Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the Editor

Regarding "Understanding the 'Scope' of the Problem: Why Laparoscopy Is Considered Safe during the COVID-19 Pandemic"

To the Editor:

First of all, thanks to the authors for this nice and clear paper. Whether laparoscopic surgery is safe during the coronavirus 2019 pandemic is a matter of actual debate [1], and it is important for the surgical community to share solid information regarding operating room technology.

We will just briefly comment on the use of high-efficiency particulate arrestance (HEPA) and ultralow particulate arrestance filters because many papers report the wrong assumption that HEPA filters can only filter particles of 0.3 μm or above in diameter. This is an important issue because solid or liquid particulate matter in the air, especially below 2.5 μm in diameter, is able to enter the bloodstream and can affect our health.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) particles range in size from 0.06 μm to 0.125 μm, falling squarely within the particle size range that HEPA filters capture with extraordinary efficiency: 0.01 μm and above [2]. It is incorrect to state that HEPA filters are not able to catch particles below 0.3 μm, such as those of SARS-CoV-2.

This belief is based on a misunderstanding of how HEPA filters work. The particle size of 0.3 μm is used as a standard to measure the effectiveness of HEPA filters, but this does not mean that they are not able to catch smaller particles. A paper from the National Aeronautics and Space Administration [3] explains well that HEPA filters are highly effective in capturing a very high proportion, up to 100%, of nanoparticulate contaminants, ranging in size from 0.1 μm to 0.001 μm (diffusion regime), because they do not fly in a straight line but collide with other fast-moving molecules and move around in random pathways. This is known as Brownian movement. When they strike the filter fibers they remain stuck in them. The intersecting regime has just a small drop in efficiency that affects particles of approximately 0.3 μm, defined as the most penetrating particle size. This value for a typical HEPA filter varies from 0.2 μm to 0.3 μm, depending on the flow rate, and when the flow speed is lowered, a simple HEPA filter will perform as an ultralow particulate arrestance filter.

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References

1. Morris SN, Fader AN, Milad MP, Dionisi HJ. Understanding the "Scope" of the problem: why laparoscopy is considered safe during the COVID-19 pandemic. *J Minim Invasive Gynecol*. 2020 Apr 3. [Epub ahead of print].
2. First MW. HEPA filters. *Appl Biosaf*. 1998;3(1):33–42.
3. Perry JL, Agui JH, Vijayakumar R. Submicron and nanoparticulate matter removal by HEPA-rated media filters and packed beds of granular materials. Available at: https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20170005166.pdf. Accessed April 6, 2020.

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