National Institute on Deafness and Other Communication Disorders (NIDCD)

COVID-19 Research

Debara L. Tucci
NIDCD Director

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NIDCD Mission and Vision

**Mission:** To conduct and support research and research training in the normal and disordered processes of hearing, balance, taste, smell, voice, speech, and language.

**Vision:** Advancing the science of communication to improve lives.
Communication Challenges During the Pandemic

Face coverings obscure facial features and can:

- disrupt speech perception
- hide the emotion conveyed by the speaker
- filter speech, making sounds less clear

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BE AWARE
Is the person you're communicating with having trouble understanding you? Ask and adapt if needed.

BE PATIENT
Face coverings block visual cues and muffle sounds that help us understand speech, which can make interactions frustrating.

BE MINDFUL
Consider how physical distancing might affect your communication. As distance increases, sound levels decrease, and visual cues are more difficult to see.

BE LOUD AND CLEAR
Speak up, but don't shout. Focus on speaking clearly. Consider wearing a clear face covering, if possible. If you're having trouble understanding, ask the person you're talking with to speak louder. If you lip-read, ask those you interact with regularly to wear a clear face covering.

TURN DOWN THE BACKGROUND VOLUME
Background noise can make conversation especially hard. When possible, move to a quieter spot or turn down the sound.

COMMUNICATE ANOTHER WAY
Use a smartphone talk-to-text application or writing tools (paper/pen, whiteboard) to communicate.*

CONFIRM THAT YOUR STATEMENT IS CLEAR
Ask if your message has been understood.

BRING A FRIEND OR BE A FRIEND
If it's essential that you comprehend important spoken details—during a discussion with a health care provider, for example—consider bringing a friend or family member with you. Or, offer to come along to listen and take notes when a friend has an important appointment or meeting.
Loss of Smell is a Strong Predictor of COVID-19

- Vaira et al. 1
- Hintschich et al.
- Atlin et al.
- Petrocelli et al.
- Vaira et al. 5
- Vaira et al. 4
- Vaira et al. 3
- Iravani et al.
- Hornuss et al.
- Moein et al. 1
- Moein et al. 2

<table>
<thead>
<tr>
<th>Study</th>
<th>Cases of Smell Loss</th>
<th>Cases without Smell Loss</th>
<th>Percentage of Cases with Smell Loss</th>
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<tr>
<td>Vaira et al. 2</td>
<td>17</td>
<td>50</td>
<td>52%</td>
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<tr>
<td>Hintschich et al</td>
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<td>63%</td>
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<td>Iravani et al.</td>
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<tr>
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<td>96%</td>
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<tr>
<td>Moein et al. 2</td>
<td>1</td>
<td>59</td>
<td>98%</td>
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Regeneration and the Peripheral Olfactory System

- The olfactory epithelium is renowned for its ability to support life-long neurogenesis and to recover after injury and restore its projection into the central nervous system.

- The olfactory epithelium is composed of three distinct cell types: basal cells, olfactory sensory neurons, and sustentacular (or supporting) cells.
Likely Olfactory System Entry Points for SARS-CoV-2

Inflammatory cytokines may also directly or indirectly inhibit olfactory sensory neuron function.

Sustentacular cells, Bowman’s gland cells, and microvillar cells in the olfactory epithelium may be direct entry points for the virus.

Indirect Inhibition of OSN function
- Inflammatory cytokines
  - Intermediating cell types
  - OSNs

Cooper et al, 2020
COVID-19 and Chemosensory Research (Administrative Supplements)

- Determine if anosmia is an early indicator of COVID-19
- Identification of genetic variation associated with anosmia in individuals with COVID-19
- Characterization of the expression of ACE2, TMPRSS2, and related SARS-CoV-2 entry genes in olfactory and taste epithelia
- Examine mechanisms underlying persistent smell loss in COVID ‘long-haulers’ (5-10% patients still have severe to complete smell loss 6 months post infection)
Analysis of postmortem tissue from patients who died due to COVID-19 to determine if virus is neuro-invasive. This work will:

- evaluate the olfactory periphery and olfactory bulb for COVID-related changes in histology, cell morphology, tissue degeneration, immune responses, vasculature, and gene expression
- elucidate possible morphological and molecular changes in taste epithelium associated with SARS-CoV-2 infection
COVID-19 Research in Other NIDCD Mission Areas (Administrative Supplements)

- Evaluate if calcitonin gene-related peptide blockers (for treating migraines) may reduce COVID-19 severity
- Assess the effects of COVID-19 on access to hearing healthcare for deaf/hard of hearing children/families
- Determine the optimal level of tele-practice treatment platforms for children with language impairment
- Develop interventions to reduce the incidence and impact of post-intubation laryngeal injury
NIDCD Notice of Special Interest: COVID-19

Research on the Impact of COVID-19 on Mission Specific Sensory and Communication Disorders

- NOT-DC-20-008 (NIDCD contact: Bracie Watson)
- Applications for research on COVID-19 in relation to NIDCD’s mission areas

- Various eligible funding mechanisms (R01, R21, with or without clinical trials), SBIR/STTR (small business grants)
- Encourages multi-disciplinary approaches to move the research beyond *in vitro* and animal models
NIH Rapid Acceleration of Diagnostics (RADx): Initiatives and Goals

RADx-Tech
(speed up development of point-of-care and home-based testing for COVID-19 ('Shark Tank' competition))

RADx-ATP
(Advanced Tech Platforms)
supports rapid scale-up of existing advanced testing platforms

RADx-UP
(Underserved Populations)
addresses disparities in COVID-19 morbidity and mortality

RADx-Radical
(rad)
supports new non-traditional approaches to address gaps in COVID-19 testing

“Now is the time for that unmatched American ingenuity to bring the best and most innovative technologies forward to make testing for COVID-19 widely available.”

— NIH Director Francis S. Collins, M.D., Ph.D.
RADx-rad Initiative: Chemosensory Testing as a COVID-19 Screening Tool

Develop objective chemosensory tests to screen for COVID-19

- Fast, instantaneous results
- Disposable, self-administered
- Highly scalable
- Validated using diverse populations and across the lifespan
- Stable and suitable for global deployment
- Multiple versions to allow for repeat testing with the same person over time

- Determine if chemosensory loss is an early indicator of COVID-19 and predictive of disease severity, disease persistence, or other neurological manifestations.
- NIDCD funded 4 awards at a total cost of $3.7 million
Ensuring Support for Investigators during the COVID-19 Pandemic

- **Delayed the start dates** of some awards to accommodate lab closures
- **Approved generous no-cost extensions** as well as modifications of existing protocols to allow telehealth/virtual intervention approaches
- Encouraged grantees to **shift research focus** to other activities or convert in-person activities to virtual, when appropriate to focus on safe conduct of research

- **Extended eligibility period** of some early career applicants
- Permitted **continued payment of salaries** on research grants despite lab closures and increased clinical responsibilities during pandemic
- **Allowed a one-page update** with preliminary data as post-submission materials for applications
- Allowed early career scientists whose career trajectories have been significantly impacted by COVID-19 to request **grant extensions** – F, K, and ECR (R21) grantees
Questions?

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