

## **OPTN Heart Committee**

### **Meeting Summary**

**July 18, 2023**

**Conference Call**

**Richard Daly, MD, Chair**

**Jon David Menteer, MD, Vice Chair**

### **Introduction**

The Heart Committee met via Citrix GoTo teleconference on 07/18/2023 to discuss the following agenda items:

1. New Committee Member Welcome
2. Regional Meeting and Heart Committee Presentations
3. Continuous Distribution: Tradeoffs through Optimization

The following is a summary of the Committee's discussions.

#### **1. New Committee Member Welcome**

The Committee welcomed the new Committee members.

#### **2. Regional Meeting and Heart Committee Presentations**

Support staff reviewed expectations for upcoming regional meetings and Committee presentations at cross-committee meetings.

#### **3. Continuous Distribution: Tradeoffs through Optimization**

##### Presentation Summary

Massachusetts Institute of Technology (MIT) representatives began the presentation by introducing themselves to the Committee and noting MIT representatives are working with the OPTN Kidney Committee too. The aim of the presentation is to show how the Committee can utilize mathematical optimization (MO), machine learning, and artificial Intelligence (AI) with the Committee's Continuous Distribution (CD) policy development. MIT representatives informed the Committee that these tools have already proven to be successful for the OPTN Lung Committee's CD implementation.

A visual representation of how AI has aided the OPTN Kidney Committee with developing CD policy was displayed. MIT representatives provided a set of attributes such as geographic disparities, transport distance, and transplant rate disparities and assigned weights to each attribute, then through several cognitive policies, the AI tool was able to predict the outcomes of those combinations. It was noted, with the MO, tens of thousands of policies can be simulated instantaneously which allows for a more efficient search in the policy space for specified attributes and outcomes. MIT representatives provided an example of prioritizing a decrease in waitlist mortality as an attribute that was given priority over another attribute, decreasing transport distance.

MIT representatives continued with another important element, being able to determine tradeoffs necessary when prioritizing one attribute over another. These tools would allow the Committee to look

at the outcomes of prioritizing certain attributes that may not have been apparent before the processing and allowing visualization of the interplay between different policy parameters. This was done by using a graphical representation that plotted median transplant distance against transplant rate disparities. MIT representatives stressed that once the desired outcome is obtained, it is necessary to know the weights assigned to each attribute in CD policy and added these tools could also provide an immediate answer as to what weight must be assigned to each attribute from a desired outcome.

MIT representatives concluded the presentation by highlighting the significance of thinking about outcomes and success measurement. Also, that the tools are dependent on defining the desired outcomes, which are crucial in guiding the entire optimization process.

### Discussion Summary

The Chair begins by inquiring whether the analysis makes assumptions about scales or assists in the scaling process. MIT representatives responded that they did not. The Chair then proceeded to elaborate on the Committee's decision regarding the distance attribute, explaining that they allocated full points up to 500 nautical miles and gradually decreased points given on a linear scale up to 1500 nautical miles and questions the potential impact of using a different scale and whether it would affect the analysis.

MIT representatives state that the tools used for analysis can also optimize rating scales and compare rating scales to parameters that weigh attributes against each other explaining that the tools can optimize these scales. It was emphasized that while intuition about scales is valuable, it is beneficial not to overly constrain them. MIT representatives continued by sharing an example of adjusting a rating scale by implementing and manipulating a range of parameters for better policy outcomes. It was noted that the Kidney Committee used this method to help determine better policy outcomes for highly sensitized patients.

The Chair asks about the potential to decide on an initial scale type and refine it later, maintaining flexibility. MIT representatives confirm this approach, suggesting that while the committee should define the nature of the curve, they can refine the specific parameters later to optimize outcomes. The Chair notes the need to revisit and refine goals regarding what the Committee is trying to accomplish while the Committee is working on scales. The Chair then asks support staff to gather a list of potential goals to gauge where the Committee is at.

A Committee member then asked for clarification on what the process will look like from running a simulation around certain chosen parameters to the output and how this technology will be integrated into current Committee processes. Support staff responded that each committee has been handling it differently. MIT representatives informed the Committee that the OPTN Kidney Committee has been using a dashboard on an interactive web page created by MIT representatives. This allowed the Committee members to experiment and understand how different outcomes were achieved and develop ideas to bring back to other Committee members.

Support staff noted a few questions the Committee will need to answer related to each of the attributes. First identifying an outcome will be critical. Then determining the purpose of the attribute and how many priority points or the rating scale will be assigned. Continuing, support staff identified that this could happen by going attribute by attribute and identifying the outcome measures should be and use that as a catalyst to move forward with the MO process.

MIT representative then provided an overview of the process the OPTN Liver Committee is using for MO stating that they have identified the purposes and priorities for each attribute, like medical urgency, so they could use the MO tools to increase transplants for medically urgent patients while minimizing geographic disparities. Once the Committee has put each attribute's purpose in plain language, decisions can be made on how to measure it.

A committee member asked when the Committee will know they are getting right and not be consumed by creating a perfect model. The Vice Chair echoed this sentiment and asked how old is the data that will be used for the MO. MIT representatives responded that the SRTR have been putting simulators together that use all the available historical data to make the most accurate predictions possible, and MIT is using this framework and the simulator in a more efficient way while noting that these tools are not perfect.

Another committee member noted that it might be beneficial to highlight the areas where it is known the simulator will not be as productive, especially when dealing with complex sensitization attributes. The Chair agreed with this and noted that there will be aspects of CD policy that will be hard to predict, and the Committee needs to use these tools to produce results that make sense to the community and the Committee while adjusting accordingly.

#### Next Steps

Support staff noted they will be working on what the next steps are for the Committee regarding identifying the purpose of outcomes and considering attributes that can then be discussed at future meetings.

#### **Upcoming Meeting(s)**

- August 2, 2023 (teleconference)
- August 15, 2023 (teleconference)
- September 6, 2023 (teleconference)
- September 22, 2023 (in-person)

## Attendance

- **Committee Members**
  - Rocky Daly, Chair
  - J.D. Mentee, Vice Chair
  - Tamas Alexy
  - Kim Baltierra
  - Jen Carapellucci
  - Jennifer Cowger
  - Tim Gong
  - Eman Hamad
  - Jennifer Hartman
  - Glen Kelley
  - Cindy Martin
  - John Nigro
  - Martha Tankersley
  - Dmitry Yaranov
- **HRSA Representatives**
  - Jim Bowman
  - Marilyn Levi
  - Daniel Thompson
- **SRTR Staff**
  - Yoon Son Ahn
  - Katherine Audette
  - Monica Colvin
- **UNOS Staff**
  - Alex Carmack
  - Cole Fox
  - Elena Liberatore
  - Kelsi Lindblad
  - Alina Martinez
  - Eric Messick
  - Laura Schmitt
  - Sara Rose Wells
- **Other Attendees**
  - Shelley Hall
  - Samantha DeLair
  - Ted Papalexopoulos
  - Samantha Taylor
  - Nikos Trichakis
  - Daniel Yip