

Peer review file

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Reviewer A

Comment 1: The OAC is very important to the entire computation. The OAC for MOMA liver was said to be 30k local and 36k export. How does this compare to other OPOs? Could you not simply demonstrate that the OAC in MOMA is lower than all the other OPOs and thus SDCF is therefore more cost-effective?

Reply 1: Thank you for your comment, which points out the importance of OAC in our model. Indeed, we have found that the liver local OACs for MOMA is generally lower than that of other OPOs; the export-OAC, however, was similar to the national average. Specifically, MOMA's local- and export-OAC for liver is \$26,000 and \$38,000, respectively, while the mean local- and export-OAC for livers nationwide is \$35,428 and \$38,033.

While MOMA's local-OAC is lower for livers, it does not guarantee additional cost savings, as each OPO has unique local/export rates and OACs that influence the total cost in our model. We have accounted for these unique local and export rates in our cost analysis.

With regard to effectiveness, our model compares various OPOs in the country using a composite measure of cost and effectiveness, with the effectiveness being computed based on observed as well as expected organ procurement rates. To inform this model, we employ O:E ratios from the SRTR database, which rigorously adjusts for donor characteristics. We chose to perform an economic evaluation of the SDCF model, as cost-savings in the absence of comparable or improved effectiveness would be a suboptimal outcome.

Changes in the text: The importance of considering effectiveness in the setting of cost savings has been further clarified in the text (page 6, line 20-21). Additionally, the importance of using OACs when computing cost is explained on page 6, line 11-18.

Comment 2: OAC seems a bit arbitrary? What is the "profit" to the OPO built in? Do some OPOs take more profit than others? If so, it breaks the assumption that the OAC

is reflective of the procurement costs.

To ensure that SDCF was not just cheaper but equivalent donors are being turned into transplants, the author used SRTR reports.

Reply 2: All 58 OPOs in the country are not for profit organizations. However, various OPOs are likely to have different margins of “profit” for various organs. Unfortunately, this information is unavailable and unlikely to be made available in the public domain. Hence, we used publicly available OACs as our best proxy of true cost of organs. Furthermore, since we conducted the analysis from a transplant center’s perspective, which in this case is the “consumer,” OACs provide a uniform metric of comparing the cost of organs from various OPOs if they were hypothetically available for sharing across the country.

Changes in the text: We have added this limitation to the Discussion section (page 16, line 5-8).

Comment 3: Local and export transplants are a function on who is on the waiting list rather than efficiency of the OPO. (i.e. maybe sicker patients just outside OPO or a super aggressive center just outside OPO). Yet, you use it for the average OAC for each OPO. Why?

Reply 3: We completely agree that local and export transplants are a function of who is on the waiting list rather than efficiency of the OPO. However, to accurately reflect the unique geographic and donor service area characteristics of each OPO, we adjusted for the existing local and export rates of each organ from each OPO in our analysis. Furthermore, the adoption of an SDCF model of care is unlikely to change the local or export organ transplantation rates from a given OPO. Hence, we felt that the use of existing local and export ratios from each OPO was a true reflection of activity in our model.

Changes in the text: We acknowledge that the generalizability of our results could be limited given that our findings are extrapolated from the performance of a single SDCF (page 16, line 17-19). We also point out that the geographic location of the SDCF may

influence cost (page 16, line 9-15).

Comment 4: DCDs are not done at the SDCF. What was the OAC for a DCD organ vs an organ at the SDCF from MOMA – Again, could this not demonstrate the cost benefit of the SDCF? Also, the average OAC for the OPO will then also be a function of the DCD to DBD ratio.

To generalize the local effect of SDCF to the nation, the authors applied the SDCF O:E to the rest of the nation.

Reply 4: The OAC for a given organ is the same for both DCD and DBD donors at MOMA. Furthermore, the cost and effectiveness of the SDCF model was gauged based on performance and cost metrics from MOMA and includes all DCD and DBD donors managed during the study period.

Changes in the text: We have inserted a clarification in the Methods section that the OAC for organs was similar for both DCD and DBD donors (Page 6, line 18-19).

Comment 5: I think that the O:E ratio being simply a reflection of SDCF is flawed. Wash U is an experienced transplant center and may beat SRTR predictions solely on that. Small OPOs or OPOs with small transplant program may underperform, and still underperform even with an SDCF? I buy the argument that SDCF better preserves donors, but I think the O:E ratio is confounded by more than that.

Reply 5: Thank you for this thoughtful comment. Given that our transplant center is in close geographic proximity to the SDCF, we acknowledge that the O:E ratio for the OPO may be influenced by our center's performance. However, it is important to note that any OPO adopting a SDCF model will likely export a significant number of the organs to other donor service areas. This is perhaps best illustrated in the setting of several organ allocation policy changes that have been adopted nationwide in recent years. For example, the lung allocation policy change was implemented in November 2017 and resulted in a significant decline in local lung transplantation for our OPO [Puri V, AJT 2019]. Despite this, SRTR data shows that the O:E ratio at MOMA was unaffected (lung O:E 1.06 in the report prior to the policy change and 1.07 in the report

thereafter). Similarly, the heart allocation policy changed in October 2018 and did not change the O:E ratio at our local OPO (heart O:E 0.85 in the report prior to the policy change and 0.85 in the report thereafter). Liver allocation policy changes were also made in January 2020, and while we expect an unchanged liver O:E ratio, SRTR reports are not yet available following this change.

Changes in the text: We acknowledge that our use of the O:E ratio has limitations and may be reflective of the performance of transplant centers in close proximity to the OPO; this has been added to the Discussion section (page 16, lines 11-13).

Reviewer B

The reviewer is honored to review the manuscript about the economic evaluation of the specialized donor care facility (SDCF) for thoracic organ donor management. The paper is well written and easy to understand. The authors investigated the SDCF system in various aspects, and they concluded that the U.S. SDCF model may be a less costly and more effective means of multi-organ donor management, particularly for thoracic organ donors, compared to the conventional hospital-based model. There are only several minor points to be revised, as follows:

Minor points:

Comment 1: In the text, there are many words underlined, such as “observed transplants (Line 138)”. Please delete such underlines through the manuscript.

Reply 1: Thank you for bringing up this point. We have removed the underlines in the text, as requested.

Changes in the text: underlines have been removed (page 8, line 1,6,7,21 and page 9, line 9).

Comment 2: The main contents of this manuscript was to explain the financial advantage in SDCF system. To ensure the accurate calculation and statistics in the manuscript, please ask a professional statistician to check the manuscript.

Reply 2: Thank you for this suggestion. Dr. Su-Hsin Chang is a professional statistician and healthcare economist at Washington University. She played an integral role in every stage of this study, personally performed the calculations, and is listed as a leading senior author.

Changes in the text: n/a

Reviewer C

Gauthier and coll. have presented a cost-effectiveness analysis of a specialized donor care facility for organ donation compared to conventional model from the perspective of the transplant centers. Analyzing data from 2 consecutive years at national level and at the SDCF, they found that the SDCF model may allow an increase in the number of organ procurement with a significant reduction in the costs.

Comment 1: I congratulate the author for this excellent paper. I have only a minor remark. The construction of a SDCF and its running, would be definitely an extra-cost. They have estimated in 5 million \$. It seems a very low amount to build a care facility with ICU, OR, etc... Further, the salary of health allies should be taken into consideration. Who pays for them in this model? These costs would not add to the OAC? I'd like the authors to comment please.

Reply 1: Thank you for this insightful comment, which has led to a helpful clarification in our discussion section. A previous study from our institution has found that the startup cost of the SDCF in 2008 was \$5.34 million [Doyle MBM, JACS 2016]. While the startup cost is indeed substantial, the study found that donor management costs are significantly reduced when donors are transferred to the SDCF. Specifically, the authors found a 51% reduction in donor recovery cost (\$16k SDCF recovery vs. \$33k outside hospital recovery). In the setting of these cost savings, the OAC paid by transplant centers for a given organ does not change based on where the organ is procured. Furthermore, it has been shown that organ yield is higher for SDCF-recovered donors [Doyle MBM, JACS 2016], which may result in a significant profit margin for the OPO. Such a cost savings allows for the salary of the required healthcare professionals at the SDCF.

The business model of OPOs is based upon managing organ donors and providing

the organs to transplant centers with the OACs providing revenue in return. While facilities without an SDCF model reimburse the hospitals where donor care is provided, the SDCF model provides all of this care in house via salaried employees. As such, the OACs in the two models are likely reflective of the costs incurred. The true financial margin, however, is not available in the public domain. We have acknowledged this limitation in the Discussion section.

Changes in the text: We have added to the limitations section of the Discussion (page 16, line 5-8). We also discuss how the SDCF's cost savings from donor management could be used to fund startup cost (page 15, line 5-8).