

Analysis Report

Data Request from the Heart Sub-Committee of the OPTN Thoracic Committee

October 12, 2018

This report was provided to HRSA by SRTR in support of ongoing policy consideration by the OPTN Heart Subcommittee of the Thoracic Organ Transplantation Committee. The analysis described herein was conducted at the specific request of the OPTN Committee and does not represent a full or final analysis related to the policy issue under consideration.

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Data Request ID#: HR2018_01

Timeline:

Request made	September 4, 2018
Analysis plan submitted	September 18, 2018
Analysis submitted	October 18, 2018
Next Committee meeting	November 1, 2018

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Data request: TSAM results for four DSA-free models of heart allocation

Background:

On August 13, 2018, the OPTN Board of Directors submitted a plan to the Secretary of Health and Human Services to remove DSAs and OPTN regions as units of allocation from all organ allocation systems. OPTN has committed to a multi-step plan to eliminate use of DSAs in heart distribution in a deliberative manner and within a timeframe that will reduce the likelihood of unintended consequences.

Toward the goal of utmost compliance with the Final Rule, the Committee has discussed options for a revised allocation proposal that will reduce disparities in access to heart transplant, and decrease potential unintended consequences of an expedited policy change. The OPTN Final Rule requires that organ allocation policies “Shall not be based on the candidate’s place of residence or place of listing, except to the extent required by paragraphs (a)(1)-(5) of this section.” (42 CFR 121.8(a)(8).) The Rule further states that “Allocation policies shall be designed to achieve equitable allocation of organs among patients ... [by] (3) Distributing organs over as broad a geographic area as feasible under paragraphs (a)(1)-(5) of this section, and in order of decreasing medical urgency.” (42 CFR 121.8(b).) Consistent with these requirements, the Committee has discussed limitations on the feasibility of national organ distribution. The Committee advised that hearts with less cold ischemic time (CIT) sustain better outcomes. CIT increases as the distance between the donor hospital and transplant hospital increases. This relationship and the desire to decrease CIT justifies a proximate priority due to the need to “achieve the best use of donated organs.” (42 CFR 121.8(a)(2).) The Committee also noted that because heart surgeons almost always travel to procure thoracic organs, organ offers that require additional travel time result in increased time that surgeons are away from the hospital and unavailable to screen offers or perform transplants. This justifies a more local priority due to the need “to promote the efficient management of organ placement.” (42 CFR 121.8(a)(5).)

The four agreed-upon frameworks to consider are outlined in the appendix. The goal of modeling these allocation frameworks is to compare the proposals and inform the choice of the final policy

proposal to send out for public comment in January 2019, and then to the Board of Directors meeting in June 2019.

The request laid out below will aid the Committee in its recommendation to the Board of Directors regarding the most appropriate policy that should be adopted.

Strategic Goal or Committee Project Addressed:

Evaluate outcomes associated with removing DSA as the first unit of allocation. This project is in alignment with the strategic goal of improving equity in access to transplants.

Request:

The SRTR contractor will be responsible for running the most recently available TSAM to determine the potential impact of removing DSA and replacing it with various nautical mile (NM) radii around the donor hospital, as outlined in the appendix.

Based on the four frameworks, provide the following metrics:

1. Counts of transplants
2. Transplant rates
3. Counts of waitlist deaths
4. Waitlist mortality rates
5. Posttransplant patient survival
6. Distribution of transport distance

Relevant metrics will be displayed in maps by DSA and tables provided in an appendix for DSA-level results for the following:

- Counts of transplants
- Transplant rates
- Counts of waitlist deaths
- Waitlist mortality rates

Items 1-6 should also be assessed by the following subgroup populations:

- OPTN Region: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
- Age: pediatric (younger than 18 at listing) and adult (18 or older at listing)
- Sex
- Race/ethnicity
- Diagnosis group
- Heart status (under board approved heart statuses 1-6)
- Blood type
- Exception status
- Candidate home zip code urbanicity: urban vs. rural, based on RUCA codes (individually, and grouped by metropolitan vs. micropolitan + small town + rural)
- Insurance status: public and private
- East/west of the Mississippi
- State
- Center volume

Study Population

The simulation cohort included transplant candidates listed on the heart and heart-lung waiting lists on June 30, 2009, and candidates added to those waiting lists from July 1, 2009, through June 30, 2011, as well as all hearts and lungs offered for transplant between July 1, 2009, and June 30, 2011. Results for lung transplant candidates are not included in the report.

Analytic Approach

SRTR used TSAM output files (from data request HR2018_01) produced to compare the approved but not yet implemented policy with four sets of DSA-free allocation rules. Overall, each set of rules was similar to the approved policy, but DSA as the first unit of allocation was replaced with circles of constant distance. In three DSA-free simulations, broader sharing of adult donor organs was maintained for candidates in the highest urgency groups, and in one simulation, that sharing was removed. A brief description of each set of rules is given in Table 1, and detailed allocation rules are given in Appendix 2.

Table 1. Name and brief description of each simulation

Name	Description
DSA	Approved policy. Except in cases of broader sharing, the local DSA is the first unit of allocation.
150NM	Replace DSA in approved policy with 150 NM as the first unit of allocation. Severity groups eligible for broader sharing under approved policy (adult status 1 and 2, pediatric status 1A) continue to receive offers of adult organs out to 500 NM.
250NM	Replace DSA in approved policy with 250 NM as the first unit of allocation. Severity groups eligible for broader sharing under approved policy (adult status 1 and 2, pediatric status 1A) continue to receive offers of adult organs out to 500 NM.
500NM-A	Replace DSA in approved policy with 500 NM as the first unit of allocation. To maintain broader sharing, first offers of adult donor organs to adult status 1 and 2 and pediatric status 1A candidates go out to 1000 NM. Subsequent orderings for those candidates are similarly incremented.
500NM-B	Replace DSA in approved policy with 500 NM as the first unit of allocation. Candidates classified as adult status 1 and 2 and pediatric status 1A are no longer eligible for broader sharing as in approved policy. Offer orders is: 1) status 1 adults and status 1A children within 500 NM, 2) status 2 adults within 500 NM, and 3) status 3 adults within 500 NM.

Each simulation was repeated 10 times with different orderings of organ arrivals to provide a measure of variability. The average, minimum, and maximum of requested metrics were calculated overall and by subgroups specified in the request.

We do not show center-level data. As TSAM results are subdivided into smaller populations, the impact of random variation increases and the range of TSAM estimates across iterations increases, making results by center difficult to interpret. TSAM also uses statistical models for offer acceptance and posttransplant outcomes, which are based the average observed outcomes across the country.

This approach has good predictive power for the system as a whole, without relying on the unique circumstances at any given center in any given year. This is important, especially because TSAM is used to predict the effects of changes in national allocation policy, to which different centers can be expected to respond differently. However, simulated effects at individual centers would be more poorly predicted than the average effects across the country or other larger groups.

Summary

- Overall, simulated waitlist and posttransplant outcomes differed little across the five simulations.
 - Transplant rates and counts, waitlist mortality rates and counts, and posttransplant mortality rates and counts were similar in DSA-first vs. DSA-free simulations.
 - Median distances donor organs traveled increased with increasing circle sizes. The DSA-first and 250NM simulations were generally similar, the 150NM simulation showed shorter travel distances, and the 500NM-A and 500NM-B simulations showed the longest travel distances.
- The overall pattern was largely repeated in most subgroups: Results were similar by age (adult and pediatric age groups), sex, race and ethnicity, diagnosis, urbanicity, insurance at listing, location in the US (east/west), by center volume, and by distance.
- Exceptions to the above:
 - Most **regions** differed little in waitlist and posttransplant outcomes across simulations, but some differences did occur.
 - In regions 1 and 9, transplant rates were higher in 500NM-A and 500NM-B simulations than in DSA-first.
 - In region 2, transplant rates decreased in the 150NM, 250NM, and 500NM-B simulations compared with DSA-first.
 - In region 1, the number of waitlist deaths declined from 33 to 26 in the DSA-first to the 500NM-A simulation.
 - Outcomes by **adult status group** showed some variation.
 - Among status 1 and 2 candidates, transplant rates increased in the 500NM-A simulation.
 - Among status 3 candidates, transplant rates increased in 250NM, 500NM-A, and 500NM-B simulations compared with DSA-first.
 - Among status 4 candidates, transplant rates decreased in 250NM, 500NM-A, and 500NM-B simulations compared with DSA-first.
 - Waitlist death counts declined for status 7 (inactive) candidates in the 500NM-A and 500NM-B simulations.
 - Most outcomes differed little by **pediatric status group**, but among pediatric status 1A candidates, transplant rates increased in the 500NM-A and 500NM-B simulations compared with DSA-first.
 - Transplant rates for **blood type A** candidates declined in the 250NM, 500NM-A, and 500NM-B simulations compared with DSA-first, and increased for blood type O candidates in the 500NM-A and 500NM-B simulations.
 - Data by annual **center volume** were generally similar to overall data patterns, but transplant rates were lower in the 500NM-A and 500NM-B simulations for centers performing 25-50 transplants per year.
 - Transplant counts **by DSA** shifted somewhat from the DSA-first to DSA-free simulations.

- Most DSAs gained or lost fewer than 10 transplants, compared with DSA-first, in any DSA-free simulation.
- The largest increase was 24 more transplants in the 500NM-A simulation. The largest decrease was 32 fewer in the 250NM-simulation. These occurred in two nearby DSAs, each of which contained more than one heart transplant program.
- Shifts in transplant counts **by state** mirrored shifts by DSA.
 - Most states gained or lost fewer than 10 transplants, compared with DSA-first, in any DSA-free simulation.
 - The largest increase was 33 more transplants among New Yorkers in the 500NM-A simulation, and the largest decrease was 26 fewer among Pennsylvanians in the 250NM simulation. These occurred in two neighboring states, each with more than one transplant program.

Interpreting TSAM results

Unless stated otherwise, most graphs plot the average (point estimate), minimum, and maximum of the metric computed across the simulations. See Figure 1 as an example. The blue diamond represents the average transplant rate across 10 simulations, the top flat bar the maximum transplant rate, and the bottom flat bar the minimum transplant rate. Graphs of most TSAM results appear to show 95% confidence limits, but they do not. TSAM uses the same candidates and donors in all simulation runs, but in different order, and the 10 TSAM runs are not independent samples, which means we cannot compute standard errors or 95% confidence limits.

Results

Overall

Overall, simulated waitlist and posttransplant outcomes differed little nationally across the five simulations. Transplant rates (Figure 1), waitlist mortality rates (Figure 2), and posttransplant mortality rates (Figure 3) were similar, as were numbers of transplants, waitlist deaths, removals from the waiting list, and posttransplant deaths (Table 2).

Table 2. Overall TSAM metrics by simulation

Metric	DSA-first			150NM			250NM			500NM-A			500NM-B		
	Avg.	Min	Max	Avg.	Min	Max	Avg.	Min	Max	Avg.	Min	Max	Avg.	Min	Max
Candidates	9913	9913	9913	9913	9913	9913	9913	9913	9913	9913	9913	9913	9913	9913	9913
TX count	4659	4648	4669	4657	4649	4669	4659	4650	4667	4649	4639	4659	4650	4641	4669
TX rate	111.1	110.1	111.8	111.0	110.0	111.8	111.0	109.9	112.0	110.3	109.2	111.5	110.6	109.6	111.7
WL death	669	652	681	662	645	674	667	648	680	646	638	659	657	643	668
WL mort rate	10.8	10.5	11.0	10.6	10.4	10.9	10.7	10.4	11.0	10.4	10.2	10.6	10.5	10.3	10.7
WL Removals	1014	1006	1029	1013	1001	1026	1016	1003	1031	1009	994	1021	1008	992	1021
1Y PT death	577	547	618	601	561	633	597	571	636	627	595	660	615	576	677
1Y PT mort rate	13.5	12.7	14.6	14.2	13.1	15.0	14.1	13.4	15.0	14.9	14.0	15.7	14.6	13.5	16.2
Distance (NM)	204	200	206	144	142	147	195	191	197	346	332	356	306	300	310

Figure 1. Overall transplant rates by simulation

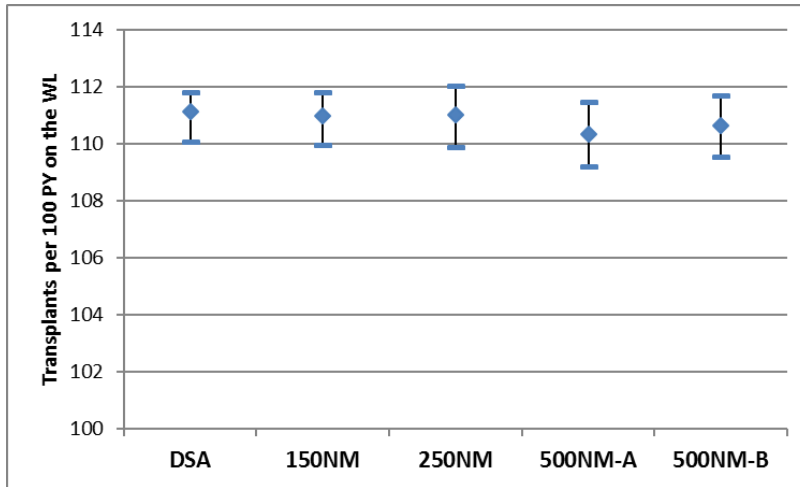


Figure 2. Overall waitlist mortality rates by simulation

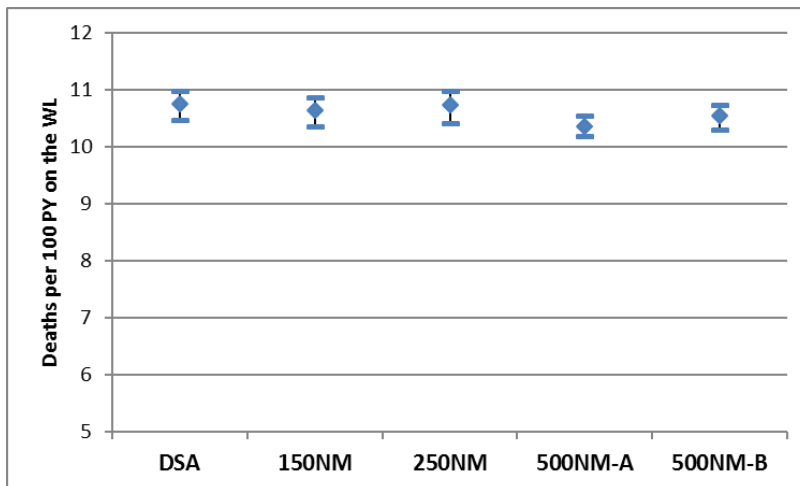
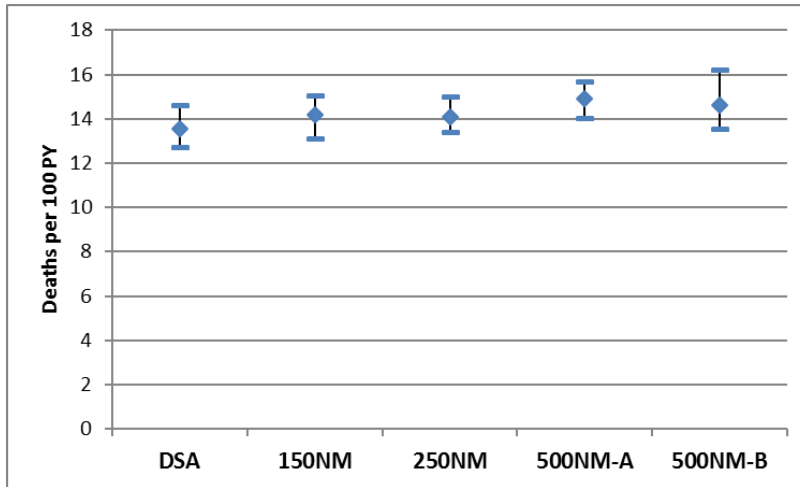


Figure 3. Overall 1-year posttransplant mortality rates by simulation



Median distance between donor and recipient hospitals varied by circle size (Figure 4). Median distance was lowest, 144 NM, when the smallest circle radius was 150 NM, and largest, 346 NM, with the smallest circle size was 500 NM and broader sharing was maintained, the 500NM-A simulation (Table 2). Distributions of overall distances are shown in Figure 5. The x-axis limit is 1500 NM, which removed 181 observations across the five panels (<0.4% of observations), but allowed a clearer view of the distribution from 0-1500 NM. Vertical lines are plotted at the mean distance. In the DSA-first and 150NM simulations, concentration of shorter-distance transplants was larger, and in both 500NM simulations, many more transplants occurred in the 0 to 500NM interval. These differences in distance were expected.

Figure 4. Median distance (NM) between donor and transplant hospital by simulation

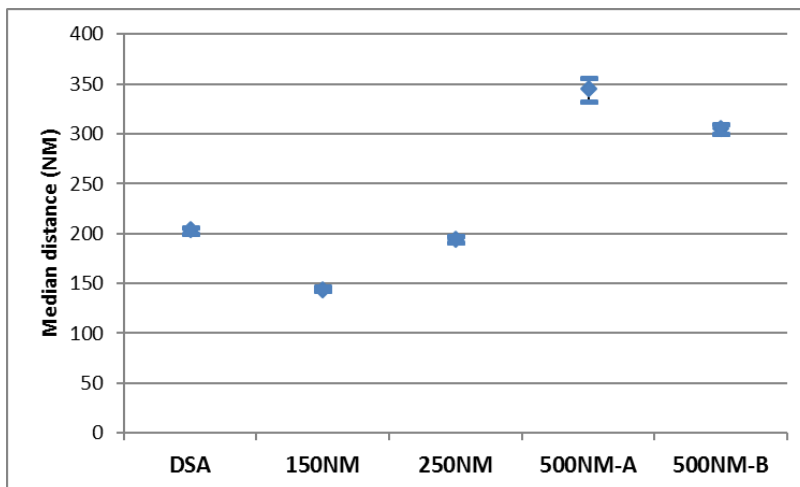
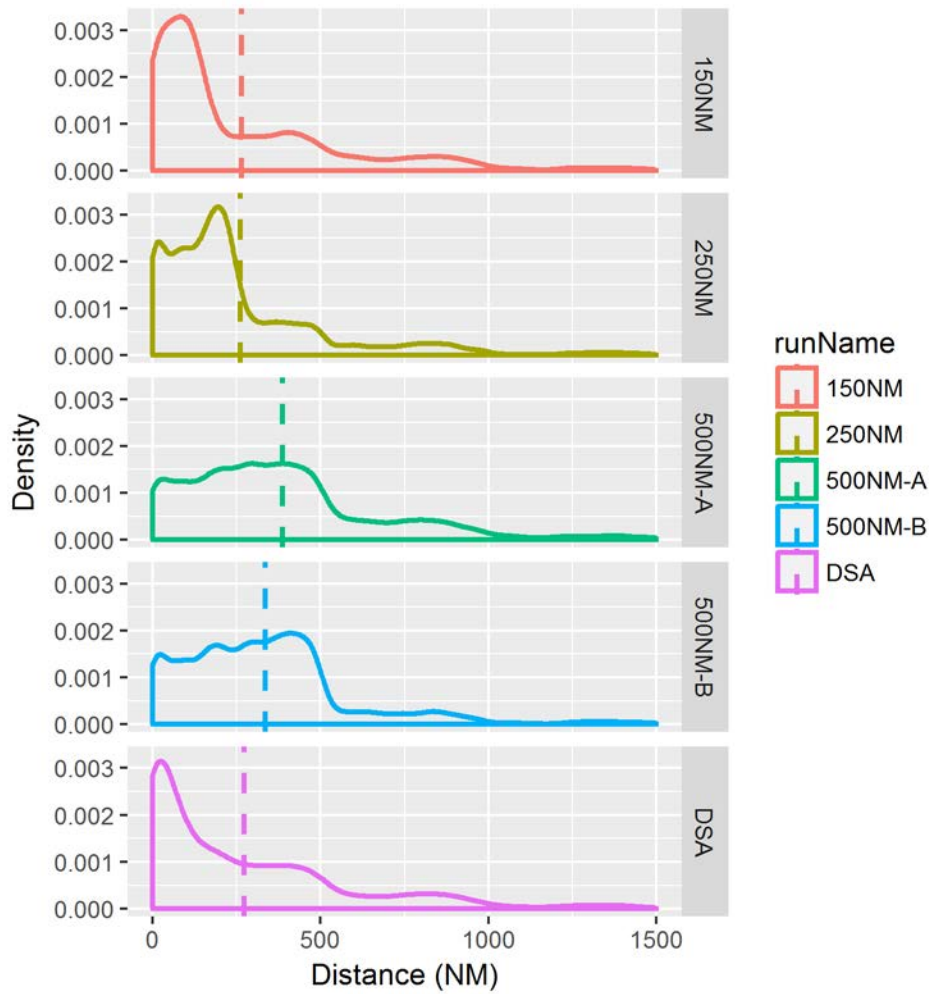


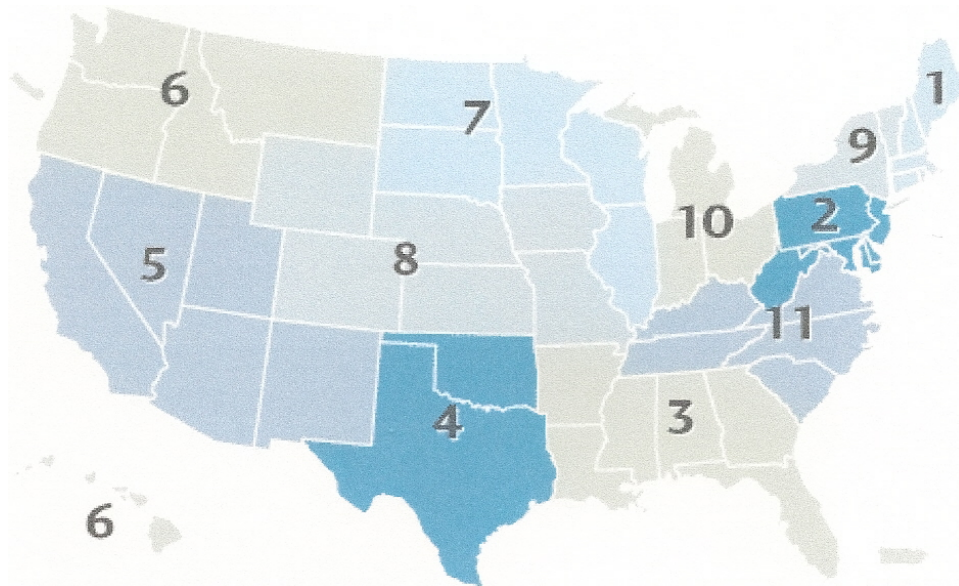
Figure 5. Distribution of distance (NM) between donor and transplant hospital by simulation



By OPTN region

Transplant rates varied considerably by region, as did change in transplant rates per simulation.

Figure 6. Map of OPTN regions



In most regions, transplant rates and counts in all four DSA-free simulations were similar to those in the DSA-first simulation (Figure 7). In regions 1 and 9, transplant rates increased in the 500NM-A and 500NM-B simulations compared with DSA-first outcomes. In region 2, transplant rates decreased in the 150NM, 250NM, and 500NM-B simulations compared with DSA-first.

In regions 2-11, waitlist mortality rates and counts in the four DSA-free simulations were similar to those in the DSA-first simulation (Figure 8). In region 1, the transplant rates were similar across simulations, but the rates point estimate and number of waitlist deaths in the 500NM-A simulation declined compared with the DSA-first simulation, from 33 to 26 (Table App1.1).

Within regions, 1-year posttransplant mortality rates were similar across simulations (Figure 9). Counts of posttransplant deaths were also similar (Table App1.1).

Median distances between donor and recipient hospitals varied by region, and tended to increase as the circle size of the first unit of allocation increased (Figure 10). This was expected. For a given circle size, each set of allocation rules will seek the most urgently ill patients within the circle for offers.

Figure 7. Transplant rates by OPTN region and simulation

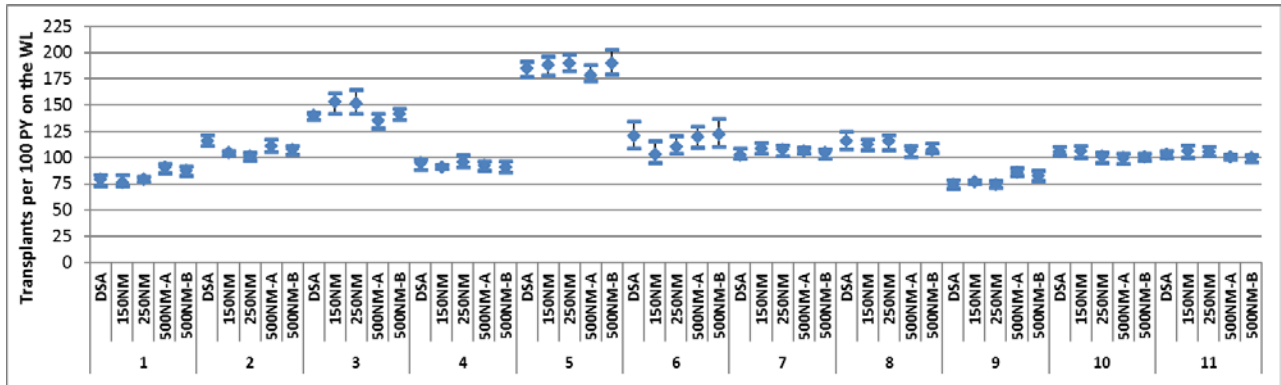


Figure 8. Waitlist mortality rates by OPTN region and simulation

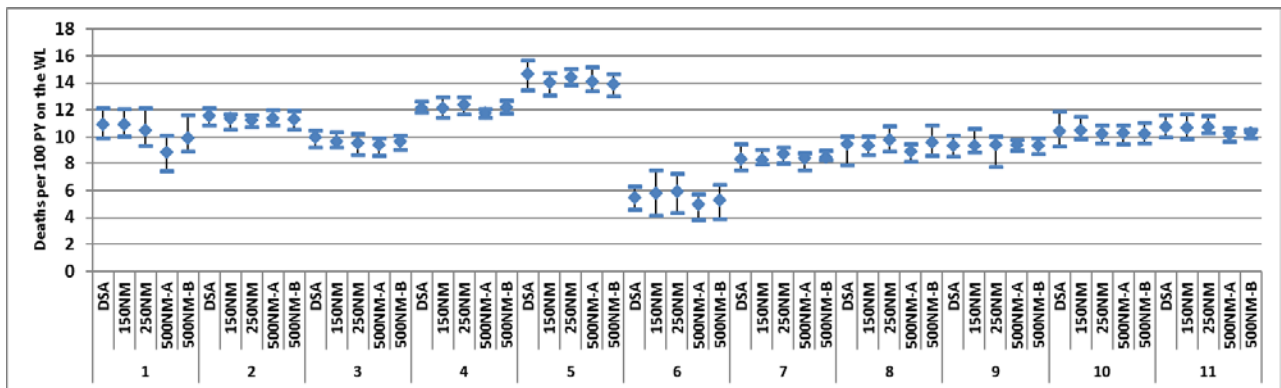


Figure 9. One-year posttransplant mortality rates by OPTN region and simulation

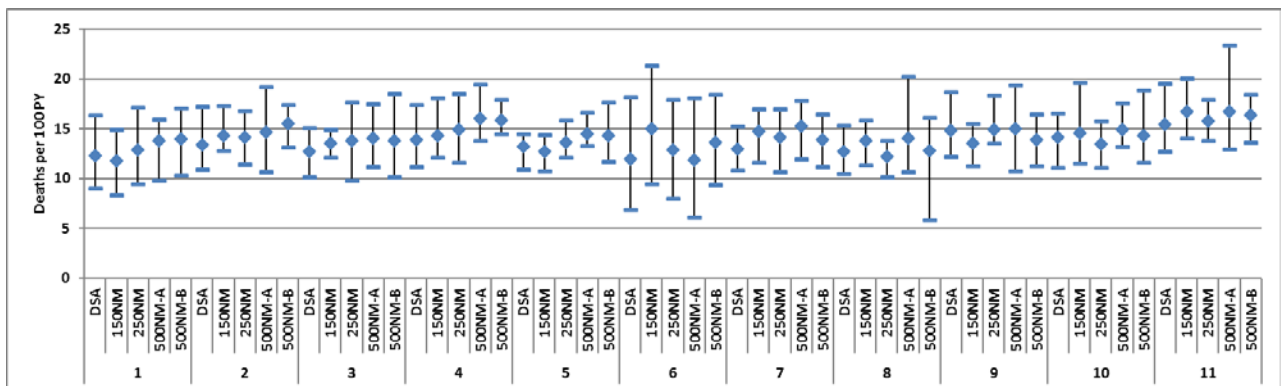
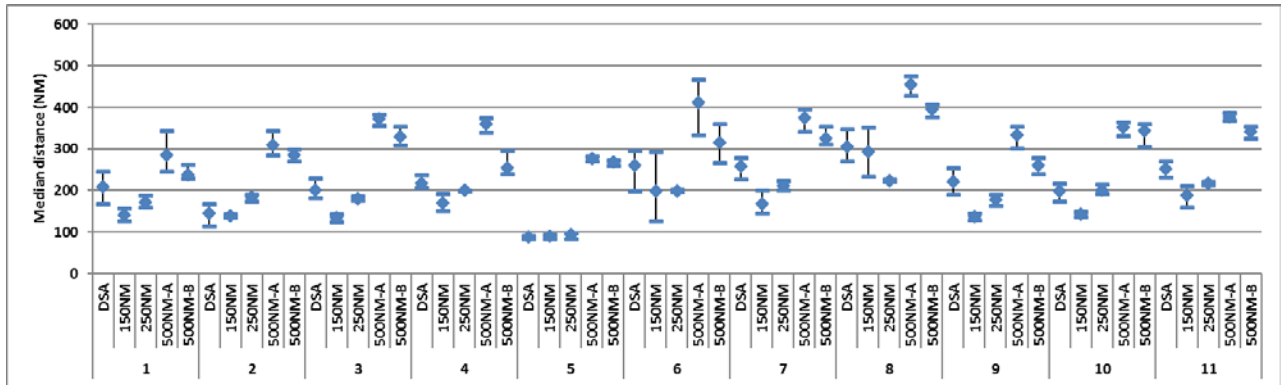


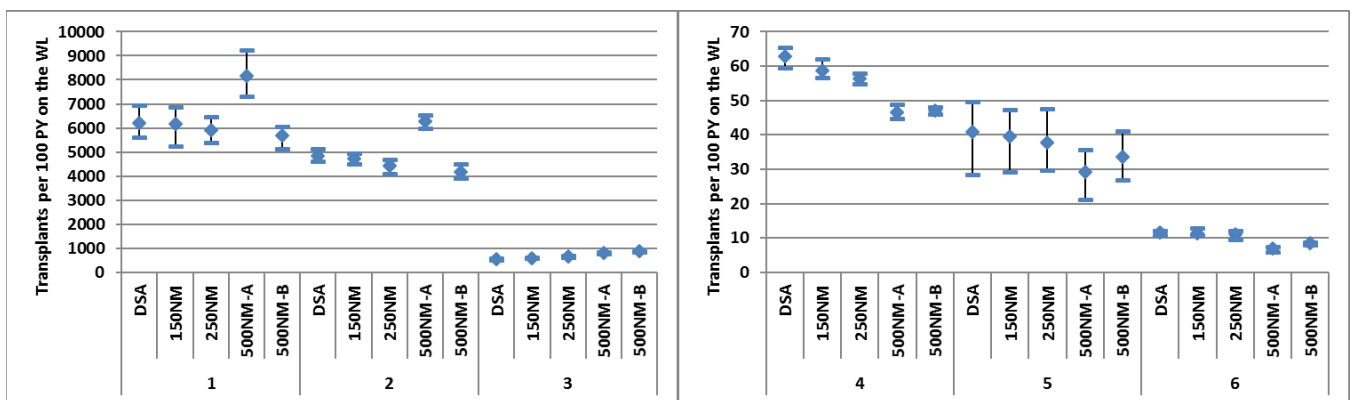
Figure 10. Median distance (NM) between donor and transplant hospital by OPTN region and simulation



By adult status group

Compared with the outgoing status 1A/1B/2 allocation rules, allocation by six status groups improved transplant rates for the most urgent waitlist candidates, as seen in prior data requests. Among status 1 and 2 candidates, transplant rates further increased in the 500NM-A simulation, in which they received first offers out to 1000NM due to broader sharing (Figure 11). Note that y-axis unit are orders of magnitude higher in the left panel than in the right. All other simulations showed similar transplant rates for status 1 candidates. Transplant rates also for status 3 candidates in all simulations using 250NM or farther as the first unit of allocation. Among status 4 candidates, transplant rates were similar in the DSA-first and 150NM simulation, but declined in the 250NM, 500NM-A and 500NM-B simulations.

Figure 11. Transplant rates by adult status and simulation



Within a status group, waitlist mortality rates were similar under all sharing rules (Figure 12). Counts of waitlist deaths were lower for status 7 (inactive) candidates in the 500NM-A and 500NM-B simulations, and similar to DSA-first for all other statuses (Table App1.2).

Figure 12. Waitlist mortality rates by adult status and simulation

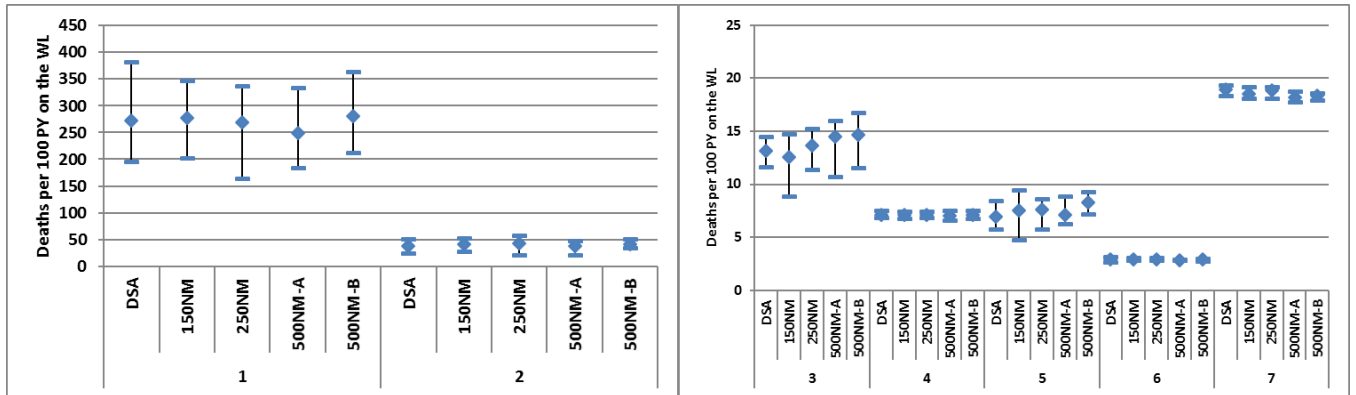
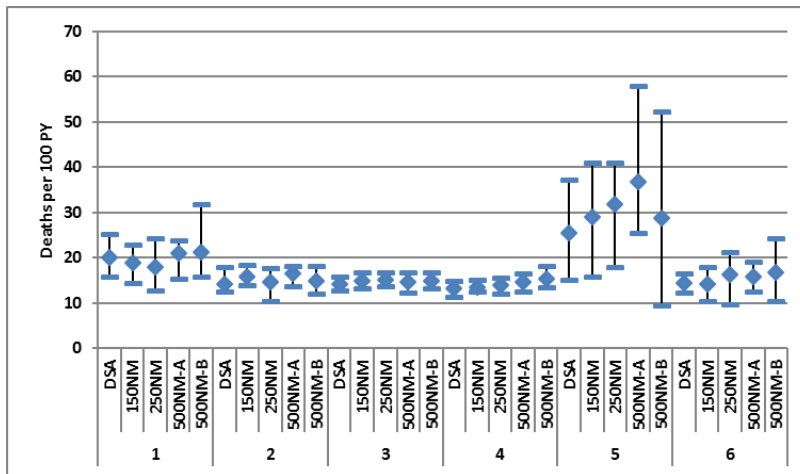


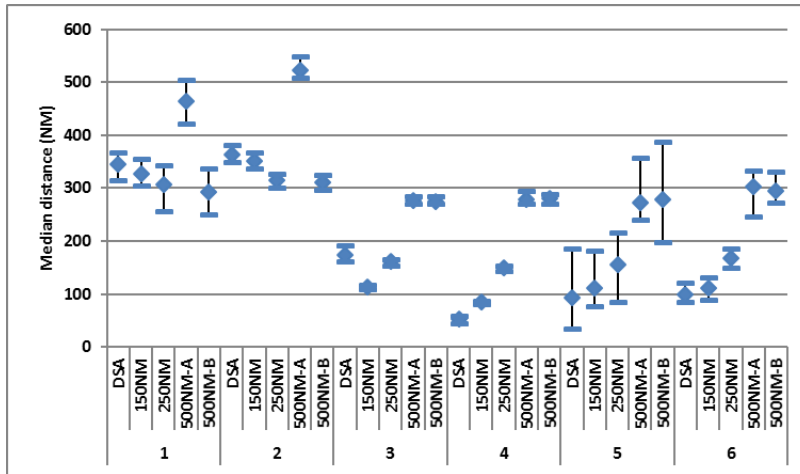
Figure 13. One-year posttransplant mortality by adult status and simulation



One-year posttransplant rates were similar across all simulations (Figure 13).

The median distance donor organs traveled was highest for status 1 and 2 transplant recipients in the 500NM-A simulation (Figure 14), as the rules dictated. For status 3 recipients, compared with the DSA-first simulation, median distance was shorter in 150NM, similar in 250NM, and higher in 500NM-A and 500NM-B simulations. For status 4 recipients, distances were shortest in the DSA-first simulation.

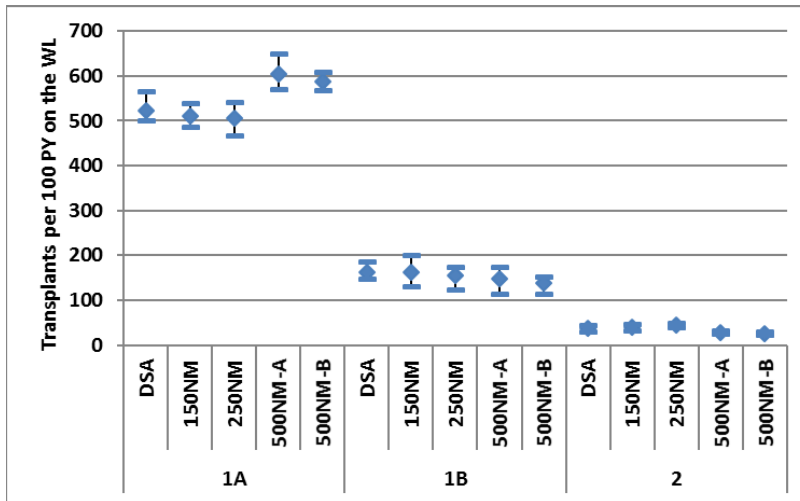
Figure 14. Median distance (NM) between donor and transplant hospital by adult status and simulation



By pediatric status group

Among pediatric status 1A candidates, transplant rates increased in the 500NM-A and 500NM-B simulations compared with DSA-first. Transplant rates remained similar to those in the DSA-first simulation for status 1B and status 2 candidates (Figure 15).

Figure 15. Transplant rate by pediatric status and simulation



Within pediatric status groups, waitlist mortality rates (Figure 16) and 1-year posttransplant mortality rates (Figure 17) were similar across all simulations. Waitlist death counts were low, and similar across all simulations. Detailed counts appear in Table App1.3.

Figure 16. Waitlist mortality rates by pediatric status and simulation

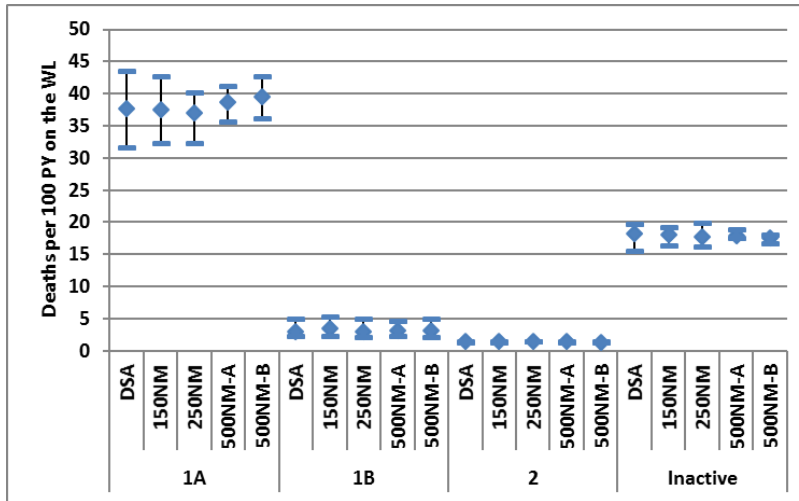
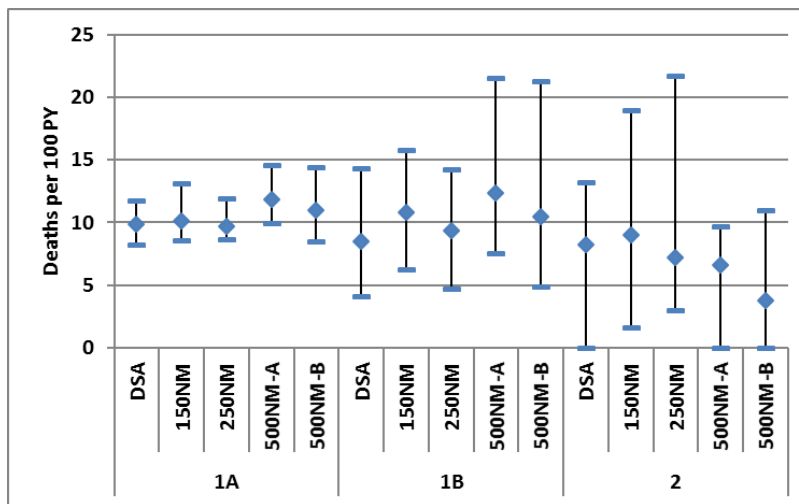
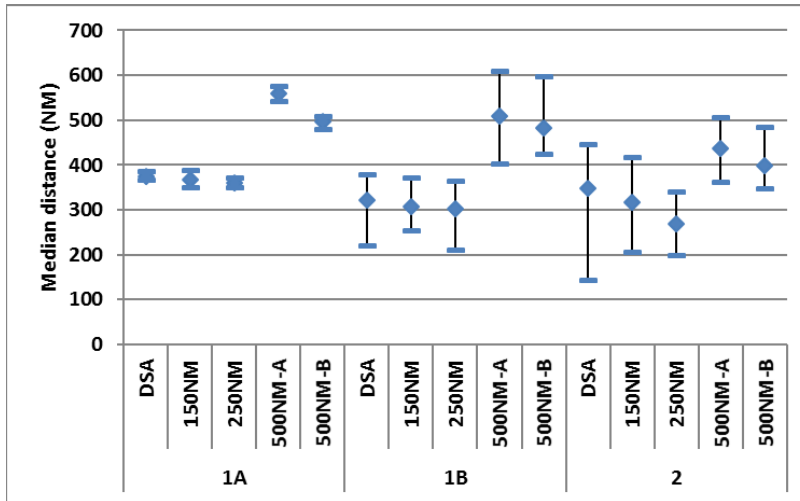


Figure 17. One-year posttransplant mortality by pediatric status and simulation



Within each pediatric status group, median distances organs traveled were similar in the DSA-first, 150NM, and 250NM simulations (Figure 18). For status 1A and 1B children, distances increased in the 500NM-A and 500NM-B simulations compared with DSA-first. For status 2 candidates, the range of distance in the simulations was large enough that DSA-first overlapped the range of 500NM-A and 500NM-B, although the point estimates of the latter two were higher.

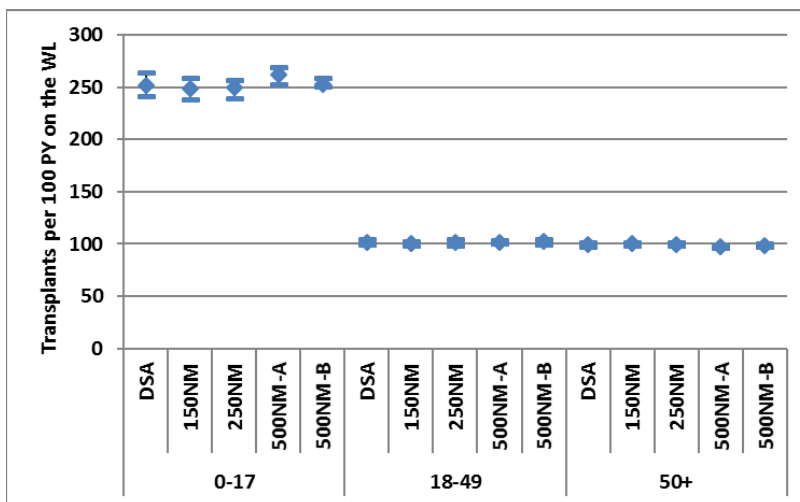
Figure 18. Median distance (NM) between donor and transplant hospital by pediatric status and simulation



By age groups

We divided age groups three ways to examine different age sub-populations. In Figure 19 to Figure 22, we categorized the population as children (0-17 years), younger adults (18-49 years), and older adults (50 years or older). Transplant rates were higher for children than for adults in all simulations; within age groups, all DSA-free simulations were similar to the DSA-first simulations (Figure 19).

Figure 19. Transplant rates by three age groups and simulation



Waitlist mortality rates were also higher for children than for either adult group, but were similar to rates for other children across simulations (Figure 20). Within an age group, 1-year posttransplant mortality rates were similar across simulations (Figure 21).

Figure 20. Waitlist mortality rates by three age groups and simulation

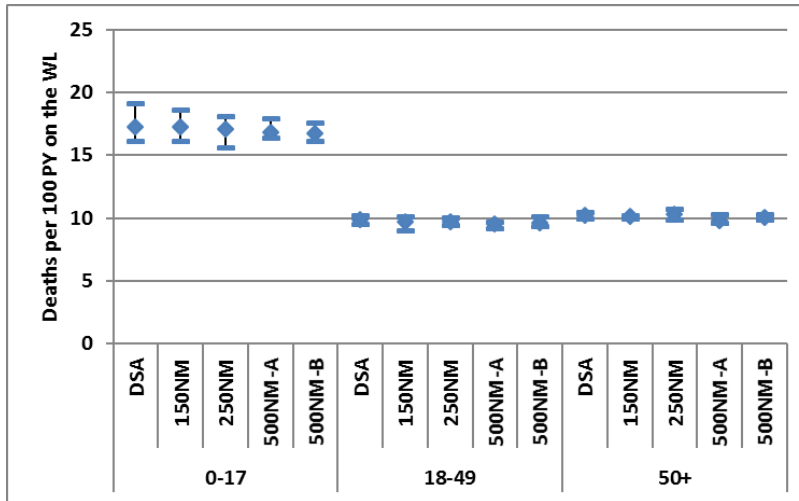
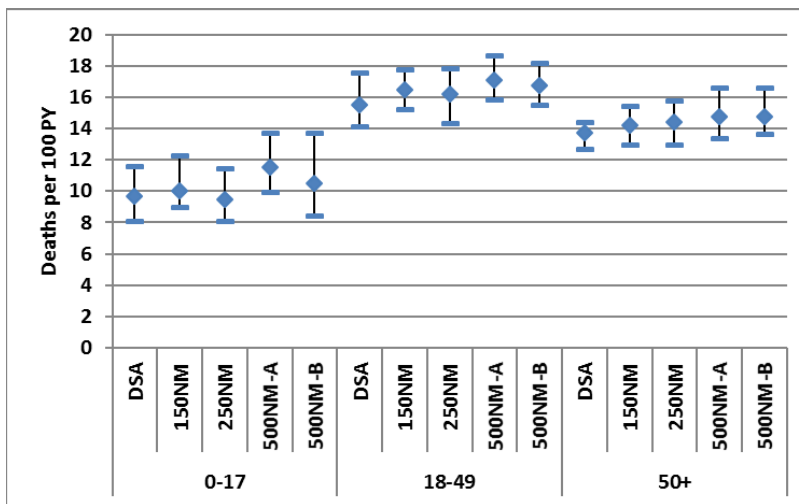
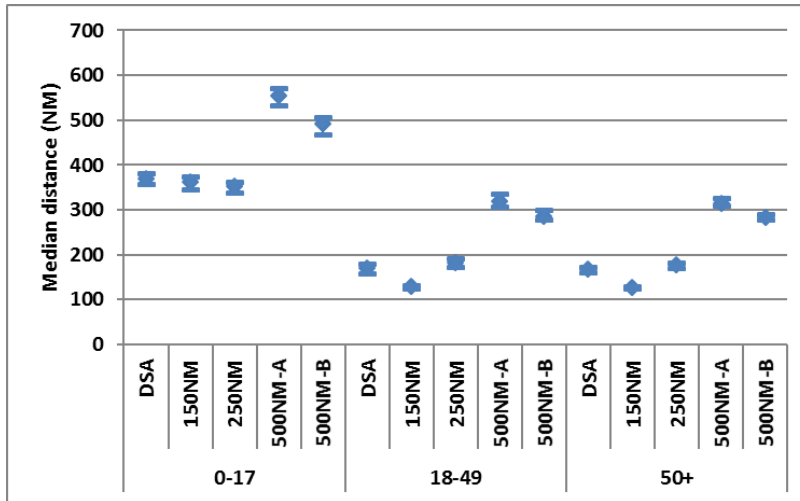


Figure 21. One-year posttransplant mortality rates by three age groups and simulation



Among children, median distance between donors and recipients was similar in the DSA-first compared with the 150NM and 250NM simulations, but higher for the 500NM-A and 500NM-B simulations (Figure 22). In both adult age groups, median distance was lower in the 150NM simulation, similar in the 250NM simulation, and notably higher in the 500NM-A and 500NM-B simulations compared with DSA-first.

Figure 22. Median distance (NM) between donor and transplant hospital by three age groups and simulation



In Figure 23 to Figure 26, we show data by three pediatric age groups and one adult age group, to investigate simulation outcomes among differently aged children. Within an age group, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with the DSA-first simulation (Figure 23, Figure 24, Figure 25, respectively).

Figure 23. Transplant rates by pediatric age groups and simulation

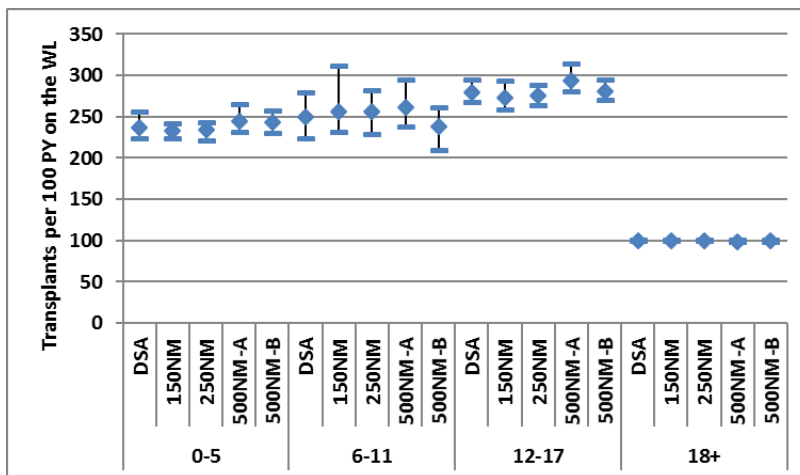


Figure 24. Waitlist mortality rates by pediatric age groups and simulation

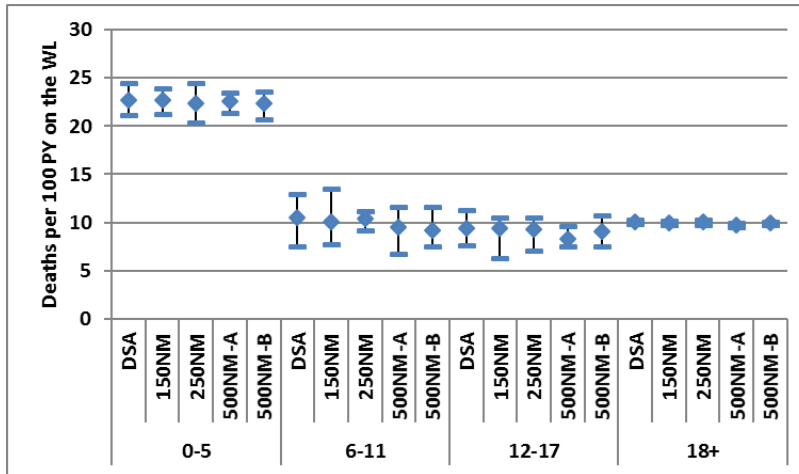
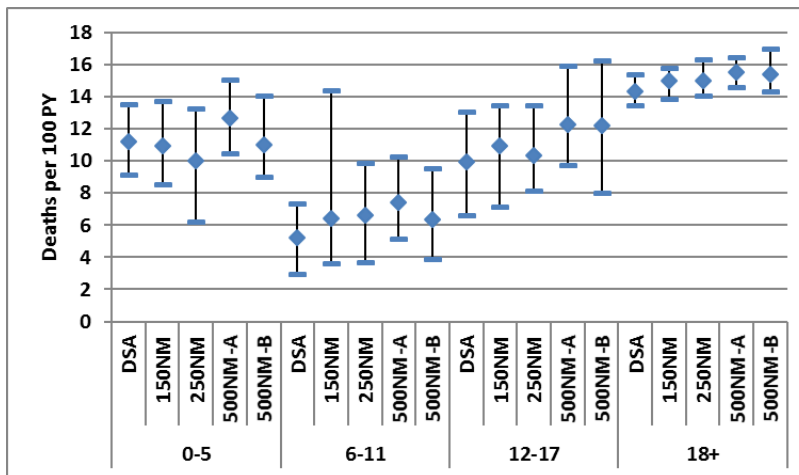


Figure 25. One-year posttransplant mortality rates by pediatric age groups and simulation



Among all pediatric age groups, distances donor organs traveled in the 150NM and 250NM simulations were similar to distances in the DSA-first simulation (Figure 26). Median distance donor organs traveled to child recipients was higher in the 500NM-A and 500NM-B simulations.

Figure 26. Median distance (NM) between donor and transplant hospital by pediatric age groups and simulation

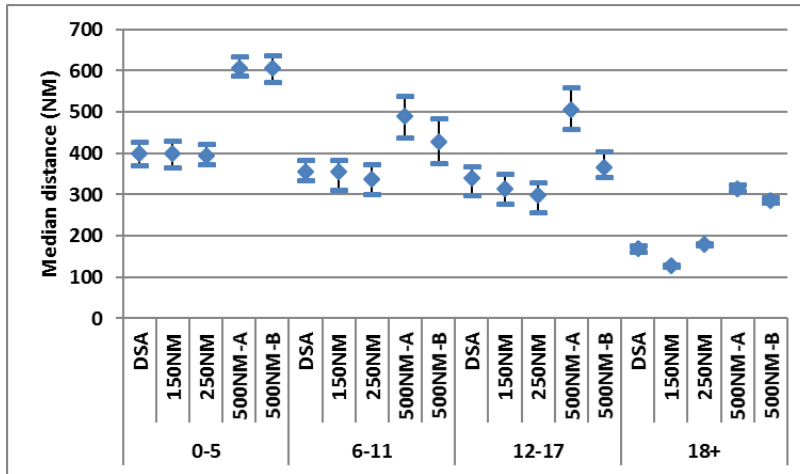


Figure 27 to Figure 30 show data by four adult age groups, to investigate simulation outcomes for differently aged adults. Within an age group, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with the DSA-first simulation (Figure 27, Figure 28, and Figure 29 respectively).

Figure 27. Transplant rates by four adult age groups and simulation

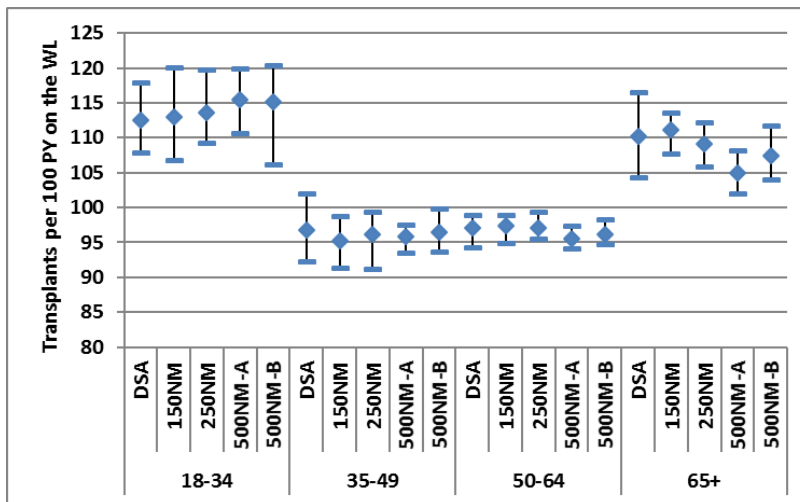


Figure 28. Waitlist mortality rates by four adult age groups and simulation

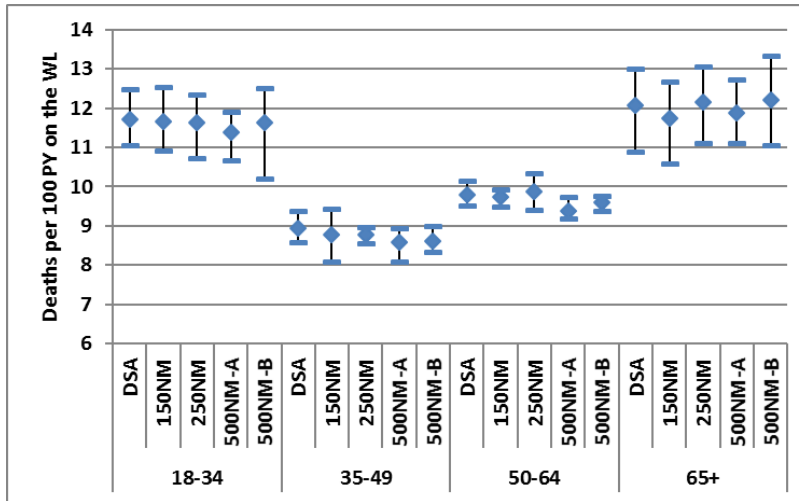
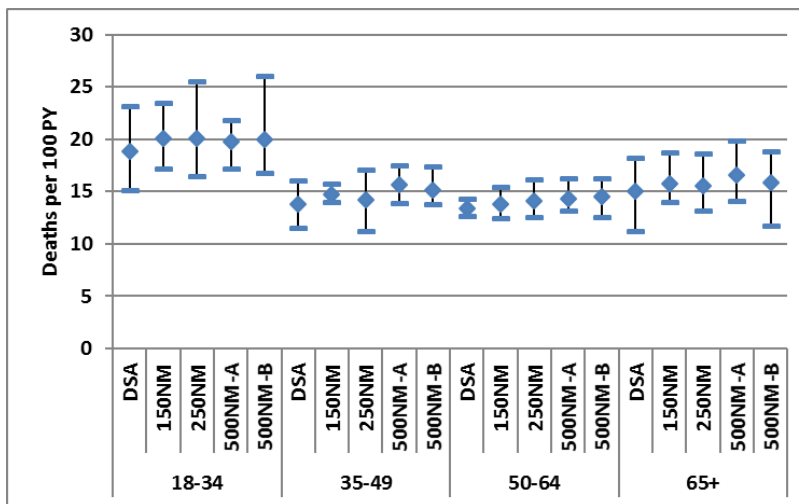
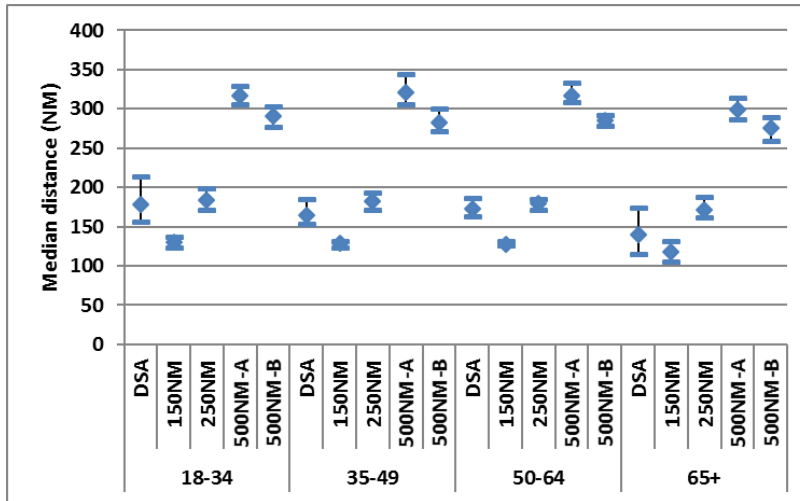


Figure 29. One-year posttransplant mortality rates by four adult age groups and simulation



Among adult age groups, the pattern of distances donor organs traveled was similar to overall data. The 250NM simulation was similar to the DSA-first, but travel distance was shorter in the 150NM simulation than in the DSA-first (Figure 30). Travel distances were considerably longer in the 500NM-A and 500NM-B simulations. Among adults aged 65 years or older, this pattern was similar, although the ranges of 150NM and 250NM simulations overlapped DSA-first.

Figure 30. Median distance (NM) between donor and transplant hospital by four adult age groups and simulation



By sex

Simulation outcomes by sex mirrored overall data. Within a sex, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with the DSA-first simulation (Figure 31, Figure 32, and Figure 33, respectively).

Figure 31. Transplant rates by sex and simulation

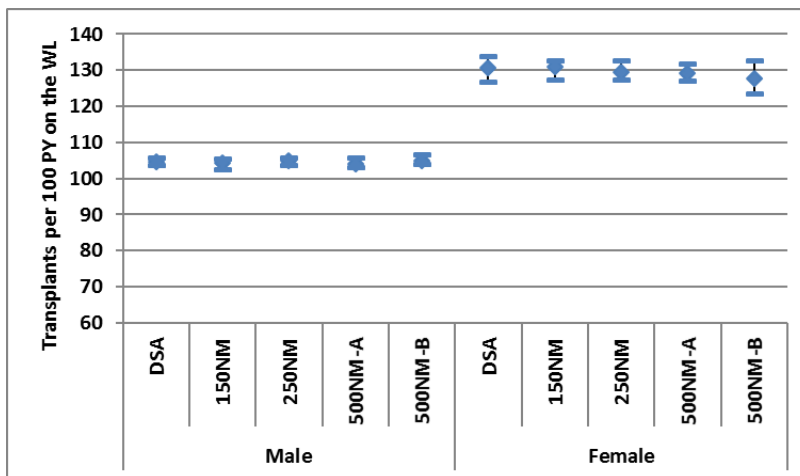


Figure 32. Waitlist mortality rates by sex and simulation

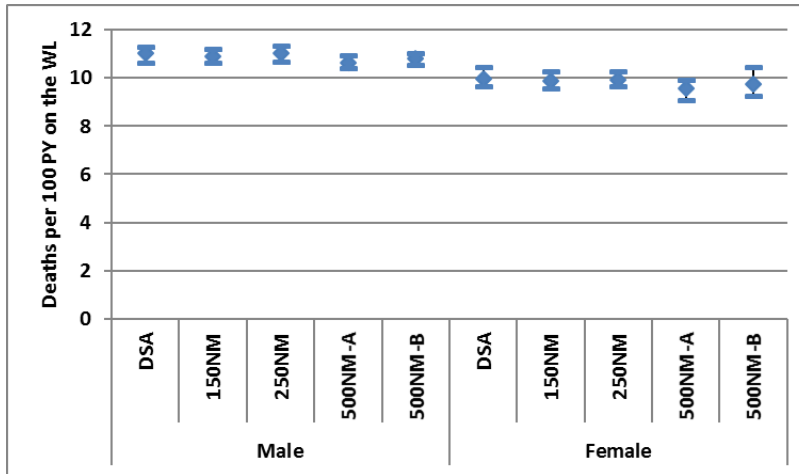
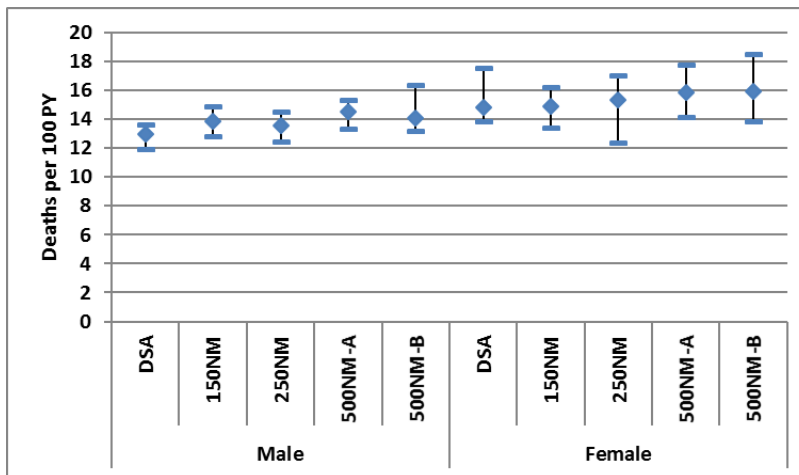
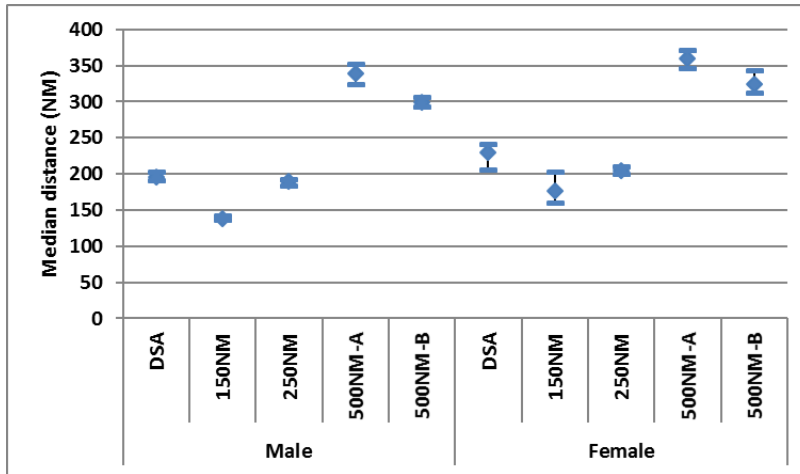


Figure 33. One-year posttransplant mortality rates by sex and simulation



The pattern of distances donor organs traveled was similar for men and women. The 250NM simulation was similar to the DSA-first, but travel distances were shorter in the 150NM simulation than in the DSA-first (Figure 34). Travel distances were considerably longer in the 500NM-A and 500NM-B simulations. Due to the smaller female candidate pool, the range of the 150NM simulation overlaps the DSA-first, so distances were not definitively shorter in the 150NM simulation for women.

Figure 34. Median distance (NM) between donor and transplant hospital by sex and simulation



By race/ethnicity groups

Simulation outcomes by race and ethnicity were similar to overall data. Within a race/ethnicity group, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with the DSA-first simulation (Figure 35, Figure 36, and Figure 37, respectively).

Figure 35. Transplant rates by race/ethnicity and simulation

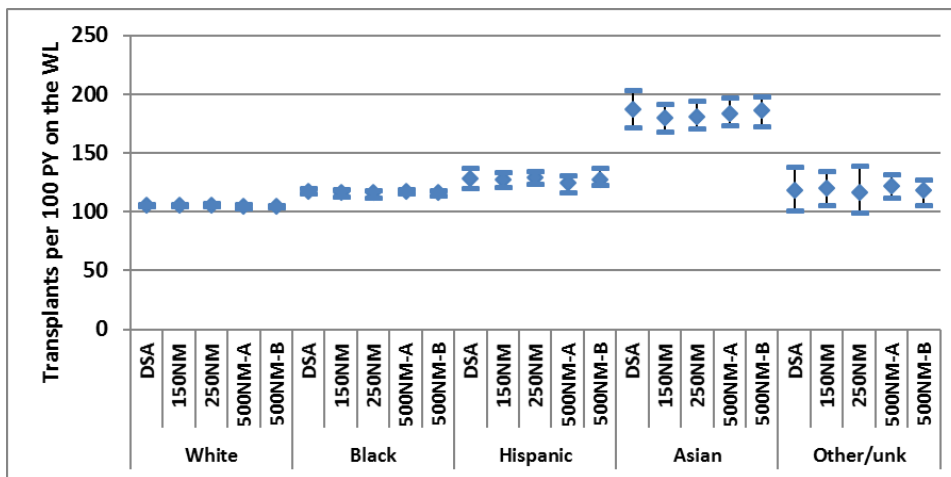


Figure 36. Waitlist mortality rates by race/ethnicity and simulation

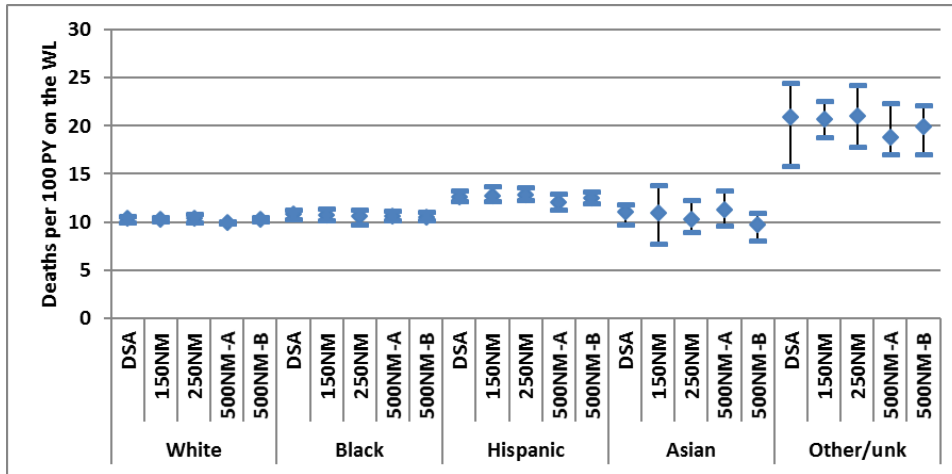
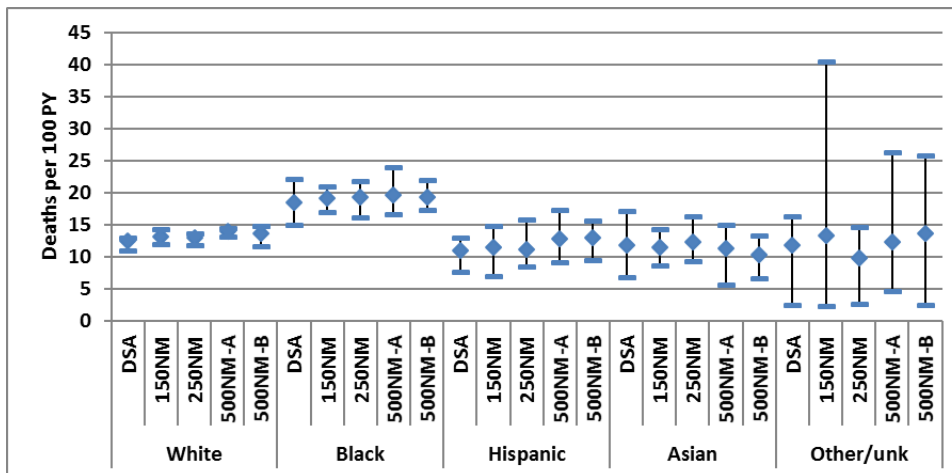
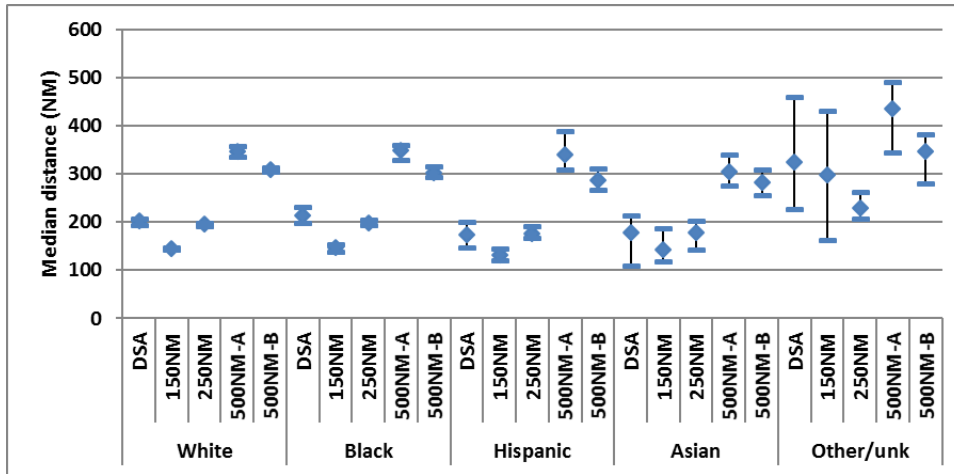


Figure 37. One-year posttransplant mortality rates by race/ethnicity and simulation



The patterns of distance donor organs traveled were similar for most race and ethnicity groups; the 250NM simulation was similar to the DSA-first, but travel distances were shorter in the 150NM simulation than in the DSA-first (Figure 38). In smaller groups, Asian and Other/unknown, the distance ranges for 150NM and 250NM overlapped the DSA-first simulation. Travel distances were considerably longer in the 500NM-A and 500NM-B simulations for all groups except Other/unknown.

Figure 38. Median distance (NM) between donor and transplant hospital by race/ethnicity and simulation



By primary diagnosis groups

Simulation outcomes by diagnosis were similar to overall data. Within a diagnosis group, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with the DSA-first simulation (Figure 39, Figure 40, and Figure 41, respectively).

Figure 39. Transplant rates by diagnosis group and simulation

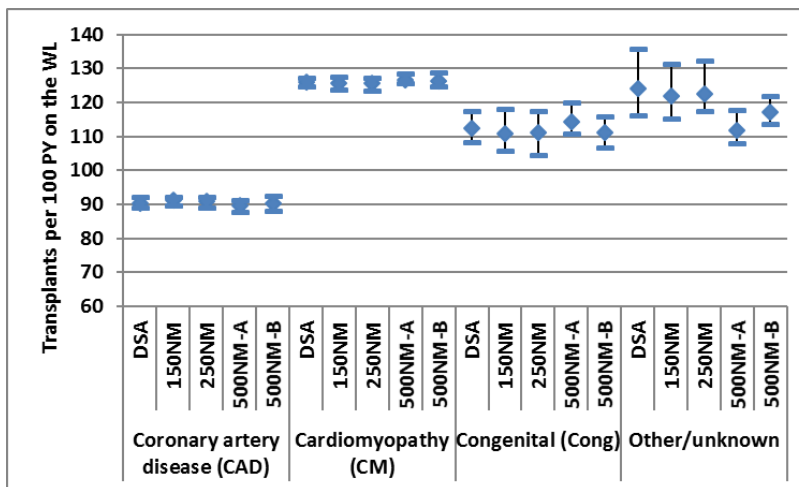


Figure 40. Waitlist mortality rates by diagnosis group and simulation

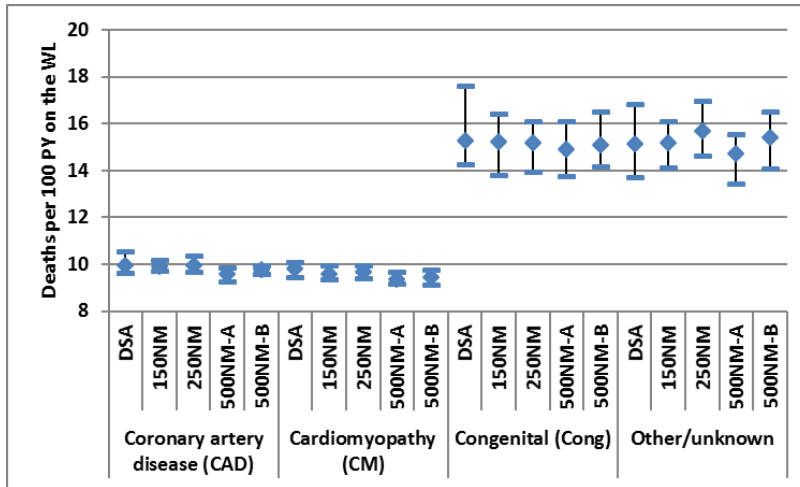
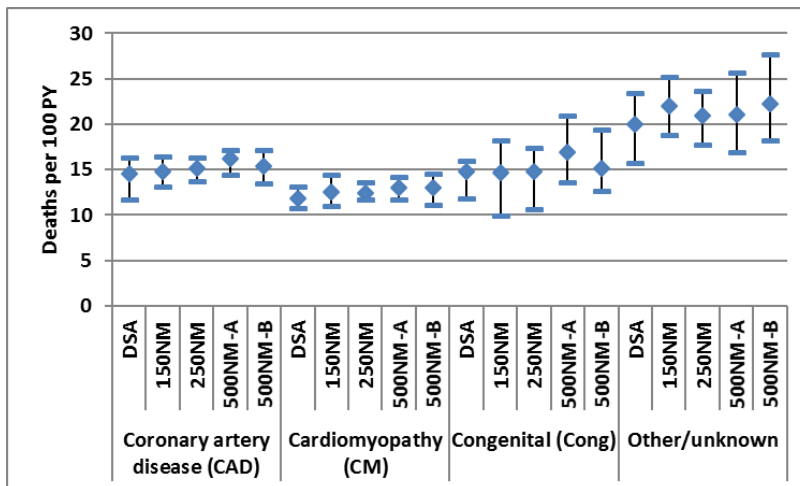
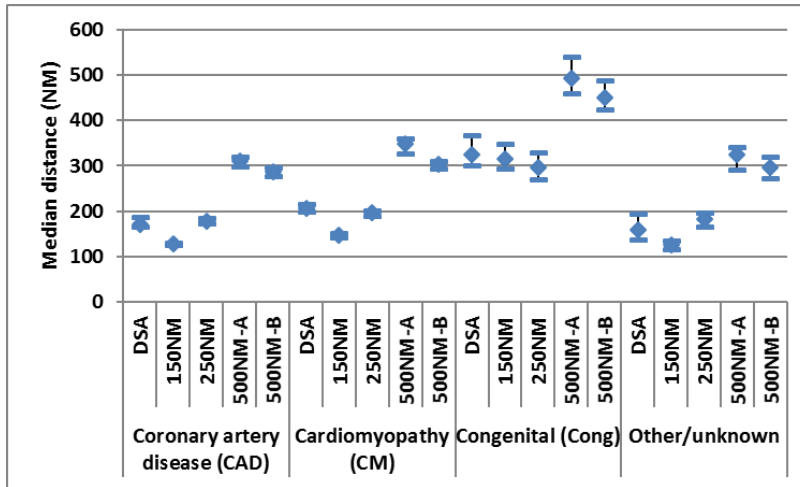


Figure 41. One-year posttransplant mortality rates by diagnosis group and simulation



The patterns of distance donor organs traveled were similar for the largest diagnosis groups, coronary artery disease, cardiomyopathy, and other. The 250NM simulation was similar to the DSA-first, but travel distances were shorter in the 150NM simulation than in the DSA-first (Figure 42). In the congenital illness group, distance ranges in the 150NM and 250NM simulations overlapped the DSA-first simulation. Travel times were considerably longer in the 500NM-A and 500NM-B simulations for all groups.

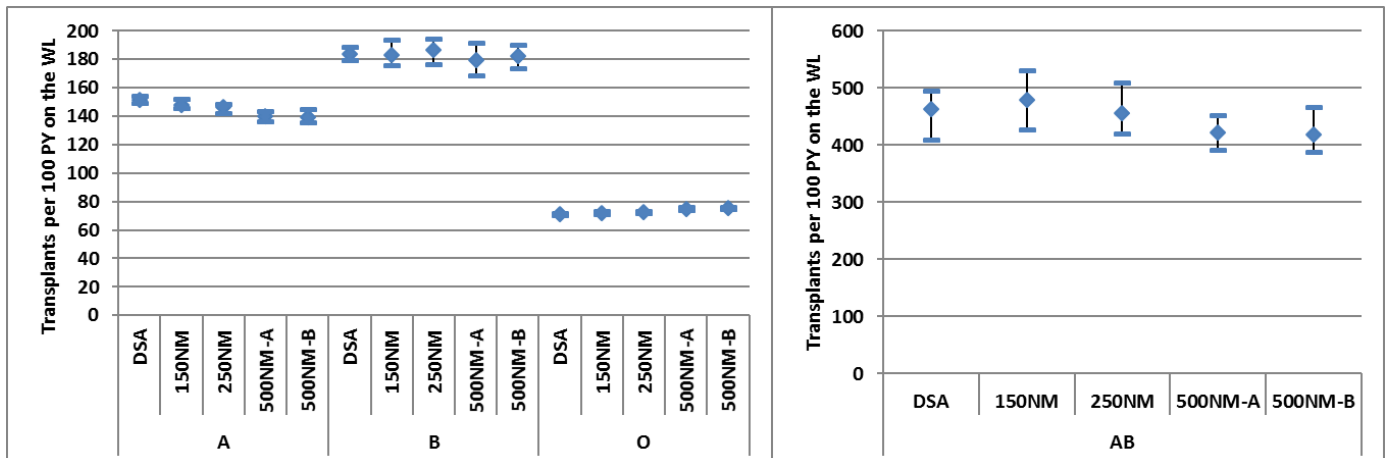
Figure 42 Median distance (NM) between donor and transplant hospital by diagnosis group and simulation



By blood type

Transplant rates for candidates with blood type A were lower in the 250NM, 500NM-A, and 500NM-B simulations compared with DSA-first (Figure 43), and higher for candidates with blood type O in the 500NM-A and 500NM-B simulations. For candidates with blood types B and AB, transplant rates were similar across all simulations.

Figure 43. Transplant rates by blood type and simulation



Within each blood type, waitlist mortality rates and 1-year posttransplant mortality rates were similar (Figure 44 and Figure 45, respectively).

Figure 44. Waitlist mortality rates by blood type and simulation

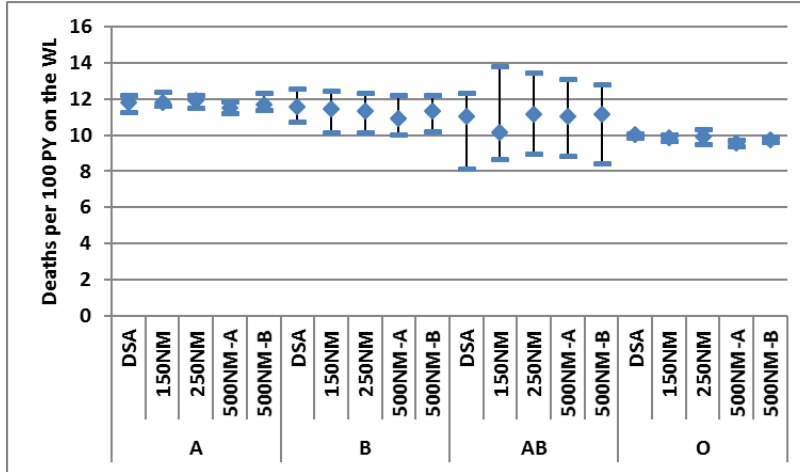
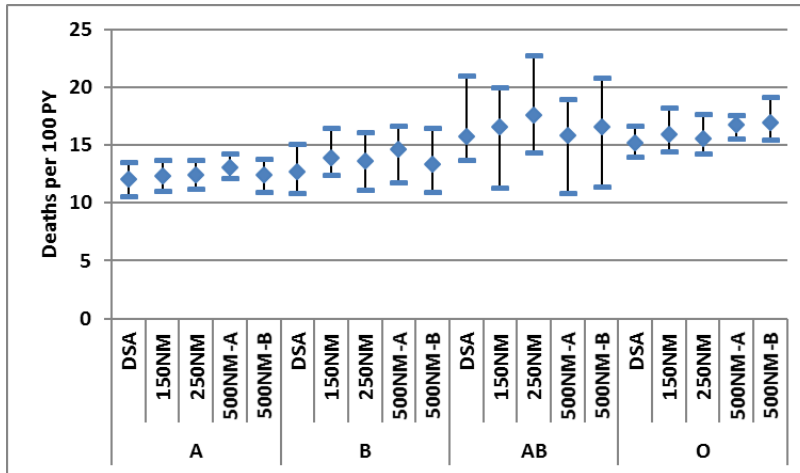
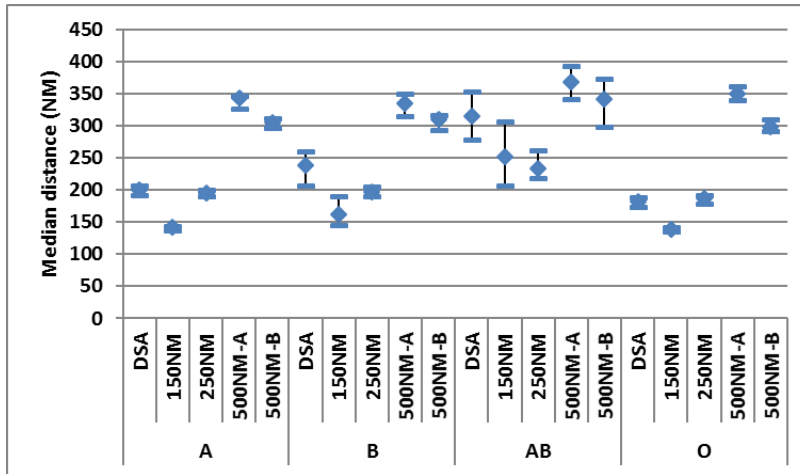


Figure 45. One-year posttransplant mortality rates by blood type and simulation



The patterns of distance donor organs traveled were similar for blood types A, B, and O. The 250NM simulation was similar to the DSA-first, but travel distance was shorter in the 150NM simulation, and longer in the 500NM-A and 500NM-B simulations (Figure 46). For blood type AB, the smallest group, all DSA-free simulations overlapped the range of the DSA-first simulation.

Figure 46. Median distance (NM) between donor and transplant hospital by blood type and simulation



By urbanicity

We classified urbanicity by matching the zip codes of a candidate’s primary residence to rural-urban commuting area (RUCA) codes based on the 2010 decennial census. Some zip codes were not in the RUCA dataset, and those were classified as Unknown. Over 80% of candidates and recipients were classified as living in metropolitan areas.

Within each urbanicity category, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with the DSA-first simulation (Figure 47, Figure 48, and Figure 49, respectively).

Figure 47. Transplant rates by urbanicity and simulation

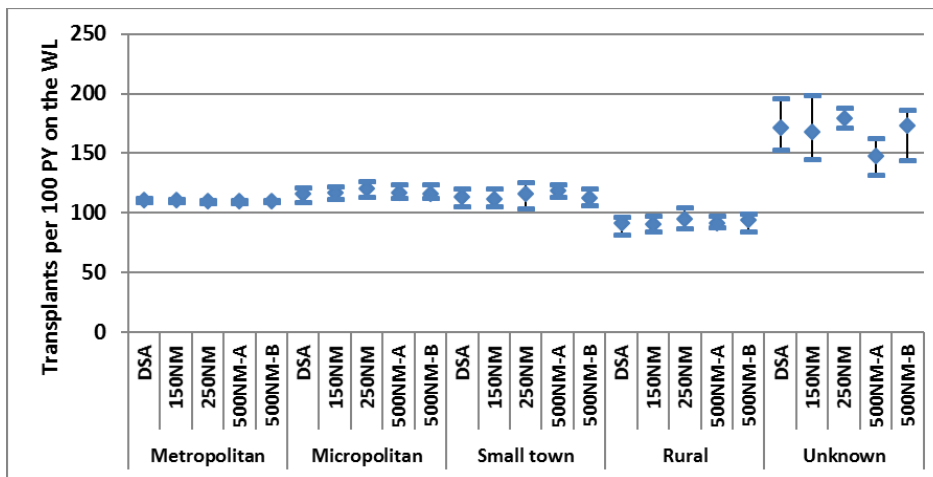


Figure 48. Waitlist mortality rates by urbanicity and simulation

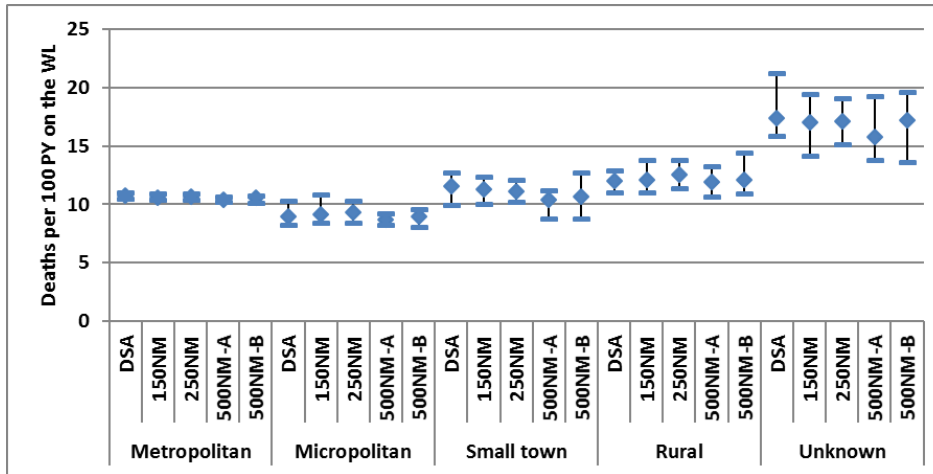
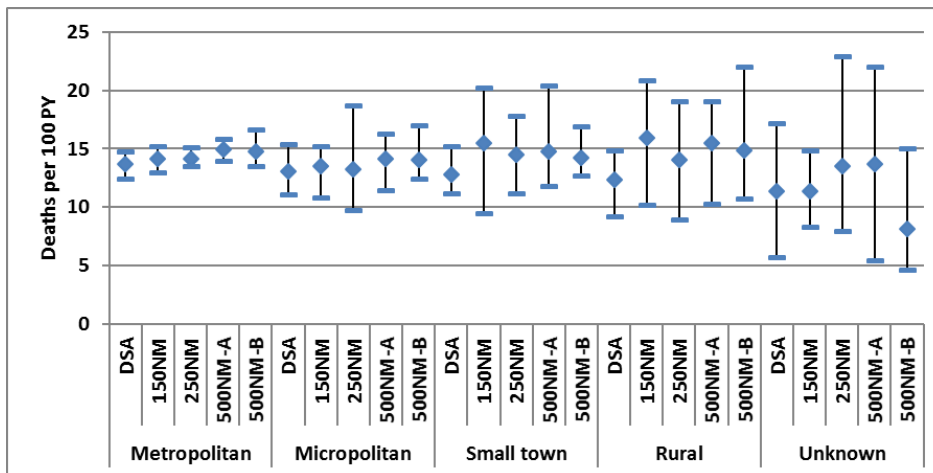
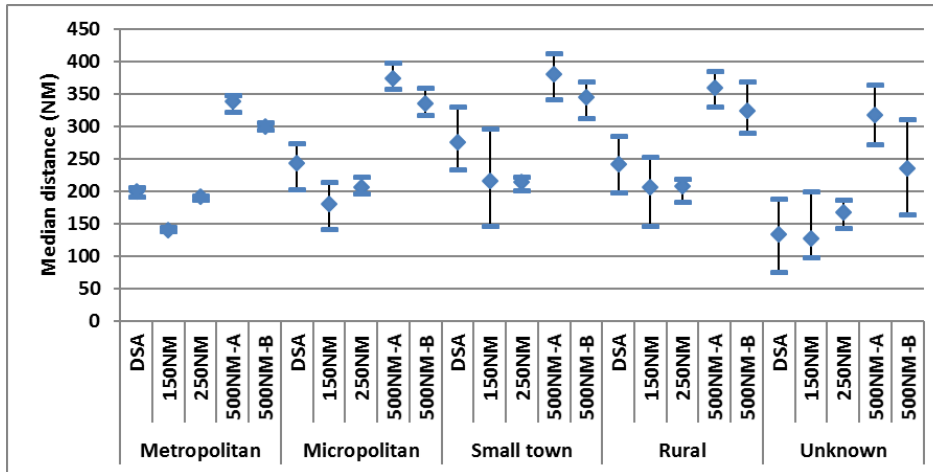


Figure 49. One-year posttransplant mortality rates by urbanicity and simulation



For recipients living in metropolitan areas, compared with the DSA-first simulation, the distance organs traveled was similar in the 250NM simulation, shorter in the 150NM simulation, and longer in the 500NM-A and 500NM-B simulations (Figure 50). For recipients living in micropolitan, small town, and rural areas, the ranges of travel distance in the 150NM and 250NM simulations overlapped those in the DSA-first simulation. Distances in the 500NM-A and 500NM-B simulations were considerably longer.

Figure 50. Median distance (NM) between donor and transplant hospital by urbanicity and simulation



By insurance

Insurance status was determined at listing, and reported on the OPTN Transplant Candidate Registration form. The number of candidates and recipients with unknown insurance status was small, less than 1% of the cohort. Results for these candidates and recipients was uninformative, and are not shown in the graphs; detailed data for all groups appear in Table App1.11.

Within each insurance coverage group, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with the DSA-first simulation (Figure 51, Figure 52, and Figure 53, respectively).

Figure 51. Transplant rates by insurance and simulation

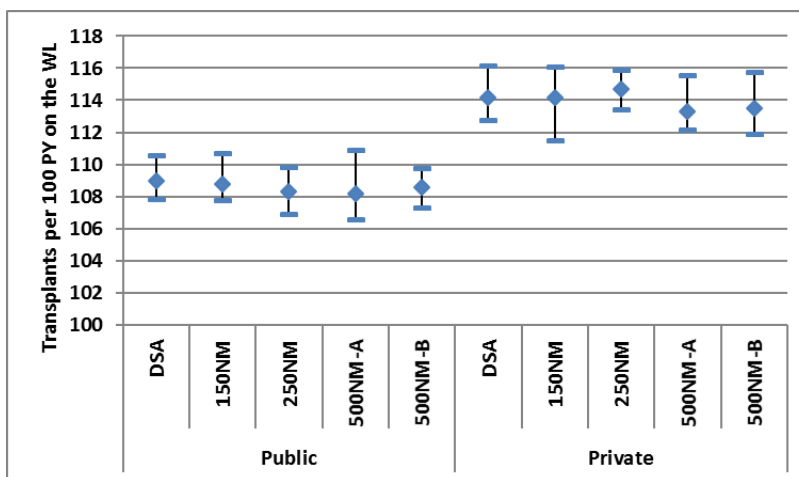


Figure 52. Waitlist mortality rates by insurance and simulation

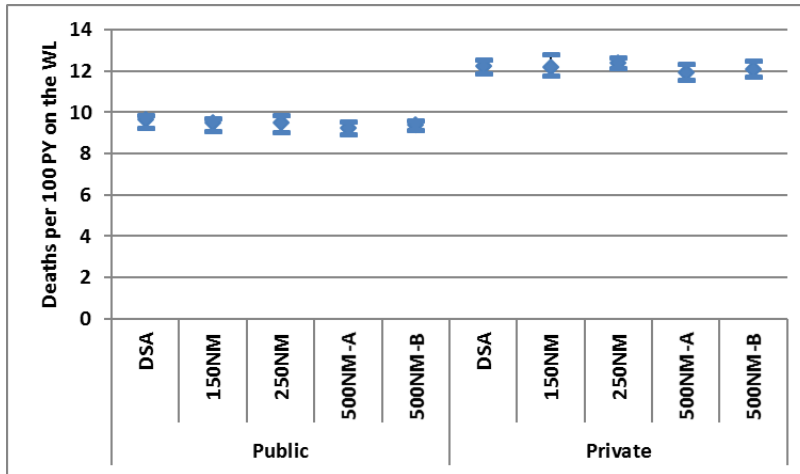
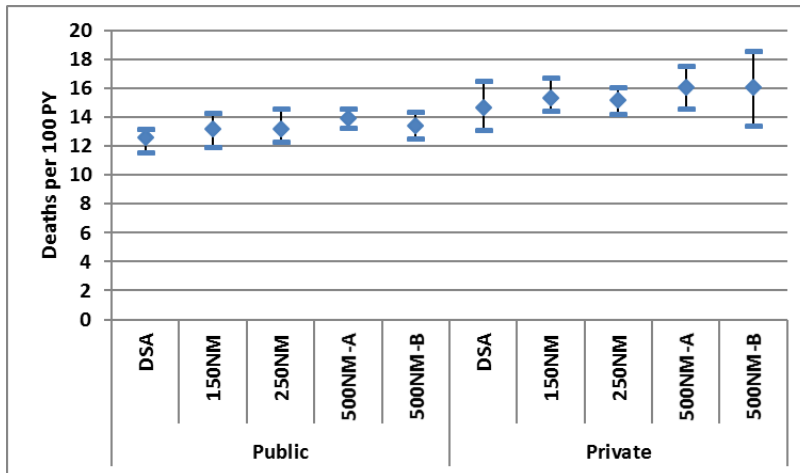
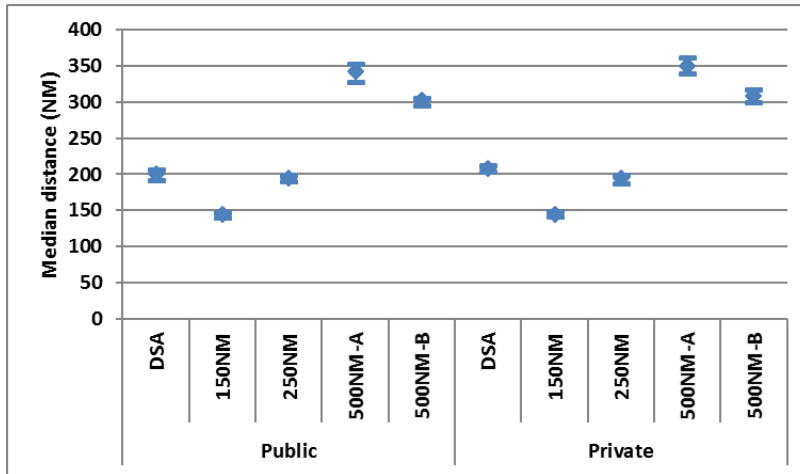


Figure 53. One-year posttransplant mortality rates by insurance and simulation



The patterns of distance donor organs traveled were similar for recipients with public and private coverage. Travel distance in the 250NM simulation was similar to the DSA-first, but shorter in the 150NM simulation (Figure 54), and considerably longer in the 500NM-A and 500NM-B simulations.

Figure 54. Median distance (NM) between donor and transplant hospital by insurance and simulation



By US location

TSAM results were computed based on the transplant center’s location within the United States. With the Mississippi River as the east/west dividing line, centers located in AL, CT, DC, DE, FL, GA, IL, IN, KY, MA, MD, MI, MS, NC, NJ, NY, OH, PA, SC, TN, VA, and WI were classified as east, and centers located in AR, AZ, CA, CO, IA, LA, MN, MO, NE, OK, OR, PR, TX, UT, and WA were classified as west. No heart transplant centers were active in AK, HI, ID, KS, ME, MT, NV, NH, NM, ND, RI, SD, VT, WV, or WY during the simulation time frame, although one was active in KS before and after our cohort interval.

In the east and west, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with DSA-first (Figure 55, Figure 56, and Figure 57, respectively).

Figure 55. Transplant rates by US location and simulation

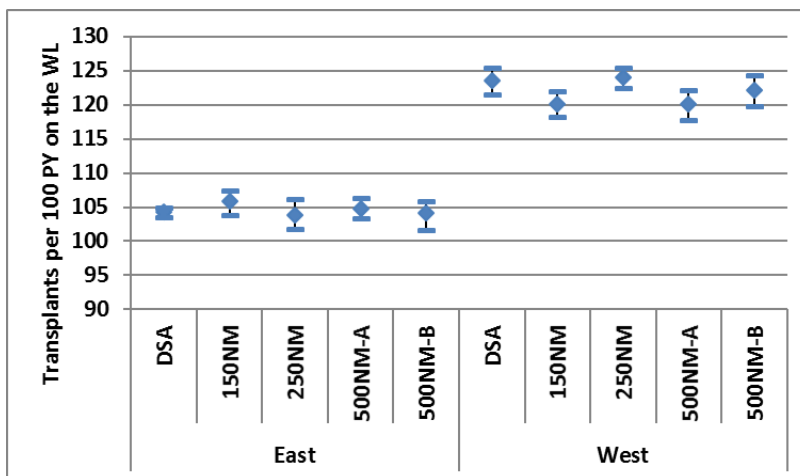


Figure 56. Waitlist mortality rates by US location and simulation

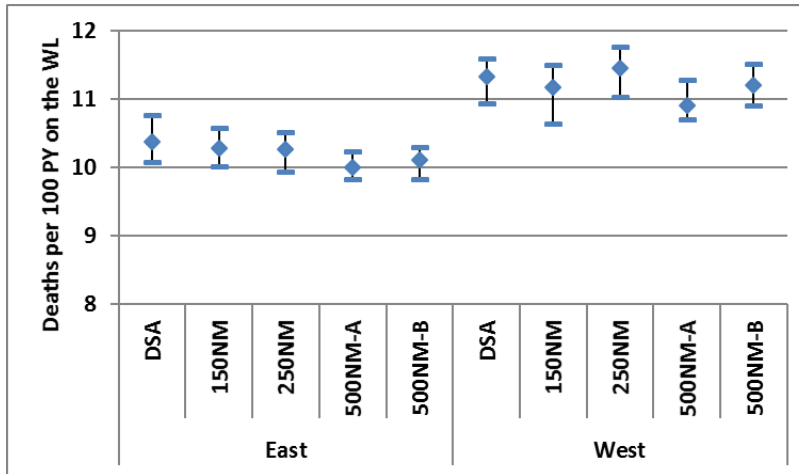
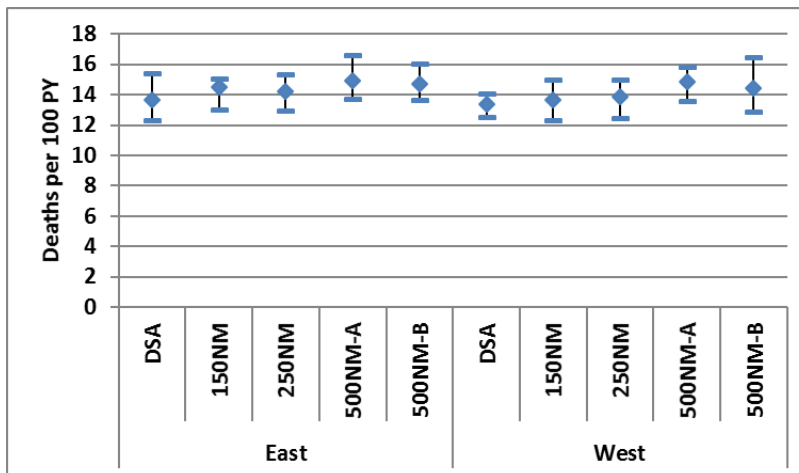
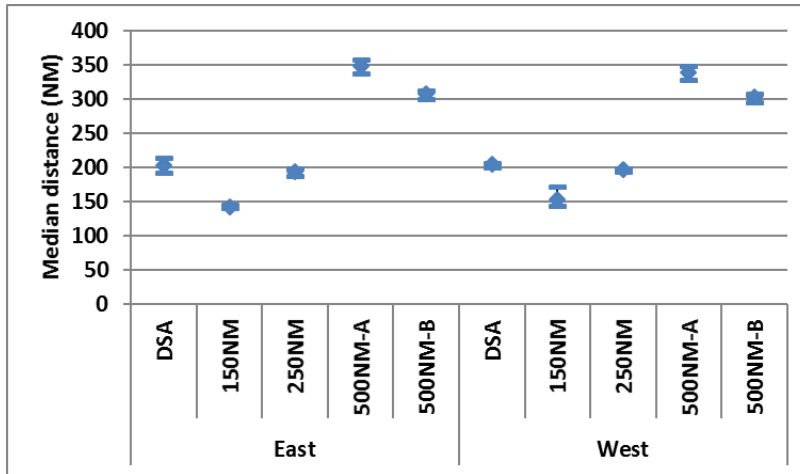


Figure 57. One-year posttransplant mortality rates by US location and simulation



The patterns of distance donor organs traveled were similar for recipients at centers east and west of the Mississippi River. Travel distance in the 250NM simulation was similar to the DSA-first, but shorter in the 150NM simulation (Figure 58), and considerably longer in the 500NM-A and 500NM-B simulations.

Figure 58. Median distance (NM) between donor and transplant hospital by US location and simulation



By exception status

Exception status in TSAM refers to candidates for whom a status 1A or status 1B exception request was submitted, but the reason for the request was not folded into one of the new status groups. The majority of reasons for status upgrade by exception were used to define a status group under the approved system, such as ventricular tachycardia (status 2) or specific congenital heart diseases (status 4). A candidate with a status 1A exception that did not fall into new status-defining criteria was labeled status 3 by exception. A candidate with a status 1B exception that did not fall into new status-defining criteria was labeled status 4 by exception. The number of candidates and recipients assigned status 3 or 4 by exception made up less than 5% of the cohort.

Approved policy includes exception pathways for all status groups, but TSAM cannot predict who might receive a status upgrade under the new system.

Transplant rates for candidates assigned status 3 by exception were similar in the 150NM and 250NM simulations, and higher in the 500NM-A and 500NM-B simulations, compared with the DSA-first simulation (Figure 59). Transplant rates for candidates assigned status 4 by exception were similar in all simulations. Waitlist mortality and 1-year posttransplant mortality were similar in all DSA-free simulations compared with DSA-first (Figure 60 and Figure 61).

Figure 59. Transplant rates by exception status and simulation

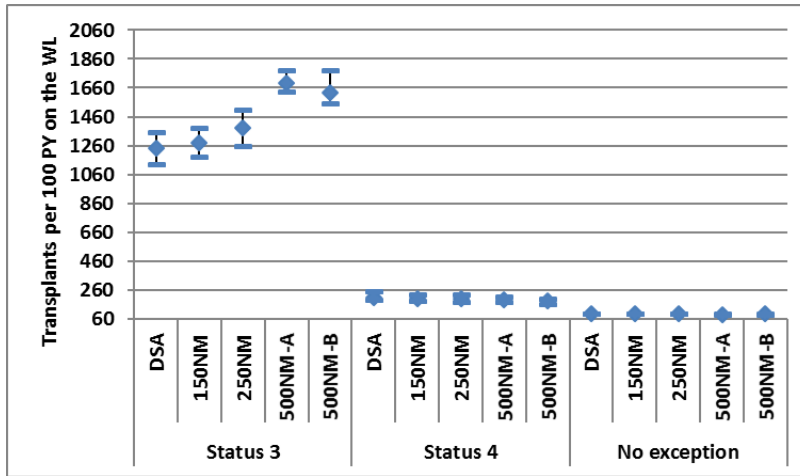


Figure 60. Waitlist mortality rates by exception status and simulation

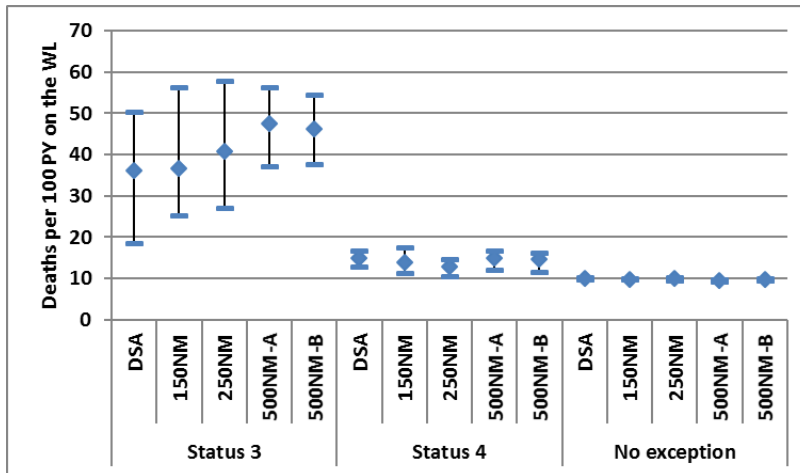
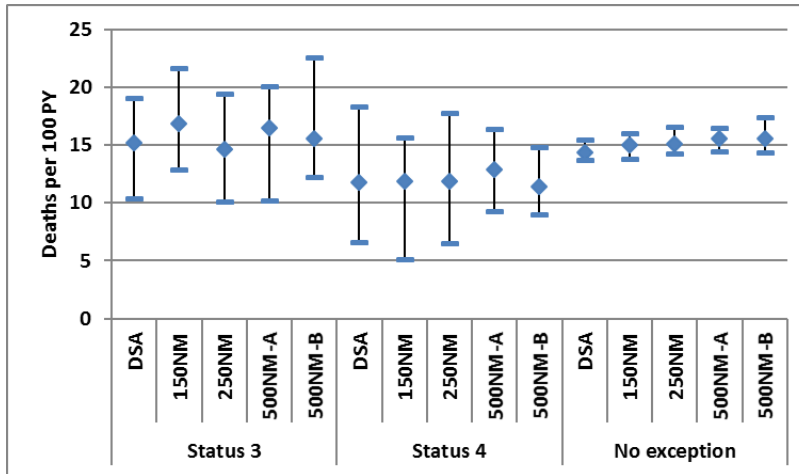
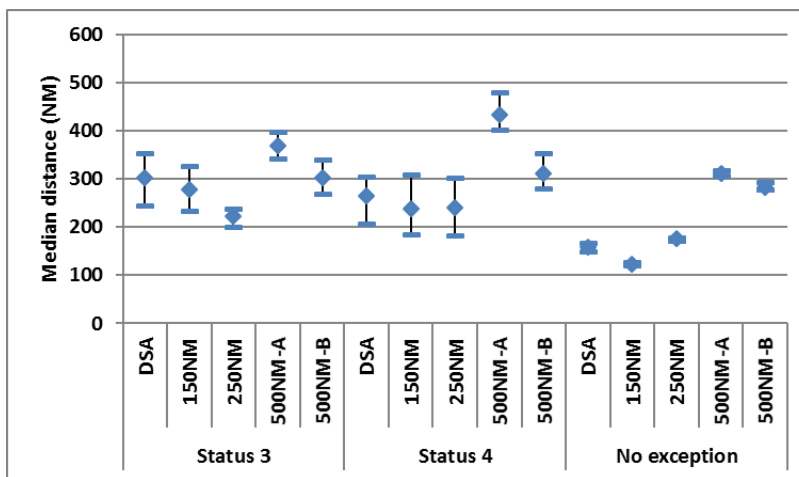


Figure 61. One-year posttransplant mortality rates by exception status and simulation



For candidates who were status 3 by exception, distance donor organs traveled was shorter in the 250NM simulation, longer in the 500NM-A simulation, and otherwise similar to the DSA-first simulation (Figure 62). For candidates who were status 4 by exception, distances in the 500NM-A simulation were longer than in the DSA-first simulation. The pattern for the group with no exceptions was similar to overall data.

Figure 62. Median distance (NM) between donor and transplant hospital by exception status and simulation



By annual center volume

Annual center volumes were based on observed data. A center that performed 30 heart transplants per year remained in that volume category for all simulations.

In most center volume categories, transplant rates, waitlist mortality rates, and 1-year posttransplant mortality rates were similar in DSA-free simulations compared with the DSA-first simulation (Figure 63, Figure 64, and Figure 65, respectively). In centers performing 25 to 50 transplants per year, transplant rates in the 500NM-A and 500NM-B simulations were lower than in the DSA-first simulation.

Figure 63. Transplant rates by annual center volume and simulation

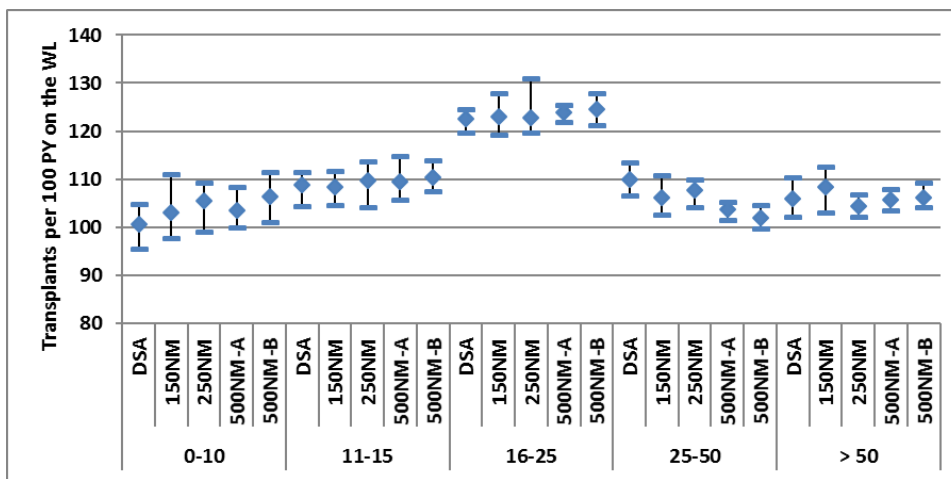


Figure 64. Waitlist mortality rates by annual center volume and simulation

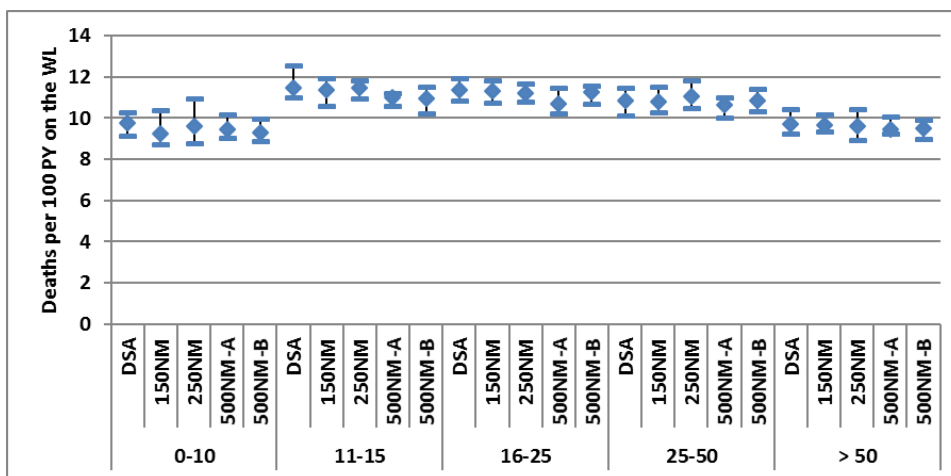
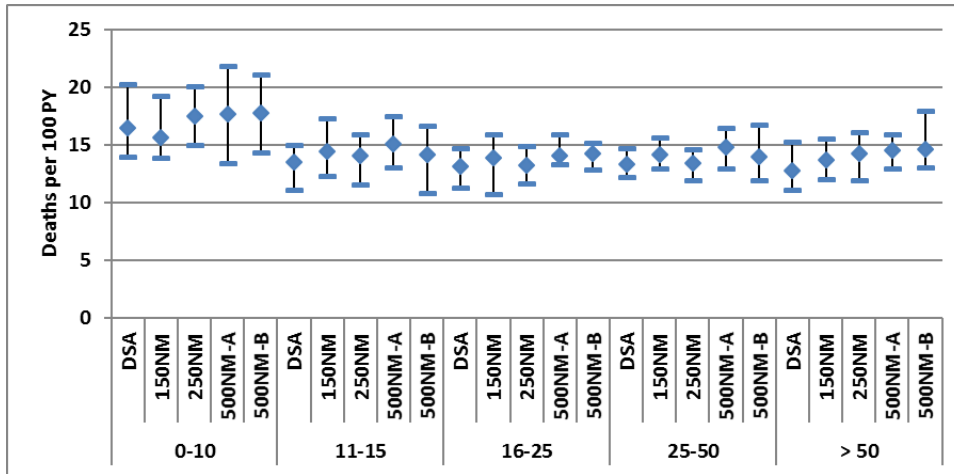
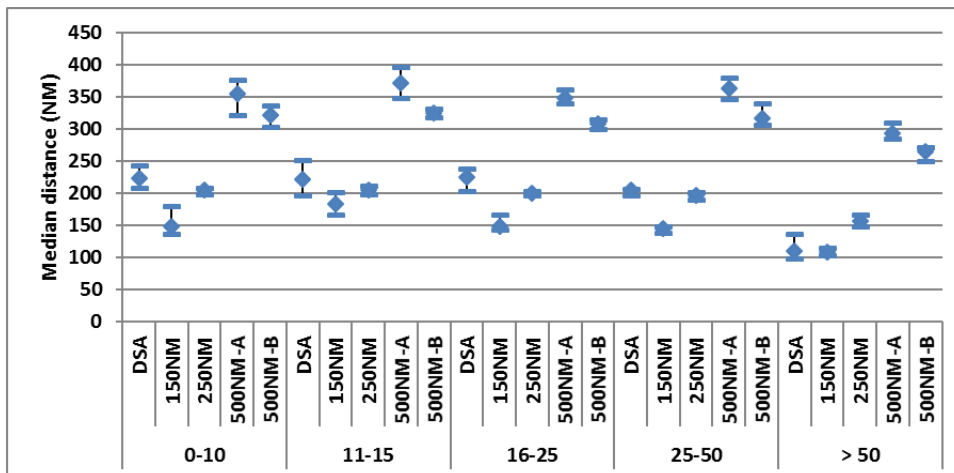


Figure 65. One-year posttransplant mortality rates by annual center volume and simulation



The patterns of distance donor organs traveled were largely similar to overall data for recipients at centers in all volume categories, but differences emerged. Among centers performing more than 50 transplants per year, travel distances were shortest in the DSA-first and 150NM simulations, and longer in the 250NM simulation (Figure 66). Travel distances in the 500NM-A and 500NM-B simulations were considerably longer than in other simulations for all center volume categories, but shorter in the high-volume centers, averaging 294 NM in the 500NM-A simulation, compared with 349-372 NM in other volume categories (Table App1.14).

Figure 66. Median distance (NM) between donor and transplant hospital by annual center volume and simulation

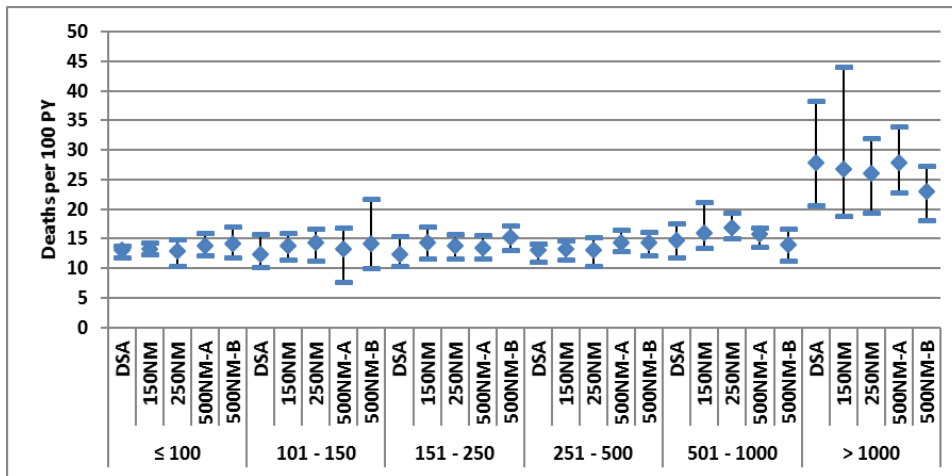


By distance

Data by distance were available only for candidates who underwent simulated transplant; distance between donor and recipient does not exist until a donor-recipient match has been identified. The number of transplants by distance group appears in Table App1.15, which shows the largest number of transplants within 100 NM in the DSA-first simulation (average count, 1728), and the number of nearby transplants declined as circle sizes grew. The number of transplants at more than 1000 NM remained small in all simulations.

Within distance groups, 1-year posttransplant mortality rates were similar across simulations (Figure 67).

Figure 67. One-year posttransplant mortality rates by distance and simulation



By DSA of the transplant center

Transplant counts varied considerably by DSA, and depended less on DSA size than on the number of transplant centers in the DSA. Figure 68 shows variation in transplant counts by DSA and simulation. Table App1.16 show detailed data per DSA. Because total number of transplants performed was similar per simulation, changes in number of transplants would be evident in a DSA changing color from one map to another.

Figure 69 shows the difference in number of transplants from the DSA-first simulation to each of the DSA-free simulations. The largest increase in transplant number compared with the DSA-first simulation was 24 additional transplants in the 500NM-A simulation, and the largest decrease 32 fewer transplants in the 250NM simulation. The largest changes often occurred in DSAs which had more than one heart transplant center, and was near another multi-center DSA. The shift likely resulted because the population of high-urgency candidates was larger in the DSA that gained transplants than in the DSA that lost transplants. Most DSAs gained or lost fewer than 10 transplants, compared with the DSA-first simulation, in any DSA-free simulation.

Figure 70 shows variation in transplant rates by DSA and simulation. With broader sharing of donor organs, the number of dark-colored DSAs (those with the highest transplant rates) declined as allocation rules sought the most urgent candidate within a given distance radius, who was often outside the DSA boundary. When the most urgent candidates receive offers first, less urgent candidates wait longer, decreasing transplant rates even if the number of transplants remains similar.

In the 500NM-A simulation, the highest transplant rate was 1217 transplants per 100 person-years. This outlier occurred in a DSA with one transplant recipient who waited a very short time. That DSA no longer has a heart transplant program. The rest of the data in the graph are in line with rates observed in other simulations.

Figure 68. Transplant counts by DSA and simulation

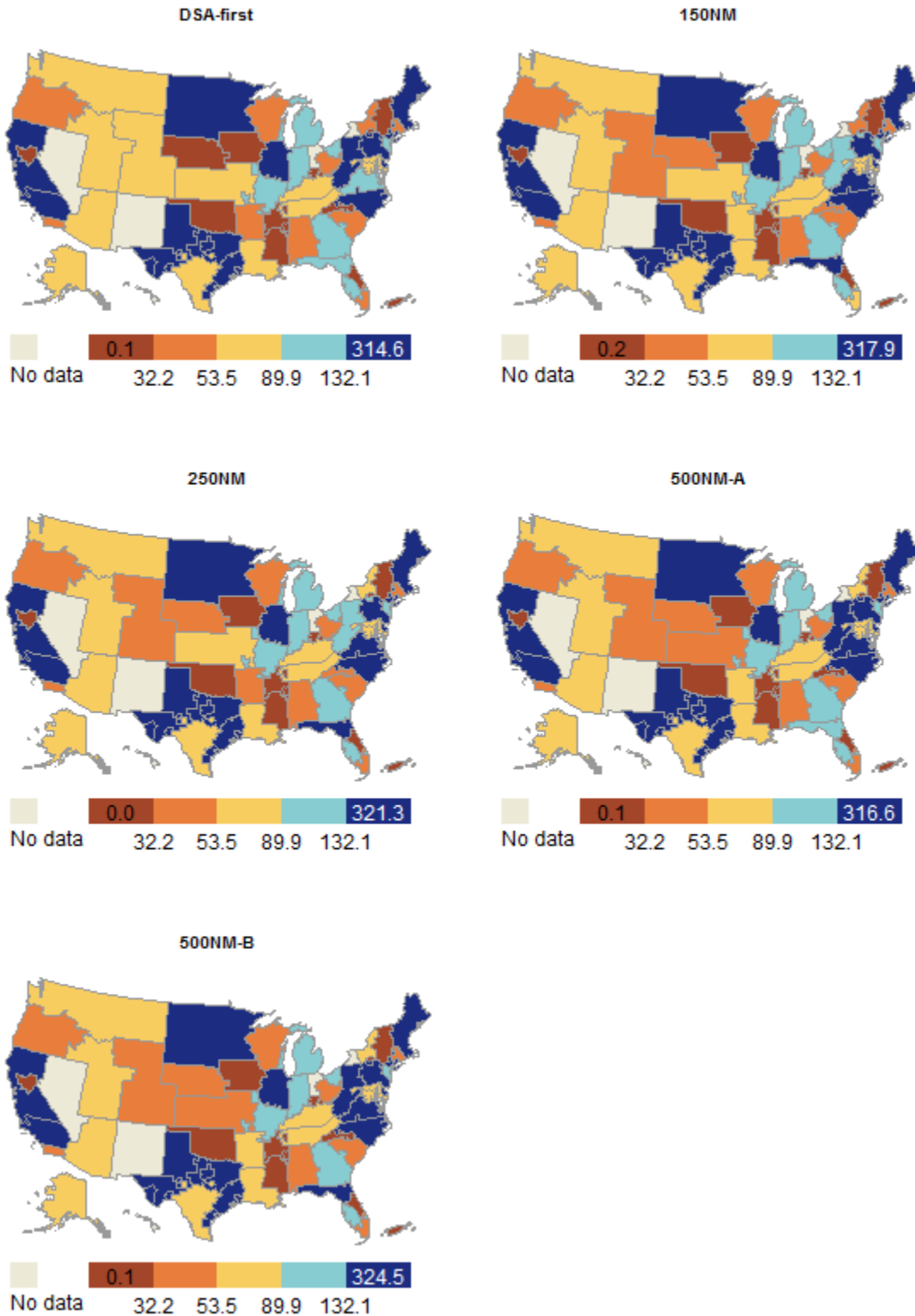


Figure 69. Difference in transplant counts from DSA-first simulation, by DSA

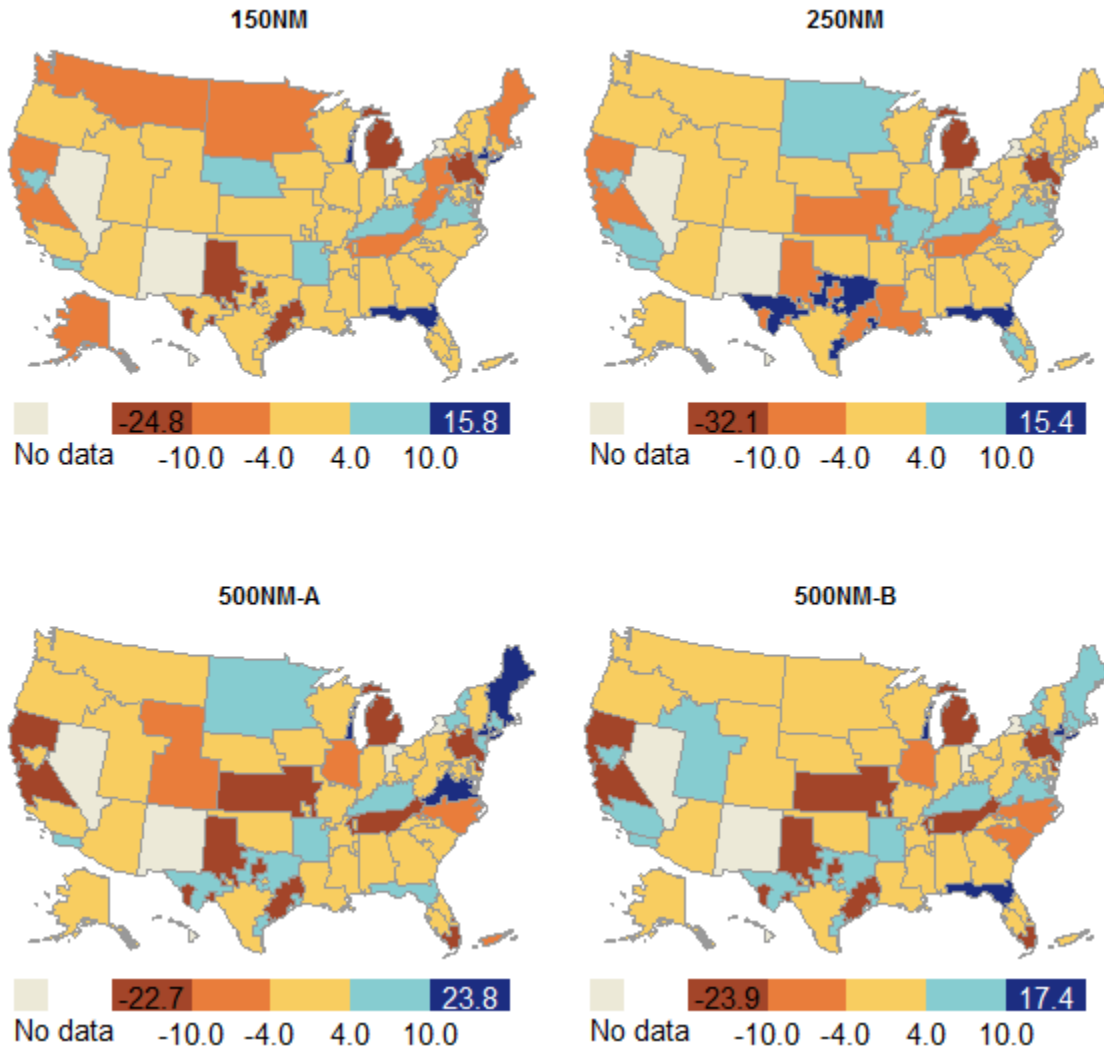
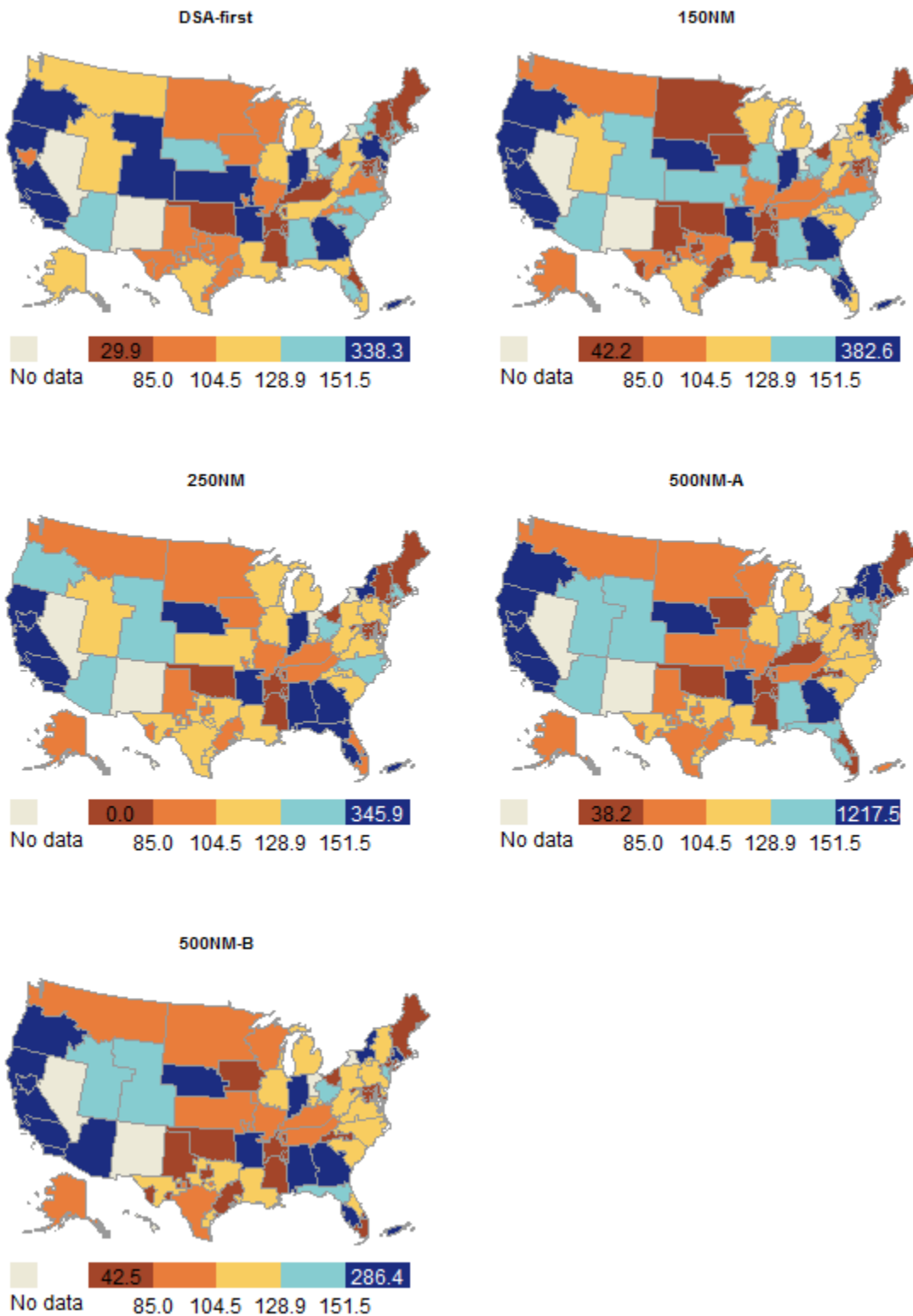


Figure 70. Transplant rates by DSA and simulation



As with transplant counts, waitlist death counts varied by DSA and depended less on DSA size than on the number of centers in a DSA. Figure 71 shows variation in waitlist death counts by DSA and simulation. Table App1.16 shows detailed data per DSA. Because the total number of waitlist deaths was similar per simulation, changes in number would be evident in a DSA changing color from one map to another.

The largest increase in waitlist deaths was 3, and the largest decrease was 4. Both of these occurred in DSAs with fairly large candidate pools. Most DSAs lost or gained zero or 1 waitlist death across simulations.

Figure 72 shows variation in waitlist mortality rates by DSA and simulation. With broader sharing of donor organs, the number of dark-colored DSAs (those with the highest waitlist mortality rates) declined as the most urgent candidates received transplant offers within a given distance radius.

Figure 71. Waitlist death counts by DSA and simulation

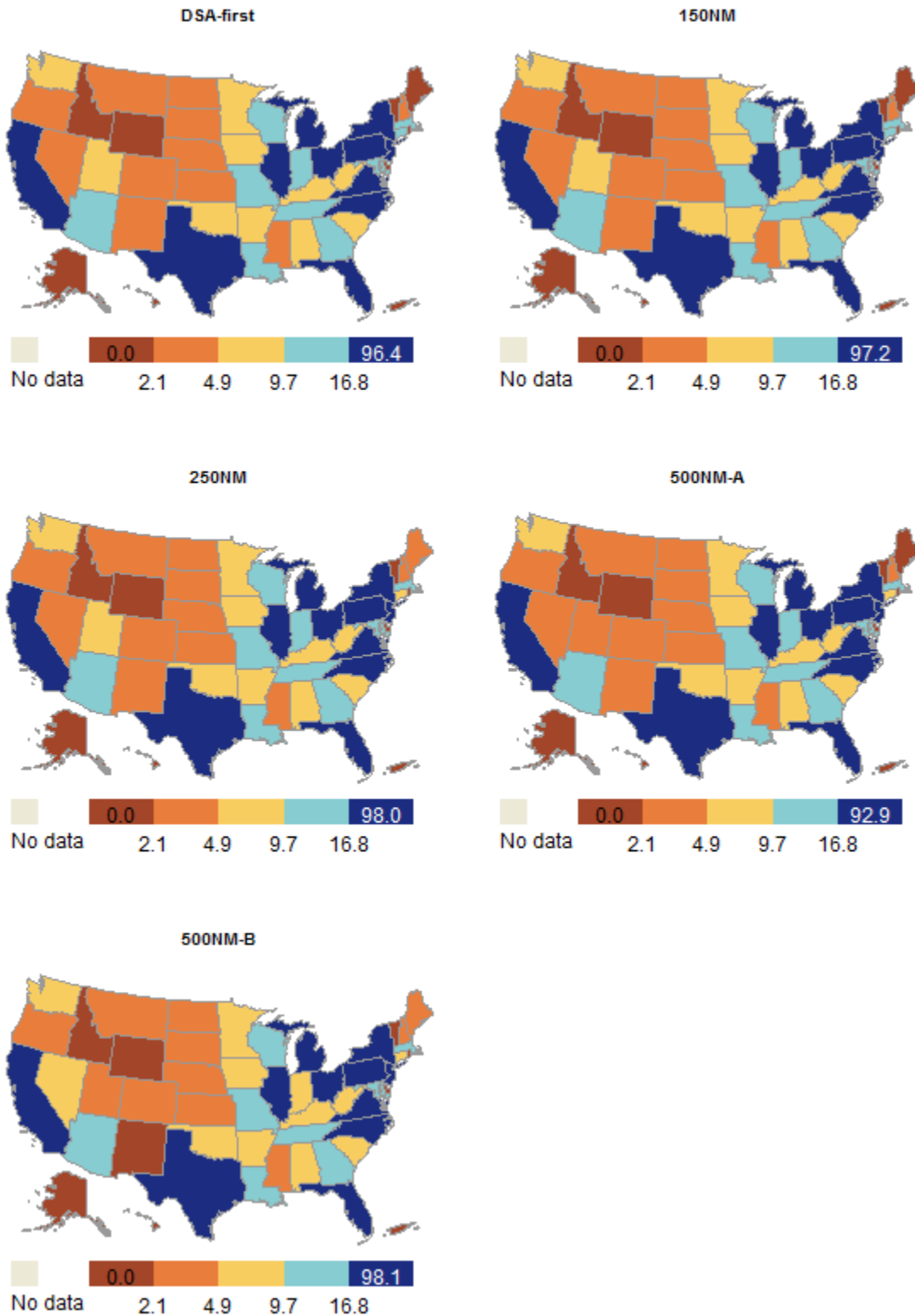
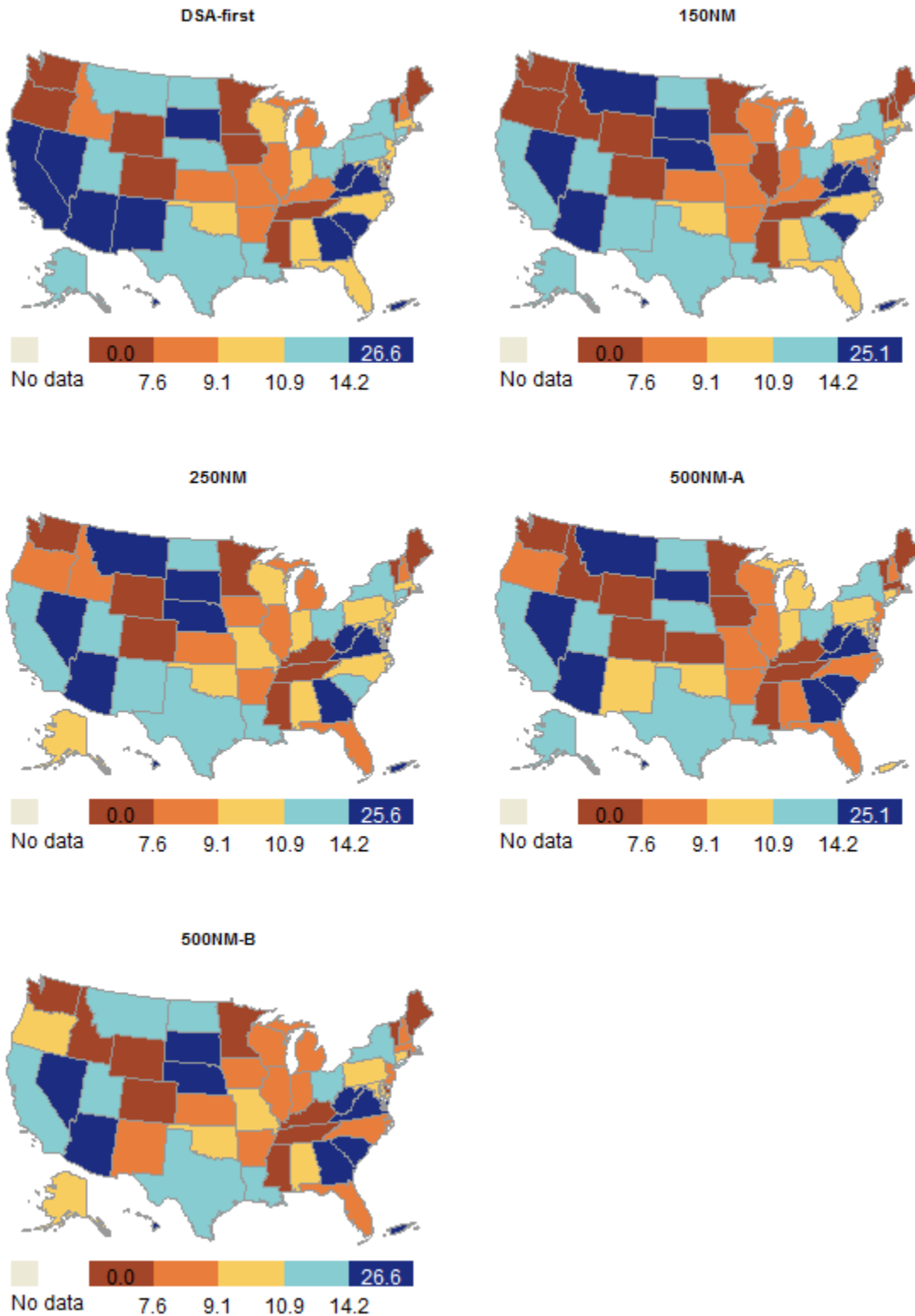


Figure 72. Waitlist mortality rates by DSA and simulation



By candidate's home state

For data by state, "state" is the candidate's home state as reported on the OPTN Transplant Candidate Registration form. Transplant counts varied considerably by state, from nearly 500 in California to fewer than 10 from each of several low-population states (Figure 73). Table App1.17 shows detailed data per state. Because the total number of transplants was similar per simulation, changes in number of transplants would be evident in a state changing color from one map to another.

Figure 74 shows the difference in number of transplants from the DSA-first simulation to each of the DSA-free simulations, by state. The largest increase in transplant number compared with DSA-first rules was 33 in New York in the 500NM-A simulation. The largest decrease was 26 in Pennsylvania in the 250NM-simulation. These occurred in two neighboring states, each with more than one heart transplant program. The shift likely resulted because the population of high-urgency candidates was higher in NY than in PA.

Most states gained or lost fewer than 10 transplants, compared with the DSA-first simulation, in any DSA-free simulation.

Figure 75 shows variation in transplant rates by candidate state and simulation. With broader sharing of donor organs, the number of dark-colored states (those with the highest transplant rates) declined. Change in rates with broader sharing of donor organs mirrored changes at the DSA level. With increasing circle sizes, allocation rules sought the sickest patient within a larger area. This resulted in a larger number of less urgent patients waiting longer, which decreased transplant rates in many states.

Figure 73. Transplant counts by candidate home state and simulation

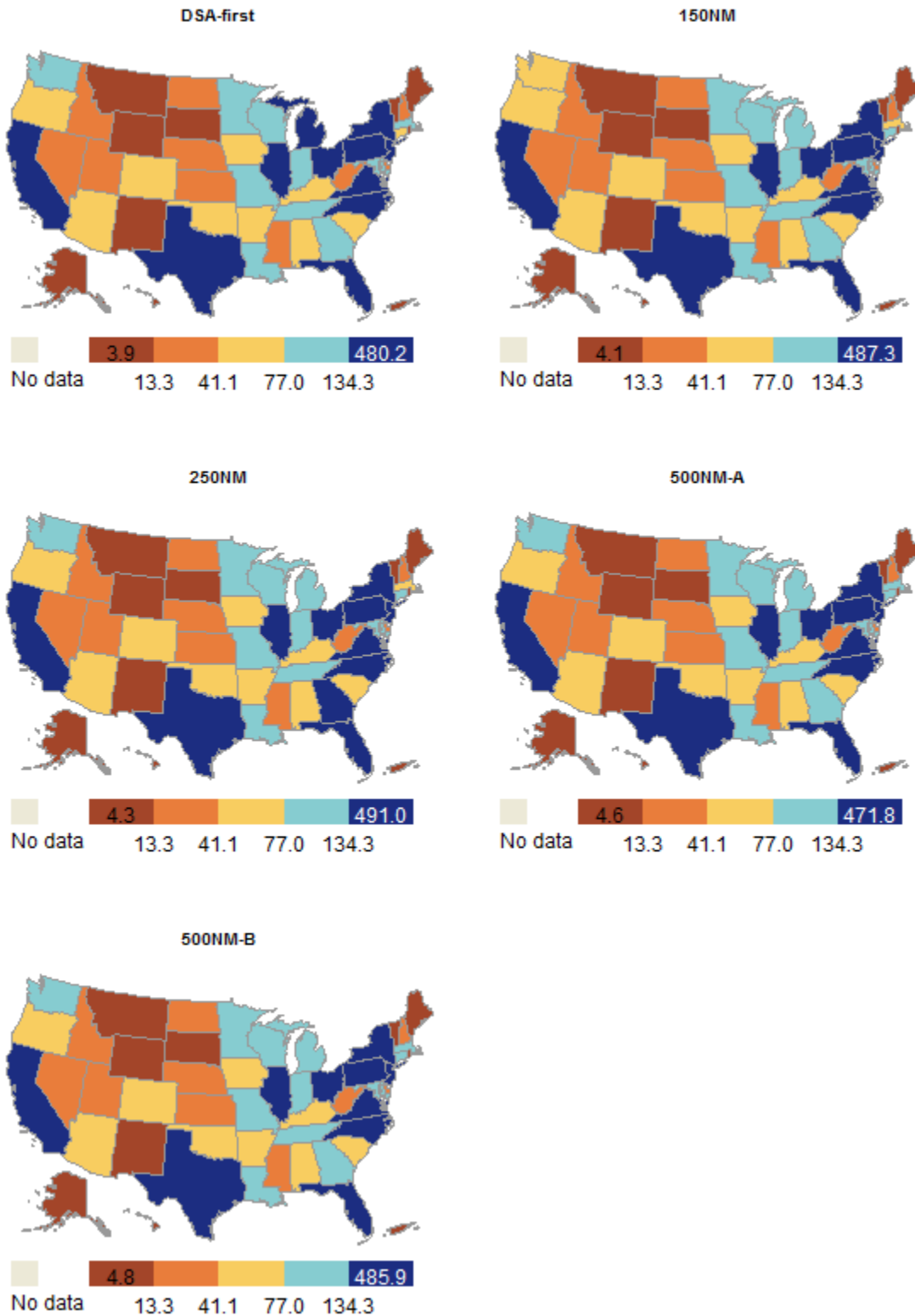


Figure 74. Difference in transplant counts from DSA-first simulation by candidate home state

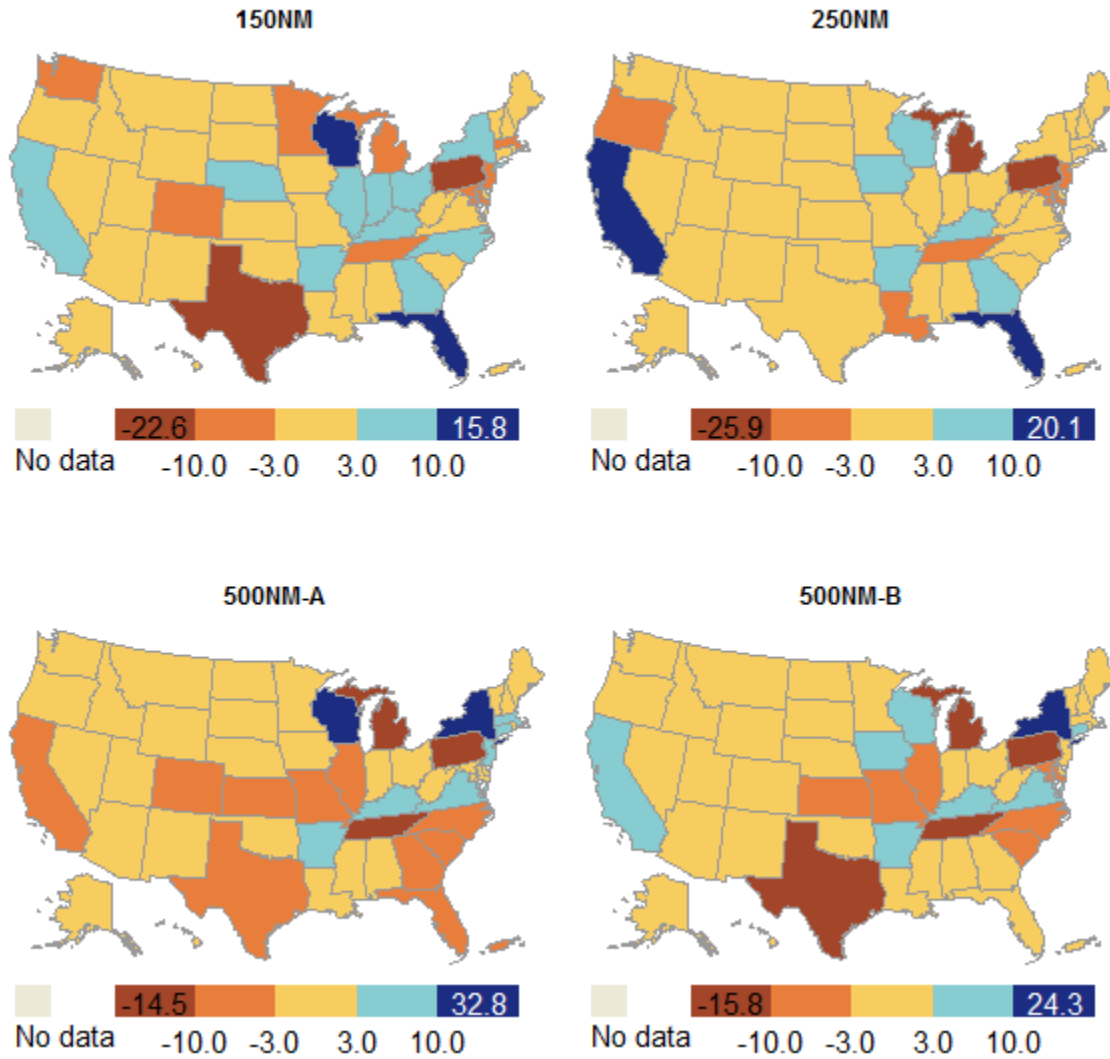
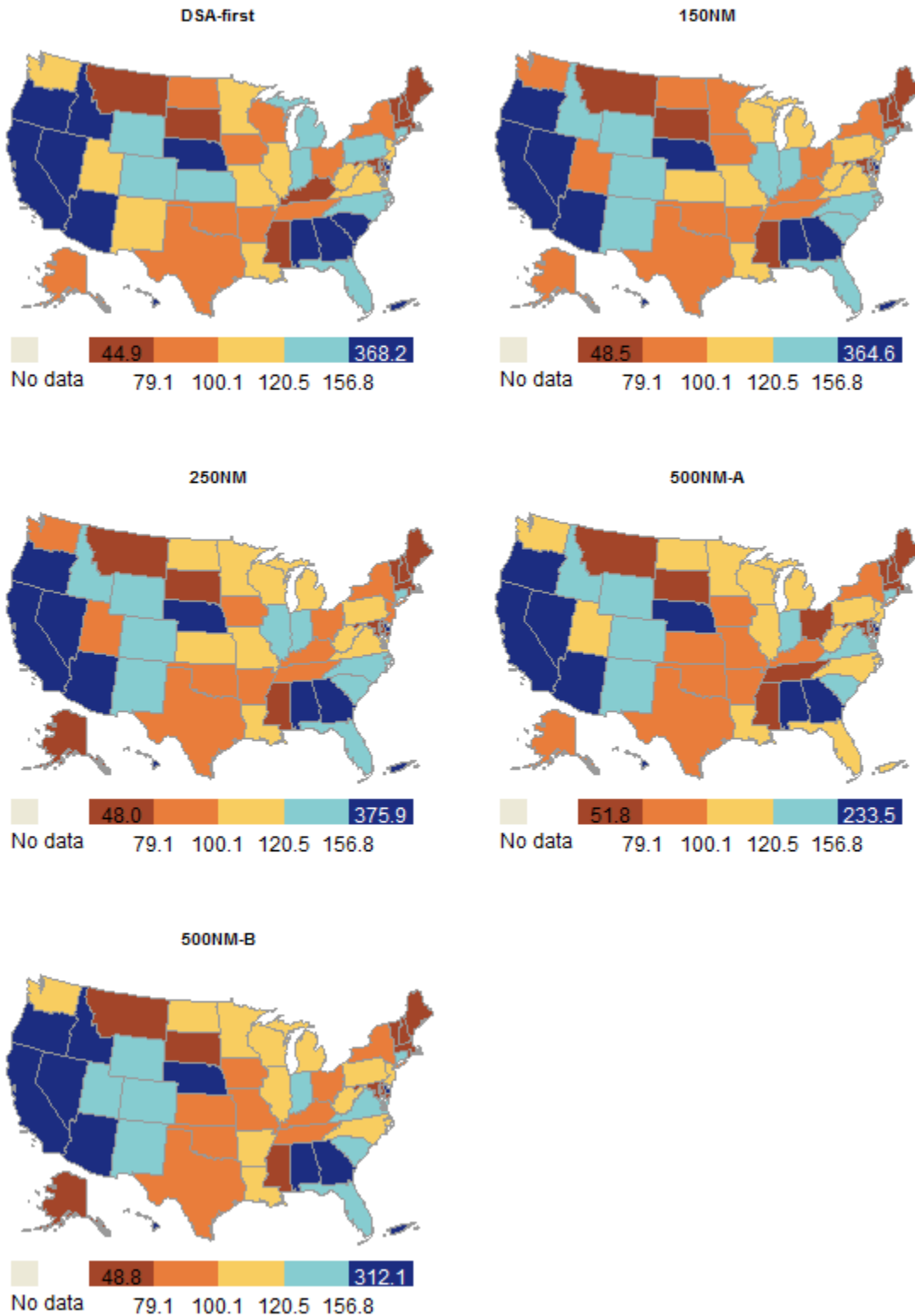


Figure 75. Transplant rates by candidate home state and simulation



As with transplant counts, waitlist death counts varied by candidate's state. Figure 76 shows variation in waitlist death counts by state and simulation. Table App1.17 shows detailed data per state. Because the total number of waitlist deaths was similar per simulation, changes in number of waitlist deaths would be evident in a state changing color from one map to another.

The largest increase in waitlist deaths was 2, and the largest decrease was 4. In Texas, the 150NM, 500NM-A and 500NM-B simulations showed 2 more deaths than the DSA-first simulation, and the 250NM simulation showed 4 fewer. The distance between the minimum and maximum number of deaths per simulation generally exceeded the differences between averages. This suggests no discernable effect on waitlist death counts in any of the simulations at the state level.

Figure 77 shows variation in waitlist mortality rates by candidate home state and simulation. Detailed data on waitlist mortality rates per state and simulation appear in Table App1.17.

Figure 76. Waitlist death counts by candidate home state and simulation

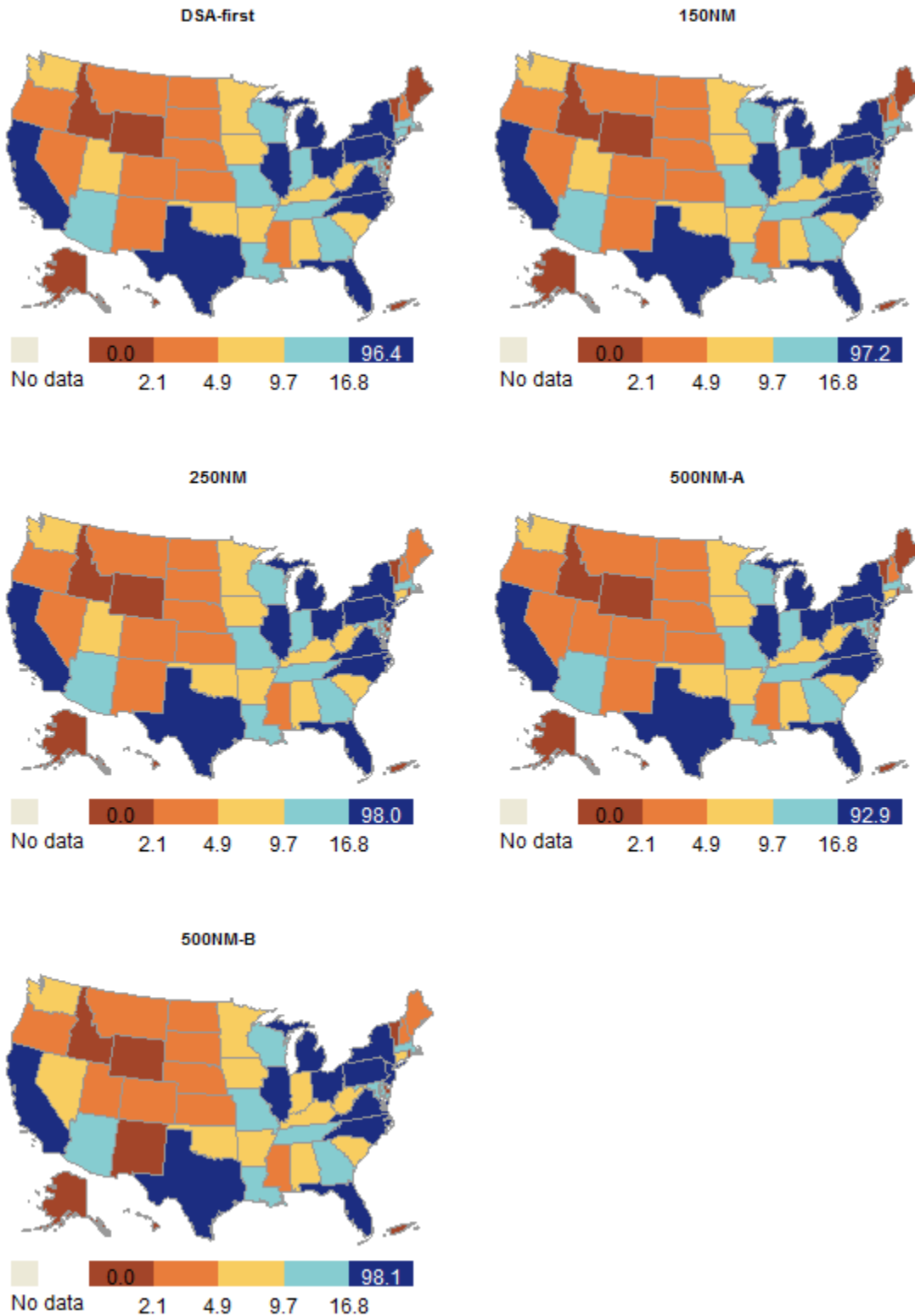
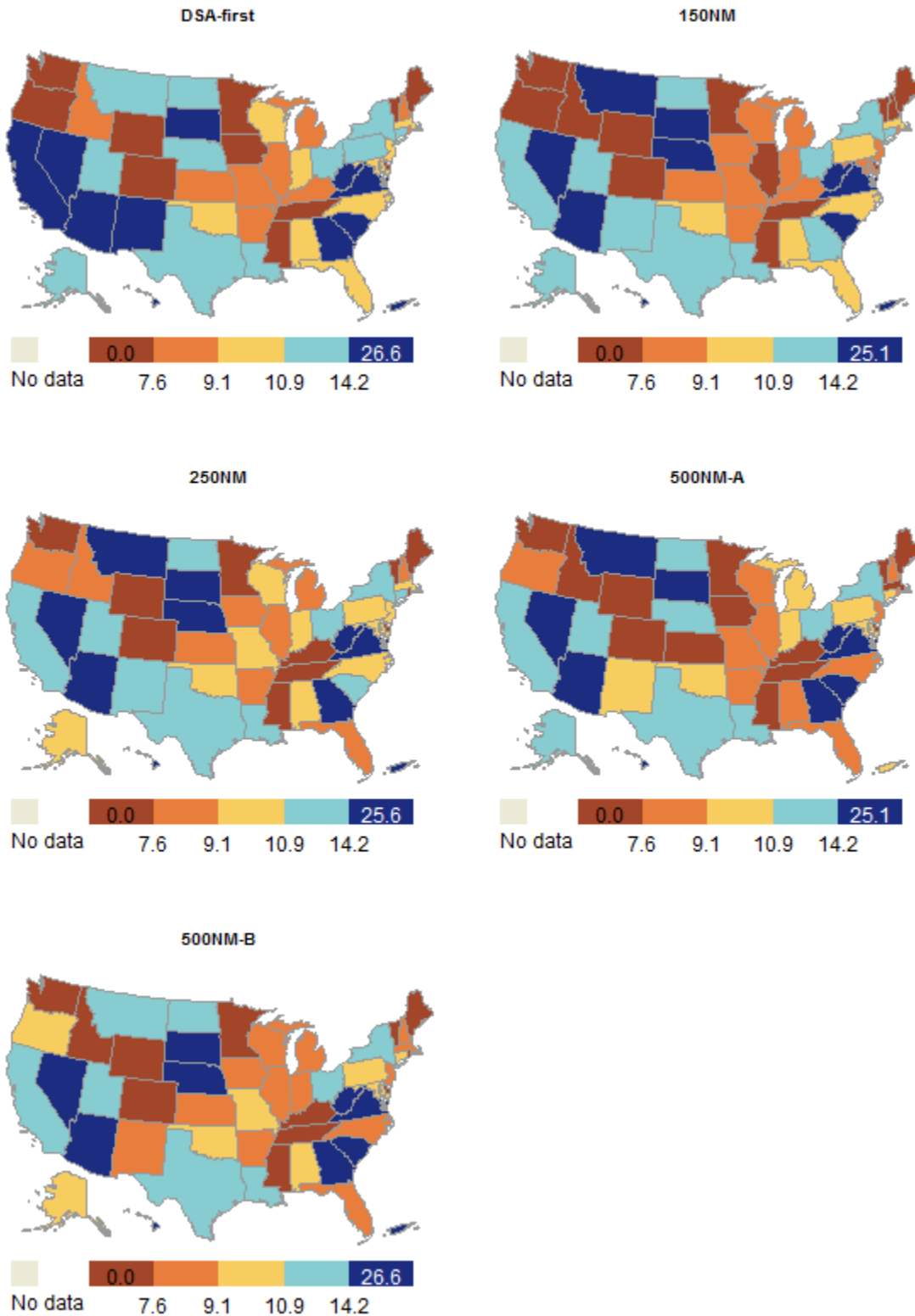


Figure 77. Waitlist mortality rates by candidate home state and simulation



Appendix 1: Detailed data tables of TSAM metrics by subgroups

Table App1.1. TSAM metrics by simulation and OPTN region

Metric	OPTN region	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	1	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454
	2	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234
	3	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151
	4	1183	1183	1183	1183	1183	1183	1183	1183	1183	1183	1183	1183	1183	1183	1183
	5	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
	6	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251
	7	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978
	8	618	618	618	618	618	618	618	618	618	618	618	618	618	618	618
	9	778	778	778	778	778	778	778	778	778	778	778	778	778	778	778
	10	853	853	853	853	853	853	853	853	853	853	853	853	853	853	853
	11	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164	1164
TX count	1	200	190	208	195	189	207	201	192	206	219	209	225	213	206	219
	2	590	579	610	555	546	569	547	532	556	575	549	598	566	553	583
	3	581	572	592	605	589	622	606	583	623	570	550	583	584	572	593
	4	495	475	509	481	475	489	498	485	516	490	474	500	483	467	500
	5	659	638	672	664	656	673	667	655	680	650	639	660	669	657	681
	6	129	118	138	119	113	125	124	119	131	130	123	135	131	123	140
	7	451	436	469	465	451	483	463	444	474	460	452	467	457	440	468
	8	288	277	293	285	271	294	289	275	304	275	265	285	276	268	284
	9	328	315	341	337	329	343	330	320	342	360	350	369	353	342	369
	10	391	381	400	391	380	399	379	365	388	377	360	389	380	373	391
	11	548	539	559	561	540	577	556	539	570	543	536	552	538	530	546
TX rates	1	79.5	73.4	83.8	75.9	73.0	83.8	79.6	76.7	82.1	90.6	85.5	94.0	87.7	82.9	91.5
	2	115.8	110.8	121.4	104.6	102.4	106.5	101.6	97.5	104.9	110.9	105.2	117.6	108.2	103.0	111.5
	3	140.2	136.4	142.7	153.0	141.7	161.5	151.9	142.2	164.9	135.2	127.9	141.6	142.0	136.5	146.7
	4	94.8	88.6	98.3	90.7	89.1	93.5	95.7	91.2	102.0	92.2	87.4	96.4	91.1	85.9	96.6
	5	184.7	177.0	191.4	188.1	178.2	196.3	189.6	182.9	198.4	178.8	173.1	188.4	190.1	179.5	202.8
	6	120.7	109.0	134.8	103.1	95.1	115.9	110.1	103.9	120.6	119.9	109.9	130.0	122.5	110.2	137.2
	7	102.6	99.1	108.6	108.4	104.1	114.5	108.1	101.2	112.2	106.1	103.5	109.6	104.8	98.6	107.5
	8	116.0	107.7	124.8	112.8	106.9	117.8	115.9	107.1	121.9	107.0	100.6	111.4	107.3	105.0	113.5
	9	74.5	70.3	78.4	77.1	75.3	78.9	74.3	71.1	77.9	86.3	82.7	90.2	83.1	77.7	88.0
	10	105.9	102.1	110.7	106.4	100.2	110.9	101.7	95.1	105.1	99.8	93.9	104.3	100.9	97.1	103.9



	11	102.8	100.2	106.4	106.3	99.9	112.1	105.7	101.1	110.6	100.3	98.0	102.8	99.8	95.6	102.3
WL death	1	33	30	36	34	30	38	32	29	37	26	22	29	29	26	35
counts	2	85	80	88	86	80	88	86	81	88	84	80	88	84	78	91
	3	62	58	66	59	55	65	58	52	63	60	55	64	60	56	64
	4	109	106	115	110	104	118	111	105	116	106	104	110	111	104	115
	5	91	84	96	87	80	90	88	84	93	89	84	94	86	79	90
	6	9	7	10	10	7	13	10	7	12	8	6	9	8	6	10
	7	51	47	58	50	48	54	53	48	56	51	46	53	52	50	55
	8	37	32	40	37	35	40	39	36	42	36	33	38	39	34	44
	9	56	51	61	56	53	62	57	46	60	54	51	56	54	51	57
	10	55	49	62	55	51	60	54	50	56	55	50	58	54	50	58
	11	82	77	88	80	73	89	81	77	86	78	75	83	79	77	81
WL morality	1	10.9	9.9	12.2	10.9	10.1	12.0	10.5	9.3	12.1	8.8	7.4	10.1	9.9	8.9	11.6
rates	2	11.6	10.9	12.1	11.4	10.6	11.7	11.3	10.8	11.6	11.4	10.9	12.0	11.3	10.6	11.9
	3	10.0	9.3	10.5	9.7	9.2	10.4	9.6	8.6	10.3	9.4	8.6	9.9	9.6	9.0	10.1
	4	12.1	11.8	12.6	12.1	11.4	13.0	12.4	11.7	13.0	11.7	11.4	12.1	12.2	11.8	12.7
	5	14.7	13.5	15.7	14.0	13.1	14.8	14.4	13.8	15.1	14.1	13.4	15.2	13.9	13.0	14.7
	6	5.5	4.6	6.3	5.8	4.1	7.5	5.9	4.4	7.3	5.0	3.9	5.7	5.3	3.9	6.4
	7	8.3	7.5	9.5	8.3	8.0	9.1	8.7	8.0	9.2	8.4	7.5	8.8	8.5	8.3	9.0
	8	9.5	7.9	10.0	9.4	8.6	10.1	9.8	8.9	10.8	8.9	8.2	9.5	9.6	8.6	10.9
	9	9.3	8.5	10.1	9.4	8.9	10.6	9.4	7.7	10.0	9.4	8.9	9.8	9.4	8.7	9.9
	10	10.5	9.3	11.9	10.5	9.9	11.5	10.2	9.5	10.9	10.3	9.5	10.9	10.3	9.5	11.1
	11	10.8	10.0	11.6	10.7	9.9	11.7	10.8	10.3	11.6	10.2	9.7	10.7	10.3	9.9	10.6
WL removals	1	32	27	35	34	31	36	33	31	35	30	27	32	30	28	32
	2	127	124	131	131	126	138	131	127	136	128	122	133	128	123	134
	3	105	99	118	102	98	107	102	94	106	102	94	109	102	95	105
	4	117	111	122	117	112	121	115	113	118	115	111	118	115	108	124
	5	138	129	146	139	131	144	137	133	145	141	132	147	140	126	150
	6	23	20	26	22	20	23	22	20	24	21	18	23	22	18	26
	7	94	89	100	93	87	97	93	86	98	94	89	101	93	90	97
	8	69	65	71	72	67	78	71	67	75	74	67	78	75	72	78
	9	106	102	112	106	99	109	108	104	111	104	99	108	104	98	108
	10	80	76	84	79	75	83	82	75	87	80	71	87	79	73	85
	11	123	117	130	118	113	126	121	114	126	121	118	125	123	119	127
1Y PT deaths	1	23	17	30	21	15	27	24	17	31	28	20	32	27	21	33
	2	72	60	90	72	65	87	70	58	84	76	57	98	80	70	90
	3	68	55	79	75	67	84	76	56	98	73	57	89	73	55	95
	4	63	51	76	63	55	76	68	52	81	71	61	81	69	63	77
	5	80	66	86	78	67	88	83	74	94	86	78	96	87	72	105
	6	14	9	19	16	10	22	15	10	19	14	8	21	16	12	21



	7	54	47	61	62	49	73	59	47	67	64	51	74	58	48	67
	8	34	28	41	36	30	41	33	27	37	35	27	49	32	16	39
	9	44	37	54	42	35	48	45	40	55	49	36	63	45	36	53
	10	51	41	60	52	42	67	47	40	52	51	47	61	49	41	63
	11	76	64	94	84	73	98	79	72	91	81	65	109	79	66	89
1Y PT death	1	12.3	9.0	16.4	11.7	8.3	15.0	12.9	9.5	17.2	13.8	9.8	16.0	14.0	10.3	17.0
rates	2	13.4	10.9	17.2	14.4	12.8	17.3	14.1	11.4	16.8	14.7	10.6	19.2	15.6	13.1	17.4
	3	12.7	10.2	15.1	13.5	12.1	15.0	13.8	9.8	17.7	14.1	11.2	17.5	13.8	10.1	18.5
	4	13.9	11.2	17.4	14.4	12.2	18.1	15.0	11.6	18.5	16.0	13.8	19.4	15.9	14.5	17.9
	5	13.2	10.9	14.5	12.7	10.7	14.4	13.7	12.1	15.9	14.5	13.3	16.7	14.4	11.7	17.7
	6	11.9	6.9	18.1	15.0	9.4	21.4	12.9	8.1	18.0	11.9	6.1	18.1	13.6	9.4	18.5
	7	12.9	10.8	15.3	14.8	11.6	17.0	14.2	10.6	17.0	15.3	11.9	17.9	13.9	11.2	16.4
	8	12.7	10.5	15.4	13.9	11.4	15.8	12.2	10.1	13.8	14.1	10.7	20.2	12.8	5.9	16.1
	9	14.9	12.2	18.7	13.6	11.3	15.5	14.9	13.6	18.3	15.0	10.8	19.4	13.9	11.3	16.4
	10	14.2	11.1	16.6	14.6	11.5	19.6	13.5	11.1	15.8	14.9	13.2	17.6	14.3	11.6	18.9
	11	15.5	12.7	19.6	16.7	14.1	20.1	15.8	13.9	18.0	16.7	12.9	23.4	16.4	13.6	18.5
Median	1	209	167	247	142	126	158	172	159	188	285	245	344	239	231	262
distance	2	145	116	168	140	134	144	184	175	192	311	285	344	285	270	299
(NM)	3	200	184	230	135	125	143	180	177	187	373	356	384	330	310	354
	4	218	206	239	169	152	194	201	199	202	361	341	375	255	239	295
	5	88	83	93	91	83	94	95	84	98	277	272	284	268	260	273
	6	260	198	295	198	127	293	198	196	202	413	334	467	316	266	361
	7	259	228	279	167	146	202	211	202	224	375	342	395	327	312	355
	8	305	270	349	293	233	354	224	222	228	456	428	477	396	378	408
	9	222	191	253	137	130	145	179	164	191	335	302	355	260	241	278
	10	199	175	218	143	137	149	201	193	216	354	333	364	344	306	361
	11	253	231	270	188	161	211	218	212	222	377	370	387	343	327	355

Table App1.2. TSAM metrics by simulation and adult status

Metric	Status	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	1	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112
	2	377	377	377	377	377	377	377	377	377	377	377	377	377	377	377
	3	931	931	931	931	931	931	931	931	931	931	931	931	931	931	931
	4	3350	3350	3350	3350	3350	3350	3350	3350	3350	3350	3350	3350	3350	3350	3350
	5	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
	6	2471	2471	2471	2471	2471	2471	2471	2471	2471	2471	2471	2471	2471	2471	2471
	7	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
TX count	1	181	164	190	178	169	189	172	164	182	189	175	202	167	155	175
	2	840	817	852	840	831	851	811	793	837	877	863	899	783	766	805
	3	1472	1452	1491	1550	1523	1604	1629	1602	1669	1778	1761	1809	1866	1849	1891
	4	1174	1132	1218	1101	1059	1147	1064	1045	1081	883	851	925	894	868	914
	5	42	31	48	42	32	48	40	32	46	32	24	40	36	29	43
	6	189	177	199	186	178	207	181	156	197	116	101	123	140	132	147
	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TX rates	1	6199.9	5626.8	6944.9	6161.0	5257.9	6889.4	5902.7	5387.9	6471.8	8179.5	7313.4	9236.2	5695.9	5142.0	6051.9
	2	4855.3	4618.2	5152.1	4741.4	4503.0	4948.2	4417.7	4105.5	4679.2	6267.1	5998.0	6535.8	4180.0	3927.8	4494.9
	3	539.8	512.6	580.5	597.7	578.1	635.6	662.3	638.8	689.6	812.1	777.1	847.3	879.1	842.8	901.4
	4	62.9	59.6	65.5	58.8	56.7	62.1	56.5	54.8	58.0	46.4	44.8	48.9	47.1	45.9	48.2
	5	40.7	28.4	49.7	39.4	29.2	47.3	37.8	29.8	47.5	29.1	21.3	35.6	33.7	26.9	41.2
	6	11.6	10.8	12.2	11.4	10.9	12.8	11.0	9.5	12.1	7.0	6.0	7.4	8.4	7.9	8.9
	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
WL death counts	1	8	6	11	8	6	10	8	5	10	6	4	8	8	6	10
	2	7	4	9	7	5	9	8	4	11	5	3	7	8	6	10
	3	36	33	41	33	23	38	34	29	38	32	24	35	31	25	35
	4	133	128	140	133	126	141	134	128	141	134	126	143	135	129	141
	5	7	6	9	8	5	10	8	6	9	8	7	10	9	8	10
	6	47	44	51	48	45	50	48	46	50	48	47	49	48	46	50
	7	330	323	336	324	317	335	328	315	333	317	308	326	319	311	323
WL morality rates	1	272.5	196.4	381.6	277.6	202.0	346.9	269.1	164.1	337.9	248.7	184.7	333.6	281.3	213.2	363.1
	2	38.5	24.4	51.2	41.2	26.9	53.5	42.9	21.0	57.1	37.7	20.3	48.4	41.9	33.8	51.4
	3	13.2	11.6	14.5	12.6	8.9	14.7	13.6	11.4	15.2	14.5	10.8	16.0	14.7	11.6	16.8
	4	7.1	6.8	7.5	7.1	6.7	7.5	7.1	6.8	7.5	7.0	6.6	7.5	7.1	6.8	7.5
	5	7.0	5.8	8.5	7.6	4.8	9.4	7.6	5.8	8.6	7.1	6.2	8.9	8.3	7.2	9.3
	6	2.9	2.7	3.1	2.9	2.8	3.1	2.9	2.8	3.1	2.8	2.8	2.9	2.9	2.8	3.0
	7	18.9	18.4	19.4	18.6	18.1	19.2	18.8	18.1	19.2	18.2	17.7	18.8	18.3	17.9	18.6
WL	1	6	3	7	6	4	8	6	2	8	5	2	8	6	3	9

removals	2	1	0	2	2	0	3	2	1	3	2	0	3	2	0	3
	3	11	9	14	11	9	14	9	7	10	10	7	11	8	5	12
	4	117	110	125	115	108	120	117	109	125	115	106	119	118	112	123
	5	13	10	15	12	10	16	13	10	16	12	9	14	13	11	15
	6	116	112	119	116	114	122	116	111	121	119	116	121	117	114	120
	7	576	571	584	575	566	581	577	568	587	577	564	591	576	567	584
1Y PT	1	32	27	39	30	23	36	27	20	36	35	28	39	31	25	44
deaths	2	108	97	133	121	107	137	107	79	130	130	110	142	106	86	128
	3	191	170	209	211	184	233	224	208	246	237	203	273	252	227	282
	4	144	129	161	135	126	156	134	120	150	117	100	132	123	107	145
	5	9	6	12	10	6	12	10	5	14	9	6	11	8	3	12
	6	25	22	28	24	18	29	27	16	36	17	14	20	21	14	29
1Y PT	1	20.0	15.9	25.2	18.9	14.4	22.8	18.0	12.7	24.3	21.1	15.5	23.9	21.4	15.9	31.8
death	2	14.2	12.5	17.9	15.9	14.0	18.4	14.6	10.5	17.6	16.5	13.8	18.3	15.0	12.0	18.2
rates	3	14.3	12.7	15.9	15.0	13.2	16.9	15.2	13.6	16.8	14.7	12.3	16.9	14.9	13.2	16.7
	4	13.3	11.4	14.9	13.4	12.6	15.2	13.9	12.0	15.6	14.6	12.7	16.7	15.3	13.4	18.2
	5	25.5	15.1	37.2	29.0	16.0	41.0	32.0	17.9	41.1	36.7	25.4	58.0	28.9	9.4	52.2
	6	14.3	12.3	16.5	14.2	10.6	17.9	16.4	9.7	21.2	15.8	12.5	19.2	16.9	10.5	24.3
Median	1	345	315	368	328	305	355	306	256	344	465	422	505	292	250	337
distance	2	363	349	381	351	337	368	315	300	327	524	508	548	312	296	325
(NM)	3	173	162	191	114	110	117	161	154	166	277	272	284	275	270	285
	4	53	45	60	85	81	87	149	143	155	279	271	294	281	270	289
	5	93	34	187	111	78	181	156	85	217	272	241	357	279	197	389
	6	99	86	121	111	90	131	169	149	187	303	246	332	294	273	332

Table App1.3. TSAM metrics by simulation and pediatric status

		DSA-first			150NM			250NM			500NM-A			500NM-B		
Metric	Status	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	1A	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798
	1B	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
	2	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263
TX count	Inactive	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176
	1A	643	639	648	641	628	648	639	624	649	674	659	682	667	657	675
	1B	66	62	75	65	56	74	64	56	70	61	49	68	60	50	67
	2	53	44	60	55	47	64	60	56	69	40	35	49	38	33	42
TX rates	Inactive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1A	523.6	501.1	564.8	511.7	486.0	538.9	506.4	467.3	541.2	603.5	570.0	650.7	586.3	568.9	609.7
	1B	162.2	146.9	185.9	162.5	131.5	201.4	154.8	123.6	174.8	147.1	115.2	174.4	137.2	113.7	151.6
WL death counts	2	38.0	30.3	44.0	39.1	32.9	46.4	43.9	39.6	49.0	28.1	24.3	33.0	26.5	22.2	29.1
	1A	46	40	54	47	42	54	47	42	51	43	42	47	45	41	49
	1B	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2
WL morality rates	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Inactive	52	45	55	51	46	55	50	45	56	51	49	53	50	47	52
	1A	37.7	31.7	43.6	37.4	32.4	42.7	37.0	32.4	40.2	38.7	35.7	41.2	39.6	36.2	42.6
	1B	3.0	2.4	5.0	3.5	2.3	5.4	2.9	2.2	5.1	3.1	2.3	4.7	3.2	2.1	5.0
WL Removals	2	1.4	1.4	1.5	1.4	1.4	1.5	1.5	1.4	1.5	1.4	1.3	1.5	1.4	1.3	1.4
	Inactive	18.3	15.6	19.7	18.0	16.4	19.2	17.8	16.2	19.9	17.9	17.5	18.9	17.6	16.7	18.1
	1A	46	44	50	47	42	51	47	43	50	43	40	48	43	37	48
1Y PT deaths	1B	3	2	3	3	2	3	3	2	3	3	2	3	3	2	3
	2	7	5	9	7	5	8	7	6	8	7	5	8	7	6	8
	Inactive	119	113	126	119	114	126	121	115	127	117	111	121	117	112	119
1Y PT death rates	1A	59	50	70	60	52	77	58	51	71	73	62	89	68	53	88
	1B	5	3	8	6	4	9	6	3	9	7	4	12	6	3	9
	2	4	0	7	5	1	9	4	2	11	3	0	4	1	0	4
Median Distance (NM)	1A	9.9	8.2	11.8	10.1	8.6	13.2	9.7	8.7	12.0	11.8	9.9	14.6	11.0	8.5	14.4
	1B	8.5	4.1	14.3	10.8	6.2	15.8	9.3	4.7	14.2	12.4	7.6	21.6	10.5	4.9	21.2
	2	8.2	0.0	13.2	9.0	1.6	19.0	7.2	3.0	21.7	6.6	0.0	9.7	3.8	0.0	11.0
1A	374	367	385	368	349	388	359	349	372	560	543	576	497	480	508	
1B	321	222	379	307	255	371	301	210	364	508	403	610	483	424	597	
2	348	143	445	317	206	417	269	200	341	436	363	506	399	349	486	

Table App1.4. TSAM metrics by simulation and three age groups

Metric	Age	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	0-17	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363	1363
	18-49	3083	3083	3083	3083	3083	3083	3083	3083	3083	3083	3083	3083	3083	3083	3083
	50+	5467	5467	5467	5467	5467	5467	5467	5467	5467	5467	5467	5467	5467	5467	5467
TX count	0-17	762	754	771	760	750	770	763	757	773	775	767	784	765	754	780
	18-49	1347	1321	1374	1343	1325	1362	1355	1318	1377	1357	1346	1370	1358	1341	1374
	50+	2550	2520	2578	2554	2533	2573	2541	2526	2574	2517	2501	2528	2527	2515	2561
TX rates	0-17	251.4	241.4	263.7	248.8	238.7	258.6	250.1	239.9	256.9	261.6	252.8	269.5	252.7	250.3	259.0
	18-49	101.6	99.3	104.5	100.6	98.9	102.8	101.6	98.1	104.4	101.9	100.6	103.3	102.2	99.9	104.3
	50+	99.5	97.1	101.0	99.9	98.3	101.5	99.4	98.2	101.1	97.4	96.5	98.8	98.3	97.3	100.8
WL death counts	0-17	101	96	113	101	95	110	100	91	105	97	94	103	98	95	103
	18-49	213	206	222	211	196	220	210	203	217	205	199	210	207	201	216
	50+	355	346	364	351	346	357	357	341	369	344	337	360	351	345	358
WL morality Rates	0-17	17.3	16.2	19.2	17.2	16.1	18.6	17.0	15.6	18.1	16.8	16.4	17.9	16.8	16.1	17.6
	18-49	9.9	9.5	10.2	9.7	9.0	10.2	9.7	9.4	10.0	9.5	9.2	9.7	9.6	9.3	10.1
	50+	10.2	10.0	10.5	10.1	10.0	10.2	10.3	9.9	10.7	9.8	9.6	10.3	10.1	9.9	10.3
WL removals	0-17	175	170	185	176	170	184	177	172	185	170	163	178	169	161	173
	18-49	329	317	337	330	324	335	328	313	341	326	320	332	325	313	335
	50+	510	500	521	507	497	520	511	505	516	513	500	524	514	499	524
1Y PT deaths	0-17	69	59	82	71	65	86	68	58	82	83	72	97	75	61	97
	18-49	188	175	207	199	183	211	197	177	218	207	193	223	203	187	221
	50+	320	298	337	331	302	358	333	306	362	337	308	376	338	316	379
1Y PT death rates	0-17	9.6	8.1	11.6	10.0	9.0	12.3	9.5	8.1	11.5	11.6	10.0	13.7	10.5	8.5	13.7
	18-49	15.5	14.1	17.6	16.5	15.2	17.8	16.2	14.4	17.8	17.1	15.8	18.7	16.7	15.5	18.2
	50+	13.7	12.7	14.4	14.2	13.0	15.5	14.4	12.9	15.8	14.8	13.4	16.6	14.7	13.7	16.6
Median distance (NM)	0-17	368	357	382	361	346	375	352	339	363	554	532	572	491	469	506
	18-49	169	158	180	129	125	133	182	173	191	319	307	337	286	278	299
	50+	167	159	173	126	124	129	177	171	182	314	310	326	283	278	289

Table App1.5. TSAM metrics by simulation and four adult age groups

Metric	Age	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	18-34	1051	1051	1051	1051	1051	1051	1051	1051	1051	1051	1051	1051	1051	1051	1051
	35-49	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032
	50-64	4345	4345	4345	4345	4345	4345	4345	4345	4345	4345	4345	4345	4345	4345	4345
	65+	1122	1122	1122	1122	1122	1122	1122	1122	1122	1122	1122	1122	1122	1122	1122
TX count	18-34	464	450	483	465	448	480	468	455	483	473	460	483	472	450	489
	35-49	883	866	916	879	858	901	886	852	906	885	868	895	886	873	907
	50-64	2023	1990	2052	2020	1999	2040	2015	1994	2048	2003	1976	2017	2007	1993	2030
	65+	527	509	543	534	521	546	526	517	540	515	508	525	520	512	531
TX rates	18-34	112.5	107.9	117.9	113.0	106.9	120.0	113.6	109.3	119.8	115.4	110.7	119.9	115.2	106.1	120.4
	35-49	96.7	92.3	101.9	95.2	91.4	98.8	96.2	91.2	99.4	95.9	93.5	97.6	96.5	93.7	99.9
	50-64	97.1	94.4	98.9	97.3	95.0	98.9	97.1	95.6	99.4	95.6	94.1	97.4	96.2	94.8	98.3
	65+	110.1	104.3	116.5	111.1	107.7	113.5	109.1	105.9	112.2	105.0	101.9	108.1	107.4	104.1	111.8
WL death counts	18-34	84	80	88	83	79	88	83	77	87	80	76	84	82	72	88
	35-49	129	124	137	128	117	136	127	123	130	125	118	130	125	121	130
	50-64	280	271	289	277	271	284	281	266	292	269	263	280	274	269	280
	65+	75	68	81	73	66	78	76	70	80	75	71	80	77	70	82
WL morality rates	18-34	11.7	11.1	12.5	11.6	10.9	12.6	11.6	10.7	12.4	11.4	10.7	11.9	11.6	10.2	12.5
	35-49	8.9	8.6	9.4	8.8	8.1	9.4	8.8	8.6	9.0	8.6	8.1	8.9	8.6	8.3	9.0
	50-64	9.8	9.5	10.1	9.7	9.5	9.9	9.9	9.4	10.3	9.4	9.2	9.7	9.6	9.4	9.8
	65+	12.1	10.9	13.0	11.7	10.6	12.7	12.2	11.1	13.1	11.9	11.1	12.7	12.2	11.1	13.3
WL removals	18-34	131	123	134	129	124	137	129	122	140	128	121	133	128	122	132
	35-49	198	190	207	201	194	207	199	189	208	199	194	202	197	186	205
	50-64	379	371	386	379	365	390	381	377	386	381	368	393	383	370	390
	65+	132	125	138	128	121	132	130	126	134	132	126	135	131	125	137
1Y PT deaths	18-34	77	63	91	82	70	93	82	69	102	82	73	88	82	69	105
	35-49	111	94	126	117	109	125	115	94	138	125	112	136	121	112	134
	50-64	248	232	260	255	231	284	259	236	292	261	241	293	264	232	296
	65+	72	53	86	76	67	89	74	62	88	77	65	89	74	56	86
1Y PT death rates (NM)	18-34	18.8	15.1	23.1	20.1	17.2	23.5	20.1	16.4	25.5	19.8	17.2	21.8	19.9	16.8	26.0
	35-49	13.8	11.5	16.1	14.7	14.0	15.7	14.2	11.2	17.1	15.7	13.9	17.5	15.1	13.8	17.4
	50-64	13.4	12.6	14.4	13.8	12.4	15.5	14.1	12.5	16.2	14.3	13.2	16.3	14.5	12.6	16.2
	65+	15.0	11.3	18.2	15.8	14.0	18.7	15.5	13.1	18.6	16.6	14.1	19.9	15.8	11.8	18.9
Median distance (NM)	18-34	178	157	214	130	123	136	183	171	198	317	306	329	291	278	303
	35-49	165	154	185	128	123	132	182	171	193	321	306	345	283	272	301
	50-64	172	163	186	128	126	131	179	171	186	317	309	334	285	278	292
	65+	140	114	174	118	106	132	171	162	188	299	286	314	276	260	290

Table App1.6. TSAM metrics by simulation and sex

		DSA-first			150NM			250NM			500NM-A			500NM-B		
Metric	Sex	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	Male	7082	7082	7082	7082	7082	7082	7082	7082	7082	7082	7082	7082	7082	7082	7082
	Female	2831	2831	2831	2831	2831	2831	2831	2831	2831	2831	2831	2831	2831	2831	2831
TX count	Male	3295	3278	3317	3294	3270	3309	3300	3276	3315	3289	3273	3315	3301	3272	3333
	Female	1364	1352	1374	1364	1347	1381	1359	1344	1379	1360	1337	1375	1349	1330	1372
TX rates	Male	104.7	103.6	105.9	104.4	102.5	105.4	104.8	103.7	106.0	104.0	103.2	105.9	104.9	104.0	106.7
	Female	130.7	126.9	133.8	130.9	127.5	132.7	129.6	127.3	132.7	129.3	127.2	131.8	127.7	123.7	132.7
WL death counts	Male	503	486	514	498	487	510	502	488	514	486	480	501	493	481	501
	Female	166	161	172	164	158	170	165	159	170	160	151	166	164	155	172
WL morality rates	Male	11.0	10.6	11.3	10.9	10.7	11.2	11.0	10.7	11.3	10.6	10.4	11.0	10.8	10.5	11.0
	Female	10.0	9.7	10.5	9.9	9.6	10.3	9.9	9.7	10.3	9.6	9.1	9.9	9.8	9.3	10.4
WL removals	Male	685	676	699	687	676	694	685	675	702	683	664	691	680	661	694
	Female	329	318	338	326	317	335	331	323	337	326	315	339	328	323	337
1Y PT deaths	Male	393	364	410	417	389	446	409	379	434	433	404	454	422	397	486
	Female	183	173	212	184	164	199	189	155	209	194	172	217	193	168	224
1Y PT death rates	Male	13.0	12.0	13.7	13.9	12.8	14.9	13.6	12.4	14.5	14.5	13.4	15.3	14.1	13.2	16.4
	Female	14.8	13.9	17.6	14.9	13.4	16.2	15.4	12.4	17.1	15.8	14.2	17.8	15.9	13.8	18.5
Median distance (NM)	Male	195	191	203	139	136	142	189	183	193	340	325	353	299	293	307
	Female	230	207	242	176	160	203	205	200	210	359	346	372	324	312	344

Table App1.7. TSAM metrics by simulation and race/ethnicity

Metric	Race/ ethnicity	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	White	6701	6701	6701	6701	6701	6701	6701	6701	6701	6701	6701	6701	6701	6701	6701
	Black	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009
	Hispanic	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866
	Asian	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
	Other/unk	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87
TX count	White	3091	3066	3123	3101	3078	3118	3092	3077	3119	3086	3056	3108	3087	3065	3102
	Black	961	939	974	954	940	971	956	931	971	958	950	972	955	941	970
	Hispanic	416	402	430	414	402	427	422	410	431	413	401	424	415	403	437
	Asian	152	145	160	148	143	155	150	142	157	150	146	156	153	146	157
	Other/unk	40	35	43	40	38	45	39	37	45	42	40	45	41	38	43
TX rates	White	105.3	104.5	106.8	105.6	104.3	106.4	105.5	104.3	107.4	104.6	102.8	106.5	105.0	104.0	106.1
	Black	117.7	115.6	120.6	116.5	113.1	119.7	116.4	111.9	118.3	117.4	115.6	119.1	116.3	114.1	118.1
	Hispanic	128.0	120.0	137.0	127.4	120.8	133.9	129.0	123.5	134.9	125.0	116.8	131.1	127.7	122.6	137.1
	Asian	187.5	172.1	203.6	180.4	168.4	191.5	180.8	170.6	194.0	183.2	173.4	196.8	186.4	172.7	198.2
	Other/unk	118.2	101.3	138.1	120.0	105.8	134.6	116.9	99.4	139.5	122.1	112.2	131.6	118.6	105.7	127.1
WL death counts	White	454	438	462	448	438	458	453	432	466	436	431	442	447	438	457
	Black	129	124	135	128	120	136	127	117	136	127	122	132	126	122	133
	Hispanic	63	60	66	63	60	69	64	61	68	61	57	65	62	58	66
	Asian	13	11	14	13	9	16	12	10	14	13	11	15	11	9	12
	Other/unk	11	8	13	11	10	12	11	10	13	10	9	11	10	9	11
WL morality rates	White	10.4	10.0	10.6	10.3	10.0	10.5	10.4	9.9	10.8	10.0	9.9	10.1	10.2	10.0	10.5
	Black	10.8	10.3	11.3	10.7	10.1	11.4	10.6	9.7	11.3	10.7	10.2	11.2	10.5	10.2	11.0
	Hispanic	12.6	12.1	13.3	12.7	12.1	13.7	12.9	12.3	13.6	12.0	11.3	13.0	12.5	11.9	13.2
	Asian	11.1	9.8	11.8	10.9	7.7	13.8	10.3	8.9	12.2	11.3	9.6	13.3	9.7	8.0	10.9
	Other/unk	20.9	15.8	24.5	20.7	18.8	22.6	21.1	17.8	24.3	18.8	17.0	22.4	20.0	17.0	22.2
WL removals	White	669	659	678	666	654	674	670	661	679	664	653	673	662	639	674
	Black	204	199	209	206	195	219	205	198	215	205	196	212	205	195	211
	Hispanic	107	100	114	106	100	109	106	102	112	106	101	112	106	96	109
	Asian	26	24	29	27	24	30	26	23	30	26	23	28	27	25	29
	Other/unk	9	7	11	8	6	11	9	7	10	8	7	9	8	7	9
1Y PT deaths	White	357	315	369	375	347	404	370	339	387	393	374	411	384	337	417
	Black	157	133	185	161	147	174	163	141	183	166	146	195	163	147	183
	Hispanic	43	31	49	44	27	54	44	34	60	48	35	66	50	37	58
	Asian	17	10	24	16	12	19	17	13	22	16	8	20	15	10	19
	Other/unk	4	1	6	5	1	13	4	1	6	5	2	9	5	1	9

1Y PT death rates	White	12.5	11.1	13.0	13.2	12.1	14.3	13.1	11.9	13.6	14.0	13.2	14.6	13.6	11.8	14.9
	Black	18.5	15.0	22.2	19.2	16.9	21.0	19.4	16.2	21.9	19.7	16.8	24.0	19.4	17.3	22.0
	Hispanic	11.0	7.7	13.0	11.5	7.1	14.9	11.2	8.5	15.9	12.8	9.1	17.4	13.1	9.6	15.7
	Asian	11.8	6.9	17.3	11.5	8.7	14.4	12.3	9.3	16.4	11.3	5.7	15.0	10.4	6.7	13.4
	Other/unk	11.9	2.6	16.3	13.3	2.5	40.4	9.8	2.8	14.7	12.4	4.8	26.3	13.7	2.6	25.9
Median distance (NM)	White	203	195	208	144	142	147	195	191	198	346	335	358	309	304	315
	Black	213	198	231	147	139	154	198	194	204	348	329	361	303	293	315
	Hispanic	173	148	201	132	121	144	177	167	191	340	308	389	287	266	310
	Asian	178	110	214	143	119	187	179	143	203	304	276	339	283	255	309
	Other/unk	325	227	461	299	162	430	230	206	263	435	344	491	347	281	382

Table App1.8. TSAM metrics by simulation and primary diagnosis

Metric	Diagnosis	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	CAD	3248	3248	3248	3248	3248	3248	3248	3248	3248	3248	3248	3248	3248	3248	3248
	CM	4934	4934	4934	4934	4934	4934	4934	4934	4934	4934	4934	4934	4934	4934	4934
	Congenital	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992
	Other/unk	739	739	739	739	739	739	739	739	739	739	739	739	739	739	739
TX count	CAD	1437	1417	1458	1441	1425	1456	1442	1424	1455	1431	1417	1444	1435	1407	1455
	CM	2426	2412	2441	2426	2403	2442	2427	2405	2442	2441	2422	2453	2436	2420	2454
	Congenital	424	417	433	422	411	438	423	407	432	427	413	440	421	410	441
	Other/unk	372	358	384	369	356	384	366	357	380	351	344	367	359	351	373
TX rates	CAD	90.4	89.1	92.0	91.2	89.8	92.3	90.9	88.9	92.3	89.5	87.8	91.3	90.2	88.1	92.6
	CM	126.1	124.7	127.1	125.5	123.8	127.6	125.7	123.3	127.3	126.6	125.6	128.4	126.4	124.5	128.8
	Congenital	112.5	108.4	117.4	110.9	105.6	118.2	111.1	104.4	117.3	114.3	110.8	120.0	111.2	106.6	115.9
	Other/unk	123.9	116.1	135.9	122.0	115.3	131.5	122.6	117.5	132.2	111.6	108.0	117.6	117.0	113.5	122.0
WL death counts	CAD	224	216	236	222	217	228	223	216	231	217	209	223	220	215	224
	CM	289	280	297	283	275	295	286	279	294	276	268	284	279	271	287
	Congenital	90	85	103	90	83	97	89	82	95	87	79	93	89	83	97
	Other/unk	67	59	73	67	61	72	69	65	74	67	61	71	69	63	73
WL morality Rates	CAD	10.0	9.6	10.5	9.9	9.7	10.2	10.0	9.7	10.4	9.6	9.3	9.9	9.8	9.6	10.0
	CM	9.8	9.5	10.1	9.6	9.3	10.0	9.7	9.4	10.0	9.4	9.2	9.7	9.5	9.1	9.8
	Congenital	15.3	14.3	17.6	15.2	13.8	16.4	15.2	14.0	16.1	14.9	13.8	16.1	15.1	14.2	16.5
	Other/unk	15.1	13.7	16.8	15.2	14.1	16.1	15.7	14.6	17.0	14.7	13.5	15.6	15.4	14.1	16.5
WL removals	CAD	336	326	347	337	329	343	337	331	343	338	330	344	338	332	347
	CM	461	448	471	459	447	468	462	451	479	454	449	461	454	448	462
	Congenital	147	140	157	149	142	155	148	141	157	146	139	155	146	138	152
	Other/unk	70	68	72	69	64	76	69	65	72	72	66	77	70	64	75

1Y PT deaths	CAD	190	155	211	194	173	216	197	183	211	208	189	220	198	179	221
	CM	265	243	293	281	251	319	277	263	304	291	263	315	291	250	320
	Congenital	56	47	62	56	38	69	57	41	66	64	52	79	57	49	75
	Other/unk	65	53	75	70	59	79	67	56	77	64	53	76	69	58	82
1Y PT death	CAD	14.5	11.7	16.3	14.8	13.1	16.5	15.1	13.7	16.4	16.2	14.4	17.2	15.3	13.5	17.2
rates	CM	11.8	10.8	13.2	12.6	11.1	14.4	12.4	11.7	13.6	13.0	11.8	14.2	13.0	11.1	14.6
	Congenital	14.7	11.8	16.0	14.6	9.9	18.2	14.8	10.7	17.4	16.9	13.6	20.9	15.1	12.6	19.4
	Other/unk	20.0	15.7	23.4	22.0	18.8	25.1	20.9	17.7	23.7	21.1	17.0	25.6	22.2	18.2	27.7
Median	CAD	172	165	186	128	126	130	178	172	184	312	299	319	287	278	296
distance (NM)	CM	207	200	217	146	142	151	196	190	201	349	327	360	302	295	311
	Congenital	325	301	368	316	293	349	297	271	329	492	461	541	451	423	487
	Other/unk	160	139	195	125	117	134	182	166	198	325	290	342	295	273	319

CAD: Coronary artery disease; CM: cardiomyopathy.

Table App1.9. TSAM metrics by simulation and blood type

Metric	Blood type	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	A	3605	3605	3605	3605	3605	3605	3605	3605	3605	3605	3605	3605	3605	3605	3605
	B	1170	1170	1170	1170	1170	1170	1170	1170	1170	1170	1170	1170	1170	1170	1170
	AB	364	364	364	364	364	364	364	364	364	364	364	364	364	364	364
	O	4774	4774	4774	4774	4774	4774	4774	4774	4774	4774	4774	4774	4774	4774	4774
TX count	A	1928	1915	1940	1912	1893	1935	1898	1885	1912	1860	1838	1883	1854	1835	1878
	B	687	675	702	685	673	706	691	667	705	684	660	703	685	666	696
	AB	281	274	290	283	271	296	278	272	283	273	267	279	274	270	281
	O	1763	1747	1780	1778	1759	1801	1792	1782	1807	1832	1812	1857	1838	1820	1855
TX rates	A	151.5	149.2	154.2	148.1	145.9	152.5	146.2	141.9	148.7	140.1	136.1	143.5	139.7	135.8	144.9
	B	183.9	179.1	188.5	182.8	176.0	193.8	186.7	176.8	194.4	179.2	168.9	191.7	182.5	173.8	189.9
	AB	463.8	409.3	495.8	479.7	426.7	530.2	456.8	420.2	509.1	422.5	392.6	451.7	418.4	388.8	467.0
	O	71.0	70.5	72.0	71.9	71.0	73.3	72.7	71.9	73.7	75.1	74.1	76.5	75.5	74.7	76.3
WL death counts	A	232	222	240	234	231	242	237	228	245	232	224	240	236	230	250
	B	69	65	74	68	60	75	67	61	74	66	62	74	68	61	73
	AB	11	8	13	10	9	13	11	9	13	12	9	13	12	9	14
	O	357	352	361	350	343	356	351	336	364	336	329	343	341	336	347
WL morality rates	A	11.8	11.2	12.2	11.8	11.6	12.4	11.9	11.5	12.2	11.5	11.2	11.9	11.7	11.4	12.3
	B	11.6	10.7	12.6	11.4	10.1	12.5	11.4	10.2	12.3	10.9	10.0	12.2	11.3	10.2	12.3
	AB	11.0	8.1	12.3	10.2	8.7	13.8	11.1	9.0	13.5	11.1	8.9	13.1	11.2	8.5	12.8
	O	10.0	9.9	10.1	9.9	9.7	10.0	9.9	9.5	10.3	9.6	9.4	9.7	9.7	9.6	9.9
WL removals	A	316	311	327	316	305	326	322	314	332	324	316	333	324	309	333
	B	100	95	105	99	94	103	98	92	105	98	92	104	99	93	103
	AB	12	7	16	13	11	16	14	10	17	14	12	17	14	10	16
	O	585	578	594	586	578	596	582	569	593	573	558	581	571	564	580
1Y PT deaths	A	215	189	236	217	197	240	216	198	237	222	211	241	212	192	230
	B	80	70	94	87	79	101	86	73	99	91	75	105	84	70	101
	AB	40	35	53	42	31	50	43	36	54	39	28	45	40	29	49
	O	242	225	264	255	232	290	252	231	285	275	257	288	279	255	314
1Y PT death rates	A	12.1	10.6	13.5	12.4	11.0	13.7	12.4	11.2	13.7	13.0	12.1	14.3	12.5	11.0	13.8
	B	12.7	10.9	15.1	13.9	12.4	16.5	13.6	11.1	16.1	14.6	11.8	16.7	13.4	11.0	16.5
	AB	15.7	13.7	21.0	16.6	11.3	20.0	17.6	14.4	22.7	15.9	10.8	19.0	16.6	11.4	20.8
	O	15.2	14.0	16.7	15.9	14.5	18.3	15.6	14.3	17.7	16.8	15.6	17.6	17.0	15.5	19.2
Median distance (NM)	A	201	192	206	141	137	144	195	191	200	343	326	347	306	296	312
	B	239	206	261	162	145	190	197	191	205	336	315	349	310	294	316
	AB	316	278	354	251	207	307	233	218	262	368	341	394	342	298	373

	O	181	173	188	139	136	142	187	179	192	349	340	362	299	292	310
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Table App1.10. TSAM metrics by simulation and urbanicity

Metric	Urbanicity	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	Metropolitan	8239	8239	8239	8239	8239	8239	8239	8239	8239	8239	8239	8239	8239	8239	8239
	Micropolitan	854	854	854	854	854	854	854	854	854	854	854	854	854	854	854
	Small town	417	417	417	417	417	417	417	417	417	417	417	417	417	417	417
	Rural	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274
	Unknown	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
TX count	Metropolitan	3873	3852	3891	3871	3842	3889	3860	3830	3869	3860	3844	3876	3863	3843	3878
	Micropolitan	411	395	421	412	407	420	416	403	426	413	404	427	410	400	418
	Small town	189	175	196	189	183	197	192	178	201	194	189	201	189	180	194
	Rural	122	114	126	122	113	128	124	117	132	123	117	130	124	117	129
	Unknown	64	60	72	64	59	68	66	62	68	60	57	64	65	57	69
TX rates	Metropolitan	110.7	109.0	112.1	110.5	109.1	112.0	109.8	107.7	111.1	109.7	108.2	110.5	110.0	108.7	111.0
	Micropolitan	116.0	109.0	121.2	117.1	112.0	122.6	120.0	113.5	126.8	116.6	112.9	124.3	116.2	112.7	123.5
	Small town	113.7	105.6	120.5	111.9	105.5	120.8	116.0	103.7	125.5	118.4	113.8	124.1	112.6	106.6	120.8
	Rural	91.0	81.7	96.5	90.5	84.2	97.6	94.5	86.9	104.7	91.2	87.9	97.7	94.1	84.7	99.0
	Unknown	171.0	153.1	196.1	167.7	145.4	198.3	179.6	171.1	188.5	147.4	131.5	162.6	173.1	143.9	186.2
WL death counts	Metropolitan	555	544	567	548	536	560	552	534	565	538	529	554	545	525	559
	Micropolitan	49	46	57	50	47	59	50	46	54	47	45	50	49	44	53
	Small town	31	27	34	31	27	34	30	28	32	27	23	29	29	24	34
	Rural	22	21	24	23	21	26	23	21	26	22	19	24	22	20	26
	Unknown	12	11	14	12	10	13	12	11	13	12	11	14	12	10	14
WL morality Rates	Metropolitan	10.8	10.5	11.0	10.6	10.4	10.9	10.7	10.4	11.0	10.4	10.2	10.7	10.6	10.1	10.8
	Micropolitan	9.0	8.3	10.3	9.1	8.4	10.9	9.3	8.4	10.3	8.7	8.2	9.3	9.0	8.0	9.6
	Small town	11.5	10.0	12.7	11.3	10.0	12.4	11.2	10.2	12.1	10.4	8.8	11.2	10.7	8.8	12.7
	Rural	12.0	11.0	12.9	12.1	11.0	13.8	12.6	11.4	13.8	11.9	10.7	13.2	12.1	10.9	14.4
	Unknown	17.4	15.8	21.2	17.0	14.1	19.5	17.1	15.2	19.1	15.8	13.8	19.2	17.2	13.6	19.6
WL removals	Metropolitan	829	820	843	832	821	841	836	819	848	830	822	838	828	814	841
	Micropolitan	93	86	98	89	83	94	89	85	94	88	82	92	90	85	93
	Small town	46	44	48	47	41	49	46	42	51	46	41	49	47	44	51
	Rural	26	23	29	25	24	27	25	24	27	26	25	29	25	23	28
	Unknown	20	18	24	20	17	23	20	16	23	19	17	22	19	16	21
1Y PT deaths	Metropolitan	485	445	517	500	461	533	498	477	523	523	492	551	517	475	576
	Micropolitan	49	42	58	51	41	56	50	38	70	53	43	61	52	48	63
	Small town	22	20	25	26	17	35	25	19	30	26	21	36	25	21	29

	Rural	14	10	17	17	12	22	16	11	21	17	12	21	17	12	23
	Unknown	7	4	10	7	5	9	8	5	12	7	3	11	5	3	9
1Y PT death rates	Metropolitan	13.7	12.5	14.7	14.2	13.0	15.2	14.2	13.5	15.1	15.0	14.0	15.8	14.8	13.5	16.6
	Micropolitan	13.1	11.1	15.4	13.5	10.8	15.2	13.2	9.8	18.7	14.1	11.4	16.3	14.0	12.4	17.0
	Small town	12.8	11.2	15.2	15.5	9.4	20.2	14.5	11.1	17.8	14.8	11.8	20.4	14.2	12.7	16.9
	Rural	12.4	9.2	14.9	16.0	10.2	20.8	14.1	8.9	19.0	15.5	10.3	19.0	14.9	10.7	22.0
	Unknown	11.4	5.7	17.2	11.4	8.3	14.8	13.5	7.9	23.0	13.7	5.4	22.1	8.1	4.6	15.0
Median distance (NM)	Metropolitan	199	192	206	141	138	145	191	187	194	339	322	347	300	295	307
	Micropolitan	243	203	274	179	142	215	206	196	222	374	357	399	336	317	359
	Small town	276	233	330	216	147	297	214	201	222	380	341	413	345	312	370
	Rural	242	199	286	206	146	254	207	184	219	359	330	386	325	290	368
	Unknown	134	75	189	126	99	200	167	144	187	317	272	364	235	164	310

Table App1.11. TSAM metrics by simulation and insurance at listing

Metric	Insurance	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	Public	5399	5399	5399	5399	5399	5399	5399	5399	5399	5399	5399	5399	5399	5399	5399
	Private	4452	4452	4452	4452	4452	4452	4452	4452	4452	4452	4452	4452	4452	4452	4452
	Unknown	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
TX count	Public	2576	2555	2591	2574	2554	2595	2571	2549	2587	2573	2549	2600	2575	2559	2589
	Private	2073	2055	2093	2074	2047	2105	2077	2064	2100	2065	2043	2098	2065	2047	2082
	Unknown	9	8	10	9	8	9	10	8	11	10	8	11	9	7	11
TX rates	Public	109.0	107.8	110.6	108.8	107.8	110.7	108.3	106.9	109.8	108.2	106.6	110.9	108.6	107.3	109.8
	Private	114.2	112.8	116.2	114.1	111.5	116.1	114.7	113.5	115.9	113.3	112.2	115.6	113.5	111.9	115.8
	Unknown	85.4	62.8	98.7	77.9	65.7	90.1	87.6	64.8	106.8	88.7	62.9	140.3	82.8	58.0	118.6
WL death counts	Public	338	326	344	333	320	339	333	317	345	324	314	336	330	323	338
	Private	325	314	331	324	315	337	328	321	335	316	305	328	321	312	331
	Unknown	6	5	6	6	6	6	6	6	6	6	5	6	6	5	6
WL morality rates	Public	9.7	9.2	9.8	9.5	9.1	9.7	9.5	9.0	9.9	9.2	8.9	9.6	9.4	9.2	9.6
	Private	12.3	11.9	12.5	12.2	11.8	12.8	12.4	12.2	12.7	11.9	11.6	12.3	12.1	11.7	12.5
	Unknown	8.4	7.0	8.7	8.5	8.4	8.7	8.6	8.4	8.8	8.3	6.9	9.1	8.3	6.9	8.8
WL removals	Public	523	510	532	527	521	533	531	521	544	522	515	531	522	514	533
	Private	482	475	490	476	465	489	475	468	488	477	466	484	476	463	490
	Unknown	7	6	7	7	6	7	7	6	7	7	6	7	7	6	7
1Y PT deaths	Public	299	277	314	312	284	335	311	293	341	328	313	342	316	299	335
	Private	277	250	310	288	273	308	285	270	300	298	276	327	298	254	340
	Unknown	1	0	2	2	0	3	1	0	2	1	0	2	1	0	3
1Y PT death	Public	12.6	11.6	13.2	13.2	11.9	14.3	13.2	12.3	14.6	14.0	13.3	14.6	13.4	12.5	14.4

rates	Private	14.7	13.1	16.5	15.3	14.4	16.8	15.2	14.3	16.1	16.0	14.6	17.5	16.1	13.4	18.6
	Unknown	11.9	0.0	27.3	20.8	0.0	40.4	11.3	0.0	24.9	16.2	0.0	32.7	13.0	0.0	35.5
Median	Public	200	191	206	144	140	147	195	191	198	342	327	353	303	295	306
distance	Private	207	204	212	144	141	149	194	188	199	350	340	362	309	299	317
(NM)	Unknown	239	56	437	218	41	416	211	138	356	289	147	485	315	107	473

Table App1.12. TSAM metrics by simulation and US location of transplant center

Metric	Location	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	East	6012	6012	6012	6012	6012	6012	6012	6012	6012	6012	6012	6012	6012	6012	6012
	West	3901	3901	3901	3901	3901	3901	3901	3901	3901	3901	3901	3901	3901	3901	3901
TX count	East	2814	2804	2828	2838	2821	2859	2806	2791	2831	2826	2809	2843	2812	2790	2834
	West	1845	1827	1865	1819	1802	1830	1853	1836	1867	1823	1803	1848	1838	1820	1856
TX rates	East	104.3	103.5	104.9	105.9	103.8	107.4	103.8	101.8	106.2	104.8	103.3	106.4	104.2	101.7	105.8
	West	123.6	121.5	125.5	120.0	118.2	121.9	124.1	122.4	125.4	120.1	117.7	122.1	122.2	119.7	124.4
WL death	East	394	382	408	388	376	404	390	377	401	379	370	389	384	376	391
counts	West	275	265	280	274	264	280	277	268	286	267	262	278	273	266	281
WL morality	East	10.4	10.1	10.8	10.3	10.0	10.6	10.3	9.9	10.5	10.0	9.8	10.2	10.1	9.8	10.3
rates	West	11.3	10.9	11.6	11.2	10.6	11.5	11.5	11.0	11.8	10.9	10.7	11.3	11.2	10.9	11.5
WL removals	East	611	606	621	606	593	613	613	590	630	603	590	614	603	592	615
	West	403	396	412	407	396	417	403	392	415	406	395	417	405	395	416
1Y PT deaths	East	351	319	390	374	337	388	363	333	392	382	357	419	375	350	408
	West	226	213	236	227	205	248	235	212	251	245	227	261	240	217	269
1Y PT death	East	13.7	12.3	15.4	14.5	13.0	15.1	14.2	13.0	15.3	14.9	13.7	16.6	14.7	13.6	16.1
rates	West	13.4	12.5	14.1	13.7	12.3	15.0	13.9	12.4	15.0	14.8	13.6	15.9	14.4	12.9	16.5
Median	East	204	192	214	142	140	145	193	188	198	349	337	358	307	300	313
distance	West	204	201	206	153	143	172	197	194	199	339	328	348	303	295	308
(NM)																

East: transplant centers located in AL, CT, DC, DE, FL, GA, IL, IN, KY, MA, MD, MI, MS, NC, NJ, NY, OH, PA, SC, TN, VA, WI;

West: transplant centers located in AR, AZ, CA, CO, IA, LA, MN, MO, NE, OK, OR, PR, TX, UT, WA

There were no heart transplant centers in AK, HI, ID, KS, ME, MT, NV, NH, NM, ND, RI, SD, VT, WV, or WY during the simulation time frame.

Table App1.13. TSAM metrics by simulation and exception status*

Metric	Exception	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max

Candidates	Status 3	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
	Status 4	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
	None	8407	8407	8407	8407	8407	8407	8407	8407	8407	8407	8407	8407	8407	8407	8407
TX count	Status 3	193	179	206	201	183	217	200	190	209	215	204	227	208	196	220
	Status 4	112	104	119	109	101	116	109	101	115	109	102	116	106	100	117
	None	3592	3570	3620	3587	3565	3603	3587	3570	3605	3551	3522	3573	3571	3554	3599
TX rates	Status 3	1243.5	1129.8	1353.6	1275.6	1186.6	1384.7	1384.1	1260.6	1511.3	1696.0	1633.2	1779.5	1627.1	1550.6	1779.3
	Status 4	208.8	189.3	253.4	201.7	184.0	225.6	199.1	176.2	227.9	189.4	178.0	211.3	181.5	165.9	201.9
	None	94.1	93.0	94.8	93.9	93.2	94.5	93.9	93.0	94.9	92.3	91.4	93.8	93.3	92.2	94.4
WL death	Status 3	6	3	8	6	4	9	6	4	8	6	5	7	6	5	7
counts	Status 4	8	7	9	8	6	10	7	6	8	9	7	10	9	7	9
	None	554	545	564	548	538	558	554	535	566	534	526	548	544	533	554
WL morality	Status 3	36.0	18.7	50.5	36.8	25.3	56.2	40.8	27.0	57.8	47.4	37.3	56.4	46.1	37.8	54.6
rates	Status 4	14.9	12.7	16.7	14.0	11.3	17.5	12.7	10.5	14.6	14.9	12.1	16.8	14.7	11.7	16.1
	None	10.0	9.8	10.1	9.8	9.7	10.0	10.0	9.6	10.2	9.6	9.4	9.8	9.8	9.6	10.0
WL removals	Status 3	1	0	3	1	0	2	0	0	1	0	0	1	0	0	1
	Status 4	2	1	5	3	1	4	3	1	5	3	2	4	4	2	5
	None	836	825	849	834	825	843	836	823	851	836	823	852	835	822	848
1Y PT deaths	Status 3	27	20	32	30	22	39	26	18	34	32	20	40	29	24	41
	Status 4	12	7	17	12	5	16	12	7	17	13	10	16	11	9	16
	None	470	449	507	487	451	518	492	467	534	500	467	531	500	468	555
1Y PT death	Status 3	15.3	10.4	19.1	16.8	12.9	21.7	14.6	10.1	19.5	16.5	10.2	20.1	15.6	12.2	22.6
rates	Status 4	11.8	6.6	18.3	11.9	5.2	15.7	11.9	6.5	17.8	12.9	9.3	16.4	11.4	9.0	14.8
	None	14.4	13.7	15.5	15.0	13.8	16.0	15.2	14.2	16.6	15.6	14.4	16.5	15.5	14.4	17.4
Median	Status 3	302	245	354	277	235	327	222	200	238	369	341	398	302	270	341
distance (NM)	Status 4	265	206	305	238	184	308	239	183	302	434	403	481	312	280	353
	None	158	149	167	124	119	126	175	171	179	310	306	318	283	278	293

* Exception status within the TSAM refers to candidates who submitted a status 1A or status 1B exception request, and the classification of that request was not folded into one of the new status groups 1-6. The majority of reasons for status upgrade were used to define a status group under the new system. Given this, data by upgrade status will not predict who might get a status upgrade under the new system. New rules allow for exceptions in each status group.

Table App1.14. TSAM metrics by simulation and annual center volume

Metric	Tx/year	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Candidates	0-10	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121
	11-15	1908	1908	1908	1908	1908	1908	1908	1908	1908	1908	1908	1908	1908	1908	1908
	16-25	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633
	26-50	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392
	> 50	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859	1859
TX count	0-10	478	458	497	488	473	509	492	480	501	488	474	496	497	483	519
	11-15	854	843	866	849	837	868	858	839	870	854	841	887	859	838	872
	16-25	1340	1318	1358	1341	1313	1357	1343	1316	1384	1354	1333	1371	1352	1338	1374
	26-50	1101	1075	1120	1082	1063	1111	1086	1064	1100	1065	1055	1080	1054	1042	1062
	> 50	886	870	900	898	865	915	880	862	891	889	876	903	888	874	902
TX rates	0-10	100.6	95.5	104.9	103.0	97.8	111.1	105.4	99.0	109.4	103.5	100.0	108.4	106.5	100.9	111.4
	11-15	108.8	104.4	111.4	108.3	104.5	111.6	109.6	104.0	113.7	109.4	105.6	114.9	110.3	107.4	114.0
	16-25	122.6	119.7	124.6	123.0	119.2	127.8	122.7	119.6	131.0	123.8	121.9	125.4	124.5	121.2	128.0
	26-50	109.9	106.6	113.4	106.1	102.7	110.8	107.7	104.1	109.9	103.6	101.5	105.4	102.0	99.8	104.5
	> 50	105.9	102.2	110.5	108.5	103.0	112.6	104.3	102.1	106.9	105.8	103.5	107.9	106.1	104.1	109.2
WL death counts	0-10	71	66	74	67	62	75	69	63	78	68	66	73	67	63	71
	11-15	142	136	153	141	134	149	141	137	146	136	130	140	135	125	142
	16-25	174	165	182	173	163	181	171	165	177	164	156	175	171	163	176
	26-50	169	158	178	170	162	179	173	164	184	168	159	173	173	165	179
	> 50	113	108	120	112	108	116	113	104	121	111	108	117	111	105	116
WL morality rates	0-10	9.8	9.1	10.3	9.2	8.7	10.4	9.6	8.8	10.9	9.5	9.0	10.2	9.3	8.9	10.0
	11-15	11.5	11.0	12.5	11.3	10.6	11.9	11.5	10.9	11.8	11.0	10.6	11.2	10.9	10.2	11.5
	16-25	11.3	10.8	12.0	11.3	10.7	11.8	11.2	10.8	11.7	10.7	10.2	11.5	11.3	10.7	11.6
	26-50	10.8	10.1	11.5	10.8	10.3	11.5	11.1	10.5	11.8	10.6	10.0	11.0	10.9	10.3	11.4
	> 50	9.7	9.2	10.4	9.7	9.3	10.2	9.6	8.9	10.4	9.4	9.2	10.1	9.5	9.0	9.9
WL removals	0-10	118	112	125	117	111	124	118	109	122	116	109	121	115	108	121
	11-15	225	216	235	227	219	231	222	215	232	220	210	224	221	213	231
	16-25	228	221	237	224	214	234	227	212	234	220	215	233	220	205	225
	26-50	241	233	247	244	237	251	244	238	252	248	241	257	248	240	255
	> 50	203	196	209	202	194	206	205	201	210	205	198	209	204	198	210
1Y PT deaths	0-10	71	60	84	69	62	82	77	68	87	76	61	90	79	64	91
	11-15	106	87	117	111	96	130	110	91	123	116	102	133	110	87	130
	16-25	162	139	181	169	136	195	163	145	188	174	164	192	175	162	185
	26-50	135	121	144	139	126	151	133	120	144	143	126	156	134	117	159
	> 50	104	91	122	112	99	128	115	98	129	117	105	127	118	108	143
1Y PT death	0-10	16.5	14.0	20.2	15.7	13.9	19.3	17.5	15.0	20.1	17.7	13.4	21.8	17.8	14.4	21.1



rates	11-15	13.5	11.1	15.0	14.4	12.4	17.3	14.1	11.6	15.9	15.1	13.0	17.5	14.1	10.9	16.7
	16-25	13.2	11.3	14.8	13.8	10.8	15.9	13.3	11.6	14.9	14.1	13.3	15.9	14.3	12.9	15.1
	26-50	13.3	12.2	14.7	14.1	12.9	15.6	13.4	11.9	14.6	14.8	12.9	16.5	14.0	12.0	16.8
	> 50	12.8	11.1	15.3	13.7	12.0	15.6	14.3	11.9	16.1	14.5	12.9	15.9	14.6	13.1	17.9
Median	0-10	223	208	243	149	136	181	205	199	209	355	321	377	321	303	336
distance (NM)	11-15	223	198	251	183	167	201	205	198	212	372	349	397	324	318	331
	16-25	225	204	238	149	143	167	200	197	203	349	339	362	308	299	315
	26-50	204	197	206	145	138	149	197	191	203	364	346	379	316	306	340
	> 50	110	99	136	109	103	116	157	149	167	294	284	309	265	250	272

Table App1.15. TSAM metrics by simulation and distance between donor and recipient hospitals

Metric	Distance (NM)	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
TX count	≤ 100	1728	1703	1757	1686	1659	1719	1255	1227	1288	706	674	721	788	752	824
	101 - 150	283	259	307	739	713	772	496	447	525	252	226	272	287	263	316
	151 - 250	547	500	585	370	356	381	1345	1303	1386	658	631	710	762	746	801
	251 - 500	1211	1160	1259	1054	1019	1100	929	879	964	1849	1799	1887	2153	2116	2211
	501 - 1000	766	746	802	682	651	713	521	501	543	1012	976	1047	565	538	616
	> 1000	125	112	145	127	112	140	113	103	131	173	148	199	95	80	109
1Y PT deaths	≤ 100	206	188	220	205	189	221	148	124	168	89	79	103	102	89	117
	101 - 150	32	29	37	93	79	105	65	48	78	31	17	37	37	28	60
	151 - 250	63	51	76	48	40	57	169	145	193	81	69	97	105	93	116
	251 - 500	146	126	161	128	116	139	111	89	128	242	222	276	280	240	312
	501 - 1000	102	84	119	98	81	127	79	72	90	143	125	154	72	57	83
	> 1000	29	22	38	28	20	44	25	20	29	40	31	49	19	15	25
1Y PT death rates	≤ 100	13.0	11.9	13.8	13.3	12.3	14.4	12.9	10.4	15.0	13.9	12.2	15.9	14.2	11.9	17.0
	101 - 150	12.3	10.3	15.9	13.8	11.5	16.0	14.4	11.4	16.8	13.3	7.7	16.8	14.2	9.9	21.8
	151 - 250	12.4	10.3	15.3	14.4	11.6	17.0	13.8	11.7	15.7	13.5	11.6	15.7	15.3	13.1	17.2
	251 - 500	13.1	11.2	14.2	13.3	11.4	14.8	13.1	10.3	15.2	14.4	12.9	16.5	14.3	12.1	16.2
	501 - 1000	14.7	11.8	17.7	16.0	13.5	21.1	16.9	15.1	19.4	15.7	13.6	16.9	14.1	11.2	16.7
	> 1000	27.9	20.7	38.3	26.9	18.9	44.2	26.0	19.4	32.0	27.9	22.8	34.0	23.0	18.1	27.3
Median distance (NM)	≤ 100	16	15	17	36	32	38	33	30	36	36	32	40	35	31	37
	101 - 150	122	119	124	126	125	126	126	124	127	126	123	128	125	122	126
	151 - 250	198	197	200	199	195	203	200	199	201	199	197	200	200	197	201
	251 - 500	375	373	377	376	372	384	373	365	379	375	371	381	376	372	382
	501 - 1000	739	724	754	735	718	747	742	730	761	727	713	744	728	710	750
	> 1000	1303	1284	1324	1325	1291	1360	1322	1282	1344	1304	1273	1328	1323	1270	1367

Data by distance were available only for candidates who underwent simulated transplant; distance data do not come into existence until a donor-recipient pair has been identified.

Table App1.16, TSAM metrics by simulation and DSA

Metric	DSA	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Tx count	ALOB	50	46	54	51	46	55	53	50	58	50	47	55	53	48	56
	AROR	51	46	55	55	50	60	52	47	55	56	51	61	55	50	58
	AZOB	66	61	72	66	63	70	67	63	71	66	63	71	68	62	73
	CADN	163	160	171	154	147	162	154	146	161	140	129	145	143	137	150
	CAGS	12	10	13	19	17	21	18	17	20	15	12	17	17	15	19
	CAOP	315	307	322	318	311	328	321	313	328	317	306	323	325	315	331
	CASD	43	37	47	48	44	51	49	41	53	49	46	53	49	44	55
	CORS	54	50	56	50	46	53	51	48	54	49	43	54	50	46	54
	CTOP	34	28	37	35	31	39	35	31	38	40	36	42	40	38	43
	DCTC	57	47	62	55	50	68	56	52	64	56	48	64	56	50	60
	FLFH	0	0	1	1	0	1	0	0	1	0	0	1	0	0	1
	FLMP	53	47	57	54	49	58	50	45	54	42	39	46	43	36	47
	FLUF	124	119	131	135	126	141	139	133	147	130	126	135	134	126	139
	FLWC	96	91	101	99	93	105	105	98	109	94	87	98	96	89	102
	GALL	122	115	128	125	120	131	126	121	134	118	114	125	120	113	124
	IAOP	26	22	28	24	18	27	27	23	33	24	21	28	26	21	30
	ILIP	175	169	184	179	173	185	172	163	183	167	154	174	167	159	173
	INOP	96	89	101	98	91	102	97	93	104	95	89	103	98	94	102
	KYDA	59	55	63	69	62	73	67	61	72	64	60	67	66	63	69
	LAOP	65	60	70	65	59	71	59	53	64	62	56	67	62	57	65
	MAOB	166	156	176	159	153	171	167	158	173	179	171	183	173	163	180
	MDPC	70	64	76	67	63	73	67	63	71	70	65	73	67	59	71
	MIOP	125	114	136	113	107	119	110	104	114	111	101	118	111	107	118
	MNOP	148	139	155	141	131	155	152	147	159	154	147	164	151	145	158
	MOMA	114	105	120	113	106	118	120	116	126	116	113	121	114	106	120
	MSOP	10	8	16	11	9	15	11	7	15	10	8	13	11	10	14
	MWOB	64	59	69	62	54	68	57	51	59	51	48	54	52	47	57
	NCCM	30	23	34	34	29	39	33	29	35	27	24	30	27	25	29
	NCNC	187	179	193	190	181	197	183	177	188	182	175	185	180	175	185
	NEOR	31	29	33	37	34	39	35	30	39	35	30	38	35	32	37
	NJTO	101	90	111	101	95	106	98	93	104	106	100	108	105	100	111
	NYAP	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1
	NYFL	52	45	57	51	45	56	56	51	61	61	58	65	60	58	64
	NYRT	276	265	286	286	279	294	274	264	281	299	287	310	293	280	311
	OHLB	120	113	125	129	123	135	123	112	131	121	116	126	121	113	128
	OHLP	39	36	42	39	37	42	37	33	40	38	35	41	39	37	41

	OHOV	12	10	13	13	9	16	11	9	14	12	9	13	11	9	14
	OKOP	27	24	31	30	27	32	28	24	33	28	25	30	30	26	34
	ORUO	40	37	43	40	37	43	37	34	41	40	36	43	41	38	45
	PADV	230	219	247	205	199	210	198	188	203	211	195	221	206	198	215
	PATF	132	123	138	127	124	132	129	126	135	132	126	137	132	125	139
	PRLL	11	10	12	11	8	12	11	8	13	6	3	8	11	10	12
	SCOP	40	36	42	36	33	41	37	34	41	36	34	39	35	30	40
	TNDS	82	76	88	76	73	81	76	68	78	70	67	71	69	65	74
	TNMS	19	15	24	19	16	23	22	19	25	22	20	24	23	19	25
	TXGC	215	209	220	198	191	208	205	198	212	203	190	209	198	189	202
	TXSA	67	63	71	65	61	69	68	61	74	66	58	71	66	59	71
	TXSB	186	176	194	188	180	193	197	178	207	193	187	201	190	183	199
	UTOP	61	55	66	59	55	64	59	55	63	64	56	69	66	64	70
	VATB	132	125	137	137	129	148	138	131	142	142	136	149	140	132	147
	WALC	89	80	96	79	76	85	88	84	95	90	82	95	90	82	96
	WIDN	93	87	101	108	99	118	102	97	109	104	99	108	104	98	107
	WIUW	35	31	40	38	35	40	36	34	42	35	32	37	35	33	37
Tx rate	ALOB	141.2	117.7	161.8	151.3	127.1	179.1	160.3	143.1	186.2	140.8	127.3	156.8	156.6	130.1	177.3
	AROR	165.5	147.5	177.6	189.8	168.4	231.8	174.7	143.4	193.2	195.4	160.7	221.7	192.9	176.6	219.0
	AZOB	142.5	121.4	171.9	148.4	128.5	182.2	147.7	128.3	169.1	143.3	131.9	160.6	154.3	135.2	186.2
	CADN	280.6	259.1	324.0	240.1	217.6	262.0	240.7	207.4	276.9	194.1	166.8	202.5	203.0	182.6	234.0
	CAGS	101.2	73.6	123.7	249.5	206.9	316.8	240.4	184.7	309.3	173.6	124.7	228.8	233.3	171.7	304.2
	CAOP	193.1	186.3	205.1	197.3	185.1	209.1	200.6	190.8	207.5	191.9	180.0	207.7	203.1	187.1	217.6
	CASD	156.6	119.7	181.6	193.7	168.6	231.8	203.8	150.3	240.4	204.7	180.9	245.2	208.1	161.3	235.4
	CORS	165.9	138.4	191.4	142.0	125.6	162.0	146.1	124.0	165.3	138.7	114.3	166.4	145.1	133.7	158.1
	CTOP	129.1	98.0	158.3	136.1	111.6	163.5	134.4	119.3	151.0	175.1	153.0	184.3	176.1	153.8	196.4
	DCTC	68.5	53.4	78.4	66.2	58.9	86.7	66.8	59.6	77.0	68.4	55.8	83.4	67.1	58.1	76.0
	FLFH	29.9	0.0	299.4	152.2	0.0	329.1	95.5	0.0	329.1	62.7	0.0	332.0	128.5	0.0	329.1
	FLMP	108.3	89.0	122.8	108.9	87.3	126.4	94.9	82.3	115.0	73.9	68.7	80.8	73.4	62.6	83.8
	FLUF	125.0	112.9	135.3	149.5	132.2	168.0	156.9	142.7	175.3	140.1	132.6	146.2	149.9	132.6	163.1
	FLWC	148.1	137.0	165.4	166.9	145.9	182.4	181.2	157.4	201.5	144.8	128.9	161.6	152.9	135.5	168.0
	GALL	222.9	193.0	248.6	237.1	219.3	282.7	240.9	224.5	281.9	208.4	190.8	241.7	215.8	187.9	235.0
	IAOP	86.2	70.9	100.5	72.4	51.1	86.9	93.5	70.1	114.2	80.7	64.7	99.4	83.2	62.7	102.7
	ILIP	124.7	112.9	136.6	134.6	125.7	141.9	122.4	111.5	128.6	114.0	98.8	123.8	114.9	106.0	123.0
	INOP	153.7	140.1	169.3	160.7	136.7	177.1	157.4	151.9	174.8	148.8	134.9	162.6	154.3	143.2	164.2
	KYDA	72.5	65.2	82.4	91.8	80.6	103.0	88.6	74.8	99.8	82.8	76.5	86.9	85.5	81.8	91.0
	LAOP	128.9	118.1	150.1	127.8	107.5	152.1	108.3	91.9	123.2	122.0	106.1	136.3	119.4	107.8	127.0
	MAOB	73.8	67.2	79.4	69.2	64.9	76.5	73.4	70.2	77.2	81.8	76.0	86.7	78.5	71.9	82.7
	MDPC	77.0	70.7	85.6	69.9	65.0	79.6	70.4	64.5	74.0	74.7	67.9	79.8	71.0	60.8	76.3
	MIOP	128.3	107.8	148.7	106.7	96.3	116.5	106.9	97.5	116.9	107.7	94.6	115.1	106.7	99.5	114.6

	MNOP	85.1	78.8	90.3	77.8	68.8	86.6	89.3	85.1	95.0	90.4	84.8	99.0	87.7	81.9	91.5
	MOMA	91.5	81.0	96.6	91.0	84.3	94.9	101.1	97.1	106.9	95.1	92.9	99.1	93.3	83.9	101.4
	MSOP	39.0	29.6	63.9	42.2	32.4	68.2	43.3	24.8	62.7	38.2	29.8	47.1	42.5	35.1	53.9
	MWOB	159.7	134.9	202.1	142.1	119.4	177.3	121.0	98.0	133.6	103.3	96.0	119.1	102.9	93.7	123.1
	NCCM	97.4	64.4	134.0	117.6	89.4	152.4	111.0	94.8	128.0	80.2	69.8	90.0	79.5	72.7	88.7
	NCNC	132.6	124.8	141.1	136.5	125.1	151.5	129.9	120.3	137.7	124.6	116.0	130.7	122.6	117.9	128.9
	NEOR	146.1	127.0	158.7	221.0	174.8	271.3	177.6	143.4	206.2	178.3	142.0	236.9	184.1	139.8	217.5
	NJTO	134.3	110.6	154.1	134.6	129.9	146.7	126.1	115.7	139.1	148.4	133.2	160.8	144.3	133.9	158.4
	NYAP	84.9	0.0	849.4	382.6	0.0	2608.9	0.0	0.0	0.0	1217.5	0.0	12175.0	114.1	0.0	1141.4
	NYFL	138.6	105.9	165.9	128.2	102.3	152.8	157.1	131.1	188.4	212.5	174.3	259.3	188.4	169.9	211.1
	NYRT	68.6	65.7	74.2	72.1	69.5	74.9	67.1	63.8	69.4	77.1	72.8	81.3	74.6	69.9	80.1
	OHLB	69.9	62.9	74.4	78.6	72.3	83.5	72.8	64.2	79.0	71.1	68.0	76.2	71.5	66.6	78.5
	OHLP	137.4	127.3	150.1	142.6	122.2	159.5	130.7	110.3	149.5	126.3	111.2	140.1	132.3	121.5	144.6
	OHOV	122.9	92.6	154.3	140.6	84.4	169.1	116.3	85.5	148.8	115.7	82.4	135.5	109.3	83.3	135.1
	OKOP	58.9	50.6	72.4	66.6	58.1	75.0	59.7	48.5	78.1	61.7	53.9	67.7	67.9	54.2	84.5
	ORUO	184.0	156.7	231.8	179.7	144.8	224.2	148.8	126.7	181.8	190.3	149.0	240.5	206.4	175.8	243.0
	PADV	156.0	146.0	168.1	128.5	119.1	135.4	118.6	111.6	126.4	134.0	122.8	145.1	128.4	121.9	135.5
	PATF	118.2	106.5	126.6	108.9	99.9	116.9	111.5	105.6	120.4	116.5	105.5	122.7	117.7	110.7	127.0
	PRLL	338.3	248.1	483.2	335.0	179.8	443.8	345.9	255.9	510.2	94.3	41.2	145.4	286.4	186.9	489.0
	SCOP	146.6	125.4	172.1	122.0	111.8	135.9	128.4	112.6	162.6	118.8	96.4	138.6	116.0	95.5	135.7
	TNDS	115.7	104.5	131.6	100.8	92.8	113.3	101.7	86.2	108.4	87.3	83.2	90.9	86.9	80.6	92.1
	TNMS	41.2	31.9	54.1	42.8	34.4	49.9	50.4	41.2	60.9	49.5	44.4	56.3	53.3	41.5	64.1
	TXGC	94.6	90.3	97.1	83.8	79.2	88.4	88.0	81.8	95.0	85.4	77.0	91.1	81.8	75.2	86.2
	TXSA	110.5	102.8	120.4	105.7	97.0	122.7	114.0	95.4	126.7	103.5	88.3	111.7	104.0	92.6	111.8
	TXSB	99.1	90.1	108.0	100.3	95.5	102.6	109.2	95.0	118.7	104.8	99.5	113.2	104.7	99.0	113.5
	UTOP	122.5	105.5	139.1	118.4	100.5	131.4	116.2	107.3	132.0	134.6	105.9	159.4	146.8	135.4	166.5
	VATB	97.9	90.4	104.5	102.8	93.4	115.3	104.8	94.6	111.5	110.0	101.9	120.6	107.2	97.2	114.7
	WALC	104.8	93.3	120.6	85.2	78.8	95.3	99.7	89.4	111.5	103.4	86.5	112.4	103.5	89.4	116.3
	WIDN	103.7	97.0	115.9	132.0	111.2	147.9	122.5	114.6	135.2	128.1	119.7	134.7	124.4	117.7	132.5
	WIUW	100.4	86.8	120.4	114.0	95.6	124.8	108.9	96.7	142.2	99.7	82.6	108.9	100.5	91.9	108.9
WL death	ALOB	10	9	11	10	9	13	10	8	11	10	9	11	10	9	12
count	AROR	7	6	8	7	6	8	7	5	8	7	5	8	7	4	8
	AZOB	15	12	16	14	11	17	14	12	18	14	12	16	13	12	16
	CADN	22	18	26	21	17	24	21	19	24	24	21	27	23	17	26
	CAGS	2	1	3	1	0	2	1	0	2	2	1	2	1	1	2
	CAOP	39	36	42	38	33	40	38	35	41	38	34	43	37	32	41
	CASD	6	3	7	5	4	6	5	4	8	4	3	6	5	3	6
	CORS	5	5	6	5	5	6	5	5	6	5	4	5	5	4	6
	CTOP	5	4	6	4	3	5	4	2	6	2	0	3	2	1	4
	DCTC	11	9	12	10	8	12	10	10	11	11	9	12	10	8	12

	FLFH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	FLMP	5	3	6	5	4	7	5	4	6	6	5	7	6	4	7
	FLUF	13	10	15	10	9	13	10	7	12	9	7	11	10	8	12
	FLWC	13	11	14	12	11	14	12	10	14	13	13	15	13	11	15
	GALL	8	5	10	7	4	9	8	6	10	8	7	10	9	8	9
	IAOP	4	2	5	4	3	5	4	3	6	4	2	5	4	3	5
	ILIP	20	17	24	19	16	22	20	18	23	21	19	22	21	19	23
	INOP	7	5	10	7	5	9	7	5	9	7	5	10	6	5	7
	KYDA	10	8	10	8	6	10	8	6	10	9	6	10	8	6	9
	LAOP	4	3	5	4	2	5	4	2	5	3	2	4	3	2	4
	MAOB	28	24	32	30	27	33	28	25	31	24	21	27	27	22	34
	MDPC	13	11	14	13	11	14	13	11	14	13	11	14	13	12	15
	MIOP	17	14	19	17	16	19	17	14	19	18	16	19	18	17	19
	MNOP	18	14	19	19	15	21	19	16	20	18	16	20	19	17	20
	MOMA	19	17	21	19	17	20	19	17	21	19	17	20	20	17	23
	MSOP	2	1	3	2	0	3	2	0	4	2	2	3	2	1	3
	MWOB	5	3	6	4	4	6	5	4	7	4	2	5	5	3	6
	NCCM	9	7	10	8	6	10	8	6	9	9	7	10	8	7	9
	NCNC	15	12	16	14	13	16	16	14	18	14	12	15	14	12	17
	NEOR	5	4	6	5	4	6	5	4	6	5	4	5	5	5	7
	NJTO	9	7	11	9	8	10	9	8	11	9	7	10	9	7	11
	NYAP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NYFL	3	2	4	2	1	3	3	0	4	2	1	3	2	1	4
	NYRT	53	49	58	53	51	59	54	44	58	52	49	54	52	49	55
	OHLB	20	18	23	20	18	21	20	18	22	20	17	22	20	19	21
	OHLP	9	7	11	9	8	11	9	8	10	9	7	10	9	7	10
	OHOV	1	0	2	1	0	2	2	0	2	1	0	2	2	0	2
	OKOP	5	4	7	5	4	7	6	5	7	6	5	7	6	5	6
	ORUO	2	1	3	2	1	3	2	1	3	2	1	3	2	1	3
	PADV	30	27	33	31	28	34	32	30	35	31	28	33	31	28	34
	PATF	21	18	24	22	19	25	22	20	24	21	19	23	22	18	23
	PRLI	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1
	SCOP	3	2	4	3	2	5	3	2	4	3	2	4	3	2	4
	TNDS	10	9	12	11	9	12	11	9	13	11	9	12	12	10	14
	TNMS	5	4	7	5	4	6	5	3	6	5	4	6	5	4	6
	TXGC	59	56	62	62	58	65	62	55	66	60	55	64	61	59	64
	TXSA	12	10	14	12	10	14	13	11	16	11	10	13	13	11	15
	TXSB	32	31	34	31	29	34	31	28	32	29	24	32	31	25	33
	UTOP	8	7	9	8	7	9	8	7	9	7	6	8	7	6	8
	VATB	31	29	33	30	27	33	31	29	33	29	26	31	29	28	32

	WALC	7	5	8	8	5	11	7	5	10	6	4	7	6	4	8
	WIDN	12	10	15	11	8	13	12	11	14	11	9	13	11	9	13
	WIUW	2	1	2	2	0	3	2	1	3	2	1	3	2	1	2
WL mortality rate	ALOB	9.9	8.8	10.8	9.7	8.6	12.7	9.9	8.1	10.7	9.3	8.5	10.5	10.1	9.0	11.9
	AROR	14.1	12.3	15.6	14.5	12.3	15.8	13.6	9.8	16.6	15.1	10.9	17.2	14.2	7.9	17.2
	AZOB	16.5	13.0	18.7	16.4	12.7	19.0	16.8	13.8	21.1	15.8	13.6	18.4	15.7	13.3	18.6
	CADN	21.6	17.9	26.5	19.5	16.4	23.4	20.1	18.4	22.4	20.5	17.4	23.3	19.8	14.9	22.1
	CAGS	10.6	5.4	17.7	8.1	0.0	14.5	8.1	0.0	14.8	12.1	6.5	14.4	10.2	6.5	15.2
	CAOP	13.6	12.3	14.9	13.2	11.3	14.1	13.3	11.9	14.3	12.9	11.5	15.4	12.8	11.1	13.8
	CASD	13.4	7.7	19.0	13.0	9.9	16.2	14.5	11.1	19.0	11.6	7.3	15.3	13.2	8.7	16.0
	CORS	7.9	7.0	9.0	7.5	7.1	8.7	7.8	7.0	8.9	7.0	5.9	8.0	7.5	6.1	9.3
	CTOP	17.9	13.6	24.1	15.0	11.5	18.5	15.7	7.7	22.8	7.3	0.0	13.2	9.4	4.2	18.2
	DCTC	10.9	9.1	12.5	10.5	8.2	12.1	10.6	9.9	11.9	10.8	9.6	12.6	10.3	8.3	12.1
	FLFH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	FLMP	8.8	4.9	10.9	8.8	6.3	11.3	8.8	6.6	10.1	8.9	7.0	11.2	8.6	5.9	10.4
	FLUF	8.7	6.8	10.4	7.8	6.6	10.3	7.3	5.5	8.8	6.7	5.3	7.9	7.2	6.0	8.5
	FLWC	13.8	11.5	15.5	14.3	13.1	15.3	13.7	11.8	16.7	14.4	13.3	16.8	14.0	12.4	16.8
	GALL	10.7	6.3	15.1	9.9	6.0	13.0	11.6	8.4	15.1	11.2	8.8	13.1	11.9	10.9	13.1
	IAOP	8.7	4.6	12.0	9.2	6.4	11.5	10.2	7.1	15.0	8.5	4.3	11.3	8.9	6.9	11.6
	ILIP	9.2	7.9	11.4	9.1	7.3	10.7	9.2	8.4	10.2	9.3	8.4	10.1	9.5	8.5	10.5
	INOP	9.1	6.0	12.8	9.2	6.4	12.5	8.8	6.5	11.6	9.0	6.5	12.5	8.0	6.4	9.4
	KYDA	9.4	8.0	10.6	8.7	6.7	11.0	8.6	6.4	10.7	8.9	6.1	10.6	8.0	6.0	9.7
	LAOP	6.0	4.5	7.9	5.6	3.2	8.5	5.3	2.8	7.6	4.5	2.9	6.2	5.1	3.0	6.2
	MAOB	10.3	8.7	11.3	10.5	9.6	11.7	10.0	9.0	11.2	9.0	7.7	10.3	10.0	8.2	12.2
	MDPC	10.8	9.1	11.8	10.4	8.8	11.5	10.3	8.8	11.3	10.6	9.0	11.5	10.8	9.5	11.7
	MIOP	10.3	8.7	11.3	10.0	9.5	10.9	10.0	8.1	11.5	10.4	9.5	11.3	10.3	9.7	10.8
	MNOP	7.4	6.0	7.9	7.5	6.2	8.5	8.0	6.7	8.9	7.6	6.7	8.5	7.8	7.0	8.5
	MOMA	9.1	8.2	10.3	8.9	8.1	9.6	9.3	8.5	10.4	9.1	8.4	9.7	9.7	8.2	11.1
	MSOP	6.0	2.9	8.6	6.1	0.0	9.0	6.1	0.0	12.6	6.0	5.3	9.0	5.1	2.7	8.7
	MWOB	10.4	5.9	13.9	9.3	7.6	12.0	10.0	7.6	13.9	7.6	3.4	9.4	8.6	5.0	11.4
	NCCM	22.2	19.2	26.6	23.2	18.3	28.5	21.6	17.6	25.2	20.9	16.6	24.1	20.1	16.6	23.5
	NCNC	7.5	6.3	8.5	7.6	6.7	8.5	8.2	7.1	9.5	6.9	5.9	7.6	7.2	5.9	8.4
	NEOR	14.5	11.1	17.5	17.2	14.1	21.6	16.3	12.6	19.3	14.3	12.2	16.4	16.1	14.4	19.0
	NJTO	10.4	8.4	11.6	10.4	9.0	11.5	10.1	8.9	12.5	10.5	8.8	12.4	10.3	8.2	12.7
	NYAP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NYFL	5.5	3.4	7.1	3.8	1.6	5.0	4.8	0.0	7.3	4.6	2.1	6.2	4.5	2.0	7.6
	NYRT	9.8	9.1	10.7	10.0	9.5	11.3	9.9	8.2	10.8	9.9	9.4	10.3	9.9	9.2	10.5
	OHLB	9.1	8.2	10.4	9.3	8.4	9.8	8.9	8.2	10.0	9.0	7.7	10.0	9.2	8.7	9.6
	OHLP	20.0	15.8	25.2	20.7	17.3	24.8	19.6	17.6	22.3	18.9	15.1	22.2	18.5	15.5	21.4
	OHOV	10.7	0.0	17.0	10.4	0.0	18.7	13.1	0.0	18.4	9.7	0.0	19.3	12.5	0.0	17.4

	OKOP	8.0	5.8	10.2	8.2	6.2	11.1	8.4	6.9	10.5	9.0	7.6	10.6	8.5	7.1	9.9
	ORUO	7.7	3.4	12.2	7.6	3.5	12.8	7.9	3.2	11.2	8.1	4.1	10.6	9.3	3.7	12.5
	PADV	11.9	10.5	13.0	11.4	10.6	12.6	11.6	10.7	12.9	11.6	10.4	12.4	11.4	10.5	12.4
	PATF	12.8	10.5	14.6	13.0	10.7	14.7	12.6	11.4	13.8	12.4	10.9	14.1	12.9	10.9	13.9
	PRLL	22.6	18.7	30.8	22.6	16.1	32.8	22.2	16.4	25.9	10.2	0.0	13.8	17.8	0.0	29.4
	SCOP	10.5	6.2	14.6	9.9	5.4	14.8	9.1	5.5	12.6	8.8	4.9	11.6	8.8	6.2	11.1
	TNDS	6.5	5.7	7.7	6.8	5.8	7.5	6.7	5.8	8.0	6.8	5.5	7.5	7.1	6.1	8.7
	TNMS	10.2	8.2	12.8	10.6	7.9	11.8	9.7	5.9	12.2	9.7	8.0	12.4	10.4	8.0	13.1
	TXGC	13.4	12.7	14.3	13.7	12.8	14.4	13.8	12.4	15.3	13.3	12.4	14.2	13.5	12.8	13.7
	TXSA	14.8	12.2	17.9	14.6	11.9	17.3	16.1	13.8	21.2	13.4	11.9	14.9	15.7	12.9	18.5
	TXSB	10.5	9.7	11.1	10.1	9.4	11.0	10.2	9.3	11.1	9.6	7.8	10.6	10.2	8.6	11.1
	UTOP	9.8	8.6	11.0	9.3	7.8	11.1	9.7	8.1	10.8	8.7	6.9	10.1	8.8	7.5	11.1
	VATB	16.2	15.1	17.9	16.0	14.8	17.8	16.5	15.6	17.8	15.7	14.5	16.8	15.8	14.9	17.4
	WALC	5.0	3.8	6.1	5.5	3.6	7.7	5.5	3.9	7.1	4.4	3.1	5.0	4.5	3.1	6.2
	WIDN	10.6	8.3	12.7	9.9	7.1	11.7	11.2	9.6	12.2	10.0	8.4	12.3	9.9	8.3	11.4
	WIUW	3.4	2.2	4.6	4.4	0.0	7.7	3.6	2.3	7.0	4.1	2.2	6.9	3.7	2.3	4.8
Median	ALOB	314	232	404	254	135	332	221	188	244	410	356	488	393	362	409
distance (NM)	AROR	339	292	386	328	273	409	304	279	341	469	395	522	430	356	478
	AZOB	274	217	314	280	258	313	238	216	266	354	320	392	332	306	361
	CADN	113	104	121	83	69	101	102	81	124	287	276	304	271	261	286
	CAGS	123	14	271	68	58	80	68	42	78	288	76	329	279	87	341
	CAOP	63	59	68	81	75	84	85	80	91	204	186	249	183	143	204
	CASD	95	18	258	95	75	111	103	94	124	221	134	274	240	172	259
	CORS	303	180	395	381	293	455	306	197	429	596	468	691	475	429	510
	CTOP	262	136	482	126	98	192	158	108	194	229	179	339	239	173	334
	DCTC	125	19	192	130	115	143	197	185	210	303	216	401	280	233	334
	FLFH	29	29	29	73	8	119	123	81	179	179	179	179	111	61	179
	FLMP	49	20	73	44	20	59	168	107	178	278	180	420	204	175	331
	FLUF	241	201	258	140	129	145	188	169	210	305	268	343	267	246	323
	FLWC	93	85	127	113	95	145	147	105	167	343	256	418	208	177	256
	GALL	191	178	198	134	124	163	188	179	193	378	357	416	361	350	377
	IAOP	264	210	360	324	189	497	209	197	212	398	355	442	336	210	394
	ILIP	164	137	221	139	129	149	213	187	227	352	276	385	313	289	347
	INOP	185	146	218	144	137	148	199	168	218	361	286	396	344	286	373
	KYDA	244	163	279	145	125	196	213	198	227	325	282	414	301	276	338
	LAOP	258	223	305	158	130	257	198	143	277	409	394	427	391	372	407
	MAOB	202	167	241	147	129	163	177	161	186	294	255	349	240	226	272
	MDPC	168	123	264	148	127	170	203	160	232	316	242	378	299	249	358
	MIOP	137	112	172	136	119	145	196	186	203	374	338	397	378	349	399
	MNOP	302	252	377	311	254	354	221	206	237	408	382	460	340	319	367



	MOMA	335	284	402	319	257	398	235	224	261	417	397	472	393	377	407
	MSOP	149	73	332	148	73	283	199	139	453	358	309	465	337	309	379
	MWOB	152	151	152	154	126	208	170	151	196	472	435	485	393	361	411
	NCCM	57	0	152	100	81	116	187	154	220	400	318	447	377	336	432
	NCNC	259	225	293	206	154	294	220	196	235	375	360	409	354	325	369
	NEOR	413	365	578	260	149	426	275	224	355	466	388	549	374	353	396
	NJTO	149	52	247	118	101	134	145	121	170	293	174	396	211	164	256
	NYAP	170	170	170	107	93	121	.	.	.	237	237	237	103	103	103
	NYFL	315	220	393	290	258	343	232	220	246	362	297	432	283	234	340
	NYRT	172	154	214	120	99	133	154	136	159	323	286	353	253	224	274
	OHLB	243	197	273	120	110	136	196	171	214	322	300	355	316	282	345
	OHLP	239	180	296	227	144	293	233	180	268	353	344	391	329	286	354
	OHOV	359	316	493	375	244	483	347	312	482	450	345	618	446	340	575
	OKOP	268	130	443	206	132	319	240	212	359	399	365	430	385	365	424
	ORUO	245	128	296	157	127	293	167	108	232	407	295	463	349	277	465
	PADV	83	77	89	115	109	125	174	154	193	301	223	362	280	243	303
	PATF	226	185	265	205	165	266	203	190	216	319	288	355	319	297	354
	PRLL	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	SCOP	214	172	309	204	124	289	224	211	230	449	396	517	373	329	420
	TNDS	212	163	231	222	164	283	218	209	234	405	378	443	385	357	411
	TNMS	318	257	407	289	124	382	209	168	224	389	368	417	367	322	416
	TXGC	211	206	238	186	131	206	202	196	206	436	382	487	229	206	297
	TXSA	170	139	203	159	120	219	189	166	215	336	243	384	245	204	298
	TXSB	242	212	295	163	149	200	199	198	201	295	282	328	255	215	289
	UTOP	272	169	333	320	130	412	256	33	371	439	400	466	427	396	445
	VATB	288	260	337	222	177	255	227	214	239	355	305	402	308	287	323
	WALC	249	199	334	217	130	294	203	197	217	416	244	501	291	217	390
	WIDN	345	289	397	206	152	279	216	187	258	407	374	477	371	294	389
	WIUW	238	137	320	120	107	144	189	141	203	294	200	354	274	246	341

Table App1.17. TSAM metrics by simulation and state where candidate resides

Metric	State	DSA-first			150NM			250NM			500NM-A			500NM-B		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Tx count	AK	5	4	8	5	1	7	5	2	7	6	4	9	5	3	8
	AL	46	45	51	46	41	48	48	45	55	46	42	49	48	44	50
	AR	43	36	47	47	43	52	46	42	48	47	42	50	47	40	52
	AZ	70	65	74	70	66	74	71	66	77	70	68	76	72	65	77
	CA	480	469	488	487	474	497	491	479	503	472	455	482	486	479	493
	CO	48	44	50	45	43	47	47	43	50	44	39	49	46	42	50
	CT	77	68	80	78	71	83	79	76	82	86	77	90	85	82	89
	DC	10	8	12	10	8	13	11	8	14	11	9	14	11	10	14
	DE	16	14	17	14	12	17	14	12	18	16	13	19	16	12	17
	FL	266	256	275	282	271	288	287	273	297	261	248	271	266	256	274
	GA	130	126	139	134	130	139	136	128	145	127	123	133	128	121	133
	HI	6	5	7	6	4	7	6	5	8	7	5	8	6	4	7
	IA	48	44	50	48	43	53	51	44	57	51	48	55	51	48	55
	ID	20	17	22	18	16	21	19	17	21	19	17	21	20	17	24
	IL	194	187	203	197	191	204	196	187	203	191	183	199	191	181	199
	IN	117	114	121	122	113	127	119	114	125	118	111	123	120	115	125
	KS	40	37	42	39	34	45	37	34	42	35	31	40	33	30	39
	KY	69	67	72	76	70	83	76	71	82	73	69	77	73	68	76
	LA	84	80	92	85	77	95	80	71	86	83	77	89	83	75	88
	MA	77	72	83	73	69	80	76	72	79	84	76	89	80	70	86
	MD	90	80	94	86	76	93	86	75	91	89	81	98	83	79	91
	ME	13	12	16	12	10	13	12	9	16	13	11	15	12	11	14
	MI	142	134	154	134	125	144	128	120	134	128	118	135	129	123	138
	MN	95	89	100	89	83	102	95	88	102	97	93	102	97	92	104
	MO	100	94	104	97	93	106	102	98	105	96	92	99	96	90	103
	MS	32	29	37	32	28	38	33	29	40	35	31	39	35	31	38
	MT	8	6	10	8	4	10	8	5	12	8	5	11	8	6	9
	NA	21	17	24	21	18	23	21	17	22	21	17	24	21	19	23
	NC	197	190	207	203	192	210	196	189	203	192	187	197	190	186	193
	ND	14	11	16	14	10	17	14	13	17	15	11	19	15	12	16
	NE	31	29	33	34	32	36	32	28	35	31	28	36	32	30	34
	NH	17	13	19	16	15	17	16	13	19	18	17	20	18	15	20
	NJ	168	161	178	165	157	172	160	154	166	172	164	179	168	161	174
	NM	11	8	14	12	8	14	13	10	14	11	9	14	12	9	15
	NV	23	21	25	23	22	25	22	19	25	22	19	26	21	17	24
	NY	321	312	330	330	321	338	323	317	337	354	344	364	345	336	358



	OH	135	130	141	143	136	149	136	127	148	135	132	138	135	126	141
	OK	44	39	48	47	43	48	45	41	48	45	42	49	45	42	50
	OR	44	41	47	44	40	48	41	38	43	44	41	47	45	41	49
	PA	265	255	276	243	237	248	239	232	248	251	239	261	249	235	260
	PR	12	11	13	12	9	13	12	9	14	7	4	9	12	11	13
	RI	7	6	8	8	7	9	8	7	9	8	6	9	8	7	10
	SC	58	54	63	56	51	61	57	55	60	55	51	58	53	48	58
	SD	6	3	9	6	4	7	5	4	8	5	4	7	5	3	6
	TN	91	85	97	88	82	96	88	81	90	80	76	84	81	78	85
	TX	441	427	456	425	417	434	443	431	457	434	424	443	428	415	441
	UT	31	28	34	29	26	32	29	25	31	32	26	36	34	30	36
	VA	154	140	157	155	145	165	155	144	164	160	150	169	161	153	167
	VT	4	3	6	4	1	7	4	3	6	5	3	6	5	4	6
	WA	81	72	89	72	68	77	79	76	85	80	74	86	81	73	87
	WI	116	105	123	132	121	141	125	119	136	127	123	132	125	122	128
	WV	30	27	33	31	27	34	31	28	33	30	27	33	30	28	33
	WY	7	5	8	6	6	7	6	5	8	7	6	7	6	5	7
Tx rate	AK	91.3	63.7	155.2	81.4	11.9	123.7	76.1	25.8	148.4	92.1	64.7	159.4	77.4	47.4	119.4
	AL	160.5	145.5	183.8	162.3	145.9	178.4	180.8	149.5	233.1	158.9	144.4	174.7	169.2	149.7	188.5
	AR	86.0	72.3	95.9	99.4	87.8	116.3	97.0	82.0	117.4	100.1	85.0	109.1	102.2	86.0	124.7
	AZ	156.8	132.6	177.8	159.3	138.3	186.0	160.2	138.9	174.6	157.1	146.8	165.2	168.2	151.5	185.3
	CA	203.3	193.7	212.4	209.2	198.7	221.6	212.4	201.8	222.1	193.3	180.0	208.9	206.6	192.0	222.1
	CO	148.0	123.9	173.1	125.9	110.6	142.1	135.6	114.1	154.6	124.4	105.4	143.6	134.2	121.0	147.5
	CT	120.9	100.1	128.5	124.2	108.4	142.6	125.2	116.6	134.2	145.2	126.6	160.3	144.0	134.0	152.6
	DC	48.7	35.5	57.9	50.6	34.5	69.5	51.0	38.4	73.0	56.7	42.8	80.8	56.1	45.5	77.4
	DE	202.3	144.3	242.3	172.8	116.4	233.3	171.2	123.6	250.9	200.2	141.5	268.0	199.1	126.8	238.0
	FL	123.2	117.5	127.7	138.6	129.9	144.7	140.6	128.5	155.4	118.7	111.2	125.7	123.6	115.8	130.3
	GA	205.3	187.0	228.7	217.0	202.0	247.4	225.2	201.9	259.6	195.7	181.1	218.7	199.5	176.9	217.7
	HI	206.5	132.1	403.9	216.5	126.1	277.0	229.6	146.2	359.9	233.5	171.6	309.2	171.3	116.6	219.5
	IA	83.3	71.1	91.6	82.2	69.1	95.8	93.1	73.0	111.5	91.6	83.8	106.0	90.4	78.8	101.8
	ID	168.9	126.5	228.7	141.0	107.3	172.8	152.9	125.9	183.7	150.0	117.4	176.1	162.5	133.8	235.1
	IL	119.9	111.0	133.9	126.9	120.3	139.2	122.2	113.2	127.6	116.5	106.9	124.9	116.9	107.2	127.3
	IN	136.4	125.4	145.1	145.0	126.8	160.6	138.7	130.8	145.3	132.6	120.7	142.0	135.5	125.7	145.3
	KS	128.6	116.3	151.6	117.7	95.4	138.5	109.0	88.8	125.1	99.9	87.3	118.6	94.5	80.7	113.9
	KY	75.9	71.3	79.6	88.0	76.2	105.1	86.8	76.5	98.3	80.9	73.2	88.3	82.7	76.2	89.4
	LA	115.0	105.5	135.9	115.4	101.8	138.8	103.8	85.9	116.0	112.1	100.8	126.4	111.7	96.0	127.3
	MA	64.1	56.5	70.2	60.0	55.8	66.6	62.8	59.2	66.5	71.7	63.7	77.4	68.3	57.8	74.2
	MD	79.0	66.4	84.7	73.0	61.2	81.1	73.1	61.5	77.4	76.0	67.6	85.3	69.5	63.9	78.5
	ME	72.0	59.0	96.8	59.8	46.9	72.3	66.6	43.7	101.8	72.7	57.5	87.4	66.9	56.0	85.2
	MI	123.3	111.2	139.9	111.5	97.1	126.2	106.3	97.4	118.0	105.5	95.5	111.7	106.4	98.1	115.4

	MN	106.2	95.4	118.7	95.4	82.1	114.8	106.9	96.6	117.6	109.2	99.0	119.2	107.2	99.0	119.3
	MO	105.1	94.6	117.6	102.5	95.6	114.0	108.6	99.9	113.9	98.1	94.0	101.8	98.3	89.5	106.2
	MS	64.4	55.6	75.9	66.6	55.3	79.3	66.4	57.5	86.7	71.0	61.0	81.5	70.8	61.8	81.7
	MT	60.4	41.3	77.7	57.1	30.0	75.6	59.3	37.2	91.5	57.6	34.5	96.3	60.0	41.7	73.9
	NA	201.8	143.8	263.2	188.3	150.5	224.1	196.5	154.0	236.7	193.8	145.1	251.3	201.2	179.4	231.9
	NC	122.4	114.4	132.6	129.2	115.4	143.4	123.8	113.4	134.4	115.1	111.7	119.2	112.9	109.7	117.4
	ND	97.6	75.3	122.4	93.3	59.5	129.3	101.3	86.4	126.6	107.5	68.6	138.8	102.6	76.3	120.0
	NE	183.7	150.7	216.9	235.2	203.9	290.8	213.1	152.9	245.7	197.6	163.8	267.4	213.4	170.0	234.8
	NH	59.4	43.1	70.4	53.9	45.5	57.8	56.1	43.2	66.0	62.9	56.2	73.1	63.9	48.8	79.0
	NJ	104.8	96.6	114.6	101.7	93.8	108.2	94.7	89.8	101.7	107.9	100.6	116.3	103.9	98.4	111.8
	NM	116.4	87.1	144.3	145.0	75.9	222.7	156.1	99.9	235.5	126.2	86.1	180.7	148.4	89.3	232.4
	NV	224.0	186.5	272.4	225.4	186.8	276.7	225.6	156.8	277.5	194.6	136.4	274.9	186.2	139.6	243.0
	NY	82.3	77.7	85.8	85.1	82.5	88.2	82.3	79.5	86.9	96.5	92.4	100.7	92.4	87.2	96.8
	OH	79.7	76.7	83.3	86.6	81.6	94.8	81.1	74.0	93.0	78.9	76.4	81.2	79.3	74.1	84.7
	OK	81.9	68.3	95.4	88.7	77.7	95.0	83.4	71.9	93.3	85.2	76.8	95.4	86.8	75.7	102.8
	OR	190.6	169.2	236.0	190.8	146.4	227.3	161.6	142.4	195.6	196.9	165.2	239.1	208.7	177.2	243.7
	PA	122.4	117.5	128.5	105.3	100.4	110.3	102.5	96.5	108.6	111.0	105.4	118.2	110.1	103.3	116.9
	PR	368.2	272.6	521.2	364.6	201.8	482.9	375.9	284.1	548.3	109.7	54.9	163.5	312.1	205.4	532.2
	RI	51.6	42.7	60.2	55.3	46.5	68.8	58.3	45.7	69.5	59.9	40.3	73.6	60.0	51.7	78.0
	SC	156.8	141.7	177.6	142.1	129.0	161.6	147.3	131.8	169.1	131.1	111.9	148.4	129.8	117.8	149.9
	SD	67.5	28.0	129.3	60.7	41.7	76.1	60.1	36.4	126.3	58.1	39.2	79.0	48.8	27.1	64.2
	TN	95.3	87.5	105.7	89.5	82.1	105.6	89.5	80.0	96.7	77.5	73.7	82.9	79.5	75.4	83.4
	TX	99.0	93.0	103.8	93.2	90.4	96.3	99.4	94.2	105.4	94.8	91.4	99.2	93.4	88.8	98.1
	UT	101.8	92.5	121.7	92.3	76.1	106.0	93.4	74.7	109.3	111.5	78.7	132.1	121.9	105.5	152.9
	VA	110.8	94.1	117.8	111.7	101.1	124.9	113.3	100.4	123.5	121.0	110.3	130.8	121.6	109.1	132.0
	VT	44.9	31.8	66.3	48.5	10.2	89.2	48.0	31.7	66.9	51.8	31.7	70.5	56.5	41.9	72.1
	WA	106.7	92.6	122.7	86.7	76.9	98.4	99.9	89.1	108.3	104.4	86.8	113.6	105.5	87.3	121.7
	WI	92.1	82.2	97.2	111.1	96.8	124.7	104.7	97.7	118.6	105.7	99.8	113.2	103.0	99.8	105.6
	WV	104.0	86.4	122.9	111.5	91.2	130.4	108.1	90.5	119.6	104.2	89.4	120.4	109.0	90.2	123.7
	WY	131.8	69.3	185.9	130.4	92.9	181.5	136.7	85.5	224.1	143.7	104.5	211.0	135.8	83.8	165.2
WL death	AK	1	0	2	1	0	2	1	0	2	1	0	1	1	0	1
count	AL	7	6	8	8	7	10	7	5	8	7	6	8	8	6	9
	AR	6	6	7	6	5	7	6	5	7	6	5	7	6	4	7
	AZ	15	13	16	15	13	17	15	13	17	14	13	16	14	12	16
	CA	59	53	63	56	53	60	57	52	60	59	53	65	56	49	60
	CO	4	4	5	4	4	5	4	4	5	4	3	4	4	3	5
	CT	10	9	11	10	9	11	9	7	12	7	4	8	7	5	9
	DC	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2
	DE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	FL	29	24	32	27	23	30	25	22	28	27	25	31	27	24	29



	GA	13	10	15	12	9	13	12	10	14	13	11	15	13	12	14
	HI	1	1	2	1	0	2	1	0	2	1	0	2	1	0	2
	IA	6	5	7	7	6	8	7	6	8	6	5	7	6	6	8
	ID	2	1	2	2	1	2	2	1	2	1	1	2	2	1	2
	IL	19	17	23	18	15	22	20	16	22	20	15	22	20	18	24
	IN	11	9	13	10	6	13	10	9	13	11	8	14	9	8	11
	KS	3	2	4	3	3	4	3	2	4	3	1	4	3	2	4
	KY	9	8	11	9	8	10	8	6	10	8	7	10	8	7	9
	LA	13	10	15	12	9	14	13	10	15	12	11	14	12	11	14
	MA	13	8	16	14	12	16	13	11	16	10	9	11	12	9	18
	MD	14	11	15	13	11	15	14	13	15	13	11	15	14	13	15
	ME	2	2	2	2	2	2	2	2	3	2	1	2	2	1	3
	MI	17	15	19	17	16	19	18	16	19	18	16	20	18	17	20
	MN	8	5	9	8	5	10	9	7	10	8	6	10	9	7	10
	MO	13	10	14	13	9	14	13	11	15	12	10	15	14	11	15
	MS	4	3	6	5	2	7	4	1	6	4	2	5	4	2	5
	MT	2	2	3	3	2	3	3	1	3	2	2	3	2	1	3
	NA	3	2	4	3	3	4	3	2	3	3	2	4	3	2	4
	NC	21	18	23	21	19	23	22	20	24	20	17	21	20	18	23
	ND	2	2	3	2	0	3	3	1	3	2	1	3	2	1	3
	NE	3	2	4	3	3	4	4	3	5	3	2	4	4	2	5
	NH	3	2	4	3	2	3	3	3	4	3	2	3	3	3	4
	NJ	19	18	21	19	17	20	20	17	23	19	16	21	19	16	21
	NM	3	1	5	3	2	4	3	1	4	2	1	3	2	1	4
	NV	5	3	7	4	3	6	5	3	6	5	4	6	5	4	6
	NY	56	50	62	56	53	61	57	46	62	55	50	59	55	51	57
	OH	29	27	32	29	28	32	29	26	31	29	26	31	29	28	32
	OK	9	7	11	8	7	10	9	7	11	9	7	11	9	7	10
	OR	2	1	3	2	1	4	3	1	3	2	1	4	3	1	4
	PA	39	35	44	41	38	44	40	38	43	40	37	42	40	38	43
	PR	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1
	RI	2	1	2	2	1	2	1	1	2	2	1	2	2	1	2
	SC	8	6	10	8	5	11	7	5	9	8	7	10	8	6	9
	SD	4	3	4	4	3	4	4	3	4	4	3	4	4	3	4
	TN	11	10	14	12	11	14	12	10	15	13	11	14	13	11	16
	TX	96	93	100	97	93	104	98	94	105	93	90	97	98	90	102
	UT	5	4	6	5	4	7	5	4	6	5	4	5	5	4	6
	VA	34	32	35	34	31	37	34	31	36	33	31	36	32	30	35
	VT	0	0	1	0	0	1	0	0	1	0	0	1	0	0	1
	WA	6	4	8	7	4	9	7	5	8	6	4	7	6	3	8

	WI	15	13	17	14	12	16	15	12	17	14	12	15	14	12	16
	WV	7	6	9	7	5	9	8	5	9	7	6	8	8	6	9
	WY	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0
WL mortality rate	AK	13.1	0.0	23.8	13.7	0.0	29.0	10.2	0.0	23.4	11.8	0.0	15.0	10.6	0.0	14.5
	AL	9.5	7.6	10.5	9.8	8.8	13.2	9.2	6.9	10.4	9.0	7.7	10.1	9.8	7.8	11.6
	AR	8.7	7.8	9.8	8.6	7.1	9.8	8.6	6.6	10.6	9.1	7.3	10.3	8.5	5.7	10.7
	AZ	16.0	14.7	17.9	16.2	14.4	18.8	16.5	14.6	18.6	15.6	14.1	17.6	16.0	12.9	18.6
	CA	14.5	13.3	15.4	13.9	12.7	15.0	14.2	13.0	14.9	14.1	12.6	16.1	13.7	12.3	14.4
	CO	6.5	5.9	7.7	6.2	5.7	7.4	6.5	5.8	7.7	5.7	4.5	6.5	6.2	4.7	8.0
	CT	13.0	11.0	14.7	13.0	12.3	14.9	12.3	9.3	16.2	9.3	5.5	12.0	10.3	7.3	12.9
	DC	8.0	4.1	9.4	7.9	4.4	10.5	7.2	4.2	9.8	7.5	4.4	10.2	7.0	4.4	10.5
	DE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	FL	9.4	7.9	10.3	9.1	7.9	10.1	8.6	7.5	9.4	8.7	7.8	10.0	8.7	7.9	9.6
	GA	14.2	10.6	17.1	13.6	10.9	15.4	14.3	11.7	17.1	14.2	12.7	16.3	14.8	13.4	15.9
	HI	21.5	13.8	32.4	15.6	0.0	34.4	18.1	0.0	38.8	19.3	0.0	32.5	20.8	0.0	32.2
	IA	7.6	6.0	8.5	8.2	7.0	9.5	8.4	7.1	10.7	7.5	6.0	8.6	7.7	6.8	9.6
	ID	8.2	4.5	10.4	6.8	4.1	9.4	7.9	4.5	10.8	6.6	4.4	9.8	7.0	4.6	9.3
	IL	7.7	6.5	9.3	7.5	6.1	8.9	7.8	6.6	8.5	7.7	5.8	8.8	8.1	7.0	9.6
	IN	9.9	7.7	11.8	8.9	5.5	11.5	9.3	8.0	11.7	10.0	7.2	12.1	8.4	6.8	9.9
	KS	8.0	4.9	11.0	8.1	6.7	10.2	7.8	4.9	10.4	7.1	2.2	9.5	7.7	4.3	9.9
	KY	7.8	6.7	9.6	7.8	7.0	8.9	7.1	5.3	8.7	6.9	5.9	8.7	6.8	6.2	7.7
	LA	13.0	10.6	15.1	12.5	9.4	14.7	13.0	9.7	15.6	12.5	10.7	14.8	12.2	11.0	14.6
	MA	9.3	5.8	11.4	9.9	8.5	11.2	9.4	7.7	11.9	7.4	6.5	8.1	8.7	6.6	12.9
	MD	9.7	7.7	11.0	9.0	7.8	10.5	9.5	9.0	10.0	9.3	7.7	10.3	9.2	8.8	10.0
	ME	6.9	6.4	7.4	6.5	6.2	7.0	7.4	6.1	9.9	6.6	3.5	7.4	7.2	3.2	10.6
	MI	9.0	8.0	9.6	8.7	8.2	9.5	8.9	8.0	10.1	9.1	8.1	10.2	8.9	8.6	9.7
	MN	6.2	4.1	7.2	6.5	4.1	7.6	6.9	5.7	8.3	6.4	4.9	8.0	6.9	5.5	8.1
	MO	8.8	7.0	10.0	8.8	6.3	9.9	9.2	7.3	10.9	8.3	6.6	10.2	9.2	7.4	10.4
	MS	6.6	4.4	8.8	7.2	3.1	10.6	6.1	1.5	9.7	5.4	2.9	8.1	5.9	3.3	7.8
	MT	14.0	11.9	19.2	16.5	12.1	20.2	15.8	6.4	19.2	14.5	11.7	17.5	13.8	6.0	19.4
	NA	21.1	12.8	24.9	21.2	18.0	29.7	19.6	14.9	22.9	20.6	13.3	30.7	22.7	13.3	28.1
	NC	9.3	8.2	10.5	9.5	8.5	10.3	9.9	9.1	11.0	8.6	7.4	9.3	8.8	7.7	9.9
	ND	12.9	10.1	16.9	12.1	0.0	17.8	13.8	5.3	19.5	12.0	5.5	17.4	11.8	5.2	17.1
	NE	11.9	7.5	16.4	14.3	11.4	17.5	17.0	10.8	23.4	12.2	7.9	15.7	14.9	7.8	17.9
	NH	8.7	5.3	11.7	7.1	5.1	8.2	8.4	7.8	11.6	7.8	5.5	8.6	8.6	7.8	11.5
	NJ	9.3	8.7	10.0	9.0	7.9	9.8	9.2	7.9	10.6	9.1	7.8	10.6	9.1	7.6	10.0
	NM	14.9	4.4	22.1	13.3	9.2	19.1	13.5	4.5	23.0	10.7	4.3	14.7	8.8	4.4	18.7
	NV	26.6	16.6	38.3	25.1	15.7	35.0	25.6	18.5	32.8	25.1	20.4	33.2	26.6	20.6	32.8
	NY	10.9	9.8	12.1	11.0	10.3	12.2	11.0	9.0	12.0	11.2	10.3	12.2	11.2	10.2	11.7
	OH	12.3	11.5	13.7	12.7	11.9	14.0	12.3	10.9	12.9	12.0	11.0	12.9	12.3	11.6	13.5



	OK	10.2	8.1	12.6	9.9	8.3	12.6	10.1	8.3	12.5	10.8	8.6	13.4	10.7	8.6	12.6
	OR	7.4	3.2	11.9	7.5	3.5	12.3	8.3	3.2	11.0	7.7	3.7	13.4	9.5	3.6	15.1
	PA	10.9	9.5	12.5	10.9	9.8	11.7	10.6	10.1	11.4	10.8	9.9	11.5	10.7	10.2	11.6
	PR	22.5	18.7	30.7	22.5	16.0	32.5	22.1	16.3	25.8	10.2	0.0	13.8	17.7	0.0	29.2
	RI	7.8	4.5	9.6	8.3	4.4	9.7	6.5	4.4	9.7	8.0	4.4	10.1	7.0	4.4	9.5
	SC	16.1	12.3	19.4	14.5	9.4	21.0	13.6	9.4	17.6	14.4	11.6	18.1	14.2	11.9	16.8
	SD	23.1	17.6	28.6	24.8	18.6	27.6	23.7	17.0	31.8	23.5	18.5	27.1	23.3	19.0	25.6
	TN	6.4	5.5	7.8	6.8	6.0	7.6	6.6	5.4	8.2	6.9	5.8	7.6	7.2	5.9	8.8
	TX	12.7	12.2	12.9	12.6	11.9	13.6	12.9	12.3	13.7	12.0	11.6	12.5	12.7	11.9	13.2
	UT	12.0	9.4	14.0	11.1	8.6	15.7	11.9	9.2	14.6	11.3	8.5	12.7	11.6	9.5	14.6
	VA	17.1	16.1	18.1	16.9	15.8	18.9	17.5	16.5	18.1	17.1	16.4	18.5	16.9	15.2	18.6
	VT	3.4	0.0	12.4	4.0	0.0	10.6	3.2	0.0	11.4	1.0	0.0	9.8	2.0	0.0	10.3
	WA	5.4	3.5	6.7	5.6	3.3	6.9	5.4	4.2	6.7	4.8	3.4	6.0	5.0	2.5	6.8
	WI	9.3	8.0	10.2	9.0	7.6	10.8	9.7	8.0	10.9	9.0	7.6	9.8	8.8	7.7	10.0
	WV	19.1	15.8	25.4	19.4	13.8	23.7	20.2	12.6	24.2	18.7	15.6	22.0	21.0	16.6	24.9
	WY	0.7	0.0	7.3	1.0	0.0	9.5	1.7	0.0	8.5	0.0	0.0	0.0	0.0	0.0	0.0
Median	AK	459	12	1246	265	3	604	228	28	622	367	94	652	349	162	702
distance (NM)	AL	280	194	355	235	157	303	223	192	256	411	376	475	379	348	404
	AR	297	254	363	294	252	403	250	207	279	402	303	476	379	325	420
	AZ	260	158	314	268	231	301	237	214	266	334	314	378	321	301	353
	CA	72	63	80	81	76	85	88	77	95	250	223	257	215	195	258
	CO	239	180	346	325	237	375	208	105	336	519	432	600	426	383	468
	CT	210	106	279	120	92	148	154	102	194	261	208	393	228	194	268
	DC	71	5	144	149	85	294	194	150	240	294	210	395	325	194	438
	DE	125	42	238	158	77	345	155	90	221	342	285	434	283	99	449
	FL	154	123	182	113	108	129	166	153	177	318	277	361	258	250	278
	GA	189	171	198	139	124	193	187	183	193	370	355	401	341	303	371
	HI	255	67	517	227	44	582	249	78	381	326	190	545	279	102	551
	IA	255	208	302	258	189	389	209	195	224	389	355	421	350	314	390
	ID	221	33	436	271	33	482	233	65	435	455	400	484	406	319	462
	IL	204	157	237	154	132	204	217	196	226	366	312	404	321	308	359
	IN	178	126	218	142	136	146	201	186	222	358	286	392	345	294	369
	KS	155	134	205	172	110	351	176	152	204	463	428	484	417	361	478
	KY	263	218	284	180	137	280	223	212	232	358	314	416	321	282	359
	LA	259	206	305	170	143	237	216	198	251	416	392	459	389	379	395
	MA	215	161	286	163	129	204	174	163	192	311	268	405	246	201	309
	MD	177	145	231	156	122	211	196	167	226	323	249	357	299	236	346
	ME	315	151	537	229	119	443	172	124	230	322	161	472	269	193	402
	MI	154	113	193	133	119	143	195	186	204	371	349	395	370	345	392
	MN	345	250	461	366	304	467	243	212	274	440	394	499	364	343	386



	MO	290	224	348	273	210	336	228	218	271	438	409	472	387	369	403
	MS	266	151	348	219	143	390	209	161	317	395	339	465	377	331	426
	MT	403	121	611	366	142	511	296	192	460	389	142	509	364	199	479
	NA	330	223	473	263	161	408	278	179	435	397	276	484	321	200	437
	NC	253	193	293	178	140	254	215	192	233	376	359	408	356	330	375
	ND	220	66	379	247	67	474	222	88	474	345	250	448	329	246	407
	NE	417	375	493	336	270	415	306	216	365	518	466	599	382	348	421
	NH	146	60	283	137	80	206	196	164	232	294	223	369	248	178	343
	NJ	140	79	182	121	110	132	152	127	189	327	302	357	234	190	268
	NM	100	54	203	105	15	246	92	12	179	326	179	419	306	231	401
	NV	102	54	229	110	56	221	107	52	192	261	99	334	257	118	317
	NY	224	196	254	139	130	150	185	169	195	341	304	356	261	244	276
	OH	250	207	280	160	141	231	212	182	247	336	313	364	321	287	349
	OK	310	165	365	280	204	367	250	214	341	421	398	443	394	367	420
	OR	240	89	295	166	123	261	171	111	232	407	295	465	368	295	464
	PA	128	100	148	141	128	148	185	177	199	297	277	316	294	278	311
	PR	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	RI	164	74	309	224	93	794	206	112	383	310	125	474	242	179	294
	SC	210	172	299	175	133	220	213	197	225	413	369	438	364	313	406
	SD	380	67	959	390	64	936	272	139	381	441	222	615	410	240	825
	TN	239	201	294	218	143	283	213	206	224	397	365	411	386	342	404
	TX	217	206	235	170	149	195	200	198	201	348	312	367	243	224	289
	UT	287	152	417	352	291	435	260	27	432	448	382	477	425	372	462
	VA	272	249	300	192	147	247	223	200	234	345	302	388	307	264	337
	VT	268	29	716	258	35	887	154	33	316	254	93	743	238	91	472
	WA	237	197	334	208	130	334	202	183	223	386	217	477	284	210	355
	WI	320	284	383	163	127	262	205	186	217	371	326	415	341	295	377
	WV	223	149	277	169	124	238	210	191	242	328	275	379	329	274	384
	WY	209	14	498	204	19	400	137	7	306	398	253	466	316	7	434

Appendix 2: Allocation rules per simulation

Table App2.1. Offer order: Smallest unit of allocation is 150 NM, donors aged 18 years or older

Order	Geography	Candidate group
1	500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
2	500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
3	500 NM	Adult status 2 and primary blood type match with the donor
4	500 NM	Adult status 2 and secondary blood type match with the donor
5	150 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
6	150 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
7	1000 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
8	1000 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
9	1000 NM	Adult status 2 and primary blood type match with the donor
10	1000 NM	Adult status 2 and secondary blood type match with the donor
11	150 NM	Adult status 4 and primary blood type match with the donor
12	150 NM	Adult status 4 and secondary blood type match with the donor
13	500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
14	500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
15	150 NM	Adult status 5 and primary blood type match with the donor
16	150 NM	Adult status 5 and secondary blood type match with the donor
17	1000 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
18	1000 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
19	150 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
20	150 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
21	1500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
22	1500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
23	1500 NM	Adult status 2 and primary blood type match with the donor
24	1500 NM	Adult status 2 and secondary blood type match with the donor
25	1500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
26	1500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
27	500 NM	Adult status 4 and primary blood type match with the donor
28	500 NM	Adult status 4 and secondary blood type match with the donor
29	500 NM	Adult status 5 and primary blood type match with the donor
30	500 NM	Adult status 5 and secondary blood type match with the donor
31	500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
32	500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
33	2500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
34	2500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
35	2500 NM	Adult status 2 and primary blood type match with the donor
36	2500 NM	Adult status 2 and secondary blood type match with the donor
37	2500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
38	2500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
39	1000 NM	Adult status 4 and primary blood type match with the donor
40	1000 NM	Adult status 4 and secondary blood type match with the donor
41	1000 NM	Adult status 5 and primary blood type match with the donor
42	1000 NM	Adult status 5 and secondary blood type match with the donor
43	1000 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
44	1000 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor

45	>2500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
46	>2500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
47	>2500 NM	Adult status 2 and primary blood type match with the donor
48	>2500 NM	Adult status 2 and secondary blood type match with the donor
49	>2500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
50	>2500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
51	1500 NM	Adult status 4 and primary blood type match with the donor
52	1500 NM	Adult status 4 and secondary blood type match with the donor
53	1500 NM	Adult status 5 and primary blood type match with the donor
54	1500 NM	Adult status 5 and secondary blood type match with the donor
55	1500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
56	1500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
57	2500 NM	Adult status 4 and primary blood type match with the donor
58	2500 NM	Adult status 4 and secondary blood type match with the donor
59	2500 NM	Adult status 5 and primary blood type match with the donor
60	2500 NM	Adult status 5 and secondary blood type match with the donor
61	2500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
62	2500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
63	>2500 NM	Adult status 4 and primary blood type match with the donor
64	>2500 NM	Adult status 4 and secondary blood type match with the donor
65	>2500 NM	Adult status 5 and primary blood type match with the donor
66	>2500 NM	Adult status 5 and secondary blood type match with the donor
67	>2500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
68	>2500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor

* TSAM does not have titer data for modeling infants eligible for ABO-incompatible offers.

Table App2.2. Offer order: Smallest unit of allocation is 150 NM, donors aged 0-17 years

Order	Geography	Candidate group
1	500 NM	Pediatric status 1A and primary blood type match with the donor
2	500 NM	Pediatric status 1A and secondary blood type match with the donor
3	150 NM	Adult status 1 and primary blood type match with the donor
4	150 NM	Adult status 1 and secondary blood type match with the donor
5	150 NM	Adult status 2 and primary blood type match with the donor
6	150 NM	Adult status 2 and secondary blood type match with the donor
7	500 NM	Pediatric status 1B and primary blood type match with the donor
8	500 NM	Pediatric status 1B and secondary blood type match with the donor
9	500 NM	Adult status 1 and primary blood type match with the donor
10	500 NM	Adult status 1 and secondary blood type match with the donor
11	500 NM	Adult status 2 and primary blood type match with the donor
12	500 NM	Adult status 2 and secondary blood type match with the donor
13	150 NM	Adult status 3 and primary blood type match with the donor
14	150 NM	Adult status 3 and secondary blood type match with the donor
15	150 NM	Adult status 4 and primary blood type match with the donor
16	150 NM	Adult status 4 and secondary blood type match with the donor
17	150 NM	Adult status 5 and primary blood type match with the donor
18	150 NM	Adult status 5 and secondary blood type match with the donor
19	500 NM	Adult status 3 and primary blood type match with the donor
20	500 NM	Adult status 3 and secondary blood type match with the donor

21	500 NM	Adult status 4 and primary blood type match with the donor
22	500 NM	Adult status 4 and secondary blood type match with the donor
23	500 NM	Adult status 5 and primary blood type match with the donor
24	500 NM	Adult Status 5 and secondary blood type match with the donor
25	150 NM	Pediatric status 2 and primary blood type match with the donor
26	150 NM	Pediatric status 2 and secondary blood type match with the donor
27	150 NM	Adult status 6 and primary blood type match with the donor
28	150 NM	Adult status 6 and secondary blood type match with the donor
29	1000 NM	Pediatric status 1A and primary blood type match with the donor
30	1000 NM	Pediatric status 1A and secondary blood type match with the donor
31	1000 NM	Adult status 1 and primary blood type match with the donor
32	1000 NM	Adult status 1 and secondary blood type match with the donor
33	1000 NM	Adult status 2 and primary blood type match with the donor
34	1000 NM	Adult status 2 and secondary blood type match with the donor
35	1000 NM	Pediatric status 1B and primary blood type match with the donor
36	1000 NM	Pediatric status 1B and secondary blood type match with the donor
37	1000 NM	Adult status 3 and primary blood type match with the donor
38	1000 NM	Adult status 3 and secondary blood type match with the donor
39	1000 NM	Adult status 4 and primary blood type match with the donor
40	1000 NM	Adult status 4 and secondary blood type match with the donor
41	1000 NM	Adult status 5 and primary blood type match with the donor
42	1000 NM	Adult status 5 and secondary blood type match with the donor
43	500 NM	Pediatric status 2 and primary blood type match with the donor
44	500 NM	Pediatric status 2 and secondary blood type match with the donor
45	500 NM	Adult status 6 and primary blood type match with the donor
46	500 NM	Adult status 6 and secondary blood type match with the donor
47	1000 NM	Pediatric status 2 and primary blood type match with the donor
48	1000 NM	Pediatric status 2 and secondary blood type match with the donor
49	1000 NM	Adult status 6 and primary blood type match with the donor
50	1000 NM	Adult status 6 and secondary blood type match with the donor
51	1500 NM	Pediatric status 1A and primary blood type match with the donor
52	1500 NM	Pediatric status 1A and secondary blood type match with the donor
53	1500 NM	Adult status 1 and primary blood type match with the donor
54	1500 NM	Adult status 1 and secondary blood type match with the donor
55	1500 NM	Adult status 2 and primary blood type match with the donor
56	1500 NM	Adult status 2 and secondary blood type match with the donor
57	1500 NM	Pediatric status 1B and primary blood type match with the donor
58	1500 NM	Pediatric status 1B and secondary blood type match with the donor
59	1500 NM	Adult status 3 and primary blood type match with the donor
60	1500 NM	Adult status 3 and secondary blood type match with the donor
61	1500 NM	Adult status 4 and primary blood type match with the donor
62	1500 NM	Adult status 4 and secondary blood type match with the donor
63	1500 NM	Adult status 5 and primary blood type match with the donor
64	1500 NM	Adult status 5 and secondary blood type match with the donor
65	1500 NM	Pediatric status 2 and primary blood type match with the donor
66	1500 NM	Pediatric status 2 and secondary blood type match with the donor
67	1500 NM	Adult status 6 and primary blood type match with the donor
68	1500 NM	Adult status 6 and secondary blood type match with the donor
69	2500 NM	Pediatric status 1A and primary blood type match with the donor
70	2500 NM	Pediatric status 1A and secondary blood type match with the donor

71	2500 NM	Adult status 1 and primary blood type match with the donor
72	2500 NM	Adult status 1 and secondary blood type match with the donor
73	2500 NM	Adult status 2 and primary blood type match with the donor
74	2500 NM	Adult status 2 and secondary blood type match with the donor
75	2500 NM	Pediatric status 1B and primary blood type match with the donor
76	2500 NM	Pediatric status 1B and secondary blood type match with the donor
77	2500 NM	Adult status 3 and primary blood type match with the donor
78	2500 NM	Adult status 3 and secondary blood type match with the donor
79	2500 NM	Adult status 4 and primary blood type match with the donor
80	2500 NM	Adult status 4 and secondary blood type match with the donor
81	2500 NM	Adult status 5 and primary blood type match with the donor
82	2500 NM	Adult status 5 and secondary blood type match with the donor
83	2500 NM	Pediatric status 2 and primary blood type match with the donor
84	2500 NM	Pediatric status 2 and secondary blood type match with the donor
85	2500 NM	Adult status 6 and primary blood type match with the donor
86	2500 NM	Adult status 6 and secondary blood type match with the donor
87	>2500 NM	Pediatric status 1A and primary blood type match with the donor
88	>2500 NM	Pediatric status 1A and secondary blood type match with the donor
89	>2500 NM	Adult status 1 and primary blood type match with the donor
90	>2500 NM	Adult status 1 and secondary blood type match with the donor
91	>2500 NM	Adult status 2 and primary blood type match with the donor
92	>2500 NM	Adult status 2 and secondary blood type match with the donor
93	>2500 NM	Pediatric status 1B and primary blood type match with the donor
94	>2500 NM	Pediatric status 1B and secondary blood type match with the donor
95	>2500 NM	Adult status 3 and primary blood type match with the donor
96	>2500 NM	Adult status 3 and secondary blood type match with the donor
97	>2500 NM	Adult status 4 and primary blood type match with the donor
98	>2500 NM	Adult status 4 and secondary blood type match with the donor
99	>2500 NM	Adult status 5 and primary blood type match with the donor
100	>2500 NM	Adult status 5 and secondary blood type match with the donor
101	>2500 NM	Pediatric status 2 and primary blood type match with the donor
102	>2500 NM	Pediatric status 2 and secondary blood type match with the donor
103	>2500 NM	Adult status 6 and primary blood type match with the donor
104	>2500 NM	Adult status 6 and secondary blood type match with the donor

* TSAM does not have titer data for modeling infants eligible for ABO-incompatible offers.

Table App2.3. Offer order: Smallest unit of allocation is 250 NM, donors aged 18 years or older

Order	Geography	Candidate group
1	500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
2	500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
3	500 NM	Adult status 2 and primary blood type match with the donor
4	500 NM	Adult status 2 and secondary blood type match with the donor
5	250 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
6	250 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
7	1000 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
8	1000 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
9	1000 NM	Adult status 2 and primary blood type match with the donor
10	1000 NM	Adult status 2 and secondary blood type match with the donor
11	250 NM	Adult status 4 and primary blood type match with the donor
12	250 NM	Adult status 4 and secondary blood type match with the donor
13	500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
14	500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
15	250 NM	Adult status 5 and primary blood type match with the donor
16	250 NM	Adult status 5 and secondary blood type match with the donor
17	1000 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
18	1000 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
19	250 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
20	250 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
21	1500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
22	1500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
23	1500 NM	Adult status 2 and primary blood type match with the donor
24	1500 NM	Adult status 2 and secondary blood type match with the donor
25	1500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
26	1500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
27	500 NM	Adult status 4 and primary blood type match with the donor
28	500 NM	Adult status 4 and secondary blood type match with the donor
29	500 NM	Adult status 5 and primary blood type match with the donor
30	500 NM	Adult status 5 and secondary blood type match with the donor
31	500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
32	500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
33	2500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
34	2500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
35	2500 NM	Adult status 2 and primary blood type match with the donor
36	2500 NM	Adult status 2 and secondary blood type match with the donor
37	2500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
38	2500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
39	1000 NM	Adult status 4 and primary blood type match with the donor
40	1000 NM	Adult status 4 and secondary blood type match with the donor
41	1000 NM	Adult status 5 and primary blood type match with the donor
42	1000 NM	Adult status 5 and secondary blood type match with the donor
43	1000 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
44	1000 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
45	>2500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
46	>2500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
47	>2500 NM	Adult status 2 and primary blood type match with the donor

48	>2500 NM	Adult status 2 and secondary blood type match with the donor
49	>2500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
50	>2500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
51	1500 NM	Adult status 4 and primary blood type match with the donor
52	1500 NM	Adult status 4 and secondary blood type match with the donor
53	1500 NM	Adult status 5 and primary blood type match with the donor
54	1500 NM	Adult status 5 and secondary blood type match with the donor
55	1500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
56	1500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
57	2500 NM	Adult status 4 and primary blood type match with the donor
58	2500 NM	Adult status 4 and secondary blood type match with the donor
59	2500 NM	Adult status 5 and primary blood type match with the donor
60	2500 NM	Adult status 5 and secondary blood type match with the donor
61	2500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
62	2500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
63	>2500 NM	Adult status 4 and primary blood type match with the donor
64	>2500 NM	Adult status 4 and secondary blood type match with the donor
65	>2500 NM	Adult status 5 and primary blood type match with the donor
66	>2500 NM	Adult status 5 and secondary blood type match with the donor
67	>2500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
68	>2500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor

* TSAM does not have titer data for modeling infants eligible for ABO-incompatible offers.

Table App2.4. Offer order: Smallest unit of allocation is 250 NM, donors aged 0-17 years

Order	Geography	Candidate group
1	500 NM	Pediatric status 1A and primary blood type match with the donor
2	500 NM	Pediatric status 1A and secondary blood type match with the donor
3	250 NM	Adult status 1 and primary blood type match with the donor
4	250 NM	Adult status 1 and secondary blood type match with the donor
5	250 NM	Adult status 2 and primary blood type match with the donor
6	250 NM	Adult status 2 and secondary blood type match with the donor
7	500 NM	Pediatric status 1B and primary blood type match with the donor
8	500 NM	Pediatric status 1B and secondary blood type match with the donor
9	500 NM	Adult status 1 and primary blood type match with the donor
10	500 NM	Adult status 1 and secondary blood type match with the donor
11	500 NM	Adult status 2 and primary blood type match with the donor
12	500 NM	Adult status 2 and secondary blood type match with the donor
13	250 NM	Adult status 3 and primary blood type match with the donor
14	250 NM	Adult status 3 and secondary blood type match with the donor
15	250 NM	Adult status 4 and primary blood type match with the donor
16	250 NM	Adult status 4 and secondary blood type match with the donor
17	250 NM	Adult status 5 and primary blood type match with the donor
18	250 NM	Adult status 5 and secondary blood type match with the donor
19	500 NM	Adult status 3 and primary blood type match with the donor
20	500 NM	Adult status 3 and secondary blood type match with the donor
21	500 NM	Adult status 4 and primary blood type match with the donor
22	500 NM	Adult status 4 and secondary blood type match with the donor
23	500 NM	Adult status 5 and primary blood type match with the donor

24	500 NM	Adult Status 5 and secondary blood type match with the donor
25	250 NM	Pediatric status 2 and primary blood type match with the donor
26	250 NM	Pediatric status 2 and secondary blood type match with the donor
27	250 NM	Adult status 6 and primary blood type match with the donor
28	250 NM	Adult status 6 and secondary blood type match with the donor
29	1000 NM	Pediatric status 1A and primary blood type match with the donor
30	1000 NM	Pediatric status 1A and secondary blood type match with the donor
31	1000 NM	Adult status 1 and primary blood type match with the donor
32	1000 NM	Adult status 1 and secondary blood type match with the donor
33	1000 NM	Adult status 2 and primary blood type match with the donor
34	1000 NM	Adult status 2 and secondary blood type match with the donor
35	1000 NM	Pediatric status 1B and primary blood type match with the donor
36	1000 NM	Pediatric status 1B and secondary blood type match with the donor
37	1000 NM	Adult status 3 and primary blood type match with the donor
38	1000 NM	Adult status 3 and secondary blood type match with the donor
39	1000 NM	Adult status 4 and primary blood type match with the donor
40	1000 NM	Adult status 4 and secondary blood type match with the donor
41	1000 NM	Adult status 5 and primary blood type match with the donor
42	1000 NM	Adult Status 5 and secondary blood type match with the donor
43	500 NM	Pediatric status 2 and primary blood type match with the donor
44	500 NM	Pediatric status 2 and secondary blood type match with the donor
45	500 NM	Adult status 6 and primary blood type match with the donor
46	500 NM	Adult status 6 and secondary blood type match with the donor
47	1000 NM	Pediatric status 2 and primary blood type match with the donor
48	1000 NM	Pediatric status 2 and secondary blood type match with the donor
49	1000 NM	Adult status 6 and primary blood type match with the donor
50	1000 NM	Adult status 6 and secondary blood type match with the donor
51	1500 NM	Pediatric status 1A and primary blood type match with the donor
52	1500 NM	Pediatric status 1A and secondary blood type match with the donor
53	1500 NM	Adult status 1 and primary blood type match with the donor
54	1500 NM	Adult status 1 and secondary blood type match with the donor
55	1500 NM	Adult status 2 and primary blood type match with the donor
56	1500 NM	Adult status 2 and secondary blood type match with the donor
57	1500 NM	Pediatric status 1B and primary blood type match with the donor
58	1500 NM	Pediatric status 1B and secondary blood type match with the donor
59	1500 NM	Adult status 3 and primary blood type match with the donor
60	1500 NM	Adult status 3 and secondary blood type match with the donor
61	1500 NM	Adult status 4 and primary blood type match with the donor
62	1500 NM	Adult status 4 and secondary blood type match with the donor
63	1500 NM	Adult status 5 and primary blood type match with the donor
64	1500 NM	Adult status 5 and secondary blood type match with the donor
65	1500 NM	Pediatric status 2 and primary blood type match with the donor
66	1500 NM	Pediatric status 2 and secondary blood type match with the donor
67	1500 NM	Adult status 6 and primary blood type match with the donor
68	1500 NM	Adult status 6 and secondary blood type match with the donor
69	2500 NM	Pediatric status 1A and primary blood type match with the donor
70	2500 NM	Pediatric status 1A and secondary blood type match with the donor
71	2500 NM	Adult status 1 and primary blood type match with the donor
72	2500 NM	Adult status 1 and secondary blood type match with the donor
73	2500 NM	Adult status 2 and primary blood type match with the donor

74	2500 NM	Adult status 2 and secondary blood type match with the donor
75	2500 NM	Pediatric status 1B and primary blood type match with the donor
76	2500 NM	Pediatric status 1B and secondary blood type match with the donor
77	2500 NM	Adult status 3 and primary blood type match with the donor
78	2500 NM	Adult status 3 and secondary blood type match with the donor
79	2500 NM	Adult status 4 and primary blood type match with the donor
80	2500 NM	Adult status 4 and secondary blood type match with the donor
81	2500 NM	Adult status 5 and primary blood type match with the donor
82	2500 NM	Adult status 5 and secondary blood type match with the donor
83	2500 NM	Pediatric status 2 and primary blood type match with the donor
84	2500 NM	Pediatric status 2 and secondary blood type match with the donor
85	2500 NM	Adult status 6 and primary blood type match with the donor
86	2500 NM	Adult status 6 and secondary blood type match with the donor
87	>2500 NM	Pediatric status 1A and primary blood type match with the donor
88	>2500 NM	Pediatric status 1A and secondary blood type match with the donor
89	>2500 NM	Adult status 1 and primary blood type match with the donor
90	>2500 NM	Adult status 1 and secondary blood type match with the donor
91	>2500 NM	Adult status 2 and primary blood type match with the donor
92	>2500 NM	Adult status 2 and secondary blood type match with the donor
93	>2500 NM	Pediatric status 1B and primary blood type match with the donor
94	>2500 NM	Pediatric status 1B and secondary blood type match with the donor
95	>2500 NM	Adult status 3 and primary blood type match with the donor
96	>2500 NM	Adult status 3 and secondary blood type match with the donor
97	>2500 NM	Adult status 4 and primary blood type match with the donor
98	>2500 NM	Adult status 4 and secondary blood type match with the donor
99	>2500 NM	Adult status 5 and primary blood type match with the donor
100	>2500 NM	Adult status 5 and secondary blood type match with the donor
101	>2500 NM	Pediatric status 2 and primary blood type match with the donor
102	>2500 NM	Pediatric status 2 and secondary blood type match with the donor
103	>2500 NM	Adult status 6 and primary blood type match with the donor
104	>2500 NM	Adult status 6 and secondary blood type match with the donor

* TSAM does not have titer data for modeling infants eligible for ABO-incompatible offers.

Table App2.5. . Offer order: Smallest unit of allocation is 500 NM, broader sharing to adult status 1 and 2 preserved, donors aged 18 years or older

Order	Geography	Candidate group
1	1000 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
2	1000 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
3	1000 NM	Adult status 2 and primary blood type match with the donor
4	1000 NM	Adult status 2 and secondary blood type match with the donor
5	500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
6	500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
7	1500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
8	1500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
9	1500 NM	Adult status 2 and primary blood type match with the donor
10	1500 NM	Adult status 2 and secondary blood type match with the donor
11	500 NM	Adult status 4 and primary blood type match with the donor
12	500 NM	Adult status 4 and secondary blood type match with the donor

13	1000 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
14	1000 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
15	500 NM	Adult status 5 and primary blood type match with the donor
16	500 NM	Adult status 5 and secondary blood type match with the donor
17	1500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
18	1500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
19	500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
20	500 NM	Adult status 6 and pediatric status 2 and secondary blood type match with the donor
21	2500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
22	2500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
23	2500 NM	Adult status 2 and primary blood type match with the donor
24	2500 NM	Adult status 2 and secondary blood type match with the donor
25	2500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
26	2500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
27	1000 NM	Adult status 4 and primary blood type match with the donor
28	1000 NM	Adult status 4 and secondary blood type match with the donor
29	1000 NM	Adult status 5 and primary blood type match with the donor
30	1000 NM	Adult status 5 and secondary blood type match with the donor
31	1000 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
32	1000 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
33	>2500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
34	>2500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
35	>2500 NM	Adult status 2 and primary blood type match with the donor
36	>2500 NM	Adult status 2 and secondary blood type match with the donor
37	>2500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
38	>2500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
39	1500 NM	Adult status 4 and primary blood type match with the donor
40	1500 NM	Adult status 4 and secondary blood type match with the donor
41	1500 NM	Adult status 5 and primary blood type match with the donor
42	1500 NM	Adult status 5 and secondary blood type match with the donor
43	1500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
44	1500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
45	2500 NM	Adult status 4 and primary blood type match with the donor
46	2500 NM	Adult status 4 and secondary blood type match with the donor
47	2500 NM	Adult status 5 and primary blood type match with the donor
48	2500 NM	Adult status 5 and secondary blood type match with the donor
49	2500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
50	2500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
51	>2500 NM	Adult status 4 and primary blood type match with the donor
52	>2500 NM	Adult status 4 and secondary blood type match with the donor
53	>2500 NM	Adult status 5 and primary blood type match with the donor
54	>2500 NM	Adult status 5 and secondary blood type match with the donor
55	>2500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
56	>2500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor

* TSAM does not have titer data for modeling infants eligible for ABO-incompatible offers.

Table App2.6. Offer order: Smallest unit of allocation is 500 NM, broader sharing to adult status 1 and 2 preserved, donors aged 0-17 years

Order	Geography	Candidate group
1	1000 NM	Pediatric status 1A and primary blood type match with the donor
2	1000 NM	Pediatric status 1A and secondary blood type match with the donor
3	500 NM	Adult status 1 and primary blood type match with the donor
4	500 NM	Adult status 1 and secondary blood type match with the donor
5	500 NM	Adult status 2 and primary blood type match with the donor
6	500 NM	Adult status 2 and secondary blood type match with the donor
7	1000 NM	Pediatric status 1B and primary blood type match with the donor
8	1000 NM	Pediatric status 1B and secondary blood type match with the donor
9	1000 NM	Adult status 1 and primary blood type match with the donor
10	1000 NM	Adult status 1 and secondary blood type match with the donor
11	1000 NM	Adult status 2 and primary blood type match with the donor
12	1000 NM	Adult status 2 and secondary blood type match with the donor
13	500 NM	Adult status 3 and primary blood type match with the donor
14	500 NM	Adult status 3 and secondary blood type match with the donor
15	500 NM	Adult status 4 and primary blood type match with the donor
16	500 NM	Adult status 4 and secondary blood type match with the donor
17	500 NM	Adult status 5 and primary blood type match with the donor
18	500 NM	Adult status 5 and secondary blood type match with the donor
19	1000 NM	Adult status 3 and primary blood type match with the donor
20	1000 NM	Adult status 3 and secondary blood type match with the donor
21	1000 NM	Adult status 4 and primary blood type match with the donor
22	1000 NM	Adult status 4 and secondary blood type match with the donor
23	1000 NM	Adult status 5 and primary blood type match with the donor
24	1000 NM	Adult Status 5 and secondary blood type match with the donor
25	500 NM	Pediatric status 2 and primary blood type match with the donor
26	500 NM	Pediatric status 2 and secondary blood type match with the donor
27	500 NM	Adult status 6 and primary blood type match with the donor
28	500 NM	Adult status 6 and secondary blood type match with the donor
29	1500 NM	Pediatric status 1A and primary blood type match with the donor
30	1500 NM	Pediatric status 1A and secondary blood type match with the donor
31	1500 NM	Adult status 1 and primary blood type match with the donor
32	1500 NM	Adult status 1 and secondary blood type match with the donor
33	1500 NM	Adult status 2 and primary blood type match with the donor
34	1500 NM	Adult status 2 and secondary blood type match with the donor
35	1500 NM	Pediatric status 1B and primary blood type match with the donor
36	1500 NM	Pediatric status 1B and secondary blood type match with the donor
37	1500 NM	Adult status 3 and primary blood type match with the donor
38	1500 NM	Adult status 3 and secondary blood type match with the donor
39	1500 NM	Adult status 4 and primary blood type match with the donor
40	1500 NM	Adult status 4 and secondary blood type match with the donor
41	1500 NM	Adult status 5 and primary blood type match with the donor
42	1500 NM	Adult Status 5 and secondary blood type match with the donor
43	1000 NM	Pediatric status 2 and primary blood type match with the donor
44	1000 NM	Pediatric status 2 and secondary blood type match with the donor
45	1000 NM	Adult status 6 and primary blood type match with the donor
46	1000 NM	Adult status 6 and secondary blood type match with the donor
47	1500 NM	Pediatric status 2 and primary blood type match with the donor

48	1500 NM	Pediatric status 2 and secondary blood type match with the donor
49	1500 NM	Adult status 6 and primary blood type match with the donor
50	1500 NM	Adult status 6 and secondary blood type match with the donor
51	2500 NM	Pediatric status 1A and primary blood type match with the donor
52	2500 NM	Pediatric status 1A and secondary blood type match with the donor
53	2500 NM	Adult status 1 and primary blood type match with the donor
54	2500 NM	Adult status 1 and secondary blood type match with the donor
55	2500 NM	Adult status 2 and primary blood type match with the donor
56	2500 NM	Adult status 2 and secondary blood type match with the donor
57	2500 NM	Pediatric status 1B and primary blood type match with the donor
58	2500 NM	Pediatric status 1B and secondary blood type match with the donor
59	2500 NM	Adult status 3 and primary blood type match with the donor
60	2500 NM	Adult status 3 and secondary blood type match with the donor
61	2500 NM	Adult status 4 and primary blood type match with the donor
62	2500 NM	Adult status 4 and secondary blood type match with the donor
63	2500 NM	Adult status 5 and primary blood type match with the donor
64	2500 NM	Adult status 5 and secondary blood type match with the donor
65	2500 NM	Pediatric status 2 and primary blood type match with the donor
66	2500 NM	Pediatric status 2 and secondary blood type match with the donor
67	2500 NM	Adult status 6 and primary blood type match with the donor
68	2500 NM	Adult status 6 and secondary blood type match with the donor
69	>2500 NM	Pediatric status 1A and primary blood type match with the donor
70	>2500 NM	Pediatric status 1A and secondary blood type match with the donor
71	>2500 NM	Adult status 1 and primary blood type match with the donor
72	>2500 NM	Adult status 1 and secondary blood type match with the donor
73	>2500 NM	Adult status 2 and primary blood type match with the donor
74	>2500 NM	Adult status 2 and secondary blood type match with the donor
75	>2500 NM	Pediatric status 1B and primary blood type match with the donor
76	>2500 NM	Pediatric status 1B and secondary blood type match with the donor
77	>2500 NM	Adult status 3 and primary blood type match with the donor
78	>2500 NM	Adult status 3 and secondary blood type match with the donor
79	>2500 NM	Adult status 4 and primary blood type match with the donor
80	>2500 NM	Adult status 4 and secondary blood type match with the donor
81	>2500 NM	Adult status 5 and primary blood type match with the donor
82	>2500 NM	Adult status 5 and secondary blood type match with the donor
83	>2500 NM	Pediatric status 2 and primary blood type match with the donor
84	>2500 NM	Pediatric status 2 and secondary blood type match with the donor
85	>2500 NM	Adult status 6 and primary blood type match with the donor
86	>2500 NM	Adult status 6 and secondary blood type match with the donor

* TSAM does not have titer data for modeling infants eligible for ABO-incompatible offers.

Table App2.7. Offer order: Smallest unit of allocation is 500 NM, removing broader sharing to adult status 1 and 2, donors aged 18 years or older

Order	Geography	Candidate group
1	500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
2	500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
3	500 NM	Adult status 2 and primary blood type match with the donor
4	500 NM	Adult status 2 and secondary blood type match with the donor
5	500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
6	500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
7	1000 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
8	1000 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
9	1000 NM	Adult status 2 and primary blood type match with the donor
10	1000 NM	Adult status 2 and secondary blood type match with the donor
11	500 NM	Adult status 4 and primary blood type match with the donor
12	500 NM	Adult status 4 and secondary blood type match with the donor
13	500 NM	Adult status 5 and primary blood type match with the donor
14	500 NM	Adult status 5 and secondary blood type match with the donor
15	1000 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
16	1000 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
17	500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
18	500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
19	1500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
20	1500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
21	1500 NM	Adult status 2 and primary blood type match with the donor
22	1500 NM	Adult status 2 and secondary blood type match with the donor
23	1500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
24	1500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
25	1000 NM	Adult status 4 and primary blood type match with the donor
26	1000 NM	Adult status 4 and secondary blood type match with the donor
27	1000 NM	Adult status 5 and primary blood type match with the donor
28	1000 NM	Adult status 5 and secondary blood type match with the donor
29	1000 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
30	1000 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
31	2500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
32	2500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
33	2500 NM	Adult status 2 and primary blood type match with the donor
34	2500 NM	Adult status 2 and secondary blood type match with the donor
35	2500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor
36	2500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
37	1500 NM	Adult status 4 and primary blood type match with the donor
38	1500 NM	Adult status 4 and secondary blood type match with the donor
39	1500 NM	Adult status 5 and primary blood type match with the donor
40	1500 NM	Adult status 5 and secondary blood type match with the donor
41	1500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
42	1500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
43	>2500 NM	Adult status 1 or pediatric status 1A and primary blood type match with the donor
44	>2500 NM	Adult status 1 or pediatric status 1A and secondary blood type match with the donor
45	>2500 NM	Adult status 2 and primary blood type match with the donor
46	>2500 NM	Adult status 2 and secondary blood type match with the donor
47	>2500 NM	Adult status 3 or pediatric status 1B and primary blood type match with the donor

48	>2500 NM	Adult status 3 or pediatric status 1B and secondary blood type match with the donor
49	2500 NM	Adult status 4 and primary blood type match with the donor
50	2500 NM	Adult status 4 and secondary blood type match with the donor
51	2500 NM	Adult status 5 and primary blood type match with the donor
52	2500 NM	Adult status 5 and secondary blood type match with the donor
53	2500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
54	2500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor
55	>2500 NM	Adult status 4 and primary blood type match with the donor
56	>2500 NM	Adult status 4 and secondary blood type match with the donor
57	>2500 NM	Adult status 5 and primary blood type match with the donor
58	>2500 NM	Adult status 5 and secondary blood type match with the donor
59	>2500 NM	Adult status 6 or pediatric status 2 and primary blood type match with the donor
60	>2500 NM	Adult status 6 or pediatric status 2 and secondary blood type match with the donor

* TSAM does not have titer data for modeling infants eligible for ABO-incompatible offers.

Table App2.8. Offer order: Smallest unit of allocation is 500 NM, removing broader sharing to adult status 1 and 2, donors aged 0-17 years

Order	Geography	Candidate group
1	1000 NM	Pediatric status 1A and primary blood type match with the donor
2	1000 NM	Pediatric status 1A and secondary blood type match with the donor
3	500 NM	Adult status 1 and primary blood type match with the donor
4	500 NM	Adult status 1 and secondary blood type match with the donor
5	500 NM	Adult status 2 and primary blood type match with the donor
6	500 NM	Adult status 2 and secondary blood type match with the donor
7	1000 NM	Pediatric status 1B and primary blood type match with the donor
8	1000 NM	Pediatric status 1B and secondary blood type match with the donor
9	1000 NM	Adult status 1 and primary blood type match with the donor
10	1000 NM	Adult status 1 and secondary blood type match with the donor
11	1000 NM	Adult status 2 and primary blood type match with the donor
12	1000 NM	Adult status 2 and secondary blood type match with the donor
13	500 NM	Adult status 3 and primary blood type match with the donor
14	500 NM	Adult status 3 and secondary blood type match with the donor
15	500 NM	Adult status 4 and primary blood type match with the donor
16	500 NM	Adult status 4 and secondary blood type match with the donor
17	500 NM	Adult status 5 and primary blood type match with the donor
18	500 NM	Adult status 5 and secondary blood type match with the donor
19	1000 NM	Adult status 3 and primary blood type match with the donor
20	1000 NM	Adult status 3 and secondary blood type match with the donor
21	1000 NM	Adult status 4 and primary blood type match with the donor
22	1000 NM	Adult status 4 and secondary blood type match with the donor
23	1000 NM	Adult status 5 and primary blood type match with the donor
24	1000 NM	Adult Status 5 and secondary blood type match with the donor
25	500 NM	Pediatric status 2 and primary blood type match with the donor
26	500 NM	Pediatric status 2 and secondary blood type match with the donor
27	500 NM	Adult status 6 and primary blood type match with the donor
28	500 NM	Adult status 6 and secondary blood type match with the donor
29	1500 NM	Pediatric status 1A and primary blood type match with the donor
30	1500 NM	Pediatric status 1A and secondary blood type match with the donor
31	1500 NM	Adult status 1 and primary blood type match with the donor
32	1500 NM	Adult status 1 and secondary blood type match with the donor
33	1500 NM	Adult status 2 and primary blood type match with the donor
34	1500 NM	Adult status 2 and secondary blood type match with the donor
35	1500 NM	Pediatric status 1B and primary blood type match with the donor
36	1500 NM	Pediatric status 1B and secondary blood type match with the donor
37	1500 NM	Adult status 3 and primary blood type match with the donor
38	1500 NM	Adult status 3 and secondary blood type match with the donor
39	1500 NM	Adult status 4 and primary blood type match with the donor
40	1500 NM	Adult status 4 and secondary blood type match with the donor
41	1500 NM	Adult status 5 and primary blood type match with the donor
42	1500 NM	Adult Status 5 and secondary blood type match with the donor
43	1000 NM	Pediatric status 2 and primary blood type match with the donor
44	1000 NM	Pediatric status 2 and secondary blood type match with the donor
45	1000 NM	Adult status 6 and primary blood type match with the donor
46	1000 NM	Adult status 6 and secondary blood type match with the donor
47	1500 NM	Pediatric status 2 and primary blood type match with the donor

48	1500 NM	Pediatric status 2 and secondary blood type match with the donor
49	1500 NM	Adult status 6 and primary blood type match with the donor
50	1500 NM	Adult status 6 and secondary blood type match with the donor
51	2500 NM	Pediatric status 1A and primary blood type match with the donor
52	2500 NM	Pediatric status 1A and secondary blood type match with the donor
53	2500 NM	Adult status 1 and primary blood type match with the donor
54	2500 NM	Adult status 1 and secondary blood type match with the donor
55	2500 NM	Adult status 2 and primary blood type match with the donor
56	2500 NM	Adult status 2 and secondary blood type match with the donor
57	2500 NM	Pediatric status 1B and primary blood type match with the donor
58	2500 NM	Pediatric status 1B and secondary blood type match with the donor
59	2500 NM	Adult status 3 and primary blood type match with the donor
60	2500 NM	Adult status 3 and secondary blood type match with the donor
61	2500 NM	Adult status 4 and primary blood type match with the donor
62	2500 NM	Adult status 4 and secondary blood type match with the donor
63	2500 NM	Adult status 5 and primary blood type match with the donor
64	2500 NM	Adult status 5 and secondary blood type match with the donor
65	2500 NM	Pediatric status 2 and primary blood type match with the donor
66	2500 NM	Pediatric status 2 and secondary blood type match with the donor
67	2500 NM	Adult status 6 and primary blood type match with the donor
68	2500 NM	Adult status 6 and secondary blood type match with the donor
69	>2500 NM	Pediatric status 1A and primary blood type match with the donor
70	>2500 NM	Pediatric status 1A and secondary blood type match with the donor
71	>2500 NM	Adult status 1 and primary blood type match with the donor
72	>2500 NM	Adult status 1 and secondary blood type match with the donor
73	>2500 NM	Adult status 2 and primary blood type match with the donor
74	>2500 NM	Adult status 2 and secondary blood type match with the donor
75	>2500 NM	Pediatric status 1B and primary blood type match with the donor
76	>2500 NM	Pediatric status 1B and secondary blood type match with the donor
77	>2500 NM	Adult status 3 and primary blood type match with the donor
78	>2500 NM	Adult status 3 and secondary blood type match with the donor
79	>2500 NM	Adult status 4 and primary blood type match with the donor
80	>2500 NM	Adult status 4 and secondary blood type match with the donor
81	>2500 NM	Adult status 5 and primary blood type match with the donor
82	>2500 NM	Adult status 5 and secondary blood type match with the donor
83	>2500 NM	Pediatric status 2 and primary blood type match with the donor
84	>2500 NM	Pediatric status 2 and secondary blood type match with the donor
85	>2500 NM	Adult status 6 and primary blood type match with the donor
86	>2500 NM	Adult status 6 and secondary blood type match with the donor

* TSAM does not have titer data for modeling infants eligible for ABO-incompatible offers.

Appendix 3: TSAM technical details

Models that underlie TSAM use historical data to predict future outcomes under different allocation rules. Acceptance models, which predict which organs will be accepted for which candidates, were built on a cohort of patients from July 2009 to June 2011.

TSAM also uses waitlist and posttransplant survival models. Waitlist survival models are used to give each candidate a complete history for the duration of the TSAM cohort period. In a given simulation run, a candidate may remain on the waiting list after undergoing transplant in real life. At the time of real-life transplant, a candidate ceases to have real waitlist data needed to participate in simulated allocation. We use waitlist survival models to create a history of appropriate clinical severity for these patients and append that history to their own. We use posttransplant survival models to predict survival in patients after they undergo simulated transplant.

To avoid over-fitting the models, we built these survival prediction models on a cohort of candidates and recipients from January 1, 2007, to June 30, 2009, the most recent cohort available prior to the cohort included in the TSAM runs.

Current results are based on a TSAM that incorporated an external dataset, provided by OPTN, that categorized common reasons for status 1A and 1B exception requests. Many of these categories were used to define new adult status 1-4. During the policy-making process, more rigorous, physiology-based definitions of these conditions was developed, but that rigor cannot be applied retroactively to TSAM data.