

## Supplemental Online Content

Allen JG, Ibrahim AM. Indoor air changes and potential implications for SARS-CoV-2 transmission. *JAMA*. Published online April 16, 2021. doi:10.1001/jama.2021.5053

**eTable.** Minimum Air Changes per Hour (ACH) According to Current Design Standards by Building Type

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

eTable. Minimum Air Changes per Hour (ACH) According to Current Design Standards by Building Type

Building type	Minimum required ACH	ASHRAE guideline <sup>7</sup>
US homes		
Single-family home	0.32 <sup>a</sup>	62.1-2019
Multifamily unit	0.35 <sup>b</sup>	
Retail <sup>c</sup>	1.7 <sup>d</sup>	62.1-2019
Banks	1.3 <sup>d</sup>	62.1-2019
Barbershops	1.9 <sup>d</sup>	62.1-2019
School classrooms		
Students 5-8 years	2.8 <sup>d</sup>	62.1-2019
Students ≥9 years	3.5 <sup>d</sup>	
Airplane cabins	7-17 <sup>e</sup>	161-2018
Hospitals		
Patient rooms	4-6 total; 2 of outdoor air <sup>f</sup>	170-2017
Emergency examination or treatment rooms	6 total; 2 of outdoor air <sup>f</sup>	
Airborne infection isolation rooms	12 total; 2 of outdoor air <sup>f</sup>	
Operating rooms	20 total; 4 of outdoor air <sup>f</sup>	

Abbreviations: ASHRAE, American Society of Heating, Refrigerating and Air-Conditioning Engineers; HEPA, high-efficiency particulate air; MERV, minimum efficiency reporting value.

<sup>a</sup>Assumes home size of 2301 square feet, 8-foot ceilings, 3 bedrooms, and default occupancy from ASHRAE.

<sup>b</sup>Assumes home size of 1350 square feet, 8-foot ceilings, 2 bedrooms, and default occupancy from ASHRAE.

<sup>c</sup>Retail refers to locations where general sales occur, not including barbershops, beauty and nail salons, coin-operated laundries, mall common areas, pet shops (animal areas), and supermarkets.

<sup>d</sup>Assuming default ceiling height of 8 ft and default occupant densities from ASHRAE.

<sup>e</sup>Total air supply consists of outside air and recirculated air through HEPA filters; estimated ACH listed here based on an application of ASHRAE 161-2018 to cabin dimensions and typical and maximum passenger loads of 3 commercial airplanes.

<sup>f</sup>Total air refers to outdoor air plus recirculated air, where recirculated air passes through MERV 14 filters.