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: Jun 02, 2020
To: "Lina Roa" [redacted]
From: "The Green Journal" em@greenjournal.org
Subject: Your Submission ONG-20-1167

RE: Manuscript Number ONG-20-1167

Travel Time to Access Maternal and Neonatal Care in the United States

Dear Dr. Roa:

Your manuscript has been reviewed by the Editorial Board and by special expert referees. Although it is judged not acceptable for publication in Obstetrics & Gynecology in its present form, we would be willing to give further consideration to a revised version.

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).

Due to the COVID-19 pandemic, your paper will be maintained in active status for 30 days from the date of this letter. If we have not heard from you by Jul 02, 2020, we will assume you wish to withdraw the manuscript from further consideration.

REVIEWER COMMENTS:

Reviewer #1: This is a research letter to map patient travel time to access obstetrical and NICU care across the US according to two different benchmarks.

This is a simple study, yet it is presenting original data. Although I could find similar studies reporting travel times in various other countries, I couldn't find similar articles citing US data. I think this is an interesting study because the data could be used to influence health policy.
Questions for further clarification:
1. The article is short and concise, but I would have liked more information as to why this study is important in a U.S. context. Is there more literature to review to put this study into context? For example, the Society of Obstetrics and Gynecology of Canada has put out a VBAC guideline stating that hospitals that provide VBACs must be able to provide an emergency c-section "immediately". This language has been very controversial, especially in light of the geographical spread of our patient population. Previous Canadian guidelines have cited the ACOG 30 minute rule. Are there other examples in published literature that can be reviewed to provide more context and explanation as to why this data is important or useful?
2. Have Redivis, OpenStreet Map and WorldPop been validated? How accurate are these tools?
3. Do level 1 and level 2 hospitals have NICUs, and if so, would including the data related to this be relevant?

Reviewer #2: 1. Introduction. Good background information. The following are minor.
a. Lines 51-54. Might mention something about the increasingly large proportion of pregnancies now considered high-risk when considering implications about limited access to care.
b. Might include additional rationale for why access to neonatal care is part of the objective. Does this apply to infants transferred following outside delivery?

2. Methods.
a. Lines 60-61. Please clarify how NICU care differs from "special neonatal services" (lines 58-59). Were levels of neonatal care considered?
b. Lines 61-64. Would add another sentence to clarify how you estimated distance and travel time from what to what. Did you look at home addresses of women who delivered and the facilities at which they received care? Were you able to stratify according to level of care?

3. Results.

The table and figures are particularly effective. The fact that ~ 1.5 million pregnant women do not live within 30 minutes of a hospital capable of providing obstetrical care is a strong message. The shading in the figures suggests widely different proportions in different regions of the country. Would it be possible to describe this more fully?

4. Discussion.
This is a good summary. Might add a little more content about the implications of your findings. Can you compare your findings with those of others? Perhaps a few more references?

Reviewer #3:
ONG-20-1167 Travel Time to Access Maternal and Neonatal Care in the United States

Thank you for the opportunity to review this research letter. The authors use the 2016 AHA Annual Survey to map 30 minute and two-hour access of the US population to maternal and obstetric care. Overall this is a well written research letter.

Some points to consider for the authors:
* Introduction: How do the AHA Levels of care differ from the Levels of Maternal Care proposed in the 2019 Obstetric Care Consensus? 1-2 sentences would be helpful to mention.
* Methods: May consider a reference for methods utilizing Redivis, OneStreeMap and population estimates. Are there confidence intervals to time to access provided by this software? For example, 30-minute access may heavily depend on time of day/traffic in urban areas. Similarly in the rural West, season (winter/snow storms) may dramatically impact time to travel to hospital. What the assumptions made by the program in terms of travel time?
* Results: If possible, a brief explanation of why 56 hospitals lack an AHA designation and any common characteristics of those 56 hospitals (mostly small?, rural? Western?)

* Discussion: As timely access to an emergency cesarean is the benchmark for this research letter, one limitation worth mentioning is that these designation do not take into account other critical factors for cesarean such as availability of obstetrical provider or anesthesiologist once travel time has been complete or availability of blood products. While women may have 30- or 2-hour travel time access to a hospital, these designations do take necessarily mean time to cesarean.
o As critical access hospitals in rural communities close (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4946037/), the time to access for obstetric care in rural communities is likely to increase. The authors use one-year (2016) data. Given closures of these hospitals, authors may consider mentioning that these estimates are fluid and may in fact may higher in 2020.

Overall, this is a very interesting and well-done research letter with important implications for consideration of regionalization of maternity care.

Reviewer #4: lines 64: Should include a reference for the spatial population data from WorldPop and the year (I presume 2016 to match with lines 67-69.

EDITOR 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. 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.

4. 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.

5. 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).

6. Provide a short title of no more than 45 characters (40 characters for case reports), including spaces, for use as a running foot.

7. 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."

8. 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.

9. 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.

Please move Table 1 to the end of the manuscript.

10. 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).

Do you have more information on reference 2 ("ACOG Committee on Professional Standards")?

Reference 9 (Obstetric Care Consensus No. 2) is outdated, and only reference 10 (Obstetric Care Consensus No. 9) should be cited.

Figures - Tailor this section based on the email response from the Production Editor.

11. Figure 1: This figure is likely too large for a Research Letter, so you may be asked to move it to supplemental digital content or chose 1 map to include in print. When you submit your revision, art saved in a digital format should accompany it. Please upload each figure as a separate file to Editorial Manager (do not embed the figure in your manuscript file). If you would like to put your figure online only as Appendix 1, please see the next paragraph.

12. 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.

13.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 http://edmgr.ovid.com/acd/accounts/ifauth.htm.

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.

Again, your paper will be maintained in active status for 30 days from the date of this letter. If we have not heard from you by Jul 02, 2020, we will assume you wish to withdraw the manuscript from further consideration..

Sincerely,

The Editors of Obstetrics & Gynecology

2018 IMPACT FACTOR: 4.965
2018 IMPACT FACTOR RANKING: 7th out of 83 ob/gyn journals

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Dear Editorial team and reviewers,

Thank you very much for the opportunity to revise this manuscript, for your time reviewing it and for your thoughtful comments, questions and suggestions. We have addressed each comment below and have made changes accordingly in the manuscript. We believe these revisions have made our manuscript stronger and I hope you agree that this will be a great addition to the literature on access to obstetric care. Most reviewers asked us to expand on different aspects of the manuscripts and to include more evidence and references. We have followed the reviewer's advice in a concise fashion but in doing so have exceeded the word count limit and reference number limit. I hope you understand we tried to balance including sufficient context with the journal guidelines. If there are any other suggestions or comments, we look forward to them.

Sincerely,

Lina Roa, MD MPH
Program in Global Surgery and Social Change, Harvard Medical School

Reviewer #1: This is a research letter to map patient travel time to access obstetrical and NICU care across the US according to two different benchmarks. This is a simple study, yet it is presenting original data. Although I could find similar studies reporting travel times in various other countries, I couldn't find similar articles citing US data. I think this is an interesting study because the data could be used to influence health policy.

Questions for further clarification:

1. The article is short and concise, but I would have liked more information as to why this study is important in a U.S. context. Is there more literature to review to put this study into context? For example, the Society of Obstetrics and Gynecology of Canada has put out a VBAC guideline stating that hospitals that provide VBACs must be able to provide an emergency c-section "immediately". This language has been very controversial, especially in light of the geographical spread of our patient population. Previous Canadian guidelines have cited the ACOG 30 minute rule. Are there other examples in published literature that can be reviewed to provide more context and explanation as to why this data is important or useful?
Response: Thank you for this comment. Our research question arose from the context that many rural hospitals in the US are closing their OB units, compromising geographic access to care for rural populations(1). Furthermore, there are ongoing efforts from ACOG to develop new levels of care to optimize access. While we recognize that the in-hospital time to cesarean (ACOG's 30 minutes and SOGC's VBAC guideline) is an important component of high-quality care, our study focused on geographic access. We've added two sentences in the introduction to provide more context.

2. Have Redivis, OpenStreet Map and WorldPop been validated? How accurate are these tools?
Response: OpenStreetMap and WorldPop provide open access data widely used to obtain geospatial information on road network and population distributions respectively. Redivis algorithm utilizes these platforms to determine travel time and population coverage to the identified Maternal and Neonatal facilities. Our group and others have collaborated with Redivis in peer-reviewed publications using the same methodology(2,3). We added a sentence at the end of the methods section to clarify this and referred to the more in-depth description of the methodology.

3. Do level 1 and level 2 hospitals have NICUs, and if so, would including the data related to this be relevant?
Response: Thank you for this point. Of the 1,766 level 1 and 2 hospitals, 415 hospitals have NICUs. We agree that this level of detail is important for policy planning, but we did not include it due to word count limitations and because it would not have changed our overarching message. We only present data of “Level 3 + NICU” as this is the most complex level of maternal and neonatal care, and although few mother-neonates will both require this level of care, ideally all populations would have timely access to it if required. We would be happy to include this if the editors agree despite word count limitations.

Reviewer #2: 1. Introduction. Good background information. The following are minor.
a. Lines 51-54. Might mention something about the increasingly large proportion of pregnancies now considered high-risk when considering implications about limited access to care.
Response: We added a line in the introduction on the rising numbers of high-risk pregnancies and the ongoing challenges in ensuring high-quality care for people in rural communities where OB hospitals are closing.

b. Might include additional rationale for why access to neonatal care is part of the objective. Does this apply to infants transferred following outside delivery?
Response: We included neonatal care as there is a large overlap with maternal morbidity, preterm birth and need for NICU care. Furthermore, there is evidence that discordance between access to level III obstetric and neonatal care may affect the delivery of risk-appropriate care for maternal-newborn dyads(4). We have added a line in the Methods to clarify why these were included. We did not look at inter-hospital transfers of infants although that would be an interesting future direction.

2. Methods.
a. Lines 60-61. Please clarify how NICU care differs from "special neonatal services" (lines 58-59). Were levels of neonatal care considered?
Response: Special neonatal services include immediate resuscitation, intravenous therapy and capacity for oxygen therapy and monitoring, while NICU care is more comprehensive and specialized as it includes providing intensive care to all sick newborns including those with the very lowest birth weights (less than 1500 grams), potential for providing mechanical ventilation, neonatal surgery, special care for the sickest infants, and staffed by at least one full-time neonatologist. We have added one sentence in the methods to clarify this. We did not stratify by all levels of neonatal care, but that would be an important future direction to consider.

b. Lines 61-64. Would add another sentence to clarify how you estimated distance and travel time from what to what. Did you look at home addresses of women who delivered and the facilities at which they received care? Were you able to stratify according to level of care?
Response: We did not link addresses of women who delivered to specific facilities and this was not stratified by level of care. Instead, we looked at the country-level population and their distance to existing facilities. We clarified this point in the methods.

3. Results.
The table and figures are particularly effective. The fact that ~ 1.5 million pregnant women do not live within 30 minutes of a hospital capable of providing obstetrical care is a strong message. The shading in the figures suggests widely different proportions in different regions of the country. Would it be possible to describe this more fully?

Response: Yes, access varies by geographic region. We did not perform the analysis by region or by state mostly because patients may not follow state/regional boundaries when seeking care. Looking at individual regions or states would be an interesting next step that would require a much more in-depth analysis to account for the limitation mentioned. We have included more details on the color scheme in the caption to Figure 1 to make the interpretation easier.

4. Discussion.
This is a good summary. Might add a little more content about the implications of your findings. Can you compare your findings with those of others? Perhaps a few more references?
Response: Thank you for your comment. We were limited by the number of references accepted on a research letter, but we've added a few more references and compared our findings to similar studies.

Reviewer #3:
ONG-20-1167 Travel Time to Access Maternal and Neonatal Care in the United States

Thank you for the opportunity to review this research letter. The authors use the 2016 AHA Annual Survey to map 30 minute and two-hour access of the US population to maternal and obstetric care. Overall this is a well written research letter.

Some points to consider for the authors:
* Introduction: How do the AHA Levels of care differ from the Levels of Maternal Care proposed in the 2019 Obstetric Care Consensus? 1-2 sentences would be helpful to mention.
Response: The definitions of Levels of Maternal Care proposed in 2019 are much more complex and specific than those designated by the AHA and comparing the definitions of levels of care are beyond the scope of the research letter. However, we agree with you and have added 1 sentence on this in the discussion to clarify the aims of the levels of care.

* Methods: May consider a reference for methods utilizing Redivis, OneStreeMap and population estimates. Are there confidence intervals to time to access provided by this software? For example, 30-minute access may heavily depend on time of day/traffic in urban areas. Similarly in the rural West, season (winter/snow storms) may dramatically impact time to travel to hospital. What the assumptions made by the program in terms of travel time?
Response: Thanks, we have included a reference to other papers using the same methodology and modified the wording in the methods section accordingly. These estimates do not take into consideration traffic or weather conditions, and thus represent a conservative estimate of access. This point is well taken and something we are actively working on to provide more nuanced analyses in the near future.

* Results: If possible, a brief explanation of why 56 hospitals lack an AHA designation and any common characteristics of those 56 hospitals (mostly small?, rural? Western?)
Response: This point is well taken. It is not clear why those 56 hospitals lack classification in the American Hospital Association database. Of these 56 hospitals, 31 were rural and 25 were urban (metropolitan and micropolitan). These hospitals were located in a variety of states. Since there were no overarching characteristics unifying these hospitals and it was a small proportion of all hospitals (56/2399), we did not include the characteristics of these hospitals.

* Discussion: As timely access to an emergency cesarean is the benchmark for this research letter, one limitation worth mentioning is that these designation do not take into account other critical factors for cesarean such as availability of obstetrical provider or

anesthesiologist once travel time has been complete or availability of blood products. While women may have 30- or 2-hour travel time access to a hospital, these designations do take necessarily mean time to cesarean.
Response: We agree with you. We are only measuring one component of access (geographic) but do not include capacity to deliver high-quality care once in the hospital. We have added one sentence about this in the discussion.

As critical access hospitals in rural communities close (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4946037/), the time to access for obstetric care in rural communities is likely to increase. The authors use one-year (2016) data. Given closures of these hospitals, authors may consider mentioning that these estimates are fluid and may in fact may higher in 2020.
Response: Thank you. We agree with your point and have made this clearer in the introduction as well as the discussion.

Overall, this is a very interesting and well-done research letter with important implications for consideration of regionalization of maternity care. Thank you.

Reviewer #4: lines 64: Should include a reference for the spatial population data from WorldPop and the year (I presume 2016 to match with lines 67-69.
Response: We've added a reference for WorldPop.

1. Hung P, Kozhimannil KB, Casey MM, Moscovice IS. Why Are Obstetric Units in Rural Hospitals Closing Their Doors? Health Serv Res [Internet]. 2016/01/25. 2016 Aug;51(4):1546–60. Available from: https://pubmed.ncbi.nlm.nih.gov/26806952
2. Knowlton LM, Banguti P, Chackungal S, Chanthasiri T, Chao TE, Dahn B, et al. A geospatial evaluation of timely access to surgical care in seven countries. Bull World Health Organ. 2017 Jun;95(6):437–44.
3. Jarman MP, Sturgeon D, Mathews I, Uribe-Leitz T, Haider AH. Validation of Zip Code-Based Estimates of Ambulance Driving Distance to Control for Access to Care in Emergency Surgery Research. JAMA Surg. 2019 Oct;154(10):970–1.
4. Brantley MD, Davis NL, Goodman DA, Callaghan WM, Barfield WD. Perinatal regionalization: a geospatial view of perinatal critical care, United States, 2010-2013. Am J Obstet Gynecol. 2017 Feb;216(2):185.e1-185.e10.