

Supplemental Online Content

Waggoner JJ, Vos MB, Tyburski EA, et al. Concordance in SARS-CoV-2 test results using nasal self-swabbing in children and adolescents vs health care workers. *JAMA*. doi:10.1001/jama.2022.14877

eAppendix. Self-swab Evaluation Questionnaire

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This supplemental material has been provided by the authors to give readers additional information about their work.

eAppendix

Self-swab evaluation questionnaire

To participant: What did you think about the video?

1. Enter participant response _____
2. Did the participant attempt the swab collection? (Y/N)
3. Did you observe the participant experiencing significant difficulties while completing the swab collection? (Y/N)
4. Did the participant require assistance? (Y/N)
If yes, what kind of assistance? (**Technical, Instructional, Task**)
 - During which task(s) did the participant require assistance? (**Opening the packaging, grasping the swab, swabbing the nostrils, placing swab in collection tube**)
5. Was the swab collection completed correctly? (Y/N)

To participant: Can you tell me what it was like to use the swab in your nose?

6. Sum up participant response (e.g., “scary,” “easy,” “hard,” “gross,” “fun,” etc.) _____

To participant: Can you tell me how it felt to use the swab in your nose?

7. Enter participant response _____

To participant: Was there anything that was hard to do?

8. *Use participant response to answer the following question:* Did the participant indicate difficulties completing the swab collection? (Y/N/Unsure)
If yes During which task(s) did the participant indicate difficulty? (**Opening the packaging, grasping the swab, swabbing the nostrils, placing swab in collection tube**)

To participant: Do you think your friends in the same grade as you would be able to use the swab in their own nose?

9. Enter participant response (Y/N)

To participant: Can you pretend I’ve never used a swab in my nose and explain to me how to do it?

10. Did participant accurately explain all steps? (Y/N)
11. Record any other relevant comments from participant _____

Self-collection Instructional Video Link: <https://www.youtube.com/watch?v=2hbuic-VK8w>

Self-collection Instructional Handout: Images and Written Instructions

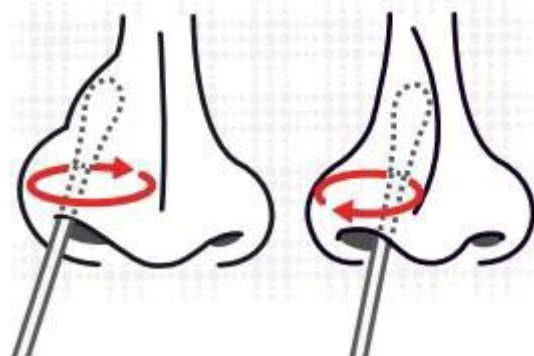
Step 1: Wash hands with soap and water, or use hand sanitizer.



Step 2: When instructed by your teacher to do so, open the tube containing the swab. Be sure to only touch the swab handle, not the soft tip of the swab. Do not let the swab touch anything. If the swab falls or touches anything prior to step 3, please let your teacher know and ask for a new swab.



Step 3: Gently insert the entire soft tip of the swab into one nostril, and rub the swab slowly in a circular motion around the inside wall of your nostril four times. The swab tip should be touching the inside wall of the nostril through each rotation. Repeat the same process with the same swab on the other nostril.



Step 4: Insert the swab back into the tube provided, or place the swab into a container as directed by your teacher.



Self-collection Instructional Handout: Images

Step 1:

Clean Hands



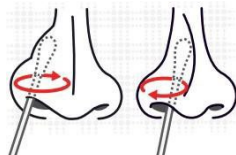
Step 2:

Open Tube



Step 3:

Swab Front of Nose 4 Times on Each Side



Step 4:

Put Swab Back in Tub or Cup



eFigure. Comparison of qualitative SARS-CoV-2 detection by rRT-PCR from self- and HCW-collected nasal swabs by participant age for **A)** participants ≤ 8 or > 8 years old and **B)** each age group.

A

≤ 8 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 36 | 0 | 36 |
| | Negative | 1 | 56 | 57 |
| | Total | 37 | 56 | 93 |

> 8 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 51 | 2 | 53 |
| | Negative | 1 | 49 | 50 |
| | Total | 52 | 51 | 103 |

B

≤ 5 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 8 | 0 | 8 |
| | Negative | 1 | 17 | 18 |
| | Total | 9 | 17 | 26 |

6 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 9 | 0 | 9 |
| | Negative | 0 | 15 | 15 |
| | Total | 9 | 15 | 24 |

7 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 10 | 0 | 10 |
| | Negative | 0 | 14 | 14 |
| | Total | 10 | 14 | 24 |

8 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 9 | 0 | 9 |
| | Negative | 0 | 10 | 10 |
| | Total | 9 | 10 | 19 |

9 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 13 | 0 | 13 |
| | Negative | 0 | 8 | 8 |
| | Total | 13 | 8 | 21 |

10 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 9 | 0 | 9 |
| | Negative | 1 | 6 | 7 |
| | Total | 10 | 6 | 16 |

11 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 9 | 0 | 9 |
| | Negative | 0 | 14 | 14 |
| | Total | 9 | 14 | 23 |

12 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 8 | 1 | 9 |
| | Negative | 0 | 9 | 9 |
| | Total | 8 | 10 | 18 |

13-14 years old

| | | HCW Sample | | |
|-----------------------|----------|------------|----------|-------|
| | | Positive | Negative | Total |
| Self-collected Sample | Positive | 12 | 1 | 13 |
| | Negative | 0 | 12 | 12 |
| | Total | 12 | 13 | 25 |

eTable 1. Characteristics of HCWs involved in participant swabbing and completion of the useability questionnaire.

| HCW | Age | Gender | Position | Pediatric experience, years | Swabbing experience, months |
|------------|------------|---------------|----------------------------------|--|--|
| 1 | 58 | Female | Registered Nurse | 37 | 20 |
| 2 | 56 | Female | Registered Nurse | 20 | 18 |
| 3 | 39 | Female | Licensed Practical Nurse | 15 | 18 |
| 4 | 41 | Female | Clinical Research Coordinator | NA | 48 |
| 5 | 30 | Female | Nurse Practitioner | 4 | 12 |

eTable 2. Analysis of the direction and degree of SARS-CoV-2 N2 Ct differences in the CDC EUA rRT-PCR between self- and HCW-collected swabs.

| Category, n (%) | <3.3 cycles N=59 | Self-collected ≥3.3 cycles lower N=12 | HCW-collected ≥3.3 cycles lower N=16 |
|--|---------------------|---|--|
| Age in years, median (IQR) | 9 (7, 12) | 10 (8, 11) | 9 (7.5, 11) |
| Age Group | | | |
| 4-5 | 7/59 (11.9%) | 0/12 (0.0%) | 1/16 (6.3%) |
| 6 | 7/59 (11.9%) | 0/12 (0.0%) | 2/16 (12.5%) |
| 7 | 6/59 (10.2%) | 3/12 (25.0%) | 1/16 (6.3%) |
| 8 | 8/59 (13.6%) | 0/12 (0.0%) | 1/16 (6.3%) |
| 9 | 7/59 (11.9%) | 2/12 (16.7%) | 4/16 (25.0%) |
| 10 | 3/59 (5.1%) | 4/12 (33.3%) | 2/16 (12.5%) |
| 11 | 6/59 (10.2%) | 0/12 (0.0%) | 3/16 (18.8%) |
| 12 | 6/59 (10.2%) | 1/12 (8.3%) | 1/16 (6.3%) |
| 13-14 | 9/59 (15.3%) | 2/12 (16.7%) | 1/16 (6.3%) |
| Gender | | | |
| Female | 28/58 (48.3%) | 6/12 (50.0%) | 8/15 (53.3%) |
| Male | 30/58 (51.7%) | 6/12 (50.0%) | 7/15 (46.7%) |
| Race/ethnicity | | | |
| Black/African American | 37/56 (66.1%) | 10/12 (83.3%) | 4/15 (26.7%) |
| Hispanic | 2/56 (3.6%) | 0/12 (0.0%) | 1/15 (6.7%) |
| White | 17/56 (30.4%) | 1/12 (8.3%) | 8/15 (53.3%) |
| Other | 0/56 (0.0%) | 1/12 (8.3%) | 2/15 (13.3%) |
| Days post-symptom onset, median (IQR) | 3 (2, 4) | 1 (1, 3) | 4 (1, 4) |
| Q4. Did the participant require assistance? | | | |
| No | 52/58 (89.7%) | 10/11 (90.9%) | 11/15 (73.3%) |
| Yes | 6/58 (10.3%) | 1/11 (9.1%) | 4/15 (26.7%) |
| Q5. Was the swab collection completed correctly? | | | |
| No | 16/58 (27.6%) | 7/15 (46.7%) | 2/11 (18.2%) |
| Yes | 42/58 (72.4%) | 8/15 (53.3%) | 9/11 (81.8%) |

eTable 3. Complete usability questionnaire results from symptomatic children and adolescents, stratified by age.

| Category, n | Age | | | | | | | | |
|---|--------------|------------|------------|------------|------------|-------------|-------------|-------------|----------------|
| | 4-5, N=26 | 6, N=24 | 7, N=24 | 8, N=19 | 9, N=21 | 10, N=16 | 11, N=23 | 12, N=18 | 13-14, N=25 |
| Q1. HCW to participant: What did you think about the video? | | | | | | | | | |
| Contained "good" | 6 | 9 | 4 | 5 | 7 | 7 | 11 | 7 | 8 |
| Contained "easy" | 4 | 3 | 6 | 2 | 2 | 0 | 4 | 3 | 5 |
| Contained "liked it" | 5 | 3 | 6 | 2 | 4 | 1 | 0 | 0 | 0 |
| Missing | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| Q2. Did the participant attempt the swab collection? | | | | | | | | | |
| No | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yes | 23 | 24 | 24 | 19 | 20 | 16 | 23 | 18 | 23 |
| Missing | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Q3. Did you observe the participant experiencing significant difficulties while completing the swab collection? | | | | | | | | | |
| No | 12 | 20 | 17 | 19 | 17 | 14 | 18 | 14 | 21 |
| Yes | 12 | 4 | 7 | 0 | 3 | 2 | 4 | 4 | 2 |
| Missing | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| Q4. Did the participant require assistance? | | | | | | | | | |
| No | 15 | 19 | 19 | 18 | 18 | 14 | 18 | 18 | 23 |
| Yes | 9 | 5 | 4 | 1 | 2 | 2 | 4 | 0 | 0 |
| Missing | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 2 |
| Q4a. If yes, what kind of assistance? | | | | | | | | | |
| Technical | 2 | 3 | 3 | 0 | 2 | 2 | 2 | 0 | 0 |
| Instructional | 7 | 2 | 3 | 1 | 0 | 0 | 3 | 0 | 0 |
| Task | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| Missing | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Q4b. During which task(s) did the participant require assistance? | | | | | | | | | |
| Opening the packaging | 2 | 1 | 2 | 0 | 2 | 2 | 2 | 0 | 0 |
| Grasping the swab | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Swabbing the nostrils | 7 | 4 | 2 | 1 | 0 | 1 | 3 | 0 | 0 |
| Other | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Missing | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Q4 Other. During which task(s) did the participant require assistance? | | | | | | | | | |
| Afraid to swab | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Afraid to test, NP the day before. | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Q5. Was the swab collection completed correctly? | | | | | | | | | |
| No | 13 | 9 | 4 | 4 | 5 | 4 | 2 | 3 | 3 |
| Yes | 11 | 14 | 20 | 15 | 15 | 12 | 20 | 15 | 19 |
| Missing | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 3 |
| Q6. HCW to participant: Can you tell me what it was like to use the swab in your nose? | | | | | | | | | |
| Contained "easy" | 8 | 13 | 11 | 11 | 8 | 5 | 13 | 15 | 14 |
| Contained "tickled" | 2 | 1 | 4 | 1 | 3 | 0 | 3 | 0 | 0 |
| Contained "fun" | 1 | 2 | 1 | 2 | 2 | 2 | 0 | 0 | 2 |
| Contained "okay" | 4 | 2 | 1 | 0 | 1 | 2 | 2 | 0 | 0 |
| Missing | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |

| | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|
| Q7. HCW to participant: Can you tell me how it felt to use the swab in your nose? | | | | | | | | | |
| Contained "tickled" | 8 | 11 | 14 | 10 | 6 | 10 | 9 | 6 | 8 |
| Contained "did not hurt" | 2 | 2 | 0 | 0 | 1 | 0 | 1 | 3 | 3 |
| Contained "soft" | 3 | 1 | 0 | 2 | 2 | 0 | 0 | 1 | 0 |
| Missing | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |
| Q8. HCW to participant: Was there anything that was hard to do? Did the participant indicate difficulties completing the swab collection? | | | | | | | | | |
| No | 18 | 21 | 21 | 18 | 17 | 16 | 21 | 18 | 22 |
| Yes | 4 | 2 | 1 | 1 | 3 | 0 | 1 | 0 | 1 |
| Unsure | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Missing | 3 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 2 |
| Q8a. If yes, during which task(s) did the participant indicate difficulty? | | | | | | | | | |
| Opening the packaging | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Grasping the swab | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Swabbing the nostrils | 3 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Missing | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Q8a Other. Describe other | | | | | | | | | |
| Complete swabbing | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Q9. HCW to participant: Do you think your friends in the same grade as you would be able to use the swab in their own nose? | | | | | | | | | |
| No | 2 | 3 | 1 | 1 | 2 | 0 | 1 | 1 | 0 |
| Yes | 19 | 20 | 21 | 18 | 18 | 16 | 21 | 17 | 23 |
| Missing | 5 | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 2 |
| Q10. HCW to participant: Can you pretend I've never used a swab in my nose and explain to me how to do it? | | | | | | | | | |
| No | 14 | 10 | 4 | 2 | 5 | 0 | 2 | 2 | 3 |
| Yes | 8 | 14 | 19 | 17 | 15 | 16 | 20 | 16 | 20 |
| Missing | 4 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 2 |

eTable 4. Complete usability questionnaire results binned by age.

| Category, n | Total, N=196 | Age ≤8, N=93 | >8, N=103 |
|---|--------------|-----------------|-----------|
| Q1. HCW to participant: What did you think about the video? | | | |
| Contained “good” | 64 | 24 | 40 |
| Contained “easy” | 29 | 15 | 14 |
| Contained “liked it” | 21 | 16 | 5 |
| Missing | 6 | 3 | 3 |
| Q2. Did the participant attempt the swab collection? | | | |
| No | 1 | 1 | 0 |
| Yes | 190 | 90 | 100 |
| Missing | 5 | 2 | 3 |
| Q3. Did you observe the participant experiencing significant difficulties while completing the swab collection? | | | |
| No | 152 | 68 | 84 |
| Yes | 38 | 23 | 15 |
| Missing | 6 | 2 | 4 |
| Q4. Did the participant require assistance? | | | |
| No | 162 | 71 | 91 |
| Yes | 27 | 19 | 8 |
| Missing | 7 | 3 | 4 |
| Q4a. If yes, what kind of assistance? | | | |
| Technical | 14 | 8 | 6 |
| Instructional | 16 | 13 | 3 |
| Task | 4 | 5 | 0 |
| Missing | 5 | 2 | 3 |
| Q4b. During which task(s) did the participant require assistance? | | | |
| Opening the packaging | 11 | 5 | 6 |
| Grasping the swab | 3 | 3 | 0 |
| Swabbing the nostrils | 18 | 14 | 4 |
| Other | 2 | 2 | 0 |
| Missing | 5 | 2 | 3 |
| Q4 Other. During which task(s) did the participant require assistance? | | | |
| Afraid to swab | 1 | 1 | 0 |
| Afraid to test. NP the day before. | 1 | 1 | 0 |
| Q5. Was the swab collection completed correctly? | | | |
| No | 47 | 30 | 17 |
| Yes | 141 | 60 | 81 |
| Missing | 8 | 3 | 5 |
| Q6. HCW to participant: Can you tell me what it was like to use the swab in your nose? | | | |
| Contained “easy” | 98 | 43 | 55 |
| Contained “tickled” | 14 | 8 | 6 |
| Contained “fun” | 12 | 6 | 6 |
| Contained “okay” | 12 | 7 | 5 |
| Missing | 6 | 2 | 4 |
| Q7. HCW to participant: Can you tell me how it felt to use the swab in your nose? | | | |
| Contained “tickled” | 82 | 43 | 39 |
| Contained “did not hurt” | 12 | 4 | 8 |
| Contained “soft” | 9 | 6 | 3 |
| Missing | 6 | 2 | 4 |

| | | | |
|---|-----|----|----|
| Q8. HCW to participant: Was there anything that was hard to do? Did the participant indicate difficulties completing the swab collection? | | | |
| No | 172 | 78 | 94 |
| Yes | 13 | 8 | 5 |
| Unsure | 3 | 3 | 0 |
| Missing | 8 | 4 | 4 |
| Q8a. If yes, during which task(s) did the participant indicate difficulty? | | | |
| Opening the packaging | 3 | 1 | 2 |
| Grasping the swab | 1 | 1 | 0 |
| Swabbing the nostrils | 8 | 6 | 2 |
| Other | 1 | 1 | 0 |
| Q8a Other. Describe other | | | |
| Complete swabbing | 1 | 1 | 0 |
| Q9. HCW to participant: Do you think your friends in the same grade as you would be able to use the swab in their own nose? | | | |
| No | 11 | 7 | 4 |
| Yes | 173 | 78 | 95 |
| Missing | 12 | 8 | 4 |
| Q10. HCW to participant: Can you pretend I've never used a swab in my nose and explain to me how to do it? | | | |
| No | 42 | 30 | 12 |
| Yes | 145 | 58 | 87 |
| Missing | 9 | 5 | 4 |
