OBSTETRICS & GYNECOLOGY

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- Comments from the reviewers and editors (email to author requesting revisions)
- Response from the author (cover letter submitted with revised manuscript)*

**The corresponding author has opted to make this information publicly available.*

Personal or nonessential information may be redacted at the editor's discretion.

Questions about these materials may be directed to the *Obstetrics & Gynecology* editorial office: obgyn@greenjournal.org.

Date: Jul 23, 2020
To: "Amy Hermesch" [redacted]
From: "The Green Journal" em@greenjournal.org
Subject: Your Submission ONG-20-2023

RE: Manuscript Number ONG-20-2023

SARS-CoV-2 Environmental Contamination and Childbirth

Dear Dr. Hermesch:

Your manuscript has been reviewed by the Editorial Board and by special expert referees. The Editors are interested in potentially publishing your revised manuscript in a timely manner. In order to have this considered quickly, we need to have your revision documents submitted to us as soon as you are able. I am tentatively setting your due date to July 27, 2020, but please let me know if you need additional time.

The standard revision letter text follows.

If you wish to consider revising your manuscript, you will first need to study carefully the enclosed reports submitted by the referees and editors. Each point raised requires a response, by either revising your manuscript or making a clear and convincing argument as to why no revision is needed. To facilitate our review, we prefer that the cover letter include the comments made by the reviewers and the editor followed by your response. The revised manuscript should indicate the position of all changes made. We suggest that you use the "track changes" feature in your word processing software to do so (rather than strikethrough or underline formatting).

REVIEWER COMMENTS:

Reviewer #1: The authors performed a small, description study of surfaces and "passive and active air" sampling which were studied before and after the delivery of four asymptomatic COVID-19 patients. This included sampling from 2 vaginal and 2 cesarean deliveries to determine the amount of generated virus contamination.

1.Line 55: Would suggest you modify the statement about transmission during L and D has not been studied with the phrase "to our knowledge".

2. The description of active air sampling is unclear to me and likely to be unclear to the readership: can you explain this technique more fully?

3. It is implied, but were those conducting the study known to be COVID-19 negative at the same time as the ascertainment of samples? Please clarify.

4. Line 137: you mean PPE when you use the term "respirators" for health care workers?

5. Although you demonstrate contamination, can you expound on the potential differences between aerosol exposure versus surface exposure and potential infection risk? You would think that the risks to HCW and others would not be the same from these two groups: some development in your discussion might be useful about these differences.

6. You mention that the pressures in the delivery rooms varied: negative pressure, positive pressure, etc: how do you think this affected your results? Why would the room pressures affect your results?

7. What method of delivery for the cesarean patients? If there was an intubation involved this would be useful to report. Did both vaginal deliveries have epidural anesthesia? No anesthesia? This would help describe the amount of discomfort or verbal sounds that might occur secondary to a delivery without regional anesthesia.

8. Line 139: With respect to your limitations: visitors (one per delivery?) and HCW were not tested (stated on line 163) and might do best in your limitation paragraph. Therefore, was there more exposure that was unexpected in these rooms? Again, does the pressure differences in the rooms affect your results?

9. Line 178: you assume that PPE will be depleted, but that is not known or should be referenced. Please modify this statement.

10. In your author list, Dr. Martindale is not given a department, and the Department of Surgery is listed from OHSU: is that his association? It is interesting that you have a surgeon as an author but not an anesthesiologist.

Reviewer #3: The purpose of this manuscript was to "explore the L&D built environment and HCW PPE to provide preliminary data as a foundation for future research and guidance for continued HCW protection." This was a case series of four subjects and their labor and delivery rooms: 2 with vaginal delivery and 2 who had cesarean section.

1. Could the authors expand their discussion of sampling? How valid is swabbing the HCW face shield at obtaining viral particles? Did the authors spike the same type of face shields with SARS-CoV-2 viral particles, swab the face shield and determine recovery rate of viral particles? Did the authors consider processing the face shields in extraction buffer with detergents (as done previously for influenza studies)? What is the effect of freezing the sample at -80 degrees Centigrade and does the length of time the sample is cryopreserved effect the results?

2. In the Materials and Methods section, could the authors expand their discussion of their passive and active air sampling techniques? Was the passive sampling technique simply placing sterile petri dishes around the room, or did the petri dish contain media (and what type of media)? For the active air sampling technique did they use a collection media with the glass impinger (and what was the media if used)? What size of glass impinger was used and did it have a fritted nozzle? Did the authors compare different flow rates for detecting SARS-CoV-2 viral particles? The authors note that one limitation was short collection time. Did the authors compare the efficacy of different collection times on detecting the virus? How valid and reliable is having a flow rate of 12.5 L/min for only one hour at detecting the virus?

3. During this study were the Health Care Workers limited to only caring for the one SARS-CoV-2 positive patient? Or did the HCWs care for more than one patient during the study and move between rooms? Were the patients in a private or semi-private room? If they cared for more than one patient were the other patients SARS-CoV-2 positive or negative? How did they avoid cross-contamination? Were the HCWs required to wear the same face shield and other PPE when dealing with the experimental subject, and remove it if they left the room to go to another patients room? Did the patients labor and deliver in the same room? Or were they moved to a delivery suite, or operating room for the cesarean sections? What type of anesthesia was used during labor and delivery? What was the air exchange in the rooms for labor and delivery?

4. The authors note one limitation was small 'n'? Did the authors consider increasing their sample size and include subjects who were SARS-CoV-2 positive and symptomatic, SARS-CoV-2 negative and asymptomatic as well as the asymptomatic SARS-CoV-2 positive subjects?

5. Why did the authors use a qRT-PCR targeting only the spike glycoprotein gene? What is the cross-reactivity of this qRT-PCR with other coronaviruses and other respiratory viruses? What is the sensitivity and specificity of this assay for SARS-CoV-2?

6. On Figure 1, could the authors label the role of each health care team member; anesthesiologist, Obstetrician, RN, etc?

7. Could the authors please re-format Table 1? In my electronic copy and printed copy there are a number of overlapping words making difficult to read. Please also include a title for Table 1.

8. "L&D built environment" What is the built environment?

Reviewer #3:

1. It is not clear whether the face shields were used in other patients before, nor how they were removed. It would be important to address the issue of whether they were contaminated before or after the clinician left the room, and not while inside the room. It is also important to make sure that the clinicians did not touch the shield with their gloved hands or otherwise.

2. Was the face shield swabbed on the surface facing outside or towards the face?
3. It is important to provide some more information about the time and timing during birth the HCW were present. Were these HCW present in the room during the early stage of labor or during the actual delivery or second stage. How long were they in the room?

4. It is not accurate to use the number of samples as the denominator. The data should be provided per patient. I would suggest that each patient be presented separate and the number of positive to total samples obtained, per site, be provided. For example, if 4 samples from one patient were all positive and none of the 12 samples from the 3 other patients were positive, it would be misleading to say that 25% of the samples were positive. Just as an example.

5. The positive swabs increased, but not by much. The small sample size and the fact that all the swabs were combined in the denominator makes it difficult to judge if that increase is significant or not.

6. The authors may want to discuss how do their findings compare with findings in non-pregnant or non-laboring patients. The real question is: should we do anything different in labor than what the medical service is doing in non-pregnant patients.

7. I am not sure how to use these findings to impact management. We already assume, or have some limited evidence, that we need to manage patients in labor as if they produce aerosols. I am not sure this study changes anything in what we do. A more useful study would be to determine environmental contamination at different stages of labor or cesarean delivery with intubation versus regional anesthesia.

ASSOCIATE EDITOR: We are happy to have received your submission. We welcome a revision with two conditions: 1) That you are able to adequately address the reviewers' concerns, and 2) that you are willing to re-format as a Research Letter.

The guidelines are as follows:

The Research Letter is a concise, focused report of original research (including pre-clinical research, sub-analyses or updates of previously published research, small studies, or pilot studies). Length should not exceed 600 words (approximately 2 1/2 manuscript pages; see Table 1). Figures or tables are limited to two, total.

Research Letters should be organized using the following headings: Introduction, Methods, Results and Discussion. An abstract should not be included.

MANUSCRIPT EDITOR:

1. The following co-authors will need to complete our electronic Copyright Transfer Agreement, which was sent to them by email through Editorial Manager. Once the form is complete, please add their disclosures to the “Financial Disclosure” section:

Leslie Dietz
Mark Fretz
William B. Messer
Robert Martindale
Kevin Van Den Wymelenberg

2. In the byline, Mark Fretz’s name appears as “Mark Fretz, DDS, MArch.” Are his degrees correct?

3. Please expand the abbreviation "HCW" to read, "health care worker" throughout your manuscript.

4. Your abstract should follow our format for Original Research articles. Please include the following:

Objective: Main question, objective, or hypothesis (single phrase starting with, for example, “To evaluate…” or “To estimate.” [never start with “To determine.”]).

Methods: Study design, participants, outcome measures, and, in the case of a negative study, statistical power.

Results: Measurements expressed in absolute numbers and percentages, and when appropriate indicate relative risks or odds ratios with confidence intervals and level of statistical significance; any results contained in the abstract should also be presented in the body of the manuscript, tables, or figures.

Conclusion: Directly supported by data, along with clinical implications. Do not include statements such as “further research is needed.”

5. Please expand the virgule to mean "and" or "or" in phrases with only words, such as "speaking/singing" on line 58.

6. Add details of a literature search to support your statement on lines 179-184: "To our knowledge, a direct comparison between childbirth and other aerosol-generating procedures has not been done to support the current CDC statement: “forceful exhalation during second stage of labor is not considered an aerosol-generating procedure for respirator prioritization during shortages over procedures more likely to generate higher concentrations of infectious respiratory aerosols[6]." Add databases searched, dates searched (including years), and search terms.

7. Add a title to Table 1. Also, please insert it in the manuscript using the "Table" function. The current version is not editable.

EDITORIAL OFFICE COMMENTS:

1. The Editors of Obstetrics & Gynecology are seeking to increase transparency around its peer-review process, in line with efforts to do so in international biomedical peer review publishing. If your article is accepted, we will be posting this revision letter as supplemental digital content to the published article online. Additionally, unless you choose to opt out, we will also be including your point-by-point response to the revision letter. If you opt out of including your response, only the revision letter will be posted. Please reply to this letter with one of two responses:
A. OPT-IN: Yes, please publish my point-by-point response letter.
B. OPT-OUT: No, please do not publish my point-by-point response letter.

2. Obstetrics & Gynecology uses an "electronic Copyright Transfer Agreement" (eCTA). When you are ready to revise your manuscript, you will be prompted in Editorial Manager (EM) to click on "Revise Submission." Doing so will launch the resubmission process, and you will be walked through the various questions that comprise the eCTA. Each of your coauthors will receive an email from the system requesting that they review and electronically sign the eCTA.

Please check with your coauthors to confirm that the disclosures listed in their eCTA forms are correctly disclosed on the manuscript's title page.

3. Figure 1: What is the source of the clipart? Permission may be necessary to reuse.

Tables, figures, and supplemental digital content should be original. The use of borrowed material (eg, lengthy direct quotations, tables, figures, or videos) is discouraged. If the material is essential, written permission of the copyright holder must be obtained.

Both print and electronic (online) rights must be obtained from the holder of the copyright (often the publisher, not the author), and credit to the original source must be included in your manuscript. Many publishers now have online systems for submitting permissions request; please consult the publisher directly for more information. Permission is also required for material that has been adapted or modified from another source. Increasingly, publishers will not grant permission for modification of their material. Creative Commons licenses and open access have also made obtaining permissions more challenging. In order to avoid publication delays, we strongly encourage authors to link or reference to the material they want to highlight instead of trying to get permission to reprint it. For example, "see Table 1 in Smith et al" (and insert reference number). For articles that the journal invites, such as the Clinical Expert Series, the journal staff does not seek permission for modifications of material — the material will be reprinted in its original form.

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If the figure or table you want to reprint can be easily found on the internet from a reputable source, we recommend providing a link to the source in your text instead of trying to reprint it in your manuscript.

4. Responsible reporting of research studies, which includes a complete, transparent, accurate and timely account of what was done and what was found during a research study, is an integral part of good research and publication practice and not an optional extra. Obstetrics & Gynecology supports initiatives aimed at improving the reporting of health research, and we ask authors to follow specific guidelines for reporting randomized controlled trials (ie, CONSORT), observational studies (ie, STROBE), observational studies using ICD-10 data (ie, RECORD), meta-analyses and systematic reviews of randomized controlled trials (ie, PRISMA), harms in systematic reviews (ie, PRISMA for harms), studies of diagnostic accuracy (ie, STARD), meta-analyses and systematic reviews of observational studies (ie, MOOSE), economic evaluations of health interventions (ie, CHEERS), quality improvement in health care studies (ie, SQUIRE 2.0), and studies reporting results of Internet e-surveys (CHERRIES). Include the appropriate checklist for your manuscript type upon submission. Please write or insert the page numbers where each item appears in the margin of the checklist. Further information and links to the checklists are available at http://ong.editorialmanager.com. In your cover letter, be sure to indicate that you have followed the CONSORT, MOOSE, PRISMA, PRISMA for harms, STARD, STROBE, RECORD, CHEERS, SQUIRE 2.0, or CHERRIES guidelines, as appropriate.

5. Standard obstetric and gynecology data definitions have been developed through the reVITALize initiative, which was convened by the American College of Obstetricians and Gynecologists and the members of the Women's Health Registry Alliance. Obstetrics & Gynecology has adopted the use of the reVITALize definitions. Please access the obstetric data definitions at https://www.acog.org/practice-management/health-it-and-clinical-informatics/revitalize-obstetrics-data-definitions and the gynecology data definitions at https://www.acog.org/practice-management/health-it-and-clinical-informatics/revitalize-gynecology-data-definitions. If use of the reVITALize definitions is problematic, please discuss this in your point-by-point response to this letter.

6. Because of space limitations, it is important that your revised manuscript adhere to the following length restrictions by manuscript type: Research Letters articles should not exceed 2.5 pages (600 words). Stated page limits include all numbered pages in a manuscript (i.e., title page, précis, abstract, text, references, tables, boxes, figure legends, and print appendixes) but exclude references.

7. Specific rules govern the use of acknowledgments in the journal. Please note the following guidelines:

* All financial support of the study must be acknowledged.
* Any and all manuscript preparation assistance, including but not limited to topic development, data collection, analysis, writing, or editorial assistance, must be disclosed in the acknowledgments. Such acknowledgments must identify the entities that provided and paid for this assistance, whether directly or indirectly.
* All persons who contributed to the work reported in the manuscript, but not sufficiently to be authors, must be acknowledged. Written permission must be obtained from all individuals named in the acknowledgments, as readers may infer their endorsement of the data and conclusions. Please note that your response in the journal's electronic author form verifies that permission has been obtained from all named persons.
* If all or part of the paper was presented at the Annual Clinical and Scientific Meeting of the American College of Obstetricians and Gynecologists or at any other organizational meeting, that presentation should be noted (include the exact dates and location of the meeting).

8. Provide a short title of no more than 45 characters, including spaces, for use as a running foot.

9. Provide a précis on the second page, for use in the Table of Contents. The précis is a single sentence of no more than 25 words that states the conclusion(s) of the report (ie, the bottom line). The précis should be similar to the abstract's conclusion. Do not use commercial names, abbreviations, or acronyms in the précis. Please avoid phrases like "This paper presents" or "This case presents."

10. Only standard abbreviations and acronyms are allowed. A selected list is available online at http://edmgr.ovid.com/ong/accounts/abbreviations.pdf. Abbreviations and acronyms cannot be used in the title or précis. Abbreviations and acronyms must be spelled out the first time they are used in the abstract and again in the body of the manuscript.

11. The journal does not use the virgule symbol (/) in sentences with words. Please rephrase your text to avoid using "and/or," or similar constructions throughout the text. You may retain this symbol if you are using it to express data or a measurement.

12. In your submission, the preferred citation should be in terms of an effect size, such as odds ratio or relative risk or the mean difference of a variable between two groups, expressed with appropriate confidence intervals. When such syntax is used, the P value has only secondary importance and often can be omitted or noted as footnotes in a Table format. Putting the results in the form of an effect size makes the result of the statistical test more clinically relevant and gives better context than citing P values alone.

If appropriate, please include number needed to treat for benefits (NNTb) or harm (NNTh). When comparing two procedures, please express the outcome of the comparison in U.S. dollar amounts.

Please standardize the presentation of your data throughout the manuscript submission. For P values, do not exceed three decimal places (for example, "P = .001"). For percentages, do not exceed one decimal place (for example, 11.1%").

13. Please review the journal's Table Checklist to make sure that your tables conform to journal style. The Table Checklist is available online here: http://edmgr.ovid.com/ong/accounts/table_checklist.pdf.

14. The American College of Obstetricians and Gynecologists' (ACOG) documents are frequently updated. These documents may be withdrawn and replaced with newer, revised versions. If you cite ACOG documents in your manuscript, be sure the reference you are citing is still current and available. If the reference you are citing has been updated (ie, replaced by a newer version), please ensure that the new version supports whatever statement you are making in your manuscript and then update your reference list accordingly (exceptions could include manuscripts that address items of historical interest). If the reference you are citing has been withdrawn with no clear replacement, please contact the editorial office for assistance (obgyn@greenjournal.org). In most cases, if an ACOG document has been withdrawn, it should not be referenced in your manuscript (exceptions could include manuscripts that address items of historical interest). All ACOG documents (eg, Committee Opinions and Practice Bulletins) may be found at the Clinical Guidance page at https://www.acog.org/clinical (click on "Clinical Guidance" at the top).

15. Each supplemental file in your manuscript should be named an "Appendix," numbered, and ordered in the way they are first cited in the text. Do not order and number supplemental tables, figures, and text separately. References cited in appendixes should be added to a separate References list in the appendixes file.

16. Authors whose manuscripts have been accepted for publication have the option to pay an article processing charge and publish open access. With this choice, articles are made freely available online immediately upon publication. An information sheet is available at http://links.lww.com/LWW-ES/A48. The cost for publishing an article as open access can be found at https://wkauthorservices.editage.com/open-access/hybrid.html.

Please note that if your article is accepted, you will receive an email from the editorial office asking you to choose a publication route (traditional or open access). Please keep an eye out for that future email and be sure to respond to it promptly.

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If you choose to revise your manuscript, please submit your revision through Editorial Manager at http://ong.editorialmanager.com. Your manuscript should be uploaded in a word processing format such as Microsoft Word. Your revision's cover letter should include the following:

* A confirmation that you have read the Instructions for Authors (http://edmgr.ovid.com/ong/accounts/authors.pdf), and
* A point-by-point response to each of the received comments in this letter.

If you submit a revision, we will assume that it has been developed in consultation with your co-authors and that each author has given approval to the final form of the revision.

Sincerely,

Dwight J. Rouse, MD
Associate Editor for Obstetrics

2019 IMPACT FACTOR: 5.524
2019 IMPACT FACTOR RANKING: 6th out of 82 ob/gyn journals

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July 30, 2020

Maternal-Fetal Medicine
Obstetrics & Gynecology

[redacted]

[redacted]

Dr. Dwight Rouse, MD
Associate Editor
Obstetrics & Gynecology

Dear Dr. Rouse,

We are respectfully resubmitting our manuscript entitled, “SARS-CoV-2 Environmental Contamination and Childbirth” to be considered for publication in *Obstetrics & Gynecology*.

Thank you for the opportunity to revise this manuscript. Please find responses to reviewer comments below. We appreciate and agree that this manuscript is best published in research letter format given the small sample size. We have significantly reduced the word count. The methods section has been abbreviated but to prioritize transparency and foster collaboration we have provided a detailed supplemental methods section that could be made available as online content for readers. We are happy to consider further manuscript revision pending your review.

This manuscript is not under consideration for publication in any other journals, and there are no professional or financial conflicts that might be perceived as biasing the publication. It has been read by all of the authors and all have approved the submission to *Obstetrics & Gynecology*. All authors meet criteria for authorship. Thank you for reviewing this manuscript, and we look forward to your response.

Sincerely,

Amy C. Hermesch, MD, PhD
Assistant Professor
Division of Maternal Fetal Medicine
Department of Obstetrics & Gynecology
Oregon Health & Science University

REVIEWER COMMENTS:

1.Line 55: Would suggest you modify the statement about transmission during L and D has not been studied with the phrase "to our knowledge".

We have made this change.

2. The description of active air sampling is unclear to me and likely to be unclear to the readership: can you explain this technique more fully?

Active air sampling uses a calibrated mechanical pump to pull indoor air through filter media at a known rate. The advantages of this technique include the ability to quantify gene copies per volume of air, capture of aerosolized particles that may remain suspended in air, ability to aggregate a high volume of air if a low density of biomass is present and reduced collection time due to the higher volume of air. The disadvantage to this technique is that it is loud and has a significant spatial presence, which makes it difficult to locate in patient rooms where floor and counter space are limited, and it may interfere with provider access to the patient. Given significant word count limitations, this has been included in "supplemental methods" section if you think appropriate to publish.

3. It is implied, but were those conducting the study known to be COVID-19 negative at the same time as the ascertainment of samples? Please clarify.

Research personnel performing the RT-PCR and majority of sample collection were confirmed COVID negative throughout study. Two other sample collection personnel were not tested but were asymptomatic. All research personnel wore surgical facemask and gloves during baseline sample collection. They wore N95 respirators, face shield, isolation gown and gloves during sample collection of known COVID positive patients. We have added this information the supplemental methods.

4. Line 137: you mean PPE when you use the term "respirators" for health care workers?

We suggest that given the face shields detected the highest gene copies of all surfaces swabbed, and that droplets are not produced without some level of aerosol, higher level of PPE (N95 respirators and full face shields) should be worn by these providers. We have modified the text to be more specific.

5. Although you demonstrate contamination, can you expound on

the potential differences between aerosol exposure versus surface exposure and potential infection risk? You would think that the risks to HCW and others would not be the same from these two groups: some development in your discussion might be useful about these differences.

We believe that our limited sample size does not allow us to draw conclusions about which type of delivery is higher risk to HCW but we have provided potential hypotheses in the discussion section.

6. You mention that the pressures in the delivery rooms varied: negative pressure, positive pressure, etc: how do you think this affected your results? Why would the room pressures affect your results?

We felt it was important to distinguish between room types as this is an additional variable supposedly important to environmental contamination. Negative pressure rooms are recommended for patients with a potentially air-borne infectious diseases. If you think it might be helpful to include the following in supplemental information, we can include it but otherwise we have not made any additional changes to the manuscript given the word count limitations.

7. What method of delivery for the cesarean patients? If there was an intubation involved this would be useful to report. Did both vaginal deliveries have epidural anesthesia? No anesthesia? This would help describe the amount of discomfort or verbal sounds that might occur secondary to a delivery without regional anesthesia.

Our IRB is for environmental sampling and does not include collecting patient specific data. We have tried to provide non-specific information that might help address this issue and have added that no patient received general anesthesia and two were not able to wear a mask effectively during delivery.

8. Line 139: With respect to your limitations: visitors (one per delivery?) and HCW were not tested (stated on line 163) and might do best in your limitation paragraph. Therefore, was there more exposure that was unexpected in these rooms? Again, does the pressure differences in the rooms affect your results?

We have consolidated these statements into one limitations paragraph. Please see our response to #6 regarding the negative versus positive pressure rooms

9. Line 178: you assume that PPE will be depleted, but that is not known or should be referenced. Please modify this statement.

We have included references regarding PPE to this statement.

10. In your author list, Dr. Martindale is not given a department, and the Department of Surgery is listed from OHSU: is that his association? It is interesting that you have a surgeon as an author but not an anesthesiologist.

Dr. Martindale is a trauma surgeon and the OHSU PI of the environmental COVID research at OHSU in conjunction with the University of Oregon Team and the OHSU Department of Infectious Disease. This research collaboration was already in place prior to COVID and the team rapidly pivoted the work to COVID. This has been corrected in manuscript (he belongs to Department of Surgery).

Reviewer #3

1. Could the authors expand their discussion of sampling? How valid is swabbing the HCW face shield at obtaining viral particles? Did the authors spike the same type of face shields with SARS-CoV-2 viral particles, swab the face shield and determine recovery rate of viral particles? Did the authors consider processing the face shields in extraction buffer with detergents (as done previously for influenza studies)? What is the effect of freezing the sample at -80 degrees Centigrade and does the length of time the sample is cryopreserved effect the results?

We did not spike the face shields with SARS-CoV-2 (this would require BSL3 laboratory). Thus, we are unable to comment on the potential recovery rate of the virus if these types of studies were performed. Downstream from sample collection, the buffer that we used (DNA/RNA Shield) both lyses and inactivates the viral cells, similar to a detergent-

based buffer. The advantage of DNA/RNA shield is that it also stabilizes the RNA for extraction, eliminating the need for storage at ultra-low temperatures for transport. Extensive research exists demonstrating that RNA is stable for up to one year at -80C and that the results should not be affected as long as the number of freeze/thaw cycles is limited, which we do.

2. In the Materials and Methods section, could the authors expand their discussion of their passive and active air sampling techniques? Was the passive sampling technique simply placing sterile petri dishes around the room, or did the petri dish contain media (and what type of media)? For the active air sampling technique did they use a collection media with the glass impinger (and what was the media if used)? What size of glass impinger was used and did it have a fritted nozzle? Did the authors compare different flow rates for detecting SARS-CoV-2 viral particles? The authors note that one limitation was short collection time. Did the authors compare the efficacy of different collection times on detecting the virus? How valid and reliable is having a flow rate of 12.5 L/min for only one hour at detecting the virus?

We have added some additional information to the supplementary methods as follows:

For passive sampling, sterile 60mm x 15mm Petri dishes are opened and both halves placed on a surface with the sterile interior exposed to the room air. No media is used. Airborne microbes accumulate on the both halves of the dish and after a period of time, the dish is closed and sealed with paraffin for transport to the lab for processing. The advantage of this technique is that it is quiet, an important consideration for healthcare environments, inexpensive, and minimally obtrusive; therefore, can be deployed throughout the room for spatial resolution. The disadvantage to this technique is that the gene copies per volume of air cannot be quantitively assessed and more time is required for particles to settle.

For active air sampling we were using the SKC BioSampler impingers from previous studies which does not have a fritted nozzle. The collection media was PBS.

3. During this study were the Health Care Workers limited to only caring for the one SARS-CoV-2 positive patient? Or did the HCWs care for more than one patient during the study and move between rooms? Were the patients in a private or semi-private room? If they cared for more than one patient were the other patients SARS-CoV-2 positive or negative? How did they avoid cross-contamination? Were the HCWs required to wear the same face

shield and other PPE when dealing with the experimental subject, and remove it if they left the room to go to another patients room? Did the patients labor and deliver in the same room? Or were they moved to a delivery suite, or operating room for the cesarean sections? What type of anesthesia was used during labor and delivery? What was the air exchange in the rooms for labor and delivery?

We have added additional information to supplemental methods including that all rooms are private labor and delivery rooms and if a C/S were then moved to the OR. Heath care workers follow standard institution donning and doffing guidelines to avoid cross-contamination. Face shields were either new or sterilized using institution approved Oxyvir Disinfectant wipes when doffing (of note, the delivering providers wore new face shields when entering room during 2nd stage of labor for VB#2). We are unable to comment specifically on the anesthesia type see response to question #7 above.

In terms of air exchange rate, the minimum code required air exchanges are 15 for cesarean delivery rooms, 12 for negative pressure L&D rooms and 4 for neutral pressure L&D rooms. Negative and positive pressure rooms are certified annually.

4. The authors note one limitation was small 'n'? Did the authors consider increasing their sample size and include subjects who were SARS-CoV-2 positive and symptomatic, SARS-CoV-2 negative and asymptomatic as well as the asymptomatic SARS-CoV-2 positive subjects?

We plan to continue this work given the findings and hope to expand upon the question regarding viral viability and will consider your suggestions of the types of patients to include in future research. In this time of rapid scientific investigation, we want to be transparent in our limitations but we also felt it was critical information in regard to decisions around PPE allocation and HCW safety.

5. Why did the authors use a qRT-PCR targeting only the spike glycoprotein gene? What is the cross-reactivity of this qRT-PCR with other coronaviruses and other respiratory viruses? What is the sensitivity and specificity of this assay for SARS-CoV-2?

Given we are not testing for the presence of absence of disease in a patient, we are unable to report sensitively and specificity. However, the lower limit of detection reported in our manuscript (line 99) is 11.1 gene copies (or 2.24 gene copies/uL).

As a reference, here are two other common SARS-CoV-2 primer sets that are used in diagnosis (Chan JF et al. J Clin Microb. 202 Apr 23:58(5). PMID 32132196). They have similar levels of cross-reactivity (we would even say more potential for binding) with other similar CoV genomes (see supplementary figure 1 in reference). We picked the spike gene target because it did seem to be a portion that had been significantly changed from other CoVs, even though the spike is considered to be a fairly highly conserved region in CoVs.

6. On Figure 1, could the authors label the role of each health care team member; anesthesiologist, Obstetrician, RN, etc?

Roles have been labeled in figure.

7. Could the authors please re-format Table 1? In my electronic copy and printed copy there are a number of overlapping words making difficult to read. Please also include a title for Table 1.

We have reformatted – hopefully this has helped with the difference in the electronic versus printing.

8. "L&D built environment" What is the built environment?

The "built environment" refers to a collection of human-constructed environments, such as buildings, rooms within buidings, duct work/airflow, transportation systems and other constructed spaces. The "L&D built environment" is the built environment specifically designed and constructed for the purpose of labor and delivery. We have not made any changes to the manuscript

Reviewer #3:

1. It is not clear whether the face shields were used in other patients before, nor how they were removed. It would be important to address the issue of whether they were contaminated before or after the clinician left the room, and not while inside the room. It is also important to make sure that the clinicians did not touch the

shield with their gloved hands or otherwise.

All clinicians follow standard donning and doffing workflow when entering and leaving rooms of COVID+ patients. Clinicians are instructed to not touch face shields or masks with their hands after donning.

This was added to supplemental methods.

2. Was the face shield swabbed on the surface facing outside or towards the face?

Surface facing outside was swabbed. We have added to the manuscript.

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3. It is important to provide some more information about the time and timing during birth the HCW were present. Were these HCW present in the room during the early stage of labor or during the actual delivery or second stage. How long were they in the room?

Face shields were swabbed only from health care workers present during delivery.

4. It is not accurate to use the number of samples as the denominator. The data should be provided per patient. I would suggest that each patient be presented separate and the number of positive to total samples obtained, per site, be provided. For example, if 4 samples from one patient were all positive and none of the 12 samples from the 3 other patients were positive, it would be misleading to say that 25% of the samples were positive. Just as an example.

We agree it is important to look at individual patient data which is provided in Table 1.

5. The positive swabs increased, but not by much. The small sample size and the fact that all the swabs were combined in the denominator makes it difficult to judge if that increase is significant or not.

Agree that small sample size makes judging significance difficult. We are looking forward to future studies to provide more substantial evidence to draw conclusions.

6. The authors may want to discuss how do their findings compare with findings in non-pregnant or non-laboring patients. The real question is: should we do anything different in labor than what the medical service is doing in non-pregnant patients.

We suggest that health care workers caring for pregnant, laboring COVID + women take the same precautions as health care workers caring for COVID+ non-pregnant, patients undergoing aerosol generating procedures.

7. I am not sure how to use these findings to impact management. We already assume, or have some limited evidence, that we need to manage patients in labor as if they produce aerosols. I am not sure this study changes anything in what we do. A more useful study would be to determine environmental contamination at different stages of labor or cesarean delivery with intubation versus regional anesthesia.

It is important to note that not all hospitals are managing labor patients as if they produce aerosols given limited PPE. We also agree that future directions of this work should include careful investigation of different labor and delivery scenarios. Good thoughts.

ASSOCIATE EDITOR: We are happy to have received your submission. We welcome a revision with two conditions: 1) That you are able to adequately address the reviewers' concerns, and 2) that you are willing to re-format as a Research Letter.

The guidelines are as follows:

The Research Letter is a concise, focused report of original research (including pre-clinical research, sub-analyses or updates of previously published research, small studies, or pilot studies). Length should not exceed 600 words (approximately 2 1/2 manuscript pages; see Table 1). Figures or tables are limited to two, total.

Research Letters should be organized using the following headings: Introduction, Methods, Results and Discussion. An abstract should not be included.

MANUSCRIPT EDITOR:

1. The following co-authors will need to complete our electronic Copyright Transfer Agreement, which was sent to them by email through Editorial Manager. Once the form is complete, please add their disclosures to the "Financial Disclosure" section:

Leslie Dietz
Mark Fretz
William B. Messer
Robert Martindale
Kevin Van Den Wymelenberg

2. In the byline, Mark Fretz's name appears as "Mark Fretz, DDS, MArch." Are his degrees correct?

Yes, correct. (from oral microbiomes to building microbiomes)

3. Please expand the abbreviation "HCW" to read, "health care worker" throughout your manuscript.

Thank you, this has been corrected throughout.

4. Your abstract should follow our format for Original Research articles. Please include the following:

Objective: Main question, objective, or hypothesis (single phrase starting with, for example, "To evaluate..." or "To estimate." [never start with "To determine."]).

Methods: Study design, participants, outcome measures, and, in the case of a negative study, statistical power.

Results: Measurements expressed in absolute numbers and percentages, and when appropriate indicate relative risks or odds ratios with confidence intervals and level of statistical significance; any results contained in the abstract should also be presented in the body of the manuscript, tables, or figures.

Conclusion: Directly supported by data, along with clinical implications. Do not include statements such as "further research is needed."

We have re-formatted our submission as a Research Letter, which is a stand-alone abstract.

5. Please expand the virgule to mean "and" or "or" in phrases with only words, such as "speaking/singing" on line 58.

This has been corrected.

6. Add details of a literature search to support your statement on lines 179-184:

"To our knowledge, a direct comparison between childbirth and other aerosol-generating procedures has not been done to support the current CDC statement: “forceful exhalation during second stage of labor is not considered an aerosol-generating procedure for respirator prioritization during shortages over procedures more likely to generate higher concentrations of infectious respiratory aerosols[6]." Add databases searched, dates searched (including years), and search terms.

This has been added to manuscript.

7. Add a title to Table 1. Also, please insert it in the manuscript using the "Table" function. The current version is not editable.

This has been inserted using table function. Let me know if it still is not editable.