We investigated if serial domiciliary measures of spirometry were sensitive at detecting subtle effects of beta-2 blockade associated with bisoprolol. This was a sub-study of NCT01656005 where domiciliary diary data were available on n=17 patients with GOLD B/C COPD comprising domiciliary FEV_1,(am/pm), heart rate, oxygen saturation, salbutamol use, and global symptom score. Patients received a two week run in (baseline) on inhaled corticosteroid (ICS) and long acting beta-2 agonist (LABA): beclometasone/formoterol 100/6 µg, 2 puffs BID. Thereafter they were placed on triple therapy with the addition of a long acting muscarinic receptor antagonist (LAMA) as Tiotropium 18 µg OD, with concomitant weekly dose titration of bisoprolol as: 1.25 mg-2.5 mg-5 mg. After a further week of bisoprolol 5 mg, they were stepped back down to dual therapy (ICS/LABA) and continued this for one week. Mean age was 64 years, mean $FEV_1$52% predicted, mean FEV_1/FVC ratio of 0.46, mean 50 pack year smoking history, and 7% mean FEV_1 reversibility to salbutamol 400 µg. Compared to a baseline am FEV_1 of 1.38 L (95% CI 1.14–1.61 L), both ICS/LABA/LAMA and ICS/LABA in conjunction with bisoprolol showed statistically significant mean falls in amounting to 100 ml 1.28 L (95% CI 1.03–1.53 L) and 120 ml respectively 1.26 L (95% CI 1.01–1.51 L); equalling and exceeding the MCID of 100 ml respectively. Bisoprolol produced a significant heart reduction of 11 beats/min from a baseline of 80 bpm (95% CI 74–85 bpm) to 69 bpm (95% CI 64–73 bpm) and 69 bpm (95% CI 65–73 bpm) for ICS/LABA/LAMA and ICS/LABA respectively. There was no change in salbutamol use, symptom score or oxygen saturation, pre and post bisoprolol, irrespective of triple or dual therapy. In the context of dual or triple therapy , bisoprolol was associated with subtle but significant falls in domiciliary FEV_1, which were disconnected from symptoms, reliever use and oxygen saturation.

P278 ASSESSING DIFFERENT VALVED HOLDING CHAMBERS (VHC) WITH FACEMASK FOR DELIVERED MASS TO CARINA WITH INHALED CORTICOSTEROID BY PRESSURISED METERED-DOSE INHALER (PMDI)

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Introduction and Objectives Laboratory evaluation of VHC-facemask add-ons is ideally undertaken simulating conditions of use. We report a study in which such devices for small child use were evaluated using an anatomical face-model and upper airway commensurate with that of a 4 year old child.

Methods A number of VHCs with facemask (n=3 devices/group) were evaluated using an anatomical face-model and upper airway commensurate with that of a 4 year old child. Each VHC was prepared to manufacturer instructions, then evaluated by breathing simulator (ASL5000), mimicking a short coordination delay of 2 s followed by tidal breathing (tidal volume (Vt)=155 mL, I:E ratio=1:2, rate=25 cycles). The facemask was attached to ADAM-III small child model. The airway was coupled directly to the breathing simulator via a filter below its exit to capture drug particles that would penetrate as far as the carina in a real patient. 5-actuations of fluticasone propionate (50 µg, FP) were delivered at 30 s intervals. FP recovered from various locations in the aerosol pathway was subsequently assayed by HPLC-UV spectrophotometry.

Results Distribution of recovered FP from each type of VHC is summarised in Table 1.

Conclusions Significantly more FP was delivered to the model 'carina' from the AC Plus VHC with child mask ($p<0.001$), the increased mass counterbalanced by decreased retention of medication within the VHC. It is important that clinicians are aware that large differences in delivery efficiency may exist when a facemask is present.

P279 PRIMING OF A NON-CONDUCTING VALVED HOLDING CHAMBER (VHC) MAY RESULT IN INCONSISTENT MEDICATION DELIVERY

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Introduction and Objectives Priming VHCs with several actuations of medication before use may be an established practice to prepare the spacer before use. However this practice can have a significant influence on subsequent medication delivery. The present study set out to test the hypothesis that priming is not effective, or better than the use of anti-static materials.

Methods The following VHCs, each with mouthpiece as patient interface (n=5 devices/group) were evaluated: AeroChamber Plus Flow-Vu Antistatic VHC (AC +FV AVHC); AeroChamber Plus; Volumatic···; Able Spacer 2···; Anti-Static Compact Space Chamber plus···. Each VHC was connected via a filter holder to a vacuum source operated at 28.3 L/min, evaluated with a pMDI (Flovent 125 µg, FP) and the Emitted Mass of FP (EM_{FP}) determined by HPLC-UV assay. The following sequence of testing was conducted: 1) Test VHC immediately after removal from packaging (no pre-treatment) and evaluate EM_{FP} following one actuation. 2) Supply two more actuations into the same VHC and evaluate EM_{FP}

Abstract P278 Table 1 FP (mean µg±SD) recovered from VHCs indicated for small child use, simulating a 2 s coordination delay followed by tidal breathing

Retention Location	AeroChamber Plus Flow-Vu	Pocket-Chamber	Vortex	Compact SpaceChamber Anti-Static	A2A Spacer	Volumatic	Able* Spacer2	Optichamber Diamond*
VHC	17.5±1.6	36.6±0.2	39.7 ±6.7	36.1±3.6	28.3±2.8	33.6±1.9	13.2±1.6	22.7±2.7
Facemask	1.4±0.2	1.9±0.8	1.2±0.2	0.0±0.0	0.2±0.1	0.1±0.1	0.0±0.0	3.4±0.8
Airway	1.1±0.2	0.4±0.2	0.6±0.3	0.1±0.1	0.4±0.1	0.0±0.0	0.2±0.0	0.7±0.1
Filter at 'Carina'	**10.1±1.0**	**4.0±1.7**	**2.7±1.5**	**2.1±0.8**	**4.1±0.9**	**1.5±0.8**	**5.1±0.9**	**5.1±0.9**