

Correction to Practical Indicators for Risk of Airborne Transmission in Shared Indoor Environments and Their Application to COVID-19 Outbreaks

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We have identified an error on some of the calculations shown in Table 2c of the paper. This is only significant for a few cells on the bottom right corner (dark red) and it reduces the risk of infection at those locations. However, it does not change the numerical or color trends on the table, and those locations continue to have the highest risk. The error does not affect anything else on the paper or any of the conclusions.

The calculation of the *absolute* probability of infection for one susceptible individual present (P_a) in Table 2c in the original paper was based on a simplified use of the expected value of the number of infectors (N_i), that is, the product of number of occupants (N) and probability of an occupant being infectious (η_i). Then the expected value of inhaled quanta by a susceptible individual is $\eta_i E_{p0} B_0 H$, where E_{p0} and B_0 are the basic quanta emission rate and the basic volumetric breathing rate, respectively, and H is the risk parameter. In the form of the Wells-Riley model, P_a can be expressed as the following function of H :

$$P_a \cong 1 - \exp(-\eta_i E_{p0} B_0 H) \quad (C1)$$

Equation 16 in the original paper is an approximate form of eq C1 when $\eta_i E_{p0} B_0 H$ is small.

Equation C1 works well for most values in Table 2c of the original paper. However, under highly risky conditions (high H_r , that is., relative infection risk parameter), the approximation in eq C1 becomes less accurate. Specifically, P_a estimated through eq C1 may exceed the probability of presence of infector(s) at a given indoor location, for highly risky situations.

We present the rigorous calculation of P_a as follows:

$$P_a = 1 - (1 - \eta_i P)^{N-1} \quad (C2)$$

where P is the probability of infection (of one susceptible person present) *conditional* to the presence of one infector and can be calculated as a function of H_r per eq 9 of the original

paper. When it is unknown whether one or more infectors are present, $\eta_i P$ is the probability of a susceptible individual being infected by another specific occupant, and $(1 - \eta_i P)$ the corresponding noninfection probability. Then $(1 - \eta_i P)^{N-1}$ is the probability of the susceptible individual not being infected by any other occupant and $1 - (1 - \eta_i P)^{N-1}$ the absolute probability of infection.

We apply eq C2 to update Table 2c of the original paper. The new Table 2c is shown below.

Compared to the original table, changes in most values in the updated Table 2c are minor and the cell colors almost the same. As indicated in the original paper the table should be understood by noting “that significant uncertainties remain in the parameters for the table (which are for the wild-type SARS-CoV-2) and that the colors should be interpreted in relative terms.” Only the few values related to poor ventilation, prolonged contact time, and high-risk activities (shouting, singing, and heavy exercise) are substantially lower in this updated version of the table compared to the original one (but still indicate high risks). This difference does not affect any conclusions or text in the original paper. The corresponding table in the online COVID-19 Aerosol Transmission Estimator (<https://tinyurl.com/covid-estimator>) has also been updated. We apologize for any confusion that this error may have caused to readers.

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Table 2. (c) Estimated Attack Rate When 0.1% of the Local Population Are Infectious

Type and level of group activity	Low occupancy			High occupancy		
	Outdoor and well ventilated	Indoor and well ventilated	Poorly ventilated	Outdoor and well ventilated	Indoor and well ventilated	Poorly ventilated
Wear face coverings, contact for short time						
Silent	<0.001%	0.001%	0.002%	<0.001%	0.003%	0.008%
Speaking	<0.001%	0.004%	0.010%	<0.001%	0.015%	0.039%
Shouting, singing	<0.001%	0.023%	0.06%	0.001%	0.09%	0.23%
Heavy exercise	0.001%	0.053%	0.13%	0.003%	0.20%	0.50%
Wear face coverings, contact for prolonged time						
Silent	<0.001%	0.009%	0.049%	<0.001%	0.035%	0.19%
Speaking	0.001%	0.045%	0.22%	0.002%	0.17%	0.83%
Shouting, singing	0.003%	0.24%	0.73%	0.013%	0.90%	2.7%
Heavy exercise	0.008%	0.46%	0.88%	0.030%	1.7%	3.3%
No face coverings, contact for short time						
Silent	<0.001%	0.002%	0.006%	<0.001%	0.008%	0.022%
Speaking	<0.001%	0.011%	0.029%	0.001%	0.042%	0.11%
Shouting, singing	0.001%	0.065%	0.16%	0.004%	0.24%	0.61%
Heavy exercise	0.002%	0.14%	0.33%	0.008%	0.54%	1.2%
No face coverings, contact for prolonged time						
Silent	<0.001%	0.026%	0.13%	0.001%	0.10%	0.50%
Speaking	0.002%	0.12%	0.50%	0.006%	0.46%	1.9%
Shouting, singing	0.010%	0.52%	0.89%	0.036%	2.0%	3.3%
Heavy exercise	0.022%	0.78%	0.90%	0.084%	2.9%	3.3%

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