



DEVICE CHOICE AND TECHNIQUE

LAMA	LAMA/LABA	SABA
LABA	LABA/ICS	SAMA
ICS	LAMA/LABA/ICS	

GENERIC DRUG NAME	DEVICE TYPE/ COST PRICE	DEVICE CLASS	CARBON FOOTPRINT KGCO2/ INHALER	ANNUAL CARBON FOOTPRINT KGCO2	DEVICE TECHNIQUE REQUIRED FOR EFFECTIVE DEPOSITION/ INSPIRATORY FLOW RATE REQUIRED	LICENSED INDICATION DOSE PER ACTUATION/ DAILY DOSE	DISTANCE DRIVING (9KM PER KG FOR AVE NEW 2019 CAR)	IMAGE
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LONG-ACTING ANTI MUSCARINIC (LAMA)

ACLIDINIUM BROMIDE	Eklira Genuair €33.22	DPI	Low	13.6	Quickly and deeply within 2-3 secs/ Medium	COPD fluti322micrograms/ BD	125	
GLYCOPYRRONIUM	Seebri Breezhaler €32.19	DPI	Low	6.84	Quickly and deeply within 2-3 secs/ Low	COPD 44micrograms/ once daily	61.2	
TIOTROPIUM	Spiriva Respimat €30.29 Refills €24.83	SMI	Low	9.4 2.4 6 monthly reusable	Quickly and deeply within 2-3 secs/ Very low	Asthma and COPD 2.5micrograms/ 2 inhalations once daily	84.6 21.6	
	Spiriva Handihaler €35.02	DPI	Low	10	Quickly and deeply within 2-3 secs/ High	COPD 10micrograms/ once daily	90	
	Braltus Zonda Inhaler €31.24	DPI	Low	6.84	Quickly and deeply within 2-3 secs/ High	COPD 10 micrograms/ once daily	61.2	
UMECLIDIUM	Incruse Ellipta €29.78	DPI	Low	8.7	Quickly and deeply within 2-3 secs/ Medium Low	COPD 55 micrograms/ once daily	78.3	








COMBINATION LONG-ACTING BETA2-AGONIST PLUS ANTICHOLINERGIC IN ONE DEVICE (LABA/LAMA)

FORMOTEROL/ ACLIDINIUM	Brimica Genuair €44.57	DPI	Low	13.6	Quickly and deeply within 2-3 secs/ Medium	COPD 340/12 micrograms BD	125	
INDACATEROL/ GLYCOPYRRONIUM	Ultibro Breezhaler €44.78	DPI	Low	6.8	Quickly and deeply within 2-3 secs/ Low	COPD 85/43 micrograms/ once daily	61.2	
OLODATEROL/ TIOTROPIUM	Spiolto Respimat €44.82	SMI	Low	9.3 2.4(2) 6 monthly reusable	Quickly and deeply within 2-3 secs/ very low	COPD 2.5/2.5 micrograms/ 2 inhalations once daily	83.7 21.6	
VILANTEROL/ UMECLIDIUM	Anoro Ellipta €42.13	DPI	Low	9.5	Quickly and deeply within 2-3 secs/ Medium Low	COPD 55/22 micrograms/ once daily	85.5	



Thank you to Tommy Walsh, Professor Basil Elnazir, the Paediatric, Clinical Photography and Pharmaceutical Departments in Tallaght University Hospital for granting permission to use of the inhaler images used in this toolkit.


GENERIC DRUG NAME	DEVICE TYPE/ COST PRICE	DEVICE CLASS	CARBON FOOTPRINT KGCO2/ INHALER	ANNUAL CARBON FOOTPRINT KGCO2	DEVICE TECHNIQUE REQUIRED FOR EFFECTIVE DEPOSITION/ INSPIRATORY FLOW RATE REQUIRED	LICENSED INDICATION DOSE PER ACTUATION/ DAILY DOSE	DISTANCE DRIVING (9KM PER KG FOR AVE NEW 2019 CAR) 	IMAGE
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CORTICOSTEROID (ICS)










BECLOMETHASONE	Becotide €3.05 - €15.57	MDI	High 20	74	Slowly and steadily over 5 secs */ very low	Asthma 50 micrograms, 100 micrograms, 250 micrograms/ BD	666	
	Beclazone €5.36 - €22.35	MDI	High 20	74	Slowly and steadily over 5 secs */ very low	Asthma 50 micrograms, 100 micrograms, 200 micrograms / BD	666	
	Beclazone Easibreathe €10.86 - €21.09	Ba MDI	High 20	74	Slowly and steadily over 5 secs */ very low	Asthma 100 micrograms, 200 micrograms, 250 micrograms / BD	666	
	QVAR €23.24	MDI	High	74	Slowly and steadily over 5 secs */ very low	Asthma 100 micrograms / BD	666	
	QVAR Autohaler €23.24	MDI	High	74	Slowly and steadily over 5 secs */ very low	Asthma 50 micrograms, 100 micrograms / BD	666	
BUDESONIDE	Pulmicort Turbohaler €12.25- €15.31	DPI	Low	13.6	Quickly and deeply within 2-3 secs/ Medium	Asthma 100 micrograms, 200 micrograms, 400 micrograms / BD	122	
CICLESONIDE	Alvesco €15.90-- €19.97	MDI	High 10	60	Slowly and steadily over 5 secs */ very low	Asthma 80 micrograms, 160 micrograms / BD	540	
FLUTICASONE PROPIONATE	Flixotide Evohaler €7.86 - €27.16	MDI	High	237	Slowly and steadily over 5 secs*/ very low	Asthma 50 micrograms, 125 micrograms, 250 micrograms / BD COPD 500 micrograms / BD	2133	
	Flixotide Diskus €4.88 - €28.68	DPI	Low	10.2	Quickly and deeply within 2-3 secs/ Medium Low	Asthma 50 micrograms, 100 micrograms, 250 micrograms, 500 micrograms / BD COPD 500 micrograms / BD	90	
MOMETASONE	Asmanex €15.57- €35.99	DPI	Low	10	Quickly and deeply within 2-3 secs/ Medium High	Asthma 200micrograms, 400micrograms / once daily or BD	90	

TRIPLE COMBINATION IN ONE DEVICE (LABA/LAMA/ICS)

INDACTEROL/ GLYCOPYRRONIUM / MOMETASONE	Trelegy Ellipta €55.42	DPI	Low	6.8	Quickly and deeply within 2-3 secs/ Low	COPD 92/55/22micrograms 1 inhalation once daily	61.2	
	Energair Breezehaler	DPI	Low	6.8	Quickly and deeply within 2-3 secs/ Medium Low	Asthma 114/46/136 micrograms 1 inhalation once daily	61.2	
FORMOTEROL FUMARATE/ GLYCOPYRRONIUM / BUDESONIDE	Trixeo Aerosphere	MDI	High 13.5	163.8	Slowly and steadily over 5 secs*	COPD 5/7.2/160 micrograms 2 inhalation BD	1471	







GENERIC DRUG NAME	DEVICE TYPE/ COST PRICE	DEVICE CLASS	CARBON FOOTPRINT KGC02/ INHALER	ANNUAL CARBON FOOTPRINT KGC02	DEVICE TECHNIQUE REQUIRED FOR EFFECTIVE DEPOSITION/ INSPIRATORY FLOW RATE REQUIRED	LICENSED INDICATION DOSE PER ACTUATION/ DAILY DOSE	DISTANCE DRIVING (9KM PER KG FOR AVE NEW 2019 CAR) 	IMAGE
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COMBINATION OF LONG-ACTING BETA2-AGONIST PLUS CORTICOSTEROID IN ONE DEVICE (LABA/ICS)

FORMOTEROL/ BUDESONIDE	Symbicort Turbohaler €33.52 - €36.11	DPI	Low	13.6	<u>Quickly and deeply within 2-3 secs</u> Medium	Asthma Regular - 100/6, 200/6, 400/12 once daily or BD (Max 2 inhalations of 400/12 twice daily) SMART Maintenance therapy 200/6 micrograms 1-2 inhalations BD up to maximum of 4 inhalations BD Reliever therapy 1 inhalation PRN (Maximum inhalations per day = 12) COPD 400/12 micrograms 1 inhalation BD	122	
	Buformix Easyhaler €31.86	DPI	Low	2.9 0 (Off set)	<u>Quickly and deeply within 2-3 secs</u> Medium	Asthma 160/4.5 micrograms (1-4 inhalations), 320/9 micrograms (1-2 inhalations) once daily or BD MART COPD 320/9 micrograms 1 inhalation once daily	26.1 0	
	DuoResp Spiromax €35.60 - €37.23	DPI	Low	13.6	<u>Quickly and deeply within 2-3 secs</u> Medium	Asthma 160/4.5 micrograms (1-4 inhalations), 320/9 micrograms (1-2 inhalations) once daily or BD COPD 320/9 micrograms 1 inhalation BD	122	
FORMOTEROL/ FLUTICASONE	Flutiform €23.99 - €49.99	MDI	High 36.5	438	<u>Slowly and steadily over 5 secs */</u> very low	Asthma 50/5 micrograms, 125/5 micrograms, 250/10 micrograms two inhalations BD	3942	
	Flutiform k-haler €24.62 - €34.45	MDI	High 35	420	<u>Slowly and steadily over 5 secs */</u> very low	Asthma 50/5 micrograms, 125/5 micrograms, 250/10 micrograms two inhalations BD	3780	
INDACTEROL/ MOMETASONE	Ateectura Breezhaler	DPI	Low	9.5	<u>Quickly and deeply within 2-3 secs/</u> Low	Asthma 125/62.5 micrograms, 125/127.5 micrograms, 125/260 micrograms 1 inhalation once daily	85.5	
SALMETEROL/ FLUTICASONE	Seretide Evohaler €22.21 - €33.26	MDI	High	237	<u>Slowly and steadily over 5 secs</u>	Asthma 25/50 micrograms, 25/125 micrograms, 25/250 micrograms 2 inhalations BD	2133	
	Seretide Diskus €20.84 - €32.64	DPI	Low	11	<u>Quickly and deeply within 2-3 secs/</u>	Asthma 50/100 micrograms, 50/250 micrograms, 50/500 micrograms 1 inhalation BD COPD 50/ 500 micrograms 1 inhalation BD	99	
	Relvar Ellipta €31.7 - €36.46	DPI	Low	6.84	<u>Quickly and deeply within 2-3 secs/</u> Medium Low	Asthma 184/22 micrograms, 92/22 micrograms 1 inhalation once daily COPD 92/22 micrograms 1 inhalation OD	61.2	

GENERIC DRUG NAME	DEVICE TYPE/ COST PRICE	DEVICE CLASS	CARBON FOOTPRINT KGCO2/ INHALER	ANNUAL CARBON FOOTPRINT KGCO2	DEVICE TECHNIQUE REQUIRED FOR EFFECTIVE DEPOSITION/ INSPIRATORY FLOW RATE REQUIRED	LICENSED INDICATION DOSE PER ACTUATION/ DAILY DOSE	DISTANCE DRIVING (9KM PER KG FOR AVE NEW 2019 CAR)	IMAGE
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LONG-ACTING BETA2-AGONISTS (LABA)

FORMOTEROL	Oxis Turbohaler €16.55-€20.11	DPI	Low	13.6	Quickly and deeply within 2-3 secs/ Medium	Asthma and COPD 6 micrograms, 12 micrograms / once daily or BD	125	
	Foradil Aerolizer €20.34	DPI	Low	13.6	Quickly and deeply within 2-3 secs/ Low	Asthma and COPD 12 micrograms / BD	125	
INDACATEROL	Onbrez Breezehaler €31.24	DPI	Low	6.8	Quickly and deeply within 2-3 secs/ Low	COPD 150 micrograms, 300 micrograms / once daily	61.2	
OLODATEROL	Striverdi respimat €27.78	SMI	Low	9.3 2.4 (6 monthly reusable)	Quickly and deeply within 2-3 secs/ very low	COPD 2.5 micrograms / 2 inhalations once daily	83.7 21.6	
SALMETEROL	Serevent Evohaler €23.73	MDI	17	237	Slowly and steadily over 5 secs*/ very low	Asthma 25 micrograms / BD COPD 25 micrograms / 2 inhalations BD	2,133	
	Serevent Diskus €23.38	DPI	Low	8.7	Quickly and deeply within 2-3 secs/ Medium Low	Asthma 50 micrograms / BD COPD 50 micrograms / BD	78.3	

SHORT-ACTING BETA2-AGONISTS (SABA)

SALBUTAMOL	Large volume e.g Ventolin €2.46 (200 metered doses)	MDI	28	n/a	Slowly and steadily over 5 secs*/ very low	Asthma and COPD 100 micrograms / 1-2 inhalations up to 4 times daily	252 (Per inhaler)	
	Small volume e.g Salamol €2.96 (200 metered doses)	MDI	10	n/a	Slowly and steadily over 5 secs*/ very low	Asthma and COPD 100 micrograms / 1-2 inhalations up to 4 times daily	90 (per inhaler)	
	Salamol Easibreathe €7.95	Ba MDI	High 10	n/a	Breath activated- Slowly and steadily over 5 secs*/ very low	Asthma and COPD 100 micrograms / 1-2 inhalations up to 4 times daily	90 (per inhaler)	
	Ventolin Diskus €4.48	DPI	Low 1	n/a	Quickly and deeply within 2-3 secs/ Medium Low https://vimeo.com/138501838	Asthma and COPD 200 micrograms / 1 inhalation up to 4 times daily	9 (per inhaler)	
TERBUTALINE	Bricanyl Turbohaler €5.79	DPI	Low 1	n/a	Quickly and deeply within 2-3 secs/ Medium	Asthma and COPD 500 micrograms / 1 inhalation up to 4 times daily	9 (per inhaler)	

SHORT-ACTING ANTICHOLINERGICS (SAMA)

IPRATROPIUM	Atrovent €2.67	MDI	15	n/a	Slowly and steadily over 5 secs*/ very low	Asthma and COPD 20 micrograms / 1-2 inhalations up to 4 times daily	135	
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CO₂e = CO₂ equivalent, the universal unit for measuring the global warming potential (GWP) of various greenhouse gases expressed in terms of the GWP of own unit of carbon dioxide. >25kgCO₂e = **Very High**, 10-25kgCO₂e = **High**, approx 1kgCO₂e = **Low**

*All patients using a pMDI to take inhaled medications should be advised to use a spacer for both regular and emergency medications

<https://openres.ersjournals.com/content/4/2/0065-2018>
<https://greeninhaler.org/inhaler-comparison/>
<https://thorax.bmj.com/content/thoraxjnl/75/1/82.full.pdf>
https://erj.ersjournals.com/content/44/Suppl_58/4635.

Inspiratory Flow Measurements:

< 0.017-kPa.min/L = **Very Low**,
0.017 - 0.019-kPa.min/L = **Low**,
≥0.020 - 0.030-kPa.min/L = **Medium Low**,
≥0.031 - 0.039-kPa.min/L = **Medium**,
0.044-kPa.min/L = **Medium High**,
≥0.050-kPa.min/L = **High**

Abbreviations:

DPI Dry powder inhaler, SMI Soft mist inhaler, MDI Metred dose inhaler, BaMDI Breath actuated metred dose inhaler, kgCO₂/inhaler equivalent kilogram of carbon dioxide generated per inhaler

Reporting of annual carbon footprint

1. Published lifecycle analysis were used in the first instance and where not available published estimated were used.
2. Annual use estimated for 2 actuations per day where more than one actuation can be used.

Calculating Carbon Footprint: Average new car in 2017 produces 112gCO₂/km equating to 9km/kgCO₂(9)