥12 weeks' duration in 1–17 year-olds (n=1691) with symptomatic asthma treated with tiotropium 5 µg or 2.5 µg or placebo (as two puffs once daily) as add-on to ICS ±other controllers. This analysis includes adverse events (AEs) and serious AEs (SAEs) recorded throughout treatment, and for 30 days after.

Results Baseline characteristics and exposure to study medication were comparable between treatment groups within each trial. Of 1691 patients treated, 1119 received tiotropium. Overall, the proportion of patients reporting AEs was comparable for tiotropium 5 µg, 2.5 µg and placebo (table 1). This was true for both genders, although slightly fewer female than male patients in the tiotropium 5 µg group reported AEs. Reporting of drug-related AEs, AEs leading to discontinuation and SAEs was low and balanced between treatment groups, irrespective of gender.

Conclusion The safety and tolerability profile of once-daily tiotropium as add-on to ICS ±additional controllers is comparable with placebo among paediatric patients with symptomatic asthma, irrespective of gender.

Please refer to page A267 for declarations of interest related to this abstract.

Abstract P172 Table 1 Overview of reported adverse events by gender

	Overall population, n (%)			Male, n (%)			Female, n (%)		
	Tiotropium Respimat® 5 µg	Tiotropium Respimat® 2.5 µg	Placebo Respimat®	Tiotropium Respimat® 5 µg	Tiotropium Respimat® 2.5 µg	Placebo Respimat®	Tiotropium Respimat® 5 µg	Tiotropium Respimat® 2.5 µg	Placebo Respimat®
Patients, n (%)	n=560	n=559	n=572	n=365	n=373	n=366	n=195	n=186	n=206
Any AEs	283 (50.5)	286 (51.2)	310 (54.2)	195 (53.4)	190 (50.9)	201 (54.9)	88 (45.1)	96 (51.6)	109 (52.9)
Drug-related AEs	7 (1.3)	1 (0.2)	8 (1.4)	5 (1.4)	0	5 (1.4)	2 (1.0)	1 (0.5)	3 (1.5)
AEs leading to discontinuation	2 (0.4)	0	5 (0.9)	2 (0.5)	0	3 (0.8)	0	0	2 (1.0)
SAEs	10 (1.8)	8 (1.4)	13 (2.3)	7 (1.9)	6 (1.6)	4 (1.1)	3 (1.5)	2 (1.1)	9 (4.4)
AEs reported in ≥5% and ≥10 patients in any treatment group									
Asthma exacerbation/ worsening	110 (19.6)	115 (20.6)	143 (25.0)	75 (20.5)	73 (19.6)	94 (25.7)	35 (17.9)	42 (22.6)	49 (23.8)
Decreased peak expiratory flow rate	55 (9.8)	64 (11.4)	68 (11.9)	38 (10.4)	49 (13.1)	44 (12.0)	17 (8.7)	15 (8.1)	24 (11.7)
Nasopharyngitis/ rhinopharyngitis	44 (7.9)	46 (8.2)	49 (8.6)	29 (7.9)	34 (9.1)	34 (9.3)	15 (7.7)	12 (6.5)	15 (7.3)
Viral respiratory tract infection	27 (4.8)	24 (4.3)	30 (5.2)	16 (4.4)	14 (3.8)	22 (6.0)	11 (5.6)	10 (5.4)	8 (3.9)
Respiratory tract infection	19 (3.4)	17 (3.0)	28 (4.9)	14 (3.8)	11 (2.9)	20 (5.5)	5 (2.6)	6 (3.2)	8 (3.9)

Treated set. Treatment + 30 days. Percentages are calculated using total number of patients per treatment as the denominator.
AE, adverse event; SAE, serious adverse event.

P173 ABSTRACT WITHDRAWN

P174 YOUNG PATIENTS WITH ASTHMA AND PATIENTS WITH COPD CAN GENERATE SUFFICIENT INSPIRATORY FLOWS VIA EASYHALER DRY POWDER INHALER

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Introduction and objectives Asthma and COPD prevalence is rising and new treatment options for effective and safe management of these diseases are needed. We evaluated if young patients with asthma, and patients with COPD can achieve sufficient inspiratory flows for effective use of recently approved Salmeterol/fluticasone propionate Easyhaler and Budesonide/formoterol Easyhaler combination dry powder