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# Impact of Hearing Loss and Universal Face Masking in the COVID-19 Era



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In the current coronavirus disease 2019 (COVID-19) pandemic, health and government officials are encouraging, even mandating, community-wide face mask wearing (ie, universal masking) to reduce potential presymptomatic or asymptomatic transmission of severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2) to others. There are three major categories of masks being used to limit the airborne transmission of large respiratory droplets and infectious agents: a respirator, or filtering face piece (FFP), such as an N95 mask; medical face masks, such as a surgical or procedure mask; and nonmedical masks, such as commercially or self-made masks usually made of cloth or other textiles. Based on mechanistic plausibility and the desire to reduce SARS-CoV-2 transmission and community impact, universal masking is recommended as a means of source control of both symptomatic and presymptomatic/asymptomatic individuals to prevent the spread of infectious respiratory droplets to others.

In addition to universal masking, the community can mitigate the risk of transmitting and acquiring SARS-CoV-2 by physical distancing (>6 feet apart), remaining at home, avoiding crowded or public places, working remotely from home, respiratory etiquette, frequent handwashing, and avoiding unnecessary hand-face contact.<sup>1</sup> Health care facilities may also restrict family members and interpreters from accompanying patients during surgery, emergency department (ED) visits, intensive care unit (ICU) stays, or hospitalizations. While these measures arguably are epidemiologically appropriate, the negative impact these measures have had on the short supply of masks and other personal protective equipment (PPE) has been widely reported. In addition, universal masking is a barrier to clear empathetic communication.

## NEGATIVE IMPACT OF HEARING LOSS AND UNIVERSAL MASKING/SOCIAL DISTANCING POLICIES

We would like to call attention to the negative impacts of universal masking and social distancing in both health care and community settings for individuals with hearing loss. Approximately 14.1% of American adults (27.7 million) aged 18 years and older report some difficulty hearing.<sup>2</sup> Hearing loss impacts all age groups, yet it is more prevalent among unscreened older adults — who are also likely to be without hearing assistance. For 60- to 69-year-old individuals, the prevalence for hearing loss affecting speech intelligibility was 39.3%.<sup>2</sup> In addition, COVID-19 fatality rates are higher in older adults who are frail with other comorbidities. Current policies often require patients to be unaccompanied by supporting family members. This can be detrimental to effective communication, patient safety, and quality health care with individuals with hearing loss who cannot understand attenuated and distorted speech nor gain clues from lip reading and facial expressions due to universal masking. A recent study showed each type of mask wearing causes a low-pass filter effect attenuating the higher frequencies (2000-7000 Hz) of the speaker's voice with decibel (dB) reduction ranging from 3 to 4 dB (medical mask) to nearly 12 dB for the N95 mask (respirator/FFP).<sup>3</sup> Whereas both age-related hearing loss and FFP masking portend substantial high-frequency region (2000-4000 Hz) inaudibility and speech understanding reduction compared with normal hearing individuals when no mask is worn, the addition of a noisy background setting (eg, ED/ICU) further confounds this and makes communication extremely difficult, if not impossible.



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**TABLE. Communication Strategies for Individuals With Hearing Loss<sup>a</sup>**

Reduce background noise
Obtain the individual's attention
Ask how the individual prefers to communicate
Confirm hearing aid users are using them
Speak slightly louder, and with a minimally reduced rate
Rephrase rather than repeating the same words, shouting, exaggerated pronunciation, etc
Take turns when speaking
Optimize positioning (ie, face-to-face, not moving around or walking)
Use low-tech methods (eg, pen-and-paper, clear partitions)
Use high-tech methods (eg, Wi-Fi-enabled tablets, video chat apps on smartphones)
Use video-conferencing platforms (eg, telemedicine, unmasked, without PPE)
Use clear (or clear-paneled) masks to improve visibility of facial expressions/lip-reading cues
Use PSAPs
Use loaner hearing aids or FM systems along with a microphone lanyard
Use scribes or professional support staff to assist health care professionals with hearing loss

<sup>a</sup>FM = frequency modulation; PPE = personal protective equipment; PSAPs = personal sound amplification products.

Social distancing also has an impact on speech audibility. Sounds rapidly become quieter as they travel away from their sources. The decibel scale logarithmically quantitates the relative intensities of sound — a sound with an intensity of half that of a reference sound corresponds to a decrease of little more than 3 dB. The inverse square law states that doubling the distance reduces the sound intensity to one-quarter of its initial value. If the distance is doubled, then a 6 dB reduction in sound intensity is noted. Whereas conversational distances between two talkers in the United States typically ranges from 1.5 to 3 feet, the currently recommended social distancing of at least 6 feet (which translates to a doubling or even quadrupling of the distance) means the sound pressure level decreases by 6 to 12 dB, or more. Social distancing further compounds the negative effect of universal masking on audibility for individuals with hearing loss.

Universal masking degrades speech quality and denies visual clues (eg, lip reading, facial expressions). Individuals with hearing loss using American Sign Language convey grammar

and tone by body language/facial expression. Similarly, individuals with hearing loss rely on adequate lighting, face-to-face positioning, and lip reading to provide contextual clues and augment speech comprehension during normal encounters. A noisy environment (eg, ED/ICU/hospital/clinic with background chatter, monitors, and alarms — often in excess of 65 dB sound pressure level), the reverberation of sounds off of smooth (ie, easily cleaned) surfaces, and those individuals who do not intentionally speak louder than ambient sound pressure levels — perhaps for well-intentioned reasons (eg, patient privacy policies) — all compound the situation further. Universal masking blocks the important facial expressions used by both health care professionals and patients to augment dialogue and to build trust, clarity, and rapport during encounters. Universal masking impedes the health care professional's ability to monitor the patient's facial expressions and nonverbal cues during encounters; consequently, nonverbal cues of misunderstanding, which normally would have prompted the provider to employ various communication strategies to repair the communication breakdown, may be missed. Moreover, a randomized clinical trial has shown mask wearing by health care professionals to have a significant and negative impact on the patient's perceived empathy and diminished the positive effects of relational continuity.<sup>4</sup>

If either the patient or health care worker (or both) have hearing issues — quite likely if either is older than the age of 50 years,<sup>2</sup> then the overreliance on oral communication as the sole or primary method of communication can be ineffective and inappropriately dangerous. Universal masking exacerbates this problem. Clear empathetic communication builds trust, which is the coin of the realm in health care — all other health care goals (eg, safety, outcomes, satisfaction scores, malpractice prevention) spring from it. When provided, medical information must be complete, accurate, timely, unambiguous, and understood by the patient<sup>5</sup> and by health care professionals as well. It is our intent to bring this burgeoning issue to the reader's attention and to encourage individuals and health care

institutions alike to devote the necessary time and resources to ensure that clear empathetic communication is maintained.

### HELPFUL STRATEGIES

Health care professionals may wish to use any of the following mechanisms to ensure effective empathetic communication in these situations: reduce background noise; obtain the individual's attention; ask how the individual prefers to communicate; confirm hearing aid users are using them; speak slightly louder, and with a minimally reduced rate; rephrase — rather than repeating the same words, shouting, exaggerated pronunciation, etc; take turns when speaking<sup>3</sup>; optimize positioning (ie, face to face, not moving around or walking); use low-tech methods (eg, pen-and-paper, clear partitions) or high-tech assistive technologies (eg, Wi-Fi-enabled computer tablets or various video chat applications on smart phones) to enable health care professionals, family members, and/or certified deaf interpreters to safely interact with patients without need for masks or PPE; using video-conferencing platforms (eg, telemedicine, unmasked, without PPE) to communicate with patients or colleagues with hearing loss; use clear (or clear-paneled) face masks to improve visibility of facial expressions and to restore lip-reading cues; use personal sound amplification products; use loaner hearing aids, or frequency modulation (FM) systems along with a microphone lanyard; use scribes or professional support staff to assist health care professionals with hearing loss, etc (see [Table](#)). Clear (or clear-paneled) face masks remain a scarce and costly option — which poses a significant barrier to adoption.

Health care professionals should recognize that with the loss of visual cues (ie, lip reading) and support systems (eg, family members), current COVID-19 policies such as universal masking, social distancing, and unaccompanied patients may “unmask” significant hearing loss-related issues that previously had been diminished or ignored. Personal sound amplification products tend to work best for individuals with rather mild hearing loss,

whereas those with more advanced hearing loss may benefit from further audiologic evaluation for hearing aids or even cochlear implants. Hospitals and clinics may wish to consider loaner amplification systems (eg, hearing aids) or use an FM system where the physician uses a microphone lanyard; however, this may be a challenging endeavor given the issues of cost, device decontamination, and potential cross-infection. Additional resources and temporary recommendations for health care facilities are continually updated and available online (<https://www.nad.org/covid19-communication-access-recs-for-hospital/>).<sup>6</sup> Health care professionals should also recognize that they, and their fellow colleagues, may also be experiencing these same challenges.

### CONCLUSION

We remain hopeful that, with increased awareness and use of the mechanisms and assistive strategies mentioned above, health care institutions, and health care professionals can provide care during the pandemic while preventing collateral damage to the trust engendered by clear effective communication, particularly when dealing with individuals with hearing loss.

**Abbreviations and Acronyms:** COVID-19 = coronavirus disease 2019; ED = emergency department; FFP = filtering face piece; ICU = intensive care unit; PPE = personal protective equipment; SARS-CoV-2 = severe acute respiratory syndrome—coronavirus 2.

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