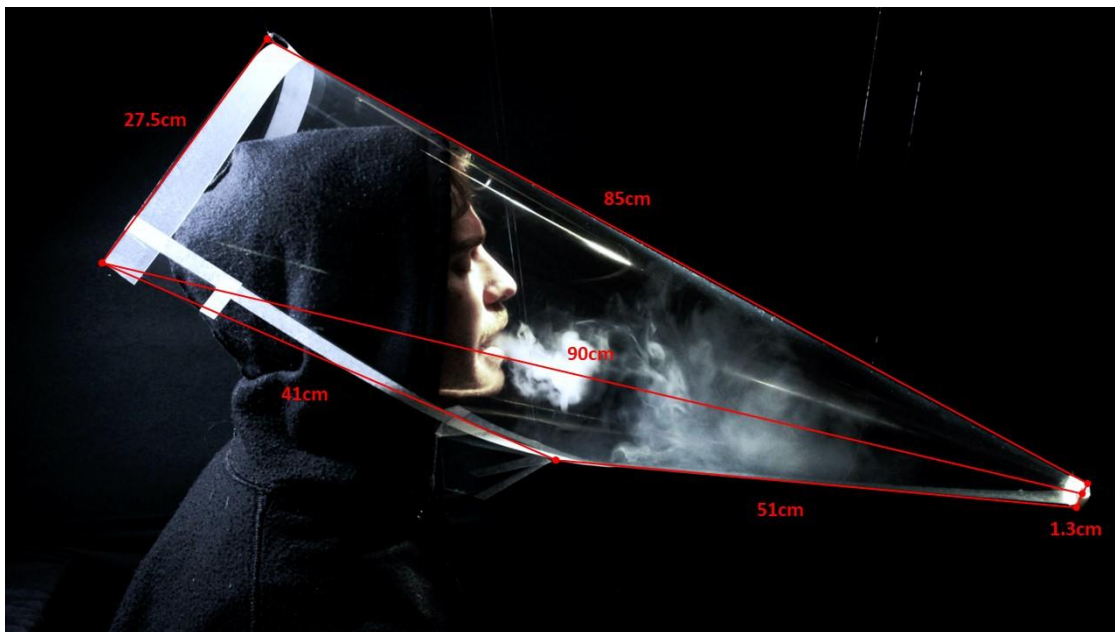




Figure S3.1 – Photograph taken of a subject within the aerosol measuring chamber during the sampling protocol. Note, backwall made of electret material, Perspex walls, experimental sampling cone composed of electrically conductive aluminium coated cardboard, polypropene hooded jacket worn by subject.



S3.2 - Subject observed within the replica Perspex cone exhaling visible aerosols during post hoc study. Red lines annotate cone dimensions. Exhaled gases observed to be almost entirely sampled during talking as shown above. (1:25:08*)



S3.3 - High efficiency of particle capture during breathing receiving HFNO at $60\text{L}\cdot\text{min}^{-1}$ flow. Despite high exhaled gas dispersal due to HFNO flow, the large cone and high sample rate sampling maintains high sampling efficiency (2:55:05*).

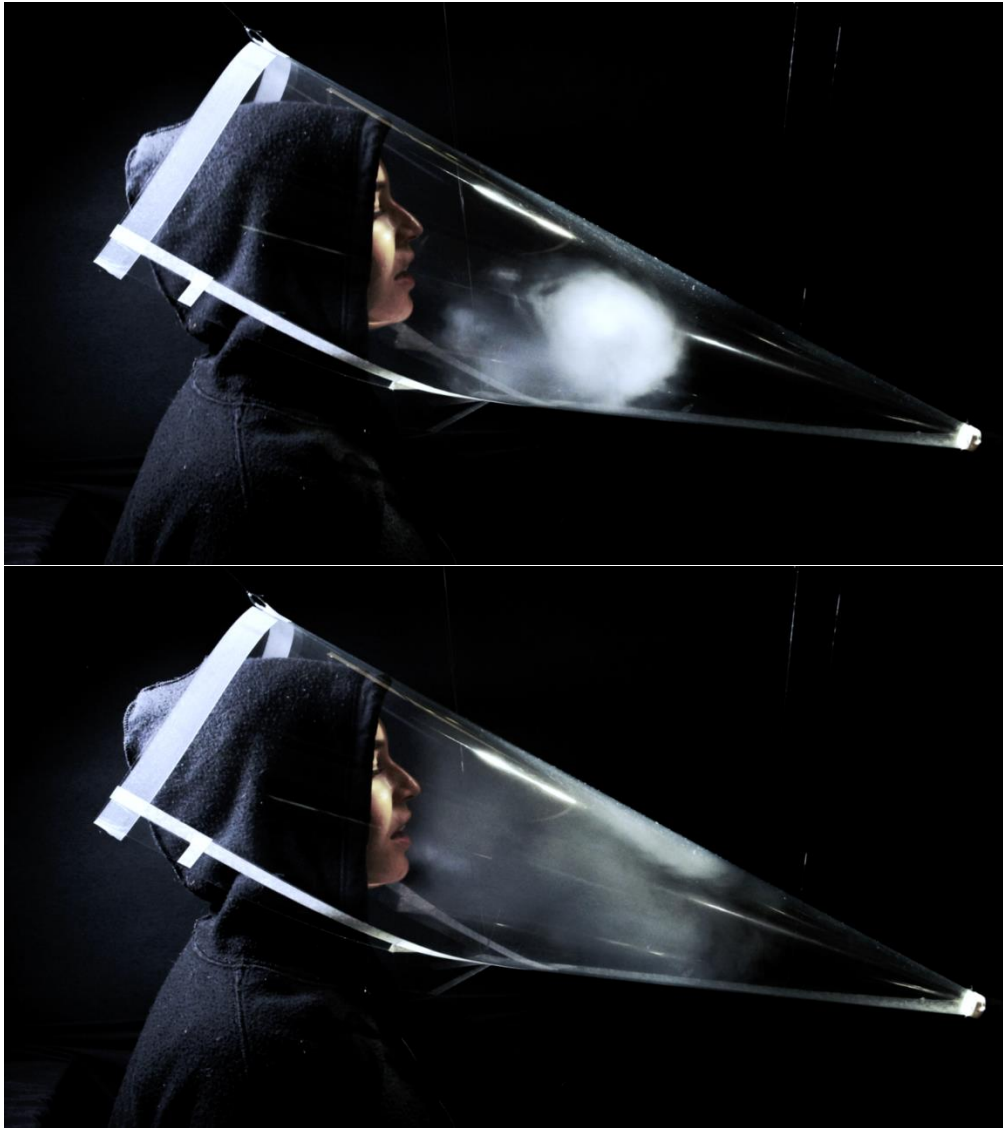


S3.4 - High efficiency of particle capture during closed limb NIPPV-D IPAP/EPAP pressure 25/10 cmH₂O. Note leakage via the facemask anti-asphyxia valve. (3:08:17*)



S3.5 - High efficiency of particle capture during open limb NIPPV-S breathing IPAP/EPAP pressure 25/10 cmH₂O. Two exhalation plumes visible, the first via anti-asphyxia valve near to mask, the second via the open expiratory port towards bottom of picture (3:41:08*)





S3.6 A-D - Series of 4 images during the early phase of a cough recorded over 110 milliseconds. High velocity nebulous cough plume visible which undergoes rapid turbulent mixing within the cone (1:45:05; 1:45:08; 1:45:11; 1:45:16*).



S3.7 – Image from 4 seconds following a cough. High velocity gas is observed to be deflected backwards and an unquantified proportion is ejected from the rear of the cone. (1:49:06*)



S3.8 - As observed during cough, the velocity and volume of cough and FEV exceed the volume and rate of sampling leading to loss of exhaled particles from the rear of cone during FEV. This suggests under-sampling during both cough and FEV despite the high sampling rate and large cone (1:38:23*)



S3.9 - Talking demonstrated deflection around the mask, which is subsequently captured on an upward thermal plume of body heat and carried upwards and out of the cone (2:19:27*).



S3.10 – Considerable quantities of high velocity exhaled gas is observed deflecting backwards following a cough (2:42:10*)

*Images obtained from Video S1 Visible Exhaled Aerosol Airflow study. Provided is the timing of the photo displayed in the video.