

Appendix 2

Inhaler technique and self-reported adherence to medications among hospitalised patients with asthma and COPD

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Table 1. Checklists and number of errors in inhaler technique.

Type of inhaler - DPI (n)	Checklist (steps in <i>italics</i> are considered as critical factors)	Number of errors (n)
Turbuhaler (13)	1. Make sure there are doses left in the turbuhaler (TBH).	13
	2. <i>Remove the cap from the TBH.</i>	1
	3. <i>Turn the bottom of the inhaler in one direction and then back so that a click is heard while the TBH is upright.</i>	2
	4. Exhale completely and empty the lungs of air, (but not into the inhaler).	9
	5. <i>Insert the mouthpiece between teeth and lips sitting or standing.</i>	0
	6. <i>Inhale deeply and vigorously through the inhaler.</i>	2
	7. Hold your breath for max 10 seconds (or as long as possible).	5
	8. Rinse your mouth with water afterwards if the inhaler contains corticosteroids.	0
Easyhaler (10)	1. Check how many doses there are left in the EasyHaler (EH).	10
	2. <i>Remove the protective cap from the EH.</i>	0
	3. Shake the EH vigorously a few times (3-5 times).	3
	4. <i>Hold the EH upright and click on the "button" once, a click should be heard.</i>	1
	5. Exhale normally to empty the lungs of air (but not into the inhaler).	5
	6. <i>Place the mouthpiece between teeth and lips, be sure to enclose tightly.</i>	0
	7. <i>Inhale vigorously and deeply through the EH.</i>	0
	8. After inhalation, try to hold your breath for at least 5 seconds (or as long as possible).	2
	9. Rinse your mouth with water afterwards if the inhaler contains corticosteroids.	0
Diskus (2)	1. Make sure there are doses left.	2
	2. Hold the discus horizontally	0
	3. <i>Open the diskus.</i>	0
	4. <i>Load a dose by pulling the "lever" as far as it will go until a click is heard.</i>	0
	5. Exhale and empty the lungs of air, (but not into the inhaler).	2
	6. <i>Place the mouthpiece between the teeth and mouth, enclose tightly.</i>	0
	7. <i>Inhale vigorously and deeply through the discus.</i>	0

	8. Hold your breath for about 5-10 seconds (or as long as possible).	0
	9. Rinse your mouth with water afterwards if the inhaler contains corticosteroids.	0
Breezhaler (1)	1. <i>Remove the breezhaler (BH) cap and remove one capsule from the blister.</i> 2. <i>Grasp the mouthpiece and tilt it backwards, place the capsule in the capsule chamber and tilt back the mouthpiece until a click is heard.</i> 3. <i>Hold the BH between your thumb and forefinger and push from both sides to pierce the capsule.</i> 4. Exhale and empty the lungs of air, (but not into the inhaler). 5. <i>Place the mouthpiece between the teeth and mouth, enclose tightly.</i> 6. <i>Inhale vigorously, deeply and for a long time through the BH so that a whirring sound is heard.</i> 7. After inhaling, try to hold your breath for about 5-10 seconds (or as long as possible). 8. <i>Grasp the mouthpiece and tilt it back to check that the capsule is empty. If it is not empty, repeat steps 4-7.</i> 9. When the capsule is empty, remove the capsule and discard it. 10. Rinse your mouth with water afterwards if the inhaler contains corticosteroids.	0 0 0 0 0 0 0 0 0 0
Ellipta (1)	1. Make sure there are doses left. 2. <i>Slide the protective cover aside until a click is heard (the dose is charged).</i> 3. Exhale and empty the lungs of air (but not into the inhaler). 4. <i>Place the lips and teeth around the mouthpiece.</i> 5. <i>Inhale with a deep, long, even breath through the inhaler.</i> 6. Hold your breath for 5-10 seconds (or as long as possible). 7. Rinse your mouth with water afterwards if the inhaler contains corticosteroids.	0 0 0 0 0 0 0
HandiHaler (1)	1. <i>Open the grey protective cover by pressing the green button.</i> 2. <i>Tilt the white mouthpiece backwards and place a capsule from the blister strip in the capsule holder.</i>	0 0

	3. <i>Fold back the white mouthpiece until you hear a click.</i> 4. <i>Pierce the capsule by clicking on the green button all the way down to the bottom.</i> 5. Exhale and empty the lungs of air, (but not into the inhaler). 6. <i>Place the lips and teeth around the mouthpiece.</i> 7. <i>Inhale deeply but evenly through the inhaler (hear the capsule vibrate).</i> 8. Hold your breath for 5-10 seconds (or as long as possible). 9. <i>Repeat steps 5-8 to make sure that all contents of the capsule have been emptied.</i>	0 0 1 0 0 1 1
Novolizer/Genuair (1)	1. Check that there are doses left. 2. <i>Remove the protective cap.</i> 3. <i>Charge the inhaler by clicking the button.</i> 4. Exhale and empty the lungs of air, (but not into the inhaler). 5. <i>Place the lips and teeth around the mouthpiece.</i> 6. <i>Inhale vigorously and deeply through the mouthpiece. A click will be heard, continue to inhale after the click.</i> 7. Hold your breath for about 5-10 seconds (or as long as possible). 8. Check that the window has turned red again, confirming a correct inhalation.	1 0 1 1 1 1 1 0
Type of inhaler - MDI (n)	Checklist (steps in italics are considered as critical factors)*	Number of errors (n)
Evohaler (3)	1. <i>Remove the protective cap.</i> 2. Shake the inhaler well, about 4-5 times. 3. Exhale and empty the lungs of air, (but not into the inhaler). 4. <i>Place the mouthpiece between the teeth and lips and enclose tightly.</i> 5. <i>Take a deep and slow breath through the inhaler, right at the beginning of the breath, press the top of the inhaler so that the aerosol is sprayed out. Keep breathing in after you have pressed.</i> 6. Hold your breath for 5-10 seconds (or as long as possible). 7. Rinse your mouth with water afterwards if the inhaler contains corticosteroids.	0 2 2 1 0 1 0
Respimat (1)	1. Make sure there are doses left.. 2. <i>...while the transparent cover is still close.</i>	1 0

	3. <i>Charge the dose by turning the lower part of the inhaler until a click is heard (in the direction shown by the arrow).</i> 4. <i>Open the transparent cover.</i> 5. <i>Exhale and empty the lungs of air.</i> 6. <i>Place the mouthpiece between the teeth and lips and enclose tightly.</i> 7. <i>Take a deep and slow breath through the inhaler, pressing the grey button to release the aerosol at the start of the inhalation. Continue to inhale after pressing.</i> 8. <i>Hold your breath for about 5-10 seconds (or as long as possible).</i> 9. <i>For one dose, two inhalations are required → Repeat steps 1-6.</i>	1 0 1 0 1 0 1
Spacer + MDI (1)	1. <i>Attach the MDI/evohaler/respimat to the spacer and shake the MDI/evohaler or prepare the respimat by loading a dose as usual.</i> 2. <i>Place the mouthpiece or mask to the mouth.</i> 3. <i>Press the MDI evohaler/respimat once.</i> 4. <i>Breathe 5 breaths completely normally to inhale the whole dose.</i> 5. <i>Remove the spacer from the mouth and try to hold the breath for 5-10 seconds (or as long as possible).</i> 6. <i>If more dosages have been prescribed or if the respimat is used, the procedure should be repeated.</i>	0 0 0 1 0 0