March 16, 2017

Revision: 2017 August 8

Revision: 2017 September 5

Revision: 2017 September 29

Dear Dr. Heber,

We wish to submit our manuscript entitled “Validation of an effective, low cost and open access 3D printed stethoscope” for publication in PLoS One.

The stethoscope is an integral piece of equipment in clinical medicine and, despite little innovation in its design since 1963, remains an expensive part of a physician’s armamentarium, costing upwards of 300 USD. For clinicians practicing in developing countries, the cost of a high quality acoustic stethoscope can be a significant barrier, ultimately affecting the health of patients in their region.

In our manuscript, we describe the design and validation of a low cost acoustic stethoscope that is comparable to the Littmann Cardiology III using materials that are readily available. Complex parts which transduce sound such as the bell and Y piece have been 3D printed and designs have been made available online (<https://github.com/GliaX>). Our stethoscope model has been trialed successfully in the Gaza Strip, where access to supplies is extremely limited. By allowing our designs to be free of cost and open access, we hope to improve worldwide health care in other regions by providing access to low cost clinical tools.

We believe that this paper will be of interest to the readers of PLoS One, a journal which agrees with our group’s culture of open access. We have had no previous communication with PLoS One editors or staff members regarding this manuscript. All co-authors have approved of the submitted version of the manuscript, and none have conflicting interests to report.

Thank you for your time.

Sincerely,

Alexander Pavlosky

Schulich School of Medicine and Dentistry

Western University

London, ON, Canada

Addendum:

Please find enclosed our modified funding and competing interest statements:

**Funding statement**

The authors received no specific funding for this work. The project was self-funded by Dr. Tarek Loubani. After the completion of the experimental work described in this paper, Dr. Tarek Loubani was awarded a grant for Alex Pavlosky to help prepare the manuscript and figures. Dr. Tarek Loubani was also awarded a fellowship with the Shuttleworth Foundation. During the latter stages of the preparation of the manuscript, Dr. Tarek Loubani received protected research time funded by the Foundation. While several authors are affiliated with Glia Inc., this research corporation is solely owned and controlled by Dr. Tarek Loubani, did not exist during the experimental work on this project, and had no role in funding or decision-making for any members of the project.

**Competing interests statement**

The authors have declared that no competing interests exist. Some authors are affiliated with Glia Inc., a research corporation solely owned and controlled by Dr. Tarek Loubani. The corporation has no role in this publication, and this affiliation does not alter our adherence to PLOS ONE policies on sharing data and materials.

Addendum 2 (2017 September 5)

a) We note you mention that "Dr. Tarek Loubani was awarded a grant for Alex Pavlosky to help prepare the manuscript and figures." Can you please clarify if Dr. Tarek Loubani awarded a grant to Alex Pavlosky? If so, could you please provide the name of the grant, if applicable?

Please see the revised Funding statement. The grant was provided to Dr. Tarek Loubani for the purpose of having a student work on the project.

b) Can you please confirm whether or not Gila Inc. supported authors Alexander Pavlosky, Jennifer Glauche, Mahmoud Al-Alawi, and Kliment Yanev in the form of salaries but did not have any additional role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript?

Please see the revised Funding statement. Glia Inc. did not exist during study design, data collection or analysis of the data. It did exist during the preparation of the manuscript. Mahmoud Al-Alawi has received a salary from Glia Inc. since March 2017. No other authors have ever received funds from Glia Inc.

I have revised the affilations of Alexander Pavlosky, Jennifer Glauche and Kliment Yanev to exclude Glia Inc, as it appears that PLoS considers affiliations with corporate entities to be tied to employment, funding or other transactions. I have reported Glauche and Yanev as “No institutional affiliation”, since they were individual professionals paid by Tarek Loubani as an individual under a general goal.

c) Are there any patents, products in development or marketed products to declare? If so, please provide any relevant patent numbers or information regarding the products.

No patents exist, are planned or would be considered for any of our work, as we are committed to keeping the hardware open and accessible to all. I have revised the competing interests statement to include this.

**Funding statement**

The authors received no specific funding for this work. The project was self-funded by Dr. Tarek Loubani. After the completion of the experimental and analytical work described in this paper, Dr. Tarek Loubani was awarded a grant from the University of Western Ontario’s medical school in the Summer Research Training Program. This grant paid Alex Pavlosky a stipend to work with Dr. Tarek Loubani for two summers. Part of this time covered preparation of this manuscript and figures. Dr. Tarek Loubani was also awarded a fellowship with the Shuttleworth Foundation in March 2017. During the latter stages of the preparation of the manuscript (after March 2017), Dr. Tarek Loubani received protected research time funded by the Foundation. This was during the revision phase of the publication process.

While Dr. Tarek Loubani and Mahmoud Al-Alawi are affiliated with Glia Inc., this research corporation is solely owned and controlled by Dr. Tarek Loubani, did not exist during the study design, data collection and analysis or decision to publish. It had no role in funding or decision-making for any members of the project for the duration of the above. While Glia Inc. existed during the preparation of the manuscript, the corporation had no role in manuscript preparation. Since March 2017, Glia Inc. has paid a salary to Mahmoud Al-Alawi for his work researching and manufacturing medical devices. The funding for Glia Inc. is presently provided by Dr. Tarek Loubani and by the Shuttleworth Foundation.

**Competing interests statement**

The authors have declared that no competing interests exist. Dr. Tarek Loubani and Mahmoud Al-Alawi are affiliated with Glia Inc., a research corporation solely owned and controlled by Dr. Tarek Loubani. The corporation had no role in the study design, data collection and analysis or decision to publish. This affiliation does not alter our adherence to PLOS ONE policies on sharing data and materials. Glia Inc., Dr. Tarek Loubani and the authors have no actual, pending or potential patents and no intention to ever patent this or similar work on open medical devices.

Addendum 3 (2017 September 29)

*1. Thank you very much for updating your Financial Disclosure and Competing Interests statement. I apologize for any confusion caused in our previous request to update these statements.*

*It is perfectly fine for authors to have commercial affiliations. We ask authors to declare these commercial affiliations in the Competing Interests statement in order to provide full transparency to potential readers of your paper. Since you have sufficiently declared these commercial affiliations in your updated Competing Interests statement, could you please update your affiliations in your manuscript to indicate which of the authors were affiliated with Glia Inc during the duration of the study, instead of stating "No institutional affiliation"?*

Thank you very much for your response. I have again reviewed the timelines and all of the affiliations are correct as stated. As Glia Inc was not operating at the time, Mr. Kliment Yanev and Ms. Jen Glauche were not affiliated with it and were operating as paid engineers for Dr. Tarek Loubani. Mr. Yanev and Ms. Glauche have no institutional affiliations currently, nor had any at the time of the study. I hope this clarifies further the affiliations and leaves them represented accurately for PloS readers.