Supplemental Online Content

eMethods.

This supplemental material has been provided by the authors to give readers additional information about their work.

eMethods

As the population in the Southwest of Germany, where the study was conducted, is rather homogeneous, ethnicity was not considered for recruitment. The measurements were taken by an automated device (G100 CO_2 incubator analyzer, Geotech, Leamington Spa, UK; measurement range: 0 – 20 vol %; accuracy ± 1% of measurement range after calibration, dual wavelength infrared measurement every second) through a measurement tube fixed to the face of the child, between lips and nose, about 1,5 cm distant from the nostrils. Each child was provided with a fresh set of masks. Masks of various producers were used: KN95 Respirator FFP2 by Jiandi (CE EN 149:2001+A1:2009), particle filtering half-masks for children (FFP2 LS9688 FFPS; CE 0370 EN149:2001 + A1:2009) by MPG Healthcare, MNS surgical mask 3 layered type II (CE EN 14683) by Schaeffer and One-way mask for children by ToyTrade (no CE) in order to avoid any effects specific for certain types of masks. The sequencing of the masks, surgical or FFP2 masks, was randomized. Randomization was performed by someone independent of the measurement team using randomizer.org and producing cards with the sequence written on a paper strip which was put into opaque sealed envelopes, with the sequence number and the category of the two strata, of younger children with age ≤ 10 and older, written on it. During each experiment the room was well ventilated several times and control measurements were taken of the CO_2 content of ambient air several times during each measurement with a second measurement device (PCE-CMM 10 by PCE; measurement range 400ppm – 5.000ppm, resolution 1ppm). CO_2 content was always kept well under 1.000 ppm or 0,1 volume %.

CO_2 measurements were averaged for each 3-minute period (Baseline pre; joint inhaled and exhaled air under FFP2, inhaled air under FFP2, exhaled air under FFP2; joint inhaled and exhaled air under surgical mask, inhaled air under surgical mask, exhaled air under surgical mask, post baseline). Data were analyzed using linear models with a within factor, as preconditions for linear modeling were met. Since some of the post-baseline data were missing and there was no statistical difference between pre- and post-baseline, we used pre-baseline data only. As there was no sequence effect, we did not enter the sequence of the masks as a factor into the model. We checked model fit and violation of the linearity assumption by inspecting normal-probability plots and residuals and found that the model describes the data well. All analyses were calculated with Statistica 13.3.