OPTN Thoracic Organ Transplantation Committee
Continuous Distribution of Lungs Workgroup
Meeting Summary
January 15, 2020
Conference Call

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Introduction

The Thoracic Committee's Continuous Distribution of Lungs Workgroup met via Citrix GoTo teleconference on 01/15/2020 to discuss the following agenda items:

1. Discussion of Lung Allocation Score (LAS) Cohort Update Project

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

1. Discussion of LAS Cohort Update Project

The Workgroup previously requested information about updating the LAS cohort as part of the Continuous Distribution of Lungs project. The cohort currently in use has not been updated since 2012 and characteristics of the candidate population may have changed in the intervening years. The Workgroup submitted a request for the Scientific Registry of Transplant Recipients (SRTR) to refit the models used to calculate LAS using an updated cohort of candidates. The new SRTR models used lung candidates and recipients listed or transplanted from March 1, 2015 through March 31, 2018 and computed LAS scores and ranks using a snapshot of candidates as of January 1, 2019.

SRTR presented updated waitlist mortality and post-transplant survival models for Workgroup consideration on December 5, 2019. Generally, refitting the model cohorts resulted in slightly decreased LAS values and slightly increased LAS rankings. SRTR found that the signs of the coefficients changed for four covariates in the waitlist mortality model, which means that these covariates had the opposite effect on LAS in the new model than in the current model. During Workgroup discussion, members also identified some missing or expired values that should be changed in updated models. The Workgroup requested more information to better understand these issues with the models and potential solutions, which was the focus of this call.

Summary of discussion:

SRTR staff explained the impact of the coefficient changes for covariates in the waitlist mortality model and provided recommendations to improve the model.

Diabetes

The first covariate discussed is diabetes status. Because the coefficient for this covariate flipped from positive to negative, the new model slightly decreases LAS for a candidate with diabetes rather than increasing LAS as the current model does. SRTR staff noted that diabetes is a significant predictor of waitlist mortality in the current model, but under the new model, it is not. SRTR staff offered two solutions: 1) remove the diabetes covariate from the model because it is not predictive of waitlist mortality relative to the other covariates included in the model, or 2) assume patients with missing data are diabetic so their LAS is not increased inappropriately.

Workgroup members and SRTR staff could not confirm the reason why diabetes does not present as a predictor of waitlist mortality in the new model, but potential explanations discussed include: 1) increased reporting or prevalence of diabetes among the new cohort; 2) uniformity among the new cohort in the diabetes covariate; and/or 3) the mortality risk associated with diabetes was correlated with other attributes that were included in the new model. SRTR staff noted that while the coefficient for the diabetes covariate is small, it is non-zero, meaning that between two candidates with the exact same characteristics except for their diabetes status, the patient with diabetes would receive a lower LAS. Because this is not the desired impact on LAS, and because the diabetes covariate does not present as a predictor of waitlist mortality in the new model, SRTR staff recommended removing the diabetes covariate from the model. The Workgroup members agreed to remove the diabetes covariate from the waitlist mortality model.

Cardiac Index (CI)

The second covariate discussed was CI. SRTR staff explained that the problem was essentially the same as with the diabetes covariate, in that for a person with a CI of 1.5, LAS increases under the current model but LAS decreases under the new model. As with the diabetes covariate, the CI covariate is not predictive of waitlist mortality in the new model. SRTR staff recommended that the Workgroup: 1) consider removing the CI covariate since it is not predictive, or 2) re-set waitlist missing/expired value to the lowest credible value so that candidates missing data on CI would not inappropriately receive a higher LAS.

The Workgroup sought to understand why CI was not showing up in the model as a predictive factor. Members wondered if use of exceptions was keeping down waitlist mortality linked to CI, but one member noted that the use of exceptions has gone down since CI was added to the LAS in the 2015 update. SRTR staff responded that the covariate may not be showing up as a predictor in the model because it is correlated with other factors in the model that are more significant.

One member noted that since transplant is not a random event, there is reduced signal in the data set to indicate factors that contribute to waitlist mortality if the OPTN is doing a good job of minimizing waitlist mortality. SRTR staff explained that the models are adjusted slightly to address this computing risk problem.

Another member noted that candidates' clinical data may not be updated at the same time, so older CI values may be overlooked in the datasets if other clinical data was entered more recently. SRTR staff replied that their datasets use the latest data available and do not drop older CI values.

A member expressed that the Workgroup was having trouble with the idea of dropping the CI covariate because they know it is important clinically. SRTR staff explained the model assessing the clinical importance of CI; the model only indicates that CI is not predictive of waitlist mortality in this particular, highly-adjusted model. In other words, the CI covariate did not provide additional information on waitlist mortality beyond the other information included in the model.

The Vice Chair expressed concern that removing covariates from the model would disadvantage pulmonary hypertension (PH) patients, as some of these covariates were added to the models in 2015 to ensure that patients with PH receive the appropriate LAS. Other Workgroup members noted that CI may be correlated with other covariates added in 2015, like bilirubin and high pulmonary artery pressure, that appropriately account for the waitlist mortality risk of PH patients. Members decided that they need more information as to whether LAS ranking is shifting inappropriately because of the CI covariate, and requested more information from SRTR on this issue.

Central Venous Pressure (CVP)

The third covariate discussed was CVP. As with the diabetes and CI covariates, abnormal CVP increases LAS in the current model but decreases LAS under the new model. CVP also is not predictive of waitlist mortality in the new model. A member asked whether it was possible that the relevant parametrization of CVP has changed as the cohort has changed. SRTR staff said it was a possibility but explained that they did not explore any changes to the definitions of the covariates, though that could be undertaken as a future project. A member stated that eliminating CVP as a covariate seems problematic from a practicality standpoint, and requested more information from SRTR around LAS ranking to provide the Workgroup with a broader perspective on the model.

Next steps:

The Workgroup will reconvene on January 16, 2020, to continue their consideration of the LAS Cohort Update project, including discussion of the fourth covariate that changed coefficients in the new model. At the Workgroup's request, SRTR staff agreed to provide additional information on the CI and CVP covariates and how the new model impacted LAS ranking.

A schedule of the regional meetings and presenters was discussed with the Workgroup members. It was also stated that prep calls for the regional meeting presentations would be scheduled in the near future.

Upcoming Meetings

- January 16, 2020
- February 13, 2020
- February 20, 2020