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.

Anaesth Crit Care Pain Med 40 (2021) 100849

Contents lists available at ScienceDirect

Anaesthesia Critical Care & Pain Medicine

journal homepage: www.elsevier.com

Editorial

Even vaccinated against COVID-19, we must continue to wear a mask

Keywords:
SARS-CoV-2
COVID-19
Mask
Vaccine
Spread

One year after the start of the pandemic, we perceive a slackening and exhaustion of healthcare workers and the general population, translated into less respect for social distancing and universal masking.

Given the reproduction rate number (R0), estimated at between 2.5 and 3.5, and considering the availability of the vaccines, only herd immunity reaching (1 − 1/R0) between 60 and 72% of the population will allow limiting the circulation of the virus.

Nonetheless, through this crisis we first have learned that there is no specific antiviral treatment [1,2]. On the other hand, we know preventive measures are vital in limiting the spread, as is the case in the majority of respiratory viral infections. Hence, they are only two ways to reduce the risk in the hospital: vaccination and universal masking. However, we are far from having reached a high percentage of vaccination that would allow us to achieve sufficient herd immunity [3]. So, should we continue to wear a mask, and for how long?

In this context, it is important to remember that transmission of SARS-CoV2 occurs from both symptomatic and asymptomatic patients with probable different risk of transmission [4,5]. However, more than 50% of infected patients are either asymptomatic or pre symptomatic [6]. For this reason, in the absence of effective tools to identify this population (i.e., the reservoir), only a universal measure can be used to control the risk; but what about its effectiveness?

Universal masking is useful

Even before the start of the pandemic, many authors had sought to measure the effectiveness of universal masking in reducing the risk of transmission of infectious agents. Several studies tried to address this question while limiting the evaluation to particular situations. Most of them highlighted a benefit when the measure was initiated early with the identification of the index case and when the latter was associated with hand hygiene. More recently, a meta-analysis including non-randomised and comparative studies of different means of prevention suggested a reduction by 15% of the risk of transmission linked to the mask. Especially, while in most studies wearing the mask alone did not reduce the risk of acquisition, it was still associated with a concrete reduction in transmission. For example, Leung et al. [7] studied mask use concerning 246 symptomatic people with influenza and seasonal coronavirus. They found a significant reduction in the virus presence by RT-PCR, droplets, and aerosols, for 124 people randomly selected to wear a mask.

Universal masking is useful to control COVID-19 outbreaks

While there was a lack of data assessing the value of universal masking in the general population, this pandemic provided an opportunity to evaluate this tool of prevention in a non-immune population. Therefore, at a hair salon in which all staff and clients were asked to wear a mask, 2 symptomatic, infected stylists attended to 139 clients, and no infections were observed in the 67 clients who were reached for interviewing and testing. Also, during an outbreak on the USS Theodore Roosevelt, persons who wore masks experienced a 70% lower risk of testing positive for SARS-CoV-2 infection [8].

Several other studies demonstrated the usefulness of universal masking in limiting the spread of COVID-19. A recent meta-analysis identified 35 studies, including three randomised controlled trials (RCTs) (4017 patients), 10 comparative studies (18,984 patients), 13 predictive models, 9 laboratory experimental studies. Regarding the reduction of infection rates, the estimations of cluster-RCTs were in favour of wearing facemasks *vs.* no mask, although not at statistically significant levels (adjusted OR 0.90, 95% CI 0.78–1.05) [9]. Similar findings were reported in observational studies. Mathematical models indicated an important decrease in mortality when the population mask coverage is near universal, regardless of mask efficacy. In the best-case scenario, when the mask efficacy is at 95%, the R0 can fall to 0.99 from an initial value of 16.90. Levels of mask filtration efficiency were heterogeneous, depending on the materials used (surgical mask: 45–97%). One laboratory study suggested a viral load reduction of 0.25 (95% CI 0.09–0.67) in favour of mask *vs.* no mask [9].

At the population level, observational studies also supported these initial data. In a study carried out in Hong Kong, community-wide masking was compared with the start of the pandemic (from the 31st of December 2019 to the 08th of April 2020). Authors highlighted a significantly lower incidence (129.0 per million population) compared to countries with similar characteristics in

https://doi.org/10.1016/j.accpm.2021.100849

terms of population density and healthcare, but without community-wide masking obligation (Spain (2983.2), Italy (2250.8), Germany (1241.5), France (1151.6), United States (1102.8), United Kingdom (831.5), Singapore (259.8), and South Korea (200.5) [10].

Universal masking reduces the risk of infection for HCWs

Several studies conducted during the pandemic suggested that universal masking was associated with a reduction of the risk of infection. A retrospective quasi-experimental study, of all patients, admitted from the 6th of April 2020 to the 18th of May 2020 to a large academic referral centre in the South-eastern U.S., showed universal masking decreased the rate of high-risk exposures by 68% per patient [11]. Thus, Wang et al. [12] presented evidence that universal masking of healthcare workers (HCWs) and patients can help reduce transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections. In the largest healthcare system of Massachusetts, authors presented data that before the implementation of universal masking in late March 2020, new infections among HCWs with direct or indirect patient contact were increasing exponentially, from 0% to 21.3% (a mean increase of 1.16% per day). However, once the universal masking policy in place, the proportion of symptomatic HCWs with positive test results steadily declined, from 14.7% to 11.5% (a mean decrease of 0.49% per day). Others (aka) compared the 7-day average incidence rates between a Massachusetts (USA) healthcare system and Massachusetts residents state-wide. The study period was from the 17th of March to the 6th of May. The healthcare system implemented universal masking on the 26th of March. Temporal incidence trends (i.e., 7-day average slopes) were compared using standardised coefficients from linear regression models. The standardised coefficients were similar between the healthcare system and the state in both the pre intervention and epidemic decline phases. During the intervention phase, the healthcare system's epidemic slope became negative (standardised β: −0.68, 95% CI: −1.06 to −0.31), while Massachusetts' slope remained positive (standardised β: 0.99, 95% CI: 0.94–1.05) [13].

The question is no longer whether the universal masking is protective, but how long this measure will be maintained. Indeed, one day it will be necessary to return to standard precautions, but this will depend on several factors, including herd immunity as well as individual risk factors. While recent data on vaccination suggest a significant decrease of symptomatic infections and their severity, some other data cover its role in reducing the risk of asymptomatic infection or re-infection. Indeed, with the emergence and spread of SARS-CoV-2 variants and the recent data suggesting a reduced efficacy of vaccines and a less robust immune protection, we must consider the hypothesis of an increase in cases of re-infection. It seems obvious to us that this risk will evolve. This is the reason why, while waiting for the data of the upcoming months, vaccinated or not, universal masking, hand hygiene, eye protection, and social distancing are needed to limit the spread of COVID-19. The vaccine will not fundamentally change the course of the epidemic because it reduces the severity of symptoms, but not contagiousness.

Conflicts of interest

The authors declare that they have no competing interests.

References

[1] Sanders JM, Monogue ML, Jodlowski TZ, Cutrell JB. Pharmacologic treatments for coronavirus disease 2019 (COVID-19): a review. Jama 2020;323(18):1824–36.

[2] Montravers P, Kantor E, Gouel-Cheron A. Anti-infective therapy against SARS-CoV-2: some light at the end of the tunnel? Anaesth Crit Care Pain Med 2020;39(6):695–7.

[3] Lipsitch M, Grad YH, Sette A, Crotty S. Cross-reactive memory T cells and herd immunity to SARS-CoV-2. Nat Rev Immunol 2020;20(11):709–13.

[4] Thompson HA, Mousa A, Dighe A, Fu H, Arnedo-Pena A, Barrett P, et al. SARS-CoV-2 setting-specific transmission rates: a systematic review and meta-analysis. Clin Infect Dis 2021.

[5] Qiu X, Nergiz AI, Maraolo AE, Bogoch II, Low N, Cevik M. Defining the role of asymptomatic and pre-symptomatic SARS-CoV-2 transmission—a living systematic review. Clin Microbiol Infect 2021. http://dx.doi.org/10.1016/j.cmi.2021.01.011.

[6] Oran DP, Topol EJ. The proportion of SARS-CoV-2 infections that are asymptomatic: a systematic review. Ann Intern Med 2021. http://dx.doi.org/10.7326/M20-6976.

[7] Leung NHL, Chu DKW, Shiu EYC, Chan KH, McDevitt JJ, Hau BJP, et al. Respiratory virus shedding in exhaled breath and efficacy of face masks. Nat Med 2020;26(5):676–80.

[8] Brooks JT, Butler JC. Effectiveness of mask wearing to control community spread of SARS-CoV-2. Jama 2021;325(10):998–9. http://dx.doi.org/10.1001/jama.2021.150.

[9] Coclite D, Napoletano A, Gianola S, Del Monaco A, D'Angelo D, Fauci A, et al. Face mask use in the community for reducing the spread of COVID-19: a systematic review. Front Med (Lausanne) 2020;7594269.

[10] Cheng VC, Wong SC, Chuang VW, So SY, Chen JH, Sridhar S, et al. The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2. J Infect 2020;81(1):107–14.

[11] Walker J, Fleece ME, Griffin RL, Leal SM, Alsip JA, Stigler WS, et al. Decreasing high risk exposures for healthcare-workers through universal masking and universal SARS-CoV-2 testing upon entry to a tertiary care facility. Clin Infect Dis 2020. http://dx.doi.org/10.1093/cid/ciaa1358.

[12] Wang X, Ferro EG, Zhou G, Hashimoto D, Bhatt DL. Association between universal masking in a health care system and SARS-CoV-2 positivity among health care workers. Jama 2020;324(7):703–4.

[13] Lan FY, Christophi CA, Buley J, Iliaki E, Bruno-Murtha LA, Sayah AJ, et al. Effects of universal masking on Massachusetts healthcare workers' COVID-19 incidence. Occup Med (Lond) 2020;70(8):606–9.

Jean-Ralph Zahar[a,*], Bernard Allaouchiche[b,c,d]

[a]*Infection Control Unit, Hôpital Avicenne, Groupe Hospitalier Paris Seine Saint Denis, AP-HP, 93000 Bobigny, France*

[b]*Intensive Care Unit, Hospices Civils de Lyon, Centre Hospitalier Lyon-Sud, ICU, F-69310 Pierre-Bénite, France*

[c]*Université Claude Bernard, Lyon1, Lyon, France*

[d]*Université de Lyon, VetAgro Sup, Campus Vétérinaire de Lyon, UPSP 2016.A101, Pulmonary and Cardiovascular Aggression in Sepsis, F-69280, Marcy l'Étoile, France*

*Corresponding author at: Infection Control Unit, Hôpital Avicenne, Groupe Hospitalier Paris Seine Saint Denis, AP-HP, 93000 Bobigny, France

E-mail address: jeanralph.zahar@aphp.fr (J.-R. Zahar).

Available online 23 March 2021