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## Review

# Considerations for de-escalating universal masking in healthcare centers

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## Abstract

Three years after the beginning of the COVID-19 pandemic, better knowledge on the transmission of respiratory viral infections (RVI) including the contribution of asymptomatic infections encouraged most healthcare centers to implement universal masking. The evolution of the SARS-CoV-2 epidemiology and improved immunization of the population call for the infection and prevention control community to revisit the masking strategy in healthcare. In this narrative review, we consider factors for de-escalating universal masking in healthcare centers, addressing compliance with the mask policy, local epidemiology, the level of protection provided by medical face masks, the consequences of absenteeism and presenteeism, as well as logistics, costs, and ecological impact. Most current national and international guidelines for mask use are based on the level of community transmission of SARS-CoV-2. Actions are now required to refine future recommendations, such as establishing a list of the most relevant RVI to consider, implement reliable local RVI surveillance, and define thresholds for activating masking strategies. Considering the epidemiological context (measured via sentinel networks or wastewater analysis), and, if not available, considering a time period (winter season) may guide to three gradual levels of masking: (i) standard and transmission-based precautions and respiratory etiquette, (ii) systematic face mask wearing when in direct contact with patients, and (iii) universal masking. Cost-effectiveness analysis of the different strategies is warranted in the coming years. Masking is just one element to be considered along with other preventive measures such as staff and patient immunization, and efficient ventilation.

**Keywords:** COVID-19; healthcare setting; infection control; universal masking; medical face mask; respiratory viral infections

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## Introduction

With the emergence of the pandemic, wearing face masks became one of the most prominent interventions against COVID-19<sup>1</sup>. In the absence of protective immunity, many countries made mask wearing mandatory for the general population in crowded areas where social distancing could not be maintained (such as public transport), and recommended wearing them even outdoors<sup>2</sup>. Before the COVID-19 pandemic, wearing a medical face mask was recommended for healthcare professionals (HCPs) when caring for patients with respiratory symptoms as part of standard precaution measures and for patients with respiratory symptoms as part of the respiratory etiquette. Transmission-based precautions were also recommended for HCPs in close contact with symptomatic patients as part of droplet precautions.

Early in the pandemic, transmission of SARS-CoV-2 by asymptomatic and presymptomatic COVID-19 cases appeared critical in the epidemiology and control of the disease<sup>3</sup>. Universal face masking in hospitals is usually defined as the requirement to wear a medical or surgical mask by all staff (clinical and nonclinical), patients, and visitors at any time. In the early phase of the pandemic, universal masking was part of guidelines on respiratory protection, issued by leading organizations in infection prevention and control (IPC)<sup>4</sup>. Following Hong Kong, Singapore, and other regions of Asia, the United States and Germany introduced universal masking in March 2020 as part of a range of non-pharmaceutical measures to control the spread of SARS-CoV-2 in healthcare settings. This change was unprecedented since, prior to the COVID-19 pandemic, studies had not shown an advantage of masks to prevent acquiring or spreading of respiratory pathogens in HCPs by the use of medical face masks. Three years later, the lower impact of COVID-19 on morbidity and mortality, fatigue of HCPs to wear personal protective equipment (PPE), cost, and ecological considerations have challenged the

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benefits of universal masking, and called for discussions on de-implementation.

In this context of evolving knowledge and recommendations, we reflected on the factors to consider de-escalating universal masking in healthcare centers.

### *Within-hospital SARS-CoV-2 risk of transmission*

Our understanding of within-hospital transmission of respiratory viruses remains imperfect, despite increased attention over the last three years. Using viral genomics to investigate sources of SARS-CoV-2 transmission in HCPs, the majority of infections (57.9%) could not be linked to a patient or coworker<sup>5</sup>. Only 10.5% and 4.2% of infections were traced to a coworker or a patient, respectively. A UK study combined viral genomic and epidemiological data in 2181 patients and HCPs<sup>6</sup>. During the first wave with an increasingly strict masking policy (“when in contact with suspected cases”, followed by “all patient contact”, and finally by “universal masking”), transmissions were staff-to-staff in 31.6%, patient-to-patient in 27.1%, patient-to-staff in 25.5%, and staff-to-patient in 15.5%. During the second wave with universal masking from the beginning, transmissions were patient-to-patient in 52.1%, patient-to-staff in 21.2%, staff-to-patient in 13.5%, and staff-to-staff in 12.9%. A staff member was identified as the index case in 50.6% of the transmission chains in the first wave but only in 31.3% in the second wave. The authors concluded that intensified control measures during the pandemic likely reduced transmission between healthcare workers but not between patients. The analysis of data from 11,290 patients admitted to shared rooms revealed that almost 40% of exposed patients were getting infected<sup>7</sup>.

### *Current evidence on the effectiveness of universal masking to prevent the transmission of COVID-19 and other respiratory viral infections*

The effectiveness of universal masking on the transmission of respiratory viruses was studied already before the pandemic. Wearing a medical mask or N95 respirator throughout work shifts by HCPs significantly reduced self-reported clinical respiratory illness (risk ratio [RR] = 0.59; 95% CI: 0.46–0.77) and influenza-like illness (RR = 0.34; 95% CI: 0.14–0.82)<sup>8</sup>. Systematic masking of all individuals in direct contact with stem cell transplant recipients significantly reduced infections due to respiratory infections in patients<sup>9</sup>. A universal masking policy in a neonatal unit reduced the number of infections due to respiratory viruses from 38 during 2011–2015 to 5 during 2017–2019, with respiratory syncytial viruses (RSV), parainfluenza viruses, and rhinoviruses representing two-thirds of the cases<sup>10</sup>.

In March 2020, a large US hospital implemented a prevention strategy combining systematic testing of symptomatic HCPs and universal masking for both HCPs and patients<sup>11</sup>. Before universal masking, the SARS-CoV-2 positivity ratio increased exponentially from 0% to 21.3%, with an average increase of 1.2% per day. During universal masking by HCPs and patients, the positivity rate decreased linearly from 14.7% to 11.5%, with an average decline of 0.5% per day. Contact tracing of 226 patients exposed to HCPs with confirmed COVID-19 identified only one possible transmission by an unmasked HCP prior to universal masking<sup>12</sup>. In the same study population, only 1 of 12 hospitalized patients testing positive on hospital day 3 or later was considered to have hospital-acquired COVID-19<sup>13</sup>. The authors concluded that there was no convincing evidence of in-hospital transmission after the implementation of universal masking for both staff and patients. During the first winter season of the COVID-19 pandemic, Europe and the US experienced a quasi-absence of seasonal influenza<sup>14</sup>.

Epidemiological investigations and ecological studies provided convincing evidence that universal non-pharmaceutical interventions in the general population, including universal masking, were associated with relevant reductions of non-COVID-19 RVIs<sup>15</sup>. The impact of universal masking on the transmission of COVID-19 and non-COVID-19 RVIs was confirmed by other studies<sup>16–20</sup>.

Together, these findings suggest that universal masking impacts on overall hospital transmission of respiratory viruses, particularly during periods of high community prevalence<sup>21</sup>. However, most of these studies used a before-after design, with limited control for confounders and without sensitivity analysis on time periods.

### *Factors to consider for de-escalating or maintaining universal masking in healthcare centers*

Lessons learned in healthcare centers during the COVID-19 pandemic, and particularly the evolving understanding of respiratory virus transmission, should drive the way medical face masks are used in the future. Importantly, universal masking is only one measure to reduce the risk of transmission of respiratory viruses among other non-pharmaceutical interventions such as hand hygiene, room ventilation, testing strategies, distancing, and patient/visitor restrictions. Some factors support de-escalating universal masking but others are in favor of maintaining it (Table 1).

#### *Provider’s adherence and compliance with universal masking*

High compliance and correct use of masks are important to ensure the effectiveness of universal masking. Experiments simulating the transmission of SARS-CoV-2 between two individuals demonstrated that source control alone is more effective than protection of the exposed individual alone, but that protection is most effective when both sides wear a mask, which makes the case of universal masking<sup>22</sup>. The main factor affecting the risk of transmission in the universal masking scenario is the leakage between the mask and the face<sup>23</sup>. Correct donning of face masks was 88% and 70% in COVID-19 and non-COVID-19 wards of a German University hospital, respectively<sup>24</sup>. Although the COVID-19 wards performed better, deficits of correct use of respirators were important. During a 4-week period after the implementation of a mandated universal masking policy in a tertiary-care center in the US, the median weekly face-mask compliance was 82.2% (range: 80.8–84.4%)<sup>25</sup>. Compliance increased to 92.6% (84.6%–97.9%) after implementing audits, passive feedback, active discussion, and better communication by leadership.

Adherence with face mask use by HCPs relies on organizational (communication, support from managers, workplace culture, training, and access to face masks) and individual factors (trust in face masks, desire to deliver good patient care, and feelings of safety from exposure to COVID-19 with and without vaccination)<sup>26</sup>. In a survey among 1,109 HCPs from an academic medical center with universal masking, only 33% of participants reported face masks being comfortable<sup>27</sup>. The main reported disadvantages of face mask wearing were breathing difficulties (80%), heat sensation (68%), and skin irritation (46.2%). In addition, only 17.1% felt that speech was sufficiently audible by others. During observations performed across the vaccination campaigns, HCPs reported feeling safe from exposure to COVID-19 when being around their colleagues<sup>28</sup>. Concerns about the negative impact of face masks on the physician-patient relationship were raised repeatedly. A study in surgery reported that patients appreciated to see the face of their surgeons when using transparent face masks, improving communication and trust, and giving a perception of increased empathy<sup>29</sup>.

**Table 1.** Factors for and against De-escalating or Maintaining Universal Masking in Healthcare Centers

Targeted population	De-escalating universal masking	Maintaining universal masking
HCP and patient perspective	<b>Adherence</b> Lack of adherence and compliance with universal masking related to fatigue, discomfort, and tolerability	Rare hospital transmission with good adherence and compliance of universal masking policy
	<b>Epidemiology</b> Decreasing benefit of universal masking in healthcare settings during low community transmission	Policy driven by imperfect epidemiological data (no real-time data, testing bias); challenge of back-and-force reinstatement of universal masking
	<b>Immunity and treatment options</b> High level of vaccine and infection-induced immunity and availability of effective treatment and prevention tools	Vaccine hesitancy and waning immunity
	<b>Community measures</b> Inconsistencies with non-pharmaceutical measures in the population	Prevention of transmission by asymptomatic and presymptomatic individuals; anticipating the occurrence of variants or emerging respiratory viruses
HCP perspective	<b>Cost and logistics</b> Rupture of supply chains, high cost, and ecological concerns	Counterbalancing costly installation of ventilation systems or investments to improve infrastructure
	<b>Absenteeism and presenteeism</b> Universal masking applying to the occupational setting only	Absenteeism due to occupational transmission of respiratory viruses; presenteeism
Patient perspective	<b>Staff without patient contact</b> Unclear benefit for HCP without direct patient contact	
	Improved HCP-patient relationship in the absence of face covering	Protection of vulnerable patients

Note. HCPs: healthcare professionals.

### *Impact of community transmission on the efficacy of universal masking in healthcare centers*

A point of attention is the level of exposure during both occupational and nonoccupational activities. Nonoccupational exposure plays a critical role in the risk of COVID-19 among HCPs. A meta-analysis showed a higher risk of COVID-19 for HCPs exposed outside the workplace (14%–32%) in comparison with exposure inside (6%–13%)<sup>30</sup>. Using survey data on self-reported risk factors, staff with confirmed household contacts were at highest risk of COVID-19 (adjusted Odds Ratio [aOR] 4.82, 95% CI: 3.45–6.72)<sup>31</sup>. The authors concluded that the moments most at risk for HCPs may be outside the healthcare system (e.g., during home-to-work transport). A large case-control study in France identified that infected persons outside work are much more likely to play a role in SARS-CoV-2 transmission (aOR 19.9, 95% CI: 12.4–31.9), compared to infected colleagues (aOR 2.26, 95% CI: 1.53–3.33) or COVID-19 patients (aOR 2.37, 95% CI: 1.66–3.40)<sup>32</sup>. HCPs alternate between not wearing a mask (e.g., at home or during meals) and wearing a mask (e.g., during commute or at work), with varying degrees of compliance and exposure toward community transmission. During phases of high community transmission, the risk of infectious staff coming to work is high. Consequently, the benefit of the universal masking strategy in healthcare centers depends on the number of infected staff coming to work and also on the degree of compliance with mask-wearing by HCPs during their daily activities.

### *Protection of vulnerable and non-vulnerable patients*

Patients in healthcare facilities are often vulnerable due to their age, comorbidities, and immunosuppression. Transmission from

individuals with COVID-19 (patients, staff members, or visitors) is a relevant risk, especially during high prevalence of COVID-19 in the community. Before August 1, 2020, 11.3% (95% CI: 11.1–11.6) of hospitalized patients with COVID-19 in 314 UK hospitals got infected during hospital stay<sup>33</sup>. The risk of mortality was estimated to be 1.3 times higher in patients with hospital- compared to community-acquired COVID-19 (95% CI: 1.005–1.683)<sup>34</sup>. Among patients, vaccination largely reduces the risk of serious COVID-19. However, the risk associated with HA-RVI persists for unvaccinated individuals, with vaccine escape variants, or with specific underlying medical conditions<sup>35</sup>. Presenteeism, defined as working while being ill, is common among HCPs, even among those who work in high-risk settings<sup>36</sup>. HCPs coming to work with mild symptoms potentially expose patients and staff members, sometimes leading to clusters of infections among HCPs and patients. This risk increases with the virus activity in the community. Universal masking by all staff in the hospital might have a relevant benefit during high prevalence periods.

### *Protection of HCPs, prevention of absenteeism, and preservation of the hospital activity*

RVIs are a major driver of absenteeism in the healthcare workforce during the winter season, when demand for healthcare services also peaks<sup>37</sup>. Absenteeism decreases the quality by limiting the capacity of care and by exposing the remaining professionals to extra workload and stress<sup>38</sup>. In a period of major staff shortages, absenteeism is a critical point to consider when reflecting on the use of PPE and recommending vaccination. Universal masking may represent a cost-effective strategy to address absenteeism, presenteeism, medical care, and mortality. However, maintaining HCPs with RVI at work with appropriate PPE in acute phases of staff shortage remains a concern.

**Table 2.** Example of Advantages and Disadvantages of Alternative Strategies to Permanent Universal Masking in Healthcare Centers

Strategies	Description	Advantages of the strategy	Disadvantages of the strategy
Symptom-based precautions	Wearing a surgical mask in addition to standard precautions by patients with respiratory symptoms	<ul style="list-style-type: none"> <li>- Better compliance with policy</li> <li>- Lower utilization of supplies</li> <li>- Better HCP-patient relationship</li> </ul>	<ul style="list-style-type: none"> <li>- Does not prevent asymptomatic and presymptomatic transmission</li> <li>- Requires high levels of vaccine and infection-induced immunity</li> </ul>
Targeted masking	Wearing of a face mask in direct patient contact (either all patients or immunocompromised patients only)	<ul style="list-style-type: none"> <li>- Better compliance with policy</li> <li>- Protection of (vulnerable) patients</li> </ul>	<ul style="list-style-type: none"> <li>- Does not prevent staff-to-staff transmission</li> <li>- Interferes with HCP-patient relationship</li> </ul>
Epidemiology-based universal masking	Wearing surgical masks by all staff (clinical and nonclinical), patients, and visitors during high level of community transmission	<ul style="list-style-type: none"> <li>- Adjustment to the risk of transmission, more acceptable by HCPs</li> <li>- Increased adherence and compliance with policy</li> <li>- Responsible utilization of supplies</li> </ul>	<ul style="list-style-type: none"> <li>- Difficult to implement in regions without sentinel data or wastewater surveillance</li> <li>- Challenge of back-and-force institution of a radical intervention in a complex environment</li> </ul>
Season-based universal masking	Wearing a surgical mask by all staff (clinical and nonclinical), patients, and visitors during seasonal respiratory viral periods	<ul style="list-style-type: none"> <li>- Adjustment to the theoretical risk of transmission of all respiratory viruses with a seasonal pattern</li> <li>- Takes into account the risk of asymptomatic and presymptomatic respiratory infections</li> <li>- Prevents hospital functioning</li> </ul>	<ul style="list-style-type: none"> <li>- Decreased adherence from HCPs during low level of community transmission</li> <li>- Not covering non-seasonal respiratory infections</li> <li>- Utilization of supplies</li> </ul>
Targeted continuous masking	Wearing of a face mask by all HCPs during their entire shifts in areas with patient care	<ul style="list-style-type: none"> <li>- Prevents HCP-patient and patient-patient asymptomatic and presymptomatic transmission</li> <li>- Increased adherence due to consistency of the strategy</li> <li>- Prevents presenteeism or absenteeism in clinical areas</li> <li>- Mitigates presenteeism in clinical areas</li> <li>- Preserves patient safety</li> <li>- Maintains clinical activity</li> </ul>	<ul style="list-style-type: none"> <li>- Utilization of supplies</li> <li>- Not preventing staff-to-staff transmission in nonclinical areas</li> <li>- Interferes with HCP-patient relationship</li> </ul>
Permanent universal masking	Wearing a surgical mask by all staff (clinical and nonclinical), patients, and visitors at any time	<ul style="list-style-type: none"> <li>- Prevents asymptomatic and presymptomatic transmission in the hospital</li> <li>- Prevents absenteeism - Mitigates presenteeism</li> <li>- Preserves patient safety</li> <li>- Maintains hospital activity</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of adherence and compliance related to fatigue, discomfort and tolerability</li> <li>- Large utilization of supplies</li> </ul>

Note. HCPs: healthcare professionals.

The level of immune protection among HCPs is a critical factor to include in the evaluation of universal masking strategies. Although vaccination had an effect on transmission initially, now this effect has become limited. Still, vaccination prevents severe disease, and thus, has a benefit to the functioning of the healthcare system by shortening staff absence, allowing HCPs with mild symptoms coming to work, and keeping COVID-19 patients out of the hospital<sup>39</sup>. In a study performed in Greece, vaccination of HCPs reduced absenteeism from 11.8 to 4.7 episodes per 100 HCPs, and the duration of absence from 11.9 to 6.9 days during a period of high SARS-CoV-2 activity in the community<sup>40</sup>. Vaccination of HCPs against SARS-CoV-2 may protect patients from acquiring COVID-19<sup>41</sup>. However, the effectiveness of current COVID-19 vaccines at preventing healthcare-associated transmission remains uncertain, with some inconsistency across studies<sup>42</sup>. The viral load (which is linked to risk of transmission) of fully vaccinated and unvaccinated individuals was similar, suggesting comparable efficiencies of SARS-CoV-2 transmission<sup>43</sup>. In other reports, fully vaccinated individuals had a shorter duration of shedding of viable virus and a lower rate of secondary transmission than partially vaccinated or unvaccinated individuals<sup>44</sup>.

Despite long-term recommendations for influenza vaccination of HCPs, uptake remains low in most countries<sup>45</sup>. Regarding COVID-19 vaccination, on September 15, 2021, among 3 millions of HCPs in 2086 facilities in the US, 70.0% were fully vaccinated<sup>46</sup>. However, vaccine hesitancy in HCPs also occurred for COVID-19 vaccination before the winter season 2022/2023, and for the bivalent COVID-19 booster vaccine<sup>47</sup>. This may compromise the protection conferred at both individual and organizational levels. Offering influenza vaccination to staff translated into a 4.4% reduction in all-cause mortality in hospitals<sup>48</sup>. A modeling estimated that 100% vaccination coverage of HCPs could result in 43% reduction in the risk of infection in hospital patients and 60% reduction in nursing home patients<sup>49</sup>. According to these criteria, requiring unvaccinated HCPs to wear a mask when working in patient areas, and vaccine mandates for HCPs against COVID-19 and influenza must be discussed.

#### *Availability, logistics, costs, and waste associated with face mask usage*

The availability of good quality material, procurement, cost, and waste associated with the use of face masks are important factors to

**Table 3.** Description of Masking Strategies for Source Control Adopted in National and International Guidelines

Country	Organization	Publication date	Guidelines content
International	WHO	Jan. 13, 2023	<ul style="list-style-type: none"> <li>• In areas of known or suspected community or cluster SARS-CoV-2 transmission:               <ul style="list-style-type: none"> <li>○ Universal masking: All health workers, including community health workers and caregivers, other staff, visitors, outpatients, and service providers, should wear a well-fitting medical mask at all times within the health facility and in any common area (eg, cafeteria, staff rooms).</li> <li>○ Inpatients not required to wear a mask unless physical distancing of at least 1 meter cannot be maintained or when outside of their care area</li> </ul> </li> <li>• In areas of known or suspected sporadic SARS-CoV-2 transmission:               <ul style="list-style-type: none"> <li>○ Targeted continuous medical mask use: health workers who work in clinical areas, should continuously wear a well-fitting medical mask during routine activities throughout the entire shift, apart from when eating and drinking. In non-patient areas, staff are not required to wear a medical mask during routine activities if they have no patient contact.</li> </ul> </li> <li>• No documented SARS-CoV-2 transmission: Medical mask use according to standard and transmission-based precautions</li> </ul>
International	ECDC	Feb. 6, 2023	<ul style="list-style-type: none"> <li>• During periods of high community transmission of respiratory viruses such as SARS-CoV-2, influenza and RSV,               <ul style="list-style-type: none"> <li>○ Staff, visitors, and patients should be advised to wear medical face masks (universal masking) in common areas of the hospital, patient rooms, and other areas where patient care is provided.</li> <li>○ Alternatively, healthcare workers in contact with patients should wear a medical face mask during all routine patient care (targeted clinical masking).</li> </ul> </li> <li>• Universal and targeted clinical masking can be discontinued when the period of high community transmission is over.</li> <li>• Decisions on the implementation of universal or targeted clinical masking should take into account the expected benefit, as well as the burden on resources, staff, patients, and visitors.</li> </ul>
US	Center for Diseases Prevention and Control	Sept. 27, 2022	<ul style="list-style-type: none"> <li>• In all circumstances, source control recommended for individuals who:               <ul style="list-style-type: none"> <li>○ Have a suspected or confirmed SARS-CoV-2 infection or other respiratory infection (e.g., those with runny nose, cough, sneeze);</li> <li>○ Had close contact (patients and visitors) or a higher-risk exposure (HCP) with someone with SARS-CoV-2 infection, for 10 days after their exposure;</li> <li>○ Reside or work on a unit or area of the facility experiencing a SARS-CoV-2 outbreak; universal masking could be discontinued once no new cases have been identified for 14 days;</li> </ul> </li> <li>• High level of SARS-CoV-2 Community Transmission (<math>\geq 100</math> New cases per 100,000 persons in the past 7 days at county level): Source control recommended for everyone in a healthcare setting in areas where they could encounter patients. HCP could choose not to wear source control when they are in well-defined areas that are restricted from patient access (eg, staff meeting rooms)</li> <li>• Not high level of SARS-CoV-2 Community Transmission: Healthcare facilities could choose not to require universal source control. Individuals might also choose to continue using source control based on personal preference, informed by their perceived level of risk for infection based on their recent activities (eg, attending crowded indoor gatherings with poor ventilation) and their potential for developing severe disease.</li> </ul>
England	UK Health Security Agency	Apr. 14, 2022	<ul style="list-style-type: none"> <li>• Standard precautions: worn (with eye protection) if a full-face visor is not available and spraying or splashing of blood, body fluids, secretions, or excretions onto the respiratory mucosa (nose and mouth) is anticipated or likely (Type IIR)</li> <li>• Transmission-based precautions:               <ul style="list-style-type: none"> <li>○ Droplet precautions: Fluid resistant face mask should be put before entering the patient room/care area</li> <li>○ Airborne precautions: FFP3 infectious pathogen spread by the airborne route, and/or undertake aerosol generating procedures</li> </ul> </li> </ul>
France	French Society of IPC (SF2H)	Feb. 7, 2023	<ul style="list-style-type: none"> <li>• High level of SARS-CoV-2 Community Transmission (<math>&gt; 200</math> New cases per 100,000 persons in the past 7 days in the administrative department level)               <ul style="list-style-type: none"> <li>○ Universal masking for everyone entering the facility (indoor and outdoor)</li> </ul> </li> <li>• Moderate level of SARS-CoV-2 Community Transmission (11 to 200 New cases per 100,000 persons)               <ul style="list-style-type: none"> <li>○ HCP: Masking in every care situation and face to face situations with patients inside the facility (indoor). In non-patient areas, staff are not required to wear a medical mask during routine activities if they have no patient contact. Continuous masking when signs of respiratory infection</li> <li>○ Patients: masking when entering in the facility (indoor), when someone entering in the room, or when getting out of the room</li> </ul> </li> <li>• Low level of SARS-CoV-2 Community Transmission (<math>\leq 10</math> New cases per 100,000 persons)               <ul style="list-style-type: none"> <li>○ HCP: during care at risk of body fluid exposure, and when signs of respiratory infection</li> <li>○ Patients: only when signs of respiratory infection</li> </ul> </li> </ul>

(Continued)

**Table 3.** (Continued)

Country	Organization	Publication date	Guidelines content
Switzerland	Swissoso	Jan. 31, 2023	<ul style="list-style-type: none"> <li>• Patients: mandatory for all patients with respiratory symptoms</li> <li>• HCPs: mandatory for all HCPs with respiratory symptoms; mandatory in direct patient contact depending on local epidemiology</li> <li>• Visitors: recommended when entering patient rooms or otherwise direct patient contact depending on local epidemiology</li> <li>• Universal masking can be considered depending on local epidemiology and in case of staff shortage</li> </ul>

Note. RSV, respiratory syncytial virus; HCP, healthcare professionals.

consider when deciding on universal masking as a prevention strategy. At the early stage of the pandemic, serious shortages of face masks were due to a combined increase in demand, shortage of production, and supply-chain ruptures. Production and supply-chain issues are now solved and most healthcare centers in high-income countries do not suffer from shortages anymore. However, the vulnerability of the system demands for stocking face masks in adequate storage conditions.

During the first year of the pandemic, the cost to procure PPE in hospitals in the US was estimated at more than \$3 billion<sup>50</sup>. In 2019, hospitals spent around \$7 per patient per day on PPE, \$20.40 during spring 2020, and \$12.45 during the height of the pandemic. Additionally, approximately 87,000 tons of PPE procured between March 2020 and November 2021 ended up as waste<sup>51</sup>. The COVID-19 waste story and the urgency to address sustainability also in healthcare ask for systems to reduce and manage healthcare waste including novel strategies of recycling and repurposing material.

#### *Alternative strategies for permanent universal masking in healthcare centers*

Table 2 lists advantages and disadvantages of alternative strategies to permanent universal masking. The first level is symptom-based and includes transmission-based precautions as defined by standard precaution measures and respiratory etiquette. Face masks are used by HCPs during droplet exposure and by patients with respiratory symptoms. Symptomatic HCPs should be discouraged or not allowed coming to work. This strategy is promoted by groups of IPC specialists in US<sup>52</sup>. Asymptomatic and presymptomatic transmission is not addressed. The second level aims to protect patients and includes face masks in direct patient contact, either for all patients or for vulnerable patients only. HCPs wear masks during any activity with the patient. Patient-to-staff and staff-to-staff transmission is not addressed. The third level is epidemiology-driven and includes universal masking when disease activity in the community is high. The main gap in this strategy is the need for epidemiological data, either in form of a sentinel network or wastewater surveillance. The strategy is also challenged by the back-and-forth institution of universal masking depending on the epidemiology, which requires significant operational flexibility. The fourth level is a seasonal strategy, defining a time period for universal masking. Adherence with this policy by HCPs may be affected in case disease activity is still low in the community. The fifth level targets patient care and includes universal masking for all HCPs during their entire shift in all areas with patient care<sup>53</sup>. Adherence could be a real challenge outside

periods of disease activity in the community. It also would generate a significant overuse of face masks raising cost-efficiency and ecological concerns. The last level aims at maximising risk reduction and includes permanent mask use by HCP, patients and visitors.

#### *Current masking strategies adopted in national and international guidelines*

The US CDC adopted an epidemiology-based, targeted continuous masking strategy on September 23, 2022 (Table 3). Healthcare facilities in areas with low levels of community spread can “choose not to mandate” all clinicians, patients, and visitors to wear a face mask. Even if masking is not universally required, if a provider works in an area experiencing a COVID-19 outbreak, or if HCPs care for immunocompromised patients, they should wear a mask. When transmission levels are high, masking is recommended for everyone in a health care setting in areas with patients, but HCPs can choose not to wear masks when they are in “well-defined areas” that are restricted from patient access, like staff meeting rooms. The US CDC guidance shift created a controversy in the IPC world with professional societies urging to maintain mandatory mask requirement policies for healthcare employees in all patient care areas<sup>54</sup>. Among 44 healthcare epidemiologists in the US participating in a survey, 33 (97%) reported that their facility was maintaining universal masking despite CDC guidance, mostly (90%) for preventing non-SARS-CoV-2 seasonal viruses and to maintain staffing capacities (73%)<sup>55</sup>.

On January 13, 2023, WHO released an update of the living IPC guideline taking into account the evolving epidemiological trends for COVID-19. The masking strategy was adapted to the SARS-CoV-2 transmission with three levels<sup>56</sup>. When any SARS-CoV-2 transmission is documented in the area, medical masks can be used according to standard and transmission-based precautions. In areas of known or suspected sporadic SARS-CoV-2 transmission, the strategy is based on a targeted continuous medical mask use. In areas of known or suspected community or cluster SARS-CoV-2 transmission, universal masking applies for HCPs but not for patients unless physical distancing of at least one meter cannot be maintained.

The ECDC guidelines, published on February 6, 2023, recommend universal masking for staff, visitors, and patients in common areas of the hospital, patient rooms, and other areas where patient care is provided, during periods of high community transmission of respiratory viruses such as SARS-CoV-2, influenza, and RSV<sup>57</sup>. Alternatively, targeted clinical masking is recommended for HCP in contact with patients during all routine patient care.

In Switzerland, the strategy is epidemiologically-driven with mandatory masking for all HCPs in direct patient contact or universal masking depending on local epidemiology and in case of staff shortage<sup>58</sup>.

Since February 7, 2023, SARS-CoV-2 community transmission is guiding the masking policy in France<sup>59</sup>. Universal masking is mandatory for every individual entering the facility (indoor and outdoor) when >200 new cases per 100,000 population have been reported during the past seven days in the administrative department. During phases of moderate transmission (11 to 200 new cases per 100,000 population), a targeted continuous masking is adopted in patients-areas, with a flexibility to not wear the mask in non-patient areas. Standard and transmission-based precautions are applied  $\leq 10$  new cases per 100,000 population. In England, since May 27, 2022, the national IPC manual reverts back from universal masking to standard and transmissions-based precautions<sup>60</sup>.

## Conclusion

In conclusion, three years after the emergence of the COVID-19 pandemic and the improved understanding of the transmission of RVI, the IPC community should consider revisiting the current masking policies. Specifically, de-escalation of the universal masking strategy implemented in healthcare centers since the first wave of COVID-19 must be revisited. The current strategies by most national and international organizations are based on the level of community transmission of SARS-CoV-2. Actions are now required to establish a list of the most burdensome RVI to consider, implement reliable local surveillance of RVI, and define thresholds for activating masking strategies. Considering the epidemiological context (measured via existing sentinel networks or innovative ways such as wastewater analysis), and if not available considering a time period (winter season) may guide to three gradual levels of masking: (i) standard and transmission-based precautions and respiratory etiquette, (ii) consistent face mask wearing when in direct contact with patients, and (iii) universal masking. Cost-effectiveness analyses are warranted in the coming years to refine recommendations. The face mask is only one element among other preventive measures in healthcare settings such as staff and patient immunization, and efficient ventilation.

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## References

- Kreuter F, Stewart K, Garcia Y, Li Y, O'Brien J. COVID-19 World Symptoms Survey (2019). <https://gisum.d.github.io/COVID-19-API-Documentation/>. Accessed July 8, 2022.
- Czypionka T, Greenhalgh T, Bassler D, Bryant MB. Masks and face coverings for the lay public: a narrative update. *Ann Intern Med* 2021;174:511–520.
- He X, Lau EHY, Wu P, *et al*. Temporal dynamics in viral shedding and transmissibility of COVID-19. *Nat Med* 2020;26:672–675.
- Birgand G, Muters NT, Otter J, *et al*. Variation of national and international guidelines on respiratory protection for health care professionals during the COVID-19 pandemic. *JAMA Netw Open* 2021;4:e2119257.
- Braun KM, Moreno GK, Buys A, *et al*. Viral sequencing to investigate sources of SARS-CoV-2 infection in US healthcare personnel. *Clin Infect Dis* 2021;73:e1329–e1336.
- Lindsey BB, Villabona-Arenas CJ, Campbell F, *et al*. Characterising within-hospital SARS-CoV-2 transmission events using epidemiological and viral genomic data across two pandemic waves. *Nat Commun* 2022;13:671.
- Karan A, Klompas M, Tucker R, *et al*. The Risk of SARS-CoV-2 transmission from patients with undiagnosed Covid-19 to roommates in a large academic medical center. *Clin Infect Dis Off Publ Infect Dis Soc Am* 2022;74:1097–1100.
- Offeddu V, Yung CF, Low MSF, Tam CC. Effectiveness of masks and respirators against respiratory infections in healthcare workers: a systematic review and meta-analysis. *Clin Infect Dis Publ Infect Dis Soc Am* 2017;65:1934–1942.
- Partridge DG, Sori A, Green DJ, *et al*. Universal use of surgical masks is tolerated and prevents respiratory viral infection in stem cell transplant recipients. *J Hosp Infect* 2022;119:182–186.
- Tong WY, Yung CF, Chiew LC, *et al*. Universal face masking reduces respiratory viral infections among inpatient very-low-birthweight neonatal infants. *Clin Infect Dis Publ Infect Dis Soc Am* 2020;71:2958–2961.
- 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;324:703.
- Baker MA, Fiumara K, Rhee C, *et al*. Low risk of coronavirus disease 2019 (COVID-19) among patients exposed to infected healthcare workers. *Clin Infect Dis* 2021;73:e1878–e1880.
- Rhee C, Baker M, Vaidya V, *et al*. Incidence of nosocomial COVID-19 in patients hospitalized at a large US academic medical center. *JAMA Netw Open* 2020;3:e2020498.
- Adlhoch C, Mook P, Lamb F, *et al*. Very little influenza in the WHO European Region during the 2020/21 season, weeks 40 2020 to 8 2021. *Euro Surveill Bull Eur Sur Mal Transm Eur Commun Dis Bull* 2021;26:2100221.
- Brooks JT, Butler JC. Effectiveness of mask wearing to control community spread of SARS-CoV-2. *JAMA* 2021;325:998.
- Seidelman J, Smith B, Akinboyo I, Lewis S. Impact of a comprehensive SARS-CoV-2 infection prevention bundle on rates of hospital-acquired respiratory viral infections. *Antimicrob Steward Healthc Epidemiol* 2021;1:s81.
- Seidelman JL, Lewis SS, Advani SD, *et al*. Universal masking is an effective strategy to flatten the severe acute respiratory coronavirus virus 2 (SARS-CoV-2) healthcare worker epidemiologic curve. *Infect Control Hosp Epidemiol* 2020;41:1466–1467.
- Wong SC, Lam GKM, AuYeung CHY, *et al*. Absence of nosocomial influenza and respiratory syncytial virus infection in the coronavirus disease 2019 (COVID-19) era: implication of universal masking in hospitals. *Infect Control Hosp Epidemiol* 2021;42:218–221.
- Lefebvre MA, Rajda E, Frenette C, *et al*. Impact of the COVID-19 pandemic on healthcare-associated viral respiratory infections at a tertiary care pediatric hospital. *Am J Infect Control* Published online February 1, 2023: S0196-6553(23)00055-X. doi: [10.1016/j.ajic.2023.01.017](https://doi.org/10.1016/j.ajic.2023.01.017)
- Temkin E, Schwaber MJ, Vaturi A, *et al*. Effect of a national policy of universal masking and uniform criteria for severe acute respiratory coronavirus virus 2 (SARS-CoV-2) exposure on hospital staff infection and quarantine. *Infect Control Hosp Epidemiol* 2022;43:757–763.
- Richterman A, Meyerowitz EA, Cevik M. Hospital-acquired SARS-CoV-2 infection: lessons for public health. *JAMA* 2020;324:2155–2156.
- Cheng Y, Ma N, Witt C, *et al*. Face masks effectively limit the probability of SARS-CoV-2 transmission. *Science* 2021;372:1439–1443.
- Bagheri G, Thiede B, Hejazi B, Schlenczek O, Bodenschatz E. An upper bound on one-to-one exposure to infectious human respiratory particles. *Proc Natl Acad Sci* 2021;118:e2110117118.
- Neuwirth MM, Mattner F, Othchwemah R. Adherence to personal protective equipment use among healthcare workers caring for confirmed COVID-19 and alleged non-COVID-19 patients. *Antimicrob Resist Infect Control* 2020;9:199.



25. Datta R, Glenn K, Pellegrino A, *et al*. Increasing face-mask compliance among healthcare personnel during the coronavirus disease 2019 (COVID-19) pandemic. *Infect Control Hosp Epidemiol* 2022;43:616–622.
26. Houghton C., Meskell P., Delaney H., *et al*. Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: a rapid qualitative evidence synthesis. *Cochrane Database Syst Rev* 2020;(4): CD013582.
27. Alzunitan MA, Perencevich EN, Edmond MB. Assessing health care worker perceptions of face coverings during the COVID-19 pandemic. *Am J Infect Control* 2021;49:521–522.
28. O'Donohue LS, Fletcher-Gutowski S, Sidhu A, Verma A, Phillips TC, Misra PG. Mask use among health care workers and feelings of safety at work pre and post- COVID-19 vaccine. *Am J Infect Control* 2022;50:503–508.
29. Kratzke IM, Rosenbaum ME, Cox C, Ollila DW, Kapadia MR. Effect of clear vs standard covered masks on communication with patients during surgical clinic encounters: a randomized clinical trial. *JAMA Surg* 2021;156:372–378.
30. Gholami M, Fawad I, Shadan S, *et al*. COVID-19 and healthcare workers: a systematic review and meta-analysis. *Int J Infect Dis* 2021;104:335–346.
31. Eyre DW, Lumley SF, O'Donnell D, *et al*. Differential occupational risks to healthcare workers from SARS-CoV-2 observed during a prospective observational study. *eLife* 2020;9:e60675.
32. Belan M, Charmet T, Schaeffer L, *et al*. SARS-CoV-2 exposures of healthcare workers from primary care, long-term care facilities and hospitals: a nationwide matched case-control study. *Clin Microbiol Infect Publ Eur Soc Clin Microbiol Infect Dis* 2022;28:1471–1476.
33. Read JM, Green CA, Harrison EM, *et al*. Hospital-acquired SARS-CoV-2 infection in the UK's first COVID-19 pandemic wave. *Lancet* 2021;398:1037–1038.
34. Ponsford MJ, Ward TJC, Stoneham SM, *et al*. A systematic review and meta-analysis of inpatient mortality associated with nosocomial and community COVID-19 exposes the vulnerability of immunosuppressed adults. *Front Immunol* 2021;12:744696.
35. Havers FP, Pham H, Taylor CA, *et al*. COVID-19-associated hospitalizations among vaccinated and unvaccinated adults 18 years or older in 13 US states, January 2021 to April 2022. *JAMA Intern Med* 2022;182:1071.
36. Wilson KE, Wood SM, Schaecher KE, *et al*. Nosocomial outbreak of influenza A H3N2 in an inpatient oncology unit related to health care workers presenting to work while ill. *Am J Infect Control* 2019;47:683–687.
37. Gianino MM, Politano G, Scarmozzino A, *et al*. Estimation of sickness absenteeism among Italian healthcare workers during seasonal influenza epidemics. *PLoS One* 2017;12:e0182510.
38. Gohar B, Larivière M, Nowrouzi-Kia B. Sickness absence in healthcare workers during the COVID-19 pandemic. *Occup Med* 2020;70:338–342.
39. Hollmeyer H, Hayden F, Mounts A, Buchholz U. Review: interventions to increase influenza vaccination among healthcare workers in hospitals. *Influenza Other Respir Viruses* 2013;7:604–621.
40. Maltezos HC, Panagopoulos P, Sourri F, *et al*. COVID-19 vaccination significantly reduces morbidity and absenteeism among healthcare personnel: a prospective multicenter study. *Vaccine* 2021;39:7021–7027.
41. Roberts SC, Aniskiewicz MJ, Choi SJ, Pettker CM, Martinello RA. Correlation of healthcare worker vaccination with inpatient healthcare-associated coronavirus disease 2019 (COVID-19). *Infect Control Hosp Epidemiol* 2022;43:524–525.
42. Stokel-Walker C. What do we know about covid vaccines and preventing transmission? *BMJ* 2022;376:o298.
43. Singanayagam A, Hakki S, Dunning J, *et al*. Community transmission and viral load kinetics of the SARS-CoV-2 delta (B.1.617.2) variant in vaccinated and unvaccinated individuals in the UK: a prospective, longitudinal, cohort study. *Lancet Infect Dis* 2022;22:183–195.
44. Jung J, Kim JY, Park H, *et al*. Transmission and infectious SARS-CoV-2 shedding kinetics in vaccinated and unvaccinated individuals. *JAMA Netw Open* 2022;5:e2213606.
45. Jorgensen P, Mereckiene J, Cotter S, Johansen K, Tsoлова S, Brown C. How close are countries of the WHO European Region to achieving the goal of vaccinating 75% of key risk groups against influenza? Results from national surveys on seasonal influenza vaccination programmes, 2008/2009 to 2014/2015. *Vaccine* 2018;36:442–452.
46. Reses HE, Jones ES, Richardson DB, Cate KM, Walker DW, Shapiro CN. COVID-19 vaccination coverage among hospital-based healthcare personnel reported through the Department of Health and Human Services Unified Hospital Data Surveillance System, United States, January 20, 2021–September 15, 2021. *Am J Infect Control* 2021;49:1554–1557.
47. Sinclair AH, Taylor MK, Weitz JS, Beckett SJ, Samanez-Larkin GR. Reasons for receiving or not receiving bivalent COVID-19 booster vaccinations among adults — United States, November 1–December 10, 2022. *MMWR Morb Mortal Wkly Rep* 2023;72:73–75.
48. Ahmed F, Lindley MC, Allred N, Weinbaum CM, Grohskopf L. Effect of influenza vaccination of healthcare personnel on morbidity and mortality among patients: systematic review and grading of evidence. *Clin Infect Dis Publ Infect Dis Soc Am* 2014;58:50–57.
49. van den Dool C, Bonten MJM, Hak E, Wallinga J. Modeling the effects of influenza vaccination of health care workers in hospital departments. *Vaccine* 2009;27:6261–6267.
50. Healthcare Finance. Hospitals have spent more than \$3B securing personal protective equipment during COVID-19 website. <https://www.healthcarefinancenews.com/news/hospitals-have-spent-more-3b-securing-personal-protective-equipment-during-covid-19>. Published October 12, 2021. Accessed July 8, 2023.
51. World Health Organization (WHO). Tonnes of COVID-19 health care waste expose urgent need to improve waste management systems website. <https://www.who.int/news/item/01-02-2022-tonnes-of-covid-19-health-care-waste-expose-urgent-need-to-improve-waste-management-systems>. Published February 1, 2022. Accessed July 8, 2023.
52. Shenoy ES, Babcock HM, Brust KB, *et al*. Universal masking in health care settings: a pandemic strategy whose time has come and gone, for now. *Ann Intern Med* 2023;176:859–861.
53. Kalu IC, Henderson DK, Weber DJ, Haessler S. Back to the future: redefining “universal precautions” to include masking for all patient encounters. *Infect Control Hosp Epidemiol* 2023;1–2. doi: 10.1017/ice.2023.2.
54. APIC, Association for professionals in infection control and Epidemiology. APIC Urges IPs to Continue Universal Masking in Patient Care Areas website. <https://apic.org/news/apic-urges-ips-to-continue-universal-masking-in-patient-care-areas/>. Published October 3, 2022. Accessed July 8, 2023.
55. Snyder GM, Passaretti CL, Stevens MP. Hospital approaches to universal masking after public health “unmasking” guidance. *Infect Control Hosp Epidemiol* 2023; 44(5):845–846.
56. World Health Organisation. WHO updates COVID-19 guidelines on masks, treatments and patient care website. <https://www.who.int/news/item/13-01-2023-who-updates-covid-19-guidelines-on-masks-treatments-and-patient-care>. Published January 13, 2023. Accessed July 8, 2023.
57. European Center for Disease Prevention and Control. Healthcare facilities should maintain and strengthen infection prevention and control measures during peaks of respiratory viruses transmission website. <https://www.ecdc.europa.eu/en/publications-data/considerations-infection-prevention-and-control-practices-relation-respiratory>. Published February 6, 2023. Accessed July 8, 2023.
58. Swissnoso. Recommendations de Swissnoso sur la désescalade des mesures de prévention et contrôle de l'infection (PCI) pour COVID-19 en milieu de soins website. [https://www.swissnoso.ch/fileadmin/swissnoso/Dokumente/5\\_Forschung\\_und\\_Entwicklung/6\\_Aktuelle\\_Ereignisse/230131\\_Recommandations\\_COVID-19\\_soins\\_aigus\\_Swissnoso\\_v5\\_FR.pdf](https://www.swissnoso.ch/fileadmin/swissnoso/Dokumente/5_Forschung_und_Entwicklung/6_Aktuelle_Ereignisse/230131_Recommandations_COVID-19_soins_aigus_Swissnoso_v5_FR.pdf). Published January 31, 2023. Accessed July 8, 2023.
59. Société Française d'Hygiène Hospitalière. Note relative à la protection des patients et des professionnels en contexte COVID-19 website. <https://www.sf2h.net/note-relative-protection-patients-professionnels-en-contexte-covid-19-version-du-07-02-2023>. Published February 7, 2023. Accessed July 8, 2023.
60. NHS England. National infection prevention and control manual for England website. <https://www.england.nhs.uk/national-infection-prevention-and-control-manual-nipcm-for-england/>. Published January 25, 2023. Accessed July 8, 2023.