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1 **Otologic and Audiologic Considerations for COVID-19**

2 Thomas L. Eby, M.D., Alberto A. Arteaga, M.D. and Christopher Spankovich, Au.D., Ph.D.,
3 M.P.H.

4 University of Mississippi Medical Center

5 Department of Otolaryngology and Communicative Sciences 2500 N. State St.

6 Jackson, Mississippi 39211

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16 CS contributed to the writing and revisions and serves as the corresponding author

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31 **Abstract**

32 The COVID-19 pandemic has created a number of considerations for Otolaryngology, anosmia
33 and ageusia in particular have gained significant attention. Here we present considerations in
34 regards to treatment with quinine derived drugs and the influence of masks on communication.

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58 A consequence of the COVID-19 pandemic is increased necessity of personal protective
59 equipment (PPE) utilization. The Centers for Disease Controls and Prevention (CDC) has
60 recently recommended wearing cloth face masks in public settings to slow the spread of the
61 virus; they even have a tutorial on making face masks [## 81 **Communication Strategies**](https://www.cdc.gov/coronavirus/2019-
62 <u>ncov/prevent-getting-sick/diy-cloth-face-coverings.html</u>. Furthermore, in clinical settings,
63 providers are often using N-95 respirators with additional cloth mask covering and face shields.
64 A recent study has demonstrated that medical masks such as the N-95 can serve as low-pass
65 filters which attenuate high frequencies important for speech understanding by up to 12 dB
66 leading to distortion in speech perception¹. Masks (cloth or medical) also remove visual cues
67 important for speech understanding. The use of masks can potentially compromise not only
68 patient-provider interaction (provider and/or patient ability to hear), but also everyday
69 communication in the real world, in particular when competing noise is present. The overall
70 impact is even more significant for the Deaf/hearing impairment population that already have
71 compromised high frequency hearing or rely on lip reading for speech understanding².
72 In addition, early reports from China and France of successful treatment of Covid-19^{3,4} related
73 pneumonia using synthetic derivatives of quinine has led to further study and widespread off-
74 label use; though non-successful outcomes are being reported⁵. As of April 20, 2020, over 140
75 trials have been registered in various national and international databases for synthetic quinine
76 (chloroquine and hydroxychloroquine) treatment of Covid-19. The risk for permanent changes in
77 hearing related to these agents is low^{6,7}, however, it is reasonable that a segment of patients
78 may experience at least transient episodes of hearing loss, tinnitus, and/or dizziness. Even if
79 synthetic quinine derivatives prove to be ineffective for Covid-19, providers should be aware of
80 these potential side effects and increased risk for communication difficulties.</p></div><div data-bbox=)

82 Effective communication between individuals and their providers is a critical element of patient
83 centered care and optimal health care delivery. For patients, communication difficulties created
84 by hearing loss and/or exacerbated by use of a mask can result in difficulty conveying an illness
85 or symptoms, poor or incorrect adherence with therapeutic recommendations, and low
86 satisfaction⁸. Among Medicare beneficiaries, those with communication disability (defined as
87 difficulty hearing, writing, and using a telephone) were observed to be more likely to report
88 dissatisfaction with their medical care⁹. Beyond patient-provider interaction, the use of masks
89 can also interfere with provider communication with colleagues and staff, particularly when
90 hearing loss is present or multiple layer PPE is utilized.

91 Hearing aids can improve health related quality of life, but only about 1 in 5 individuals that
92 could benefit from hearing aids actually wear one¹⁰. In addition, patients experiencing transient
93 hearing issues related to possible use of synthetic quinine drugs may not have access to
94 traditional hearing aids. For persons without hearing aids or other hearing devices (e.g. cochlear
95 implant) we recommend use of simple communication strategies (see **Table 1**) modified in
96 consideration of mask use.

97 Providers and patients can also consider use of assistive listening devices such as personal
98 sound amplification devices (e.g. Pocketalker). A bodyworn personal sound amplification device
99 can be provided to patients during their visit (while using sanitary headphone cover slips) and
100 sanitized in-between users. Alternatively, if the patient or provider has a smartphone they can
101 download apps that use the microphone from their smart device to transmit to headphones
102 (wired); turning a smartphone/smart device into a personal sound amplification device. One
103 example is the *EarMachine* app, the app was designed by hearing scientists with funding from
104 the NIDCD-NIH. The *EarMachine* app allows the user to adjust the loudness and pitch of the
105 sound, but is limited to iOS devices. Android users can consider the *Sound Amplifier* app. Both
106 apps must be used with wired headphones. In addition, to amplification apps, speech-to-text

107 apps can transcribe speech in realtime. For example, the *Otter voice meeting notes* app can
108 provide live captioning and is available for both iOS and android devices.

109 Communication is a cornerstone to optimal health care. Enhanced use of PPE, in particular face
110 masks, represent challenges for patient interaction and daily communication. Simple
111 communication strategies and assistive listening devices can help to mitigate these challenges.

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139 Table 1. Communication Strategies with Masks

Attention	Say the person's name before beginning conversation to get their attention
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Face the Speaker	Though you may not get visual clues from the patient's mouth, facing them will improve the signal to noise ratio
Use Clear Speech	Talk slightly slower, louder, articulate speech sounds, and take pauses; This is not exaggerated speech or shouting
Reduce Noise	Reduce competing noise, move to a quieter space or turn off unnecessary noise sources
Use Repair Strategies	If you do not understand, ask for clarification by repeating the information heard and ask for repetition or rephrasing of the communication
Use technology	Use amplifying devices if available (e.g. hearing aids). Consider smartphone based apps (e.g. EarMachine app)
Have Patience	Try not to get frustrated or blame the other person

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