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.

their worth in preventing both onwards transmission and more widespread restrictive interventions.

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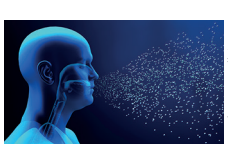
Aerosol generating procedures: are they of relevance for transmission of SARS-CoV-2?

It is now generally accepted that SARS-CoV-2 can be spread by aerosols as well as larger droplets from the upper respiratory tract, although the relative importance of aerosol transmission remains incompletely answered.[1] Despite this, current UK infection control guidance for hospitals is centred on the premise that aerosols are only generated by specific medical interventions designated as aerosol generating procedures (AGPs).[2] This draws from epidemiological observations during the 2003 outbreak of severe acute respiratory syndrome, during which certain procedures appeared to be associated with an increased risk of staff infection (particularly tracheal intubation), and these procedures had a theoretical risk of viral aerosolisation.[3] However, the evidence supporting aerosolisation during these procedures was, before the pandemic, remarkably slim, with aerosolisation being assumed on the basis of the precautionary principle and low quality mechanistic studies.[4]

This view of aerosol generation subsequently led to a dichotomisation—later codified in international guidance[2]—that categorised all medical activities into either AGPs, where potentially infectious aerosols are generated, versus everything else, where the risk of potentially infectious aerosol is presumed to be negligible. The logical extension of this dichotomy has resulted in health-care workers in many countries undertaking interventions classified as AGPs wearing higher levels of personal protective equipment (PPE), such as FFP3 or N95 masks, whereas those health-care workers providing other medical care have not been afforded the same protection, as infectious aerosol is not considered a risk outside of AGPs.[5]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Although this dichotomy was reasonable at the start of the pandemic, recent aerosol sampling studies from multiple groups investigating several currently defined AGPs have revealed more information on the potential risk of aerosols from these procedures. In fact, the aerosol emissions from tracheal intubation, high-flow nasal oxygen, and non-invasive ventilation are low, with similar sampled aerosol concentrations to tidal breathing and speaking.[6–9]

Critically, these aerosol studies also confirm that coughing by both healthy volunteers, and patients (with or without COVID-19), generates orders of magnitude more aerosol than many AGPs.[6–8] Despite this, the generation of a cough during a procedure is not considered sufficient for that procedure to be designated an AGP. Consequently, current UK infection control guidance advises the highest aerosol precaution PPE for procedures that are demonstrably not high risk (compared with coughing) and advises lower grade droplet precaution PPE when infectious aerosol risk is high (eg, caring for coughing patients with confirmed COVID-19 for a prolonged period of time in poorly ventilated health-care settings).

Although we and others have sought to quantify aerosol generation, it should also be clear that a simple observation of increased aerosol emission does not confirm the potential for pathogen transmission; the much more exacting task of quantifying airborne infectious SARS-CoV-2 concentrations carried in aerosols has so far proven intractable.

More research is ongoing to quantify other AGPs across a range of clinical settings. However, based on the research to date, a coughing patient with acute COVID-19 is likely to generate more infectious aerosol than many AGPs. This appears to be supported by the epidemiological evidence, which points to an increased risk of infection for ward medical staff (who care for acutely dyspnoeic, coughing patients with COVID-19) compared with intensive care staff—although it should be noted that interpretation of that data is confounded by patient mix, among other factors.[10]

We propose an end to the term aerosol generating procedure, as it is neither accurate (aerosol is not generated above a cough for many of these procedures), implies aerosol emission is only from specific procedures (rather than being generated during normal respiratory events), potentially misidentifies the source of infection risk, and applies a binary definition to a situation that is more complex. Instead, we propose that clinicians follow an evidence-based framework that accounts for the major drivers of risk, with a focus on physical exposure to patients with suspected or confirmed COVID-19 as the critical component (panel).

Subsequently, additional factors known to be relevant in viral transmission, such as ventilation, proximity, and duration of exposure to patients, should be included in assessing risk, while recognising the changing epidemiology of infection with setting.

In summary, it is increasingly clear that transmission of SARS-CoV-2 via aerosol is possible and might represent a significant transmission route. However, emerging evidence indicates that many currently defined AGPs are unlikely to play any significant role in generation of infectious aerosol that poses a risk to staff. In view of this, the term AGP has neither face validity nor construct validity. Instead, we should focus on the risk in plain sight: close, physical exposure to people suspected, or known to have, COVID-19 for prolonged time or where ventilation remains poor.

We declare no competing interests.

Panel: **Proposed factors to be included in risk matrix for respiratory transmission of SARS-CoV-2**

Patient risk (by far the largest risk factor)
The probability of the patient having the infection, and time since acquisition. Risk based on symptoms, PCR positivity, and vaccination status. Note symptoms such as coughing and increased respiratory exertion are likely to be major factors in aerosol generation.

Duration of exposure
The duration that the risk is in place. The length of time required to be in close proximity naturally increases risk of both aerosol and droplet transmission.

Health-care practitioner risk from COVID-19
Age, sex, body mass index, comorbidities, vaccination status.

Proximity risk
Exposure to any care intervention requiring close patient contact increases risk. This includes personal care (such as mouthcare) and physical examination (especially relating to upper respiratory tract such as nasal or throat swab, nasendoscopy, or intubation).

Environmental risk
Ventilation, humidity, temperature.

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See **Online** for appendix

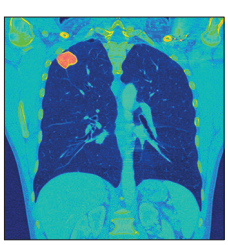
The 2021 USPSTF lung cancer screening guidelines: a new frontier

In March, 2021, the United States Preventive Services Task Force (USPSTF) updated their lung cancer screening guidelines. This marks the first change in the guidelines since screening with low-dose CT was initially recommended by the USPSTF in 2013. The new guidelines reduce the lower limit of the screening age from 55 to 50 years and the minimum smoking history from 30 to 20 pack-years. By expanding the screening criteria, the changes made in the 2021 guidelines are key to including more high-risk women and racial minorities in screening. Of note, under the new guidelines, 14·5 million Americans will be eligible for screening, which is an increase of 6·5 million individuals compared with the previous guidelines.[1] Given that screening with low-dose CT has been shown to reduce lung cancer mortality by 20–33% in high-risk populations,[2,3] it is estimated that the increase in screening under the new guidelines could save an additional 10 000–20 000 lives each year.

Although the new guidelines include two greatly welcomed changes that increase the number of eligible individuals, there continues to be many high-risk individuals who are ineligible for screening. First, under the new guidelines, individuals who quit smoking more than 15 years ago are not eligible for screening. However, up to 45·7% of lung cancers in former smokers occur more than 15 years after quitting smoking.[4] Revising the guidelines by removing this 15-year rule would allow more former smokers to be eligible for life-saving screening.

Second, under the new guidelines, individuals aged 80 years or older are not eligible for screening. However, with the rapidly ageing population in the USA, the number of adults aged 80 years or older who would benefit from lung cancer screening will increase. Given the advancement of minimally invasive surgical techniques and stereotactic body radiotherapy, many older individuals diagnosed with early-stage lung cancer will be able to undergo curative-intent treatment, which is associated with excellent 5-year overall survival.

Third, although the 2021 USPSTF guidelines increase the overall number of individuals eligible for screening, racial disparities in screening eligibility are likely to persist. It is well documented that racial minorities diagnosed with lung cancer are diagnosed at an earlier age and smoke fewer cigarettes than White men diagnosed with lung cancer. By decreasing the lower limit of the screening age from 55 to 50 years and the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For the **USPSTF lung cancer screening guidelines** see https://uspreventiveservicestaskforce.org/uspstf/recommendation/lung-cancer-screening