Supplementary Data:

**Table 1.** Aerosol drug delivery using a VMN in a simulated spontaneously breathing adult patient with LFNO. Results are presented as mean ± SD (%) inhaled dose.

| LFNO gas flow rate (LPM) | VMN via cannula | VMN/aerosol chamber at 0 LPM | VMN/aerosol chamber at 2 LPM | VMN/aerosol chamber at 6 LPM | P-Value |
|--------------------------|-----------------|-----------------------------|-----------------------------|-----------------------------|---------|
| 0                        | N/A             | 29.83 ± 0.96                | 30.47 ± 0.85                | 17.44 ± 0.18                | < 0.001 |
| 2                        | 7.72 ± 0.23     | 29.76 ± 1.06                | 31.44 ± 1.33                | 22.07 ± 1.05                | < 0.001 |
| 3.5                      | 13.34 ± 0.58    | 29.39 ± 1.23                | 29.36 ± 1.84                | 18.74 ± 0.51                | < 0.001 |
| 5                        | 12.26 ± 0.86    | 25.91 ± 1.35                | 26.30 ± 1.07                | 16.80 ± 0.60                | < 0.001 |
| 7.5                      | 7.48 ± 0.57     | 18.44 ± 1.04                | 25.36 ± 1.79                | 16.60 ± 0.39                | < 0.001 |
| 10                       | 4.72 ± 0.37     | 9.40 ± 0.89                 | 18.26 ± 0.66                | 13.14 ± 0.88                | < 0.001 |

**Table 2.** Aerosol drug delivery using a VMN in a simulated spontaneously breathing adult patient with HFNO. Results are presented as mean ± SD % inhaled dose.

| HFNO gas flow rate (LPM) | VMN/nebuliser adapter | VMN/aerosol chamber at 0 LPM | VMN/aerosol chamber at 2 LPM | VMN/aerosol chamber at 6 LPM | P-Value |
|--------------------------|------------------------|-----------------------------|-----------------------------|-----------------------------|---------|
| 10                       | 15.72 ± 0.21           | 4.27 ± 0.90                 | 21.33 ± 1.48                | 24.29 ± 0.39                | < 0.001 |
| 30                       | 5.80 ± 0.41            | 0.51 ± 0.11                 | 10.26 ± 0.86                | 6.99 ± 0.44                 | < 0.001 |
| 50                       | 2.03 ± 0.12            | 0.51 ± 0.09                 | 0.64 ± 0.18                 | 0.67 ± 0.11                 | < 0.001 |
| 60                       | 1.37 ± 0.18            | 0.47 ± 0.04                 | 0.53 ± 0.08                 | 0.77 ± 0.22                 | < 0.001 |