

Aerogen®

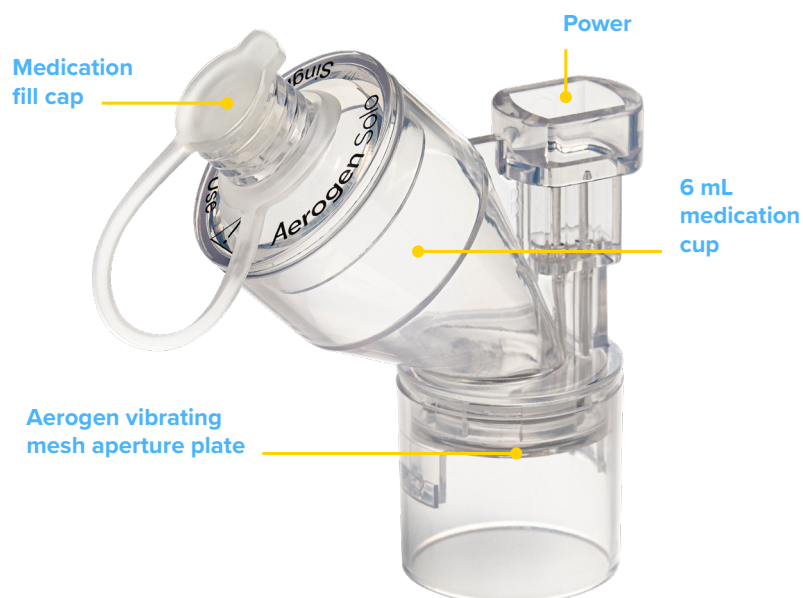
...for healthy lungs

Aerogen® products

Aerogen Solo

Single-patient-use device that facilitates aerosol drug delivery at every stage of a patient's respiratory journey (invasive mechanical ventilation, non-invasive ventilation, high-flow therapy and self-ventilation)²

- Aerogen is intended for the aerosolisation of physician-prescribed medications for inhalation that are approved for use with a general-purpose nebuliser²
- Quick and easy to set up²
- Virtually silent^{2,3}
- No added flow²
- Refill medication cup without opening the circuit²
- Single patient use²
- 28 days intermittent or 7 days continuous use²



Aerogen Ultra

- Innovative chamber design provides an aerosol reservoir intended for optimal drug delivery⁵
- Oxygen port enables optional delivery of oxygen⁵
- Extended mouthpiece⁺ to easily add bacterial or viral filter⁵
- Compatible with all standard aerosol/valved face masks⁵



Aerogen Continuous Nebulisation Tube Set

- Drop-by-drop precise medication control for continuous nebulisation²
- Works with most standard syringe pumps²



Aerogen Controllers

Powered by Aerogen Pro-X Controller² or Aerogen USB Controller⁴

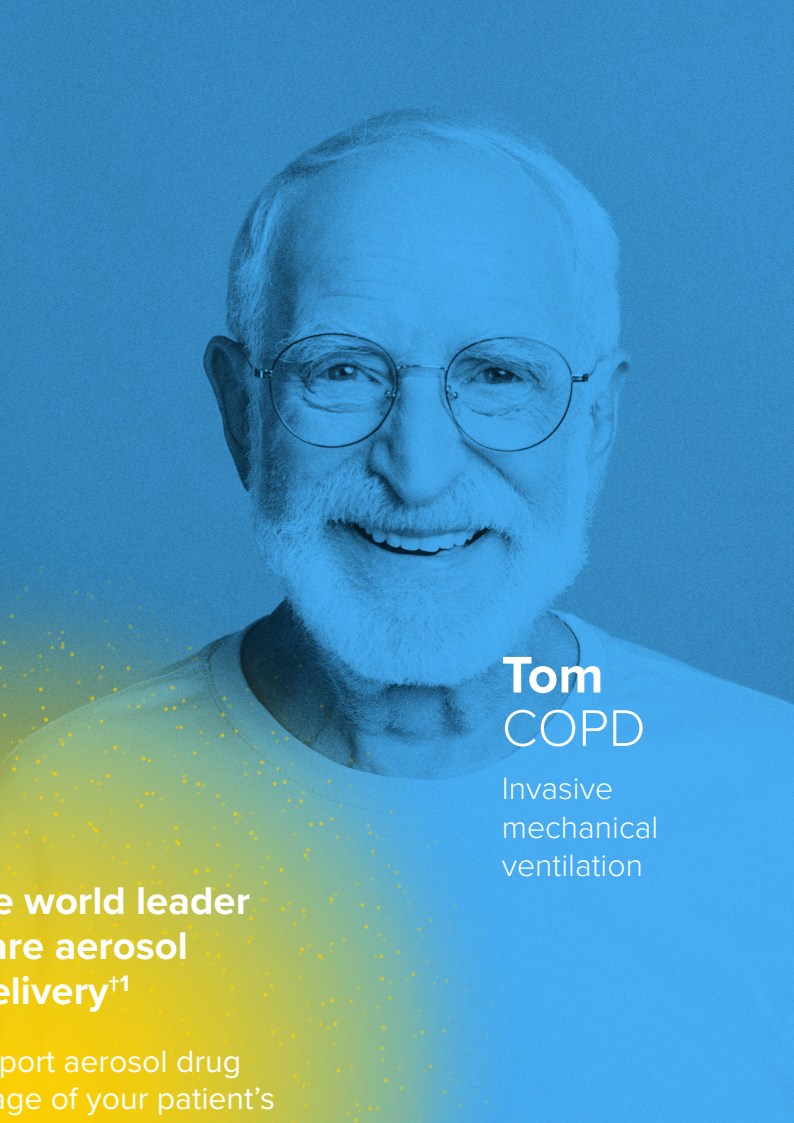
⁺The Aerogen Ultra with an extended mouthpiece is only available in selected regions, refer to the relevant instruction manual for your region to determine availability.



Clea

Upper respiratory
tract infection

High-flow therapy



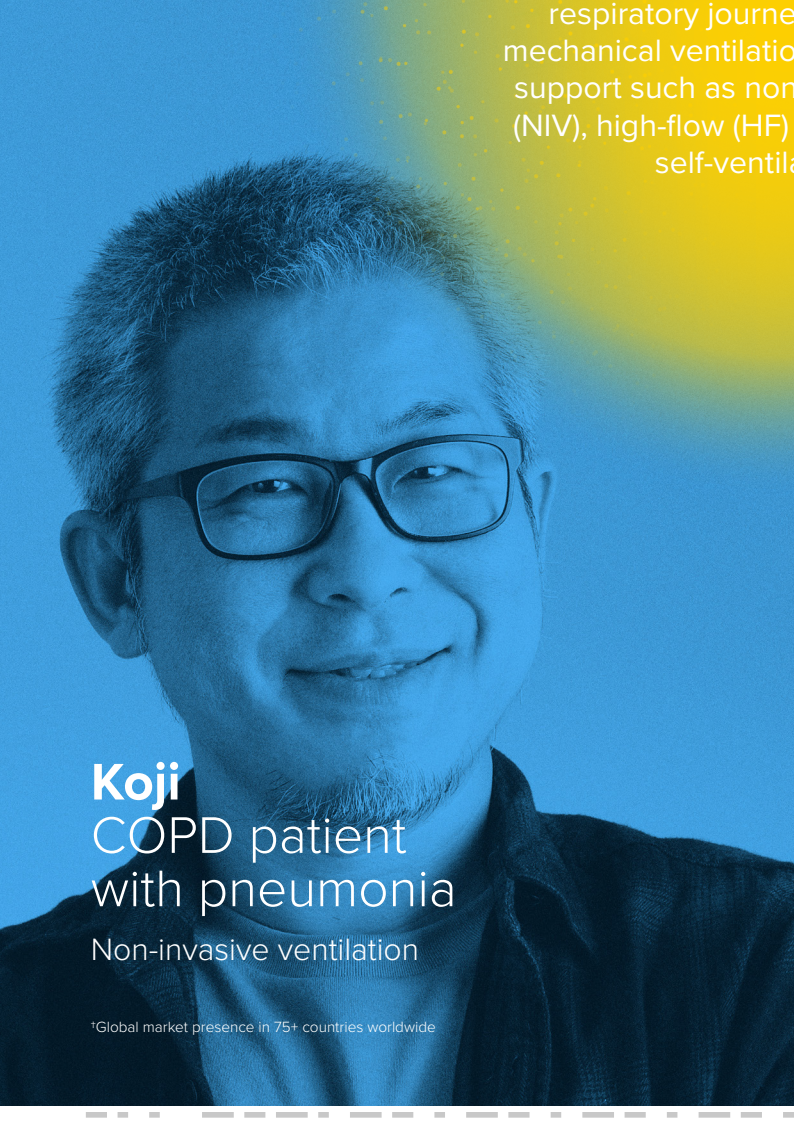
Tom

COPD

Invasive
mechanical
ventilation

**Aerogen is the world leader
in acute care aerosol
drug delivery^{†1}**

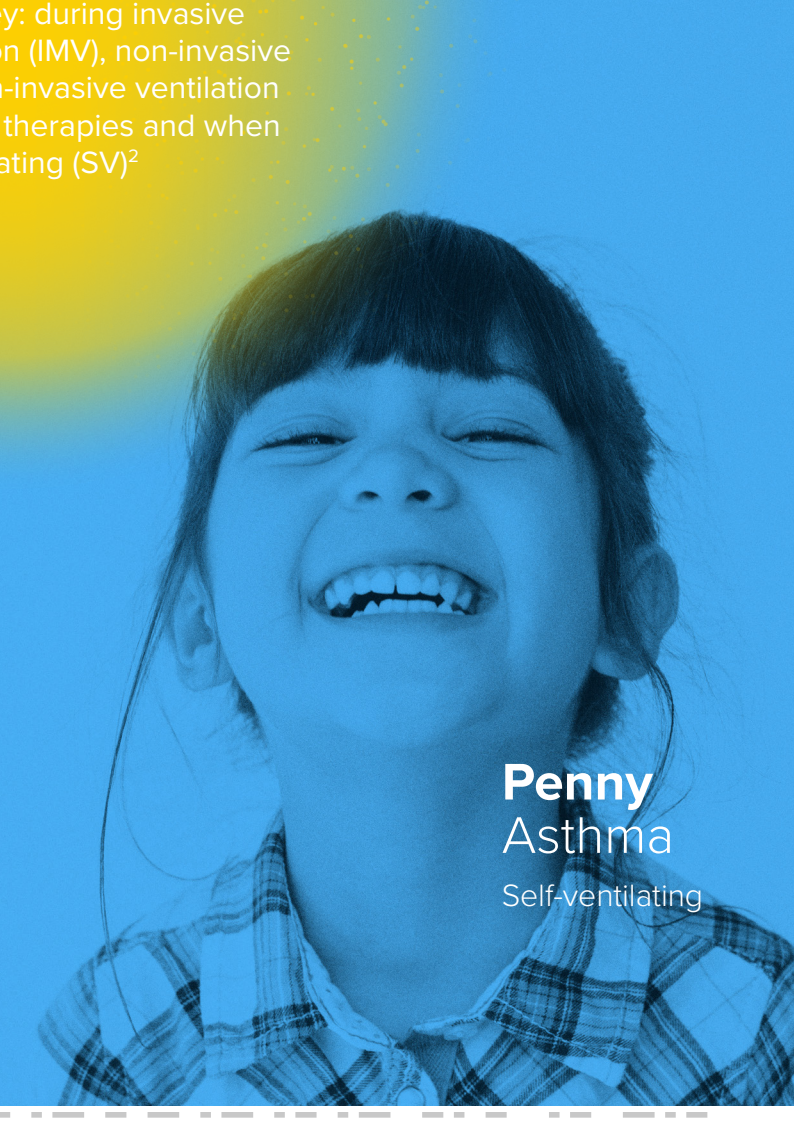
Aerogen can support aerosol drug
delivery at every stage of your patient's
respiratory journey: during invasive
mechanical ventilation (IMV), non-invasive
support such as non-invasive ventilation
(NIV), high-flow (HF) therapies and when
self-ventilating (SV)²



Koji

COPD patient
with pneumonia

Non-invasive ventilation



Penny

Asthma

Self-ventilating

^{†1}Global market presence in 75+ countries worldwide



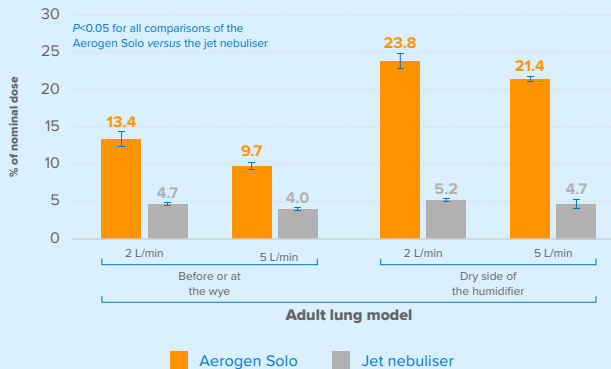
Invasive mechanical ventilation

Aerogen is a closed-circuit aerosol drug delivery system,^{2,6} which can help mitigate the release of fugitive aerosols during nebulisation.^{†6-9}



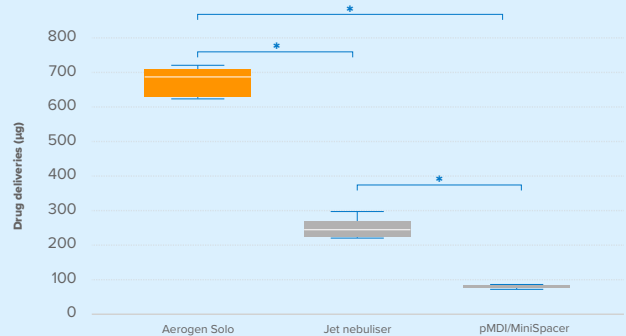
~4x more drug deposition compared with jet nebulisers^{†#10,#11}

Simulated invasive mechanical ventilation in an adult lung model^{†10}



8x higher drug delivery with Aerogen versus pMDI^{§12}

During simulated standard ventilation with passive humidification

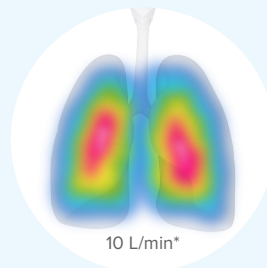


†Studies by Joyce et al and McGrath et al were performed in in-vitro models of mechanical ventilation and self-ventilation, respectively. †The jet nebuliser was placed 15 cm from the wye using standard aerosol tubing, while the Aerogen Solo was attached between the wye and the circuit. †In vitro model. §Aerosol drug delivery using standard adult settings during simulated mechanical ventilation with passive humidification (HMEF). Results are presented as mean ± SD µg drug delivered. *Denotes statistical significance at P<0.0001. †Representative scintigraphic image of aerosol lung deposition following aerosol drug delivery by Aerogen Solo in a postoperative neurosurgery patient with healthy lung function receiving pressure support ventilation.¹³

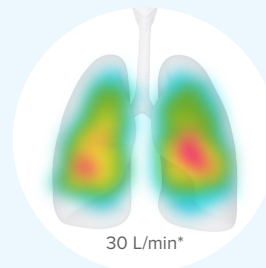


High-flow therapy

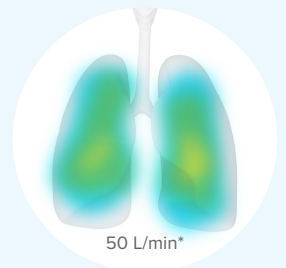
With Aerogen, integrated aerosol drug delivery is possible.² Aerogen fits in-line with no added flow and no interruption of therapy during administration of medication.²



10 L/min*



30 L/min*



50 L/min*

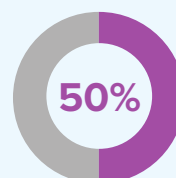
3.5–17% medication delivery to the lungs, depending on flow rates^{†14}

71%

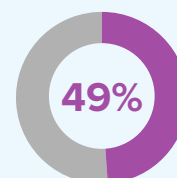
of the 248 clinician respondents who preferred to place the nebuliser in-line within the high-flow circuit did so to **maintain the benefits of high-flow**^{†15}

Benefits of in-line aerosol drug delivery as perceived by clinicians who place a nebuliser in-line within the HF circuit (n=177)^{†15}

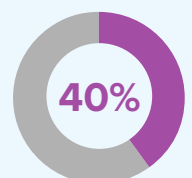
Clinician respondents



Better comfort



More efficiency



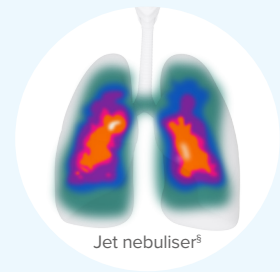
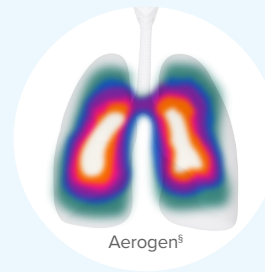
More convenience

†Study performed in healthy subjects. †Survey of worldwide clinical practice of high-flow and concomitant aerosol therapy in the adult ICU setting. Conventional aerosol therapy consisted of a vibrating mesh nebuliser, ultrasonic nebuliser or jet nebuliser used with a facemask. †Representative scintigraphy images of pulmonary deposition across different flow rates (10, 30 and 50 L/min) in healthy adults.¹⁴



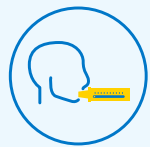
Non-invasive ventilation

Aerogen effectively delivers aerosol medication to your patients during non-invasive ventilation.^{2,†16,‡17}



~4x more medication delivered to the lungs compared with jet nebulisers^{†16,‡17}

Significant improvements in lung function (FEV₁, FVC, breathlessness score, RR, and PaCO₂) *versus* jet nebulisers during acute exacerbations of COPD^{†18}



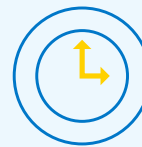
FEV₁
+165 vs +116 mL
at 120 min
(*P*=0.001)



FVC
+394 vs +123 mL
at 120 min
(*P*<0.001)



Borg dyspnoea score
4.4 vs 5.3
at 120 min
(*P*=0.007)



Respiratory rate
19.7 vs 21.2 BPM
at 120 min
(*P*=0.001)



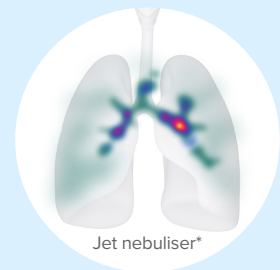
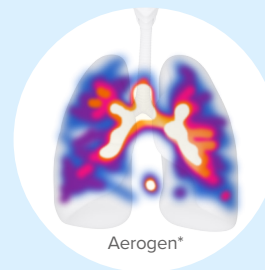
PaCO₂
47.3 vs 56.1 mm Hg
at 120 min
(*P*=0.004)

[†]Study performed in healthy subjects. [‡]Study performed in stable subjects with moderate-to-severe COPD. [§]Aerosol delivery via BIPAP. Graphic representations of scintigraphic images during nebulisation with non-invasive ventilation using a jet nebuliser and Aerogen in healthy adults. ¹⁶ ¹⁷Between-group difference in change from baseline to 120 minutes in patients with acute exacerbation of COPD.



Self-ventilating

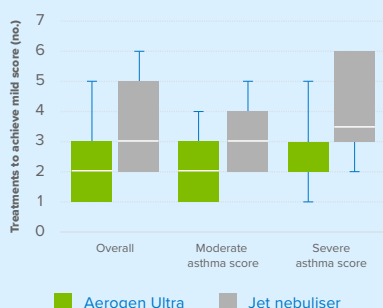
Aerogen effectively delivers aerosol medication to your self-ventilating patients requiring symptom control for respiratory exacerbations.^{19,20,‡21,‡22}



6x more drug deposition when self-ventilating *versus* jet nebulisers^{‡21}

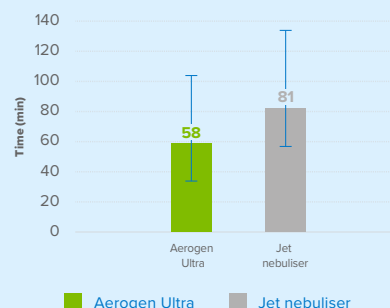
In a study of children with moderate-to-severe asthma exacerbation receiving bronchodilator therapy¹⁹

Significantly fewer treatments required to achieve symptom control[§] with Aerogen Ultra *versus* a jet nebuliser, irrespective of disease severity.



Median (IQR) number of treatments:
2 (1–3) vs 3.0 (2–5);
P<0.001

Significantly less time required to achieve symptom control[§] with Aerogen Ultra *versus* a jet nebuliser.



Median (IQR) time:
58 min (33–103)
vs 81 min (56–133);
P=0.004

[†]Study performed in healthy subjects; between-group difference: 341% vs 5.2%; *P*<0.001. [‡]In-vitro/ex vivo models. [§]Defined as achieving a mild asthma score following an asthma exacerbation. ^{*}Representative scintigraphic images of aerosol lung deposition in a healthy male subject.²¹

Your Aerogen contact

Name
Phone
Email

COPD, chronic obstructive pulmonary disease; ETT, endotracheal tube; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; HF, high-flow; HMEF, heat and moisture exchanging filter; IMV, invasive mechanical ventilation; IQR, interquartile range; NIV, non-invasive ventilation; PaCO₂, partial pressure of carbon dioxide; pMDI, pressurised metered dose inhaler; RR, respiratory rate; SD, standard deviation; SV, self-ventilating.

1. Aerogen data on file, January 2023. **2.** 30-354 Rev U Aerogen Solo System Instruction Manual. **3.** Royal National Institute for Deaf People (RNID). How loud is too loud? <https://rnid.org.uk/information-and-support/ear-health/protect-your-hearing/how-loud-is-too-loud/>. Accessed October 10, 2023. **4.** 30-763 Rev H Aerogen USB Controller System Instruction Manual. **5.** 30-1487 Rev A Aerogen Ultra Instruction Manual. **6.** Joyce M, McGrath JA, Mac Giolla Eain M, et al. *Pharmaceutics*. 2021;13(2):199. **7.** McGrath JA, O'Sullivan A, Bennett G, et al. *Pharmaceutics*. 2019;11(2):75. **8.** Harnois LJ, Alolaiwat AA, Jing G, et al. *Respir Care*. 2022;67(4):394-403. **9.** Li J, A Alolaiwat A, J Harnois L, Fink JB, Dhand R. *Respir Care*. 2022;67(4):404-414. **10.** Ari A, Atalay OT, Harwood R, et al. *Respir Care*. 2010;55(7):845-851. **11.** Ari A, Areabi H, Fink JB. *Respir Care*. 2010;55(7):837-844. **12.** Naughton PJ, Joyce M, Mac Giolla Eain M, et al. *Pharmaceutics*. 2021;13(10):1574. **13.** Dugernier J, Reyckler G, Wittebole X, et al. *Ann Intensive Care*. 2016;6(1):73. **14.** Alcoforado L, Ari A, Barcelar JM, et al. *Pharmaceutics*. 2019;11(7):320. **15.** Li J, Tu M, Yang L, et al. *Respir Care*. 2021;66(9):1416-1424. **16.** Galindo-Filho VC, Ramos ME, Rattes CS, et al. *Respir Care*. 2015;60(9):1238-1246. **17.** Galindo-Filho VC, Alcoforado L, Rattes C, et al. *Respir Med*. 2019;153:60-67. **18.** Avdeev S, Nuralieva G, Soe AK et al. *J Aerosol Med Pulm Drug Deliv*. 2021;34(6):358-365. **19.** Moody GB, Luckett PM, Shockley CM, et al. *Respir Care*. 2020;65(10):1451-1463. **20.** Dunne RB, Shortt S. *Am J Emerg Med*. 2018;36(4):641-646. **21.** Dugernier J, Hesse M, Vanbever R, et al. *Pharm Res*. 2017;34(2):290-300. **22.** Lin HL, Fang TP, Cho HS, et al. *Pulm Pharmacol Ther*. 2018;48:225-231.

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