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Supplemental information

**Hydrating the respiratory tract: An alternative explanation why masks
lower severity of COVID-19**

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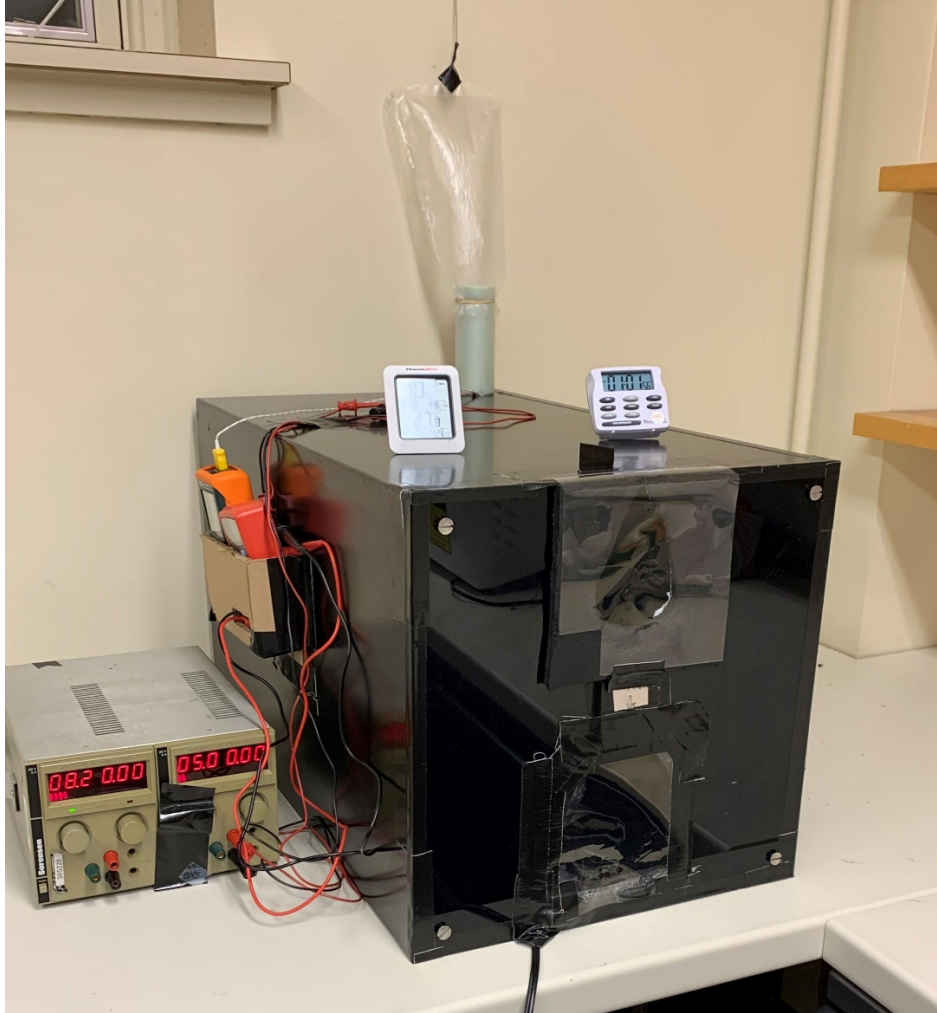


FIGURE S1. Breathing chamber used for humidity measurements. The steel chamber has a plastic front panel with two sealable openings. The upper opening is shaped to optimally fit the face of the volunteer and is lined with high density foam rubber to make a tight seal with the face. For purging the chamber, a fan is mounted outside the chamber in front of the bottom hole. The polyethylene bag at the top of the box is connected to the interior by a short piece of high-density pipe insulation and accommodates the change in gas volume associated with breathing into the box. Thermocouple and temperature sensor leads enter the chamber along the flexible pipe insulation.

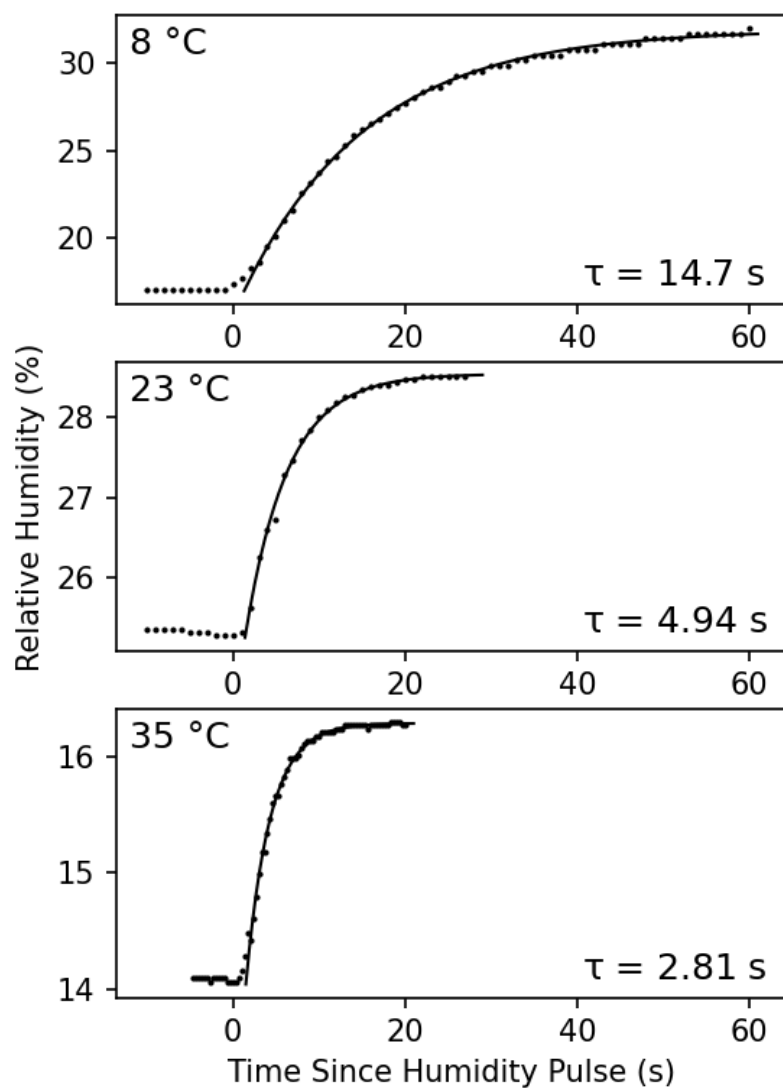


FIGURE S2. Humidity sensor response to a step-increase in humidity at time zero, recorded at three different temperatures. The solid lines correspond to mono-exponential fits to the step-elevated humidity of the chamber, preceded by a 1.4-s delay that is attributed to the time required for mixing of the air by the internal fan. The time constants are indicated in each panel.



FIGURE S3. Four masks used for humidity measurements. From to top bottom: 3M 9205 N95 mask; NIH stockroom surgical mask; NIH stockroom polyester-cotton blend two-ply cloth mask; double-ply 100% cotton mask, purchased online from <https://mandalascrubs.com/products/face-mask>

TABLE S1. Temperature and humidity sensor readings before and after pseudo-tidal breathing. Voltages and temperatures after breathing were taken after stabilization.

MASK	LOCATION	RUN	TEMPERATURE (°C) BEFORE	SENSOR VOLTAGE (V) BEFORE	TEMPERATURE (°C) AFTER	SENSOR VOLTAGE (V) AFTER
NONE	cold room	1	7.7	1.20	7.8	2.35
NONE	cold room	2	7.7	1.20	7.8	2.30
NONE	cold room	3	7.7	1.20	7.8	2.35
SURGICAL	cold room	1	7.7	1.20	7.8	1.96
SURGICAL	cold room	4	7.7	1.20	7.6	1.92
SURGICAL	cold room	5	7.7	1.20	7.6	1.94
LIGHT CLOTH	cold room	1	7.7	1.20	7.6	1.91
LIGHT CLOTH	cold room	2	7.7	1.20	7.6	1.90
LIGHT CLOTH	cold room	3	7.7	1.20	7.8	1.89
N95	cold room	1	7.7	1.20	7.8	1.8
N95	cold room	2	7.7	1.20	7.9	1.81
N95	cold room	3	7.7	1.20	7.8	1.78
HEAVY COTTON	cold room	4	7.3	1.20	7.2	1.55
HEAVY COTTON	cold room	2	7.7	1.20	7.8	1.57
HEAVY COTTON	cold room	3	7.7	1.20	7.9	1.55
NONE	office	2	22.3	1.62	22.9	2.32
NONE	office	3	22.1	1.61	22.65	2.335
NONE	office	4	22.1	1.62	22.6	2.33
SURGICAL	office	1	22.1	1.62	22.6	2.20
SURGICAL	office	2	22.1	1.62	22.6	2.21
SURGICAL	office	3	22.1	1.62	22.4	2.20
LIGHT CLOTH	office	1	22.1	1.62	22.4	2.105
LIGHT CLOTH	office	2	22.1	1.61	22.6	2.11
LIGHT CLOTH	office	3	22.1	1.61	22.6	2.11
N95	office	1	22.1	1.61	22.6	2.09
N95	office	4	22.2	1.61	22.4	2.09
N95	office	5	22.0	1.61	22.4	2.09
HEAVY COTTON	office	2	21.9	1.61	22.4	1.95
HEAVY COTTON	office	3	22.1	1.61	22.5	1.90
HEAVY COTTON	office	4	22.0	1.60	22.4	1.95
NONE	hot room	1	38.4	1.20	38.6	1.53
NONE	hot room	2	37.5	1.20	37.9	1.52
NONE	hot room	3	37.9	1.20	37.9	1.52
SURGICAL	hot room	1	37.7	1.21	38.2	1.43
SURGICAL	hot room	2	37.6	1.21	38.2	1.44
SURGICAL	hot room	4	37.2	1.20	37.7	1.45

LIGHT CLOTH	hot room	2	37.2	1.20	37.3	1.39
LIGHT CLOTH	hot room	3	37.2	1.20	37.9	1.37
LIGHT CLOTH	hot room	4	37.2	1.21	37.6	1.40
N95	hot room	1	37.4	1.21	37.6	1.45
N95	hot room	2	37.0	1.21	37.4	1.44
N95	hot room	3	37.1	1.20	37.2	1.44
HEAVY COTTON	hot room	1	37.0	1.21	37.5	1.33
HEAVY COTTON	hot room	2	37.4	1.20	37.4	1.33
HEAVY COTTON	hot room	3	37.5	1.02	37.7	1.33