

Analysis Report

Data request from the OPTN Liver and Intestinal Organ Transplantation Committee

Date: 9/15/2017

This report was provided to HRSA by SRTR in support of ongoing policy consideration by the OPTN Liver and Intestinal 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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Executive Summary

The OPTN Liver and Intestinal Organ Transplantation Committee (the Committee) requested that SRTR use the liver simulated allocation model (LSAM) to assess the simulated impact of Enhanced 11 Regions for liver distribution.

What's new in this analysis? The Committee has seen several reports assessing different types and variations of conceptualized liver redistribution policies. The major differences between this report and previous analyses include:

- **DCD donors and donors aged ≥ 70 years:** Organs from donation after circulatory death (DCD) donors and/or donors aged ≥ 70 years are allocated using a separate allocation order in which within-DSA MELD candidates are prioritized over regional MELD candidates.
- **Enhanced regions:** Candidates listed at a transplant program within 150 miles of a donor hospital are considered to be within the UNOS region during the match run for a recovered organ.
- **Proximity points:** All scenarios examined here include five additional MELD/PELD points awarded to candidates within a certain proximity to the donor hospital. Two variations on proximity point policies are included: (1) proximity points awarded to candidates within a 150-mile radius of the donor hospital, and (2) proximity points awarded to candidates within the DSA or within a 150-mile radius of the donor hospital. For adult candidates, proximity points are added to their calculated (laboratory) MELD scores. For pediatric candidates, proximity points are added to their allocation MELD/PELD scores. This adjusted MELD score is not capped at 40. For example, an adult within 150 miles of a donor hospital with a calculated MELD score of 37 would have an adjusted MELD score of 42. Another adult at the same center with a MELD of 40 would have an adjusted MELD score of 45 and would still be higher in the allocation order.
- **MELD/PELD sharing thresholds:** Two of the scenarios examined here include a "sharing threshold" at MELD/PELD of 29 or above. This means that only candidates with a MELD/PELD score (calculated MELD score for adults, allocation MELD/PELD score for pediatric candidates) of 29 or above are included in the first level of regional allocation. Two of the scenarios include a "sharing threshold" at MELD/PELD 22 or above. The last two scenarios have no "sharing threshold," and adult candidates use the higher of their calculated or allocation MELD scores. (See details of allocation orders for these policies in Appendix D.)

Main Findings

MELD scores at transplant: The variance in median MELD/PELD at transplant among DSAs is projected to decrease 1.5- to 2-fold in all alternative policy scenarios compared with current policy for all candidates, and 2- to 3-fold for candidates with no exceptions. The maps of median allocation MELD/PELD at transplant by DSA show the decrease in disparity for all recipients compared with the current policy scenario. The maps of median calculated MELD/PELD at transplant by DSA for recipients with no exceptions show similarly reduced disparity. At the same time, the national median MELD/PELD at transplant for all candidates is not projected to increase compared with current policy.

Transplant rates and counts: Transplant rates overall are not projected to change in alternative policy scenarios compared with current policy. Similarly, LSAM projects that transplant counts overall may not change under current or alternative policies, since the ranges of estimates overlap. In population subgroups, transplant rates decrease for candidates with HCC and Other exceptions, with only a small decrease in transplant counts, indicating that these candidates may wait longer for transplant, but numbers of transplants are not projected to decrease much.

- Transplant rates and counts for candidates with M/P 35+ decrease under alternative policy scenarios with sharing thresholds compared with current policy. In the no-sharing-threshold scenarios, transplant rates for these candidates do not change, but transplant counts decrease.
- Transplant counts for candidates with M/P 29-34 increase in all alternative policy scenarios compared with current policy. However, the rates increase only in the no-sharing-threshold scenarios. This projected increase is likely due to candidates with M/P 29+ being included in the enhanced region offer pool.
- Transplant counts are projected to increase for candidates with M/P 25-28 and decrease for candidates with M/P 15-24 under alternative policies compared with current policy. However, transplant rates for these candidates may remain the same as under current policy.
- Transplant counts for candidates with M/P < 15 are expected to increase under alternative policy scenarios compared with current policy. This is due to candidates with M/P 10-14 who receive five proximity points and move up in the allocation order above national 1A and 1B candidates.
- The variation in transplant rates among DSAs decreases slightly in all alternative policy scenarios compared with current policy.

Waitlist mortality rates and counts: Overall waitlist mortality rates and counts for all candidates are projected to decrease in all alternative policy scenarios compared with current policy. This is likely due to more transplants occurring more quickly for higher-MELD/PELD candidates on the waiting list.

- Waitlist mortality rates and counts are projected to decrease for candidates with M/P 35+ in sharing threshold alternative policy scenarios compared with current policy. Waitlist mortality counts are projected to decrease in the no-sharing-threshold scenarios, but rates are not projected to change.
- Waitlist mortality counts and rates are projected to be slightly lower for candidates with M/P 29-34.
- Waitlist mortality counts may decrease slightly for candidates with M/P 25-28. Waitlist mortality counts remain the same or decrease for candidates with M/P 15-24 under alternative policy scenarios compared with current policy. However, waitlist mortality rates for these candidates are projected to remain unchanged from current policy.
- The overall variance in waitlist mortality rates among DSAs may decrease very slightly or remain unchanged from current policy under alternative policy scenarios.

Posttransplant mortality rates and counts: Posttransplant mortality rates and counts are not expected to change under alternative policy scenarios. However, in sharing threshold scenarios, counts may slightly increase for no-exception recipients.

Transport metrics: Overall transport time, transport distance, and percentages of organs flown are projected to increase under alternative policy scenarios compared with current policy.

Subgroup analysis: SRTR also assessed the projected effect of the alternative policies on age (pediatric), sex (female), race/ethnicity (African American, Hispanic/Latino, Asian), education level (high school or less, more than high school), insurance type (private, public), and urban/rural (metropolitan, micropolitan, small town, rural) subgroups. For most metrics, sex, race/ethnicity, education level, insurance type, and urban/rural subgroups were affected similarly to the overall population (as described above). However, projected effects for pediatric candidates differed from overall results.

- **Pediatric candidates:** Transplant counts and rates increase for the pediatric population. Under current policy, median travel time, median travel distance, and percentage of organs flown are higher for pediatric populations than for the overall population. Travel metrics increase in alternative scenarios for the overall population, however, transport time and distance decrease in alternative scenarios for pediatric populations.

Comparison of Alternative Policy Scenarios

Tradeoff between transport increases and disparity reductions: Alternative policy scenarios with a projected decrease in disparities show a corresponding increase in travel metrics. All alternative policy scenarios examined are projected to decrease the disparity in median MELD/PELD at transplant from current policy, while increasing travel time, travel distance, and percentages of organs flown.

Proximity points: A notable projected difference between the two types of proximity points (150-mile radius circle versus DSA) is present only with regard to transport metrics. Proximity points awarded within the DSA or within 150 miles produce somewhat higher transport metrics across all alternative policy scenarios than proximity points awarded within a 150-mile radius circle from the donor hospital. This is likely because many DSAs are larger geographically than a 300-mile diameter circle, and organs are distributed to patients with proximity points within these somewhat larger (although variably sized) geographic areas.

Overview data tables

Table 1 Overview of main metrics

	variance in median allocation M/P at transplant	median allocation MELD/PELD at transplant	median transport time (hours)	median transport distance (miles)	% of organs flown
Current	10 (8.7,11.9)	29 (29,29)	1.7 (1.69,1.72)	88.5 (86.9,90)	50.7 (50.2,51.1)
M29 150m	6 (5.3,7.6)	29 (29,29)	1.74 (1.73,1.75)	100.7 (98.7,103.4)	55.2 (54.5,55.9)
M29 150m DSA	5.8 (5.2,7.4)	29 (29,29)	1.74 (1.74,1.75)	102.1 (99.8,103.7)	55.6 (55,56.1)
M22 150m	4.1 (3.4,4.6)	29 (29,29)	1.77 (1.76,1.77)	112.5 (110.2,115.4)	59.5 (58.8,60.1)
M22 150m DSA	4.3 (3.5,4.9)	29 (29,29)	1.77 (1.77,1.78)	113.8 (111.7,115.1)	59.9 (59.5,60.2)
150m	4.4 (3.9,4.8)	29.2 (29,30)	1.79 (1.78,1.79)	118.4 (117.2,119.3)	61.1 (60.8,61.7)
150m DSA	4.3 (3.9,5.3)	29.2 (29,30)	1.79 (1.78,1.79)	119.9 (118.5,122.3)	61.4 (61,62.1)

All metrics reported as *mean (min, max)* across the 10 simulation iterations.

Table 2 Overview of additional metrics

	transplant rate	transplant count	waitlist mortality rate	waitlist mortality count	post-tx mortality rate	post-tx mortality count
Current	0.444 (0.436,0.452)	6651 (6575,6727)	0.097 (0.095,0.1)	1455 (1425,1504)	0.077 (0.075,0.08)	686 (666,721)
M29 150m	0.437 (0.429,0.446)	6651 (6586,6728)	0.09 (0.088,0.092)	1366 (1335,1404)	0.077 (0.075,0.08)	682 (659,717)
M29 150m DSA	0.437 (0.431,0.445)	6644 (6563,6724)	0.09 (0.089,0.092)	1369 (1343,1408)	0.078 (0.074,0.08)	688 (662,712)
M22 150m	0.434 (0.428,0.445)	6644 (6558,6746)	0.087 (0.085,0.088)	1337 (1302,1358)	0.077 (0.076,0.078)	681 (670,702)
M22 150m DSA	0.434 (0.429,0.443)	6647 (6562,6725)	0.087 (0.087,0.089)	1339 (1319,1366)	0.078 (0.076,0.08)	691 (669,718)
150m	0.436 (0.429,0.445)	6623 (6537,6709)	0.091 (0.09,0.093)	1390 (1368,1421)	0.078 (0.076,0.08)	687 (667,718)
150m DSA	0.435 (0.427,0.445)	6617 (6547,6713)	0.091 (0.089,0.093)	1387 (1349,1414)	0.078 (0.075,0.082)	686 (663,734)

All metrics reported as *mean (min, max)* across the 10 simulation iterations. All rates are per patient-year.

Policy concepts

This section provides a brief overview of policy concepts used in conversations regarding liver redistribution and in this report.

Area of Distribution

Distribution indicates the geographic area within which available donor organs are distributed. For liver transplant, organs are currently distributed within the DSA, the OPTN region, and nationally. See [OPTN Policy 9.6.E – 9.6.G](#) for more detail.

Allocation

Allocation indicates the process by which available donor organs are distributed. For liver transplant, organs are generally allocated by model for end-stage liver disease (MELD) and pediatric end-stage liver disease (PELD) scores and by blood type and waiting time. See [OPTN Policy 9](#) for more detail.

Scientific concepts

Simulation modeling

One method used for policy evaluation is simulation modeling. Simulation modeling uses data and software to simulate the functioning of the nationwide liver transplant system. Patients are listed on the waiting list, donor organs arrive, and transplants occur, just as in real life. Policy conditions can be modified within the simulations, allowing us to examine the probable outcomes of various policy scenarios in a way that is close to real life without putting patients at risk.

The software tool that SRTR uses to conduct simulation modeling of the US liver transplant system is the liver simulated allocation model (LSAM). The LSAM is a discrete-event simulation of the liver allocation system, which simulates the allocation of donated livers to waitlisted candidates by drawing on historical patient data including candidate listing, candidate status changes, and organ donations.

Data request: provide revised LSAM data on key proposals for redistricting

The full text of the original OPTN data request to which this report responds is shown below, as submitted on June 29, 2017.

OPTN Committee Data Analysis Request Form

Date Form Submitted to HRSA:

Requesting Committee: OPTN Liver and Intestinal Organ Transplantation Committee

Date Committee Met: June 19, 2017

Date of Next Meeting: July 20 2017

OPTN staff member referring Committee's requests: Ann Harper, MPH

Chair Approval? Yes

ANALYSES REQUESTED:

• **Descriptive Statistical Requests (responsibility of OPTN contractor)**

- None

• **Inferential STATISTICAL REQUESTS (RESPONSIBILITY OF SRTR CONTRACTOR)**

Data Request 1: Provide revised LSAM data on key proposals for redistricting

Background: During the Committee conference call on June 12, 2017 the committee crafted a revised liver distribution proposal for Fall 2017 public comments submission. This data request takes priority over the request submitted on June 2, 2017.

The Committee is asking that the SRTR provide new LSAM modeling to reflect prioritization for adult candidates with calculated (laboratory) MELD/PELD scores with a threshold of 29, candidates less than 18 with allocation MELD/PELD scores with a threshold of 29, and assigning five priority points to candidates listed at centers within a 150-nautical mile radius of the donor hospital or DSA. The intent of these modifications is to mitigate the effects of broader sharing on distances organs travel and the percentage of organs transported by air. Further, restricting broader sharing to those with MELD/PELD scores above a certain threshold is intended to provide greater access to those most in need of deceased donor livers, based on data demonstrating that the existing geographic disparities disproportionately affect those without MELD/PELD exceptions.

Strategic Goal or Committee Project Addressed: Reduce disparities in access to liver transplants.

Request:

Using the most recently available LSAM version and data, model the following distribution systems (in the order specified below):

1. Candidates listed at centers within a 150 mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates age less than 18, with a sharing threshold of MELD/PELD 29+.
2. Candidates listed at centers within a 150 mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates age less than 18, with a sharing threshold of MELD/PELD 22+.

3. Candidates listed at centers within a 150-mile radius circle from the donor hospital receive 5 additional proximity points add to their lab MELD for adults and their allocation MELD/PELD for candidates age less than 18, with no sharing threshold.
4. Candidates listed at centers within either (a) the DSA of the donor hospital or (b) a 150-mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates age less than 18, with a sharing threshold of MELD/PELD 29+.
5. Candidates listed at centers within either (a) the DSA of the donor hospital or (b) a 150-mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates age less than 18, with a sharing threshold of MELD/PELD 22+.
6. Candidates listed at centers within either (a) the DSA of the donor hospital or (b) a 150-mile radius circle from the donor hospital receive 5 additional proximity points add to their lab MELD for adults and their allocation MELD/PELD for candidates age less than 18, with no sharing threshold.

Proximity points are defined as follows: At the time of the match run, a liver candidate with a MELD or PELD score registered at a transplant hospital within a 150-mile radius of the donor hospital, or within the DSA as well as the 150-mile radius, receives five MELD or PELD points added to their score as described above. For adults, proximity points are only added to calculated (lab) MELD score. For candidates less than 18, proximity points are added to the allocation MELD/PELD score.

Use the following allocation sequence for scenarios:

For adult donors:

1. Region or 150-mile circle (i.e., any candidate listed at centers within the Region, or at centers with 150 miles from the donor hospital) Status 1A
2. Region or 150-mile circle Status 1B
3. Region or 150-mile circle adjusted MELD with a MELD/PELD ≥ 29 (or 22, or no threshold)
4. DSA allocation MELD/PELD ≥ 15
5. Region or 150-mile circle allocation ≥ 15
6. National Status 1A
7. National Status 1B
8. National allocation MELD/PELD ≥ 15
9. DSA allocation MELD/PELD ≤ 15
10. Region or 150-mile circle allocation MELD/PELD < 15
11. National allocation MELD/PELD < 15

* In tier 3:

- For scenarios with a sharing threshold: The adjusted MELD/PELD is equal to the calculated (lab) MELD plus proximity points (as applicable) for adults, or the allocation MELD/PELD plus proximity points for candidates age ≤ 18 .
- For scenarios without a sharing threshold: For adults: the adjusted MELD is equal to either the exception MELD score, or the calculated (lab) MELD score plus proximity points (as applicable) (whichever is higher). For pediatrics, the adjusted score equals the allocation MELD/PELD plus proximity points (as applicable) for candidates age < 18 .

Livers from DCD donors or donors greater than or equal to 70 years old:

1. Region or 150-mile circle Adult or Pediatric status 1A
2. Region or 150-mile circle Pediatric status 1B
3. DSA MELD or PELD of at least 15
4. Region or 150-mile circle MELD or PELD of at least 15
5. Nation Adult or Pediatric status 1A
6. Nation Pediatric status 1B
7. Nation MELD or PELD of at least 15

8. DSA MELD or PELD less than 15
9. Region or Circle MELD or PELD less than 15
10. Nation MELD or PELD less than 15

The allocation sequences for donors aged 0-10 and 11-17 should follow those used in the classifications described in the proposed policy.

Donors Age 0-10

1. Region or Circle Pediatric status 1A
2. Nation Pediatric status 1A and 0 to 11 years old
3. Region or Circle Adult status 1A
4. Region or Circle Pediatric status 1B
5. Region or Circle Any PELD
6. Region or Circle MELD of at least 15 and 12 to 17 years old
7. Region or Circle MELD of at least 15 and at least 18 years old
8. Region or Circle MELD less than 15 and 12 to 17 years old
9. Region or Circle MELD less than 15 and at least 18 years old
10. Nation Pediatric status 1A and 12 to 17 years old
11. Nation Adult status 1A
12. Nation Pediatric status 1B and 0 to 17 years old
13. Nation Any PELD
14. Nation Any MELD and 12 to 17 years old
15. Nation Any MELD and at least 18 years old

Donors Age 11-17

1. Region or Circle Pediatric status 1A
2. Region or Circle Adult status 1A
3. Region or Circle Pediatric status 1B
4. Region or Circle Any PELD
5. Region or Circle MELD of at least 15 and 12 to 17 years old
6. Region or Circle MELD of at least 15 and at least 18 years old
7. Region or Circle MELD less than 15 and 12 to 17 years old
8. Region or Circle MELD less than 15 and at least 18 years old
9. Nation Pediatric status 1A
10. Nation Adult status 1A
11. Nation Pediatric status 1B
12. Nation Any PELD
13. Nation Any MELD and 12 to 17 years old
14. Nation Any MELD and at least 18 years old

Based on the above scenarios, provide the following metrics. Relevant metrics will be stratified by all candidates, non-exception candidates, HCC candidates, and other exceptions. Metrics to be assessed for the overall population (nationwide) include:

- Waiting list mortality rates**
- Variance in waiting list mortality rates***
- Transplant rates**
- Variance in transplant rates**
- Counts of transplant
- Median MELD/PELD at transplant**
- Variance in median MELD/PELD at transplant**
- Median transport distance
- Median transport time
- Percent of organs flown for transport**

- Percent of organs transplanted in donor DSA**
- Post-transplant patient survival

** If a limited set of initial metrics will expedite the delivery of the results, these metrics can be prioritized for initial results.

Metrics will also be assessed by subgroup populations including:

- Urbanicity: metropolitan, micropolitan, and rural
- Insurance status: public and private
- Age: pediatric (under 18)
- Sex: female
- Race/ethnicity: African American, Asian/Pacific Islander, Hispanic, Caucasian
- MELD/PELD group: <15, 15-24, 25-28, 29-34, 35+ (includes Status 1A and 1B)
- Exception status: No exceptions, HCC exception, Other exception
- OPTN Region: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
- Relevant metrics will be displayed in maps by DSA and tables provided in an appendix for DSA level results for: Median MELD/PELD at transplant, transplant counts, transplant rates, waitlist mortality rates, percent of organs flown for transplant, percent of organs transplanted outside donor DSA.

• **OTHER Requests** None

Study population

The Committee has expressed strong interest in simulations based on the most recent data possible, and, if available, data collected after the Share35 liver allocation policy implementation. Reflecting this request, data for these policy simulations were collected between July 2013 and June 2016, post-Share35 implementation.

The simulation uses donor and candidate populations created by the LSAM donor and candidate generators. This software draws on patient data for transplant candidates listed at the beginning of the data cohort period, and candidates added to the waiting list and organs donated during the data cohort period. The generators use these real patient data to create independent donor and candidate populations for each of the multiple LSAM iterations involved in simulating each allocation scenario.

Analytical approach

Policy scenarios

The liver transplantation policy scenarios simulated include:

- **Current:**
 - Distribution: current distribution
 - DCD/ \geq 70 allocation: Uses the same allocation order for all deceased donors
 - Proximity points: No proximity points
 - Sharing threshold: Share35 / sharing threshold of MELD/PELD \geq 35 for the third tier of allocation (after allocation to Statuses 1A and 1B)
 - Ranking in 3rd tier of allocation proceeds by allocation MELD/PELD
- **M29 150m:**
 - Distribution: 11 OPTN Regions plus 150 mile radius circles from the donor hospital
 - DCD/ \geq 70 allocation: Uses a different allocation order for organs from donors who are DCD or \geq 70 years of age
 - Proximity points: Candidates listed at centers within a 150 mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates $<$ 18
 - Sharing threshold: sharing threshold of MELD/PELD \geq 29 for the third tier of allocation (after allocation to Statuses 1A and 1B)
 - Ranking in 3rd tier of allocation proceeds by adjusted MELD/PELD. The adjusted MELD/PELD is equal to the calculated (lab) MELD plus proximity points (as applicable) for adults, or the allocation MELD/PELD plus proximity points (as applicable) for candidates aged $<$ 18.

- **M29 150m DSA:**
 - Distribution: 11 OPTN Regions plus 150 mile radius circles from the donor hospital
 - DCD/ \geq 70 allocation: Uses a different allocation order for organs from donors who are DCD or \geq 70 years of age
 - Proximity points: Candidates listed at centers within either (a) the DSA of the donor hospital or (b) a 150 mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates $<$ 18
 - Sharing threshold: sharing threshold of MELD/PELD \geq 29 for the third tier of allocation (after allocation to Statuses 1A and 1B)
 - Ranking in 3rd tier of allocation proceeds by adjusted MELD/PELD. The adjusted MELD/PELD is equal to the calculated (lab) MELD plus proximity points (as applicable) for adults, or the allocation MELD/PELD plus proximity points (as applicable) for candidates aged $<$ 18.

- **M22 150m:**
 - Distribution: 11 OPTN Regions plus 150 mile radius circles from the donor hospital
 - DCD/ \geq 70 allocation: Uses a different allocation order for organs from donors who are DCD or \geq 70 years of age
 - Proximity points: Candidates listed at centers within a 150 mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates $<$ 18
 - Sharing threshold: sharing threshold of MELD/PELD \geq 22 for the third tier of allocation (after allocation to Statuses 1A and 1B)
 - Ranking in 3rd tier of allocation proceeds by adjusted MELD/PELD. The adjusted MELD/PELD is equal to the calculated (lab) MELD plus proximity points (as applicable) for adults, or the allocation MELD/PELD plus proximity points (as applicable) for candidates aged $<$ 18.

- **M22 150m DSA:**
 - Distribution: 11 OPTN Regions plus 150 mile radius circles from the donor hospital
 - DCD/ \geq 70 allocation: Uses a different allocation order for organs from donors who are DCD or \geq 70 years of age
 - Proximity points: Candidates listed at centers within either (a) the DSA of the donor hospital or (b) a 150 mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates $<$ 18

- Sharing threshold: sharing threshold of MELD/PELD ≥ 22 for the third tier of allocation (after allocation to Statuses 1A and 1B)
- Ranking in 3rd tier of allocation proceeds by adjusted MELD/PELD. The adjusted MELD/PELD is equal to the calculated (lab) MELD plus proximity points (as applicable) for adults, or the allocation MELD/PELD plus proximity points (as applicable) for candidates aged <18.
- **150m:**
 - Distribution: 11 OPTN Regions plus 150 mile radius circles from the donor hospital
 - DCD/ ≥ 70 allocation: Uses a different allocation order for organs from donors who are DCD or ≥ 70 years of age
 - Proximity points: Candidates listed at centers within a 150 mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates <18
 - Sharing threshold: No sharing threshold
 - Ranking in 3rd tier of allocation proceeds by adjusted MELD/PELD. The adjusted MELD/PELD is equal to either the exception MELD score, or the calculated (lab) MELD score plus proximity points (as applicable), whichever is higher. For pediatrics, the adjusted score equals the allocation MELD/PELD plus proximity points (as applicable) for candidates aged <18.
- **150m DSA:**
 - Distribution: 11 OPTN Regions plus 150 mile radius circles from the donor hospital
 - DCD/ ≥ 70 allocation: Uses a different allocation order for organs from donors who are DCD or ≥ 70 years of age
 - Proximity points: Candidates listed at centers within either (a) the DSA of the donor hospital or (b) a 150 mile radius circle from the donor hospital receive 5 additional proximity points added to their lab MELD for adults and their allocation MELD/PELD for candidates <18
 - Sharing threshold: No sharing threshold
 - Ranking in 3rd tier of allocation proceeds by adjusted MELD/PELD. The adjusted MELD/PELD is equal to either the exception MELD score, or the calculated (lab) MELD score plus proximity points (as applicable), whichever is higher. For pediatrics, the adjusted score equals the allocation MELD/PELD plus proximity points (as applicable) for candidates aged <18.

Metrics

The OPTN data request specified that the following outcome metrics be assessed. Metrics are assessed for the overall population, and, where possible, by current OPTN region and patient

exception status. SRTR also assessed metrics by subgroup populations including pediatrics (age younger than 18 years), sex (female), race/ethnicity (African American, Asian/Pacific Islander, Hispanic, white), education level (high school or less, more than high school), insurance type (private, public), and urban/rural (Metropolitan, Micropolitan, Small Town, Rural).

Metrics include:

- Waitlist mortality rates
- Variance in waitlist mortality rates
- Transplant rates
- Variance in transplant rates
- Transplant counts
- Median MELD/PELD at transplant
- Variance in median MELD/PELD at transplant
- Median transport distance
- Median transport time
- Percentage of organs flown for transport
- Percentage of organs transplanted within donor DSA
- Posttransplant patient survival

Results

Results for the simulated scenarios are reported primarily in the form of plots, with each plot displaying the values for a given metric across the 6 scenarios tested. In viewing these results, it is important to compare each of the 6 scenarios with the current allocation policy scenario to identify changes in outcome metrics due to the proposed policy changes. Each scenario was simulated 10 times, and the plot displays the range of results across the 10 simulations as a vertical line extending from the minimum value to the maximum value found for that metric and scenario. A point along that line marks the mean value of the metric across the 10 iterations.

Allocation MELD/PELD at Transplant

Variance in Median Allocation MELD/PELD at Transplant by DSA

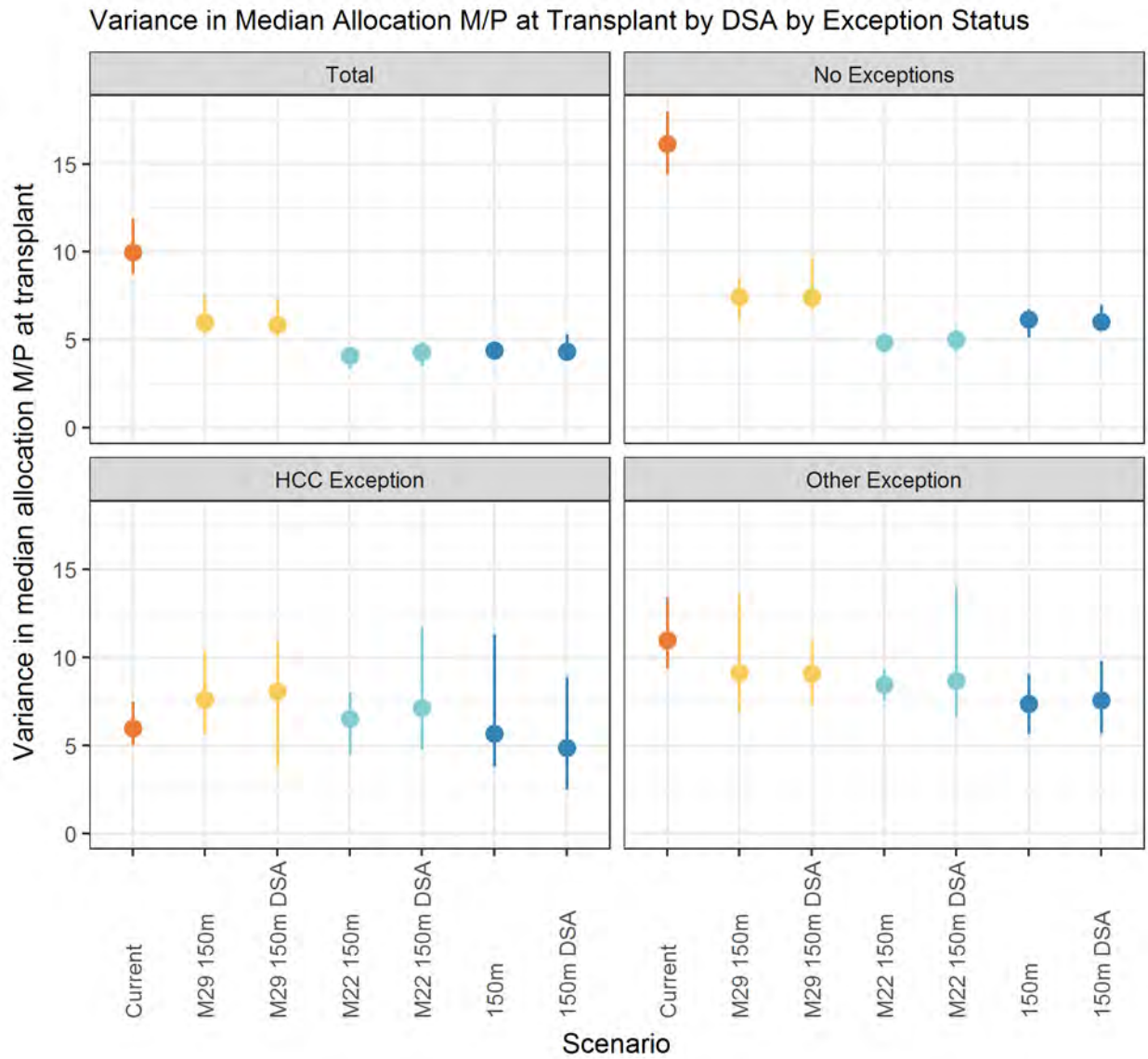


Figure 1 Variance in median allocation M/P at transplant by DSA by exception status

Median Allocation MELD/PELD at Transplant

Median Allocation M/P at Transplant by Exception Status - All Regions

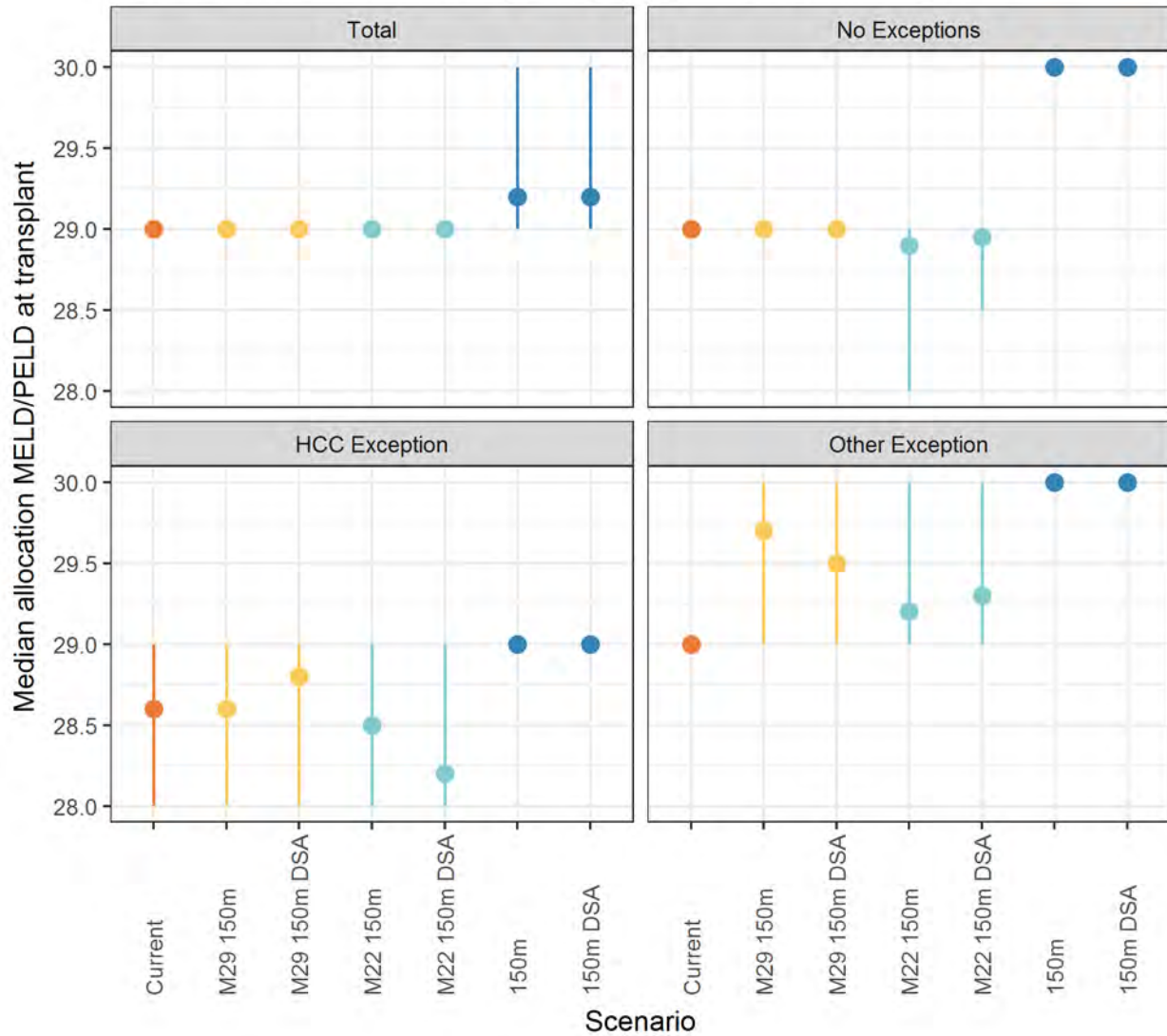


Figure 2 Median allocation MELD/PELD at transplant by exception status - all regions

Maps of Median Allocation MELD/PELD at Transplant by DSA

Maps of Median Allocation MELD/PELD at Transplant by DSA

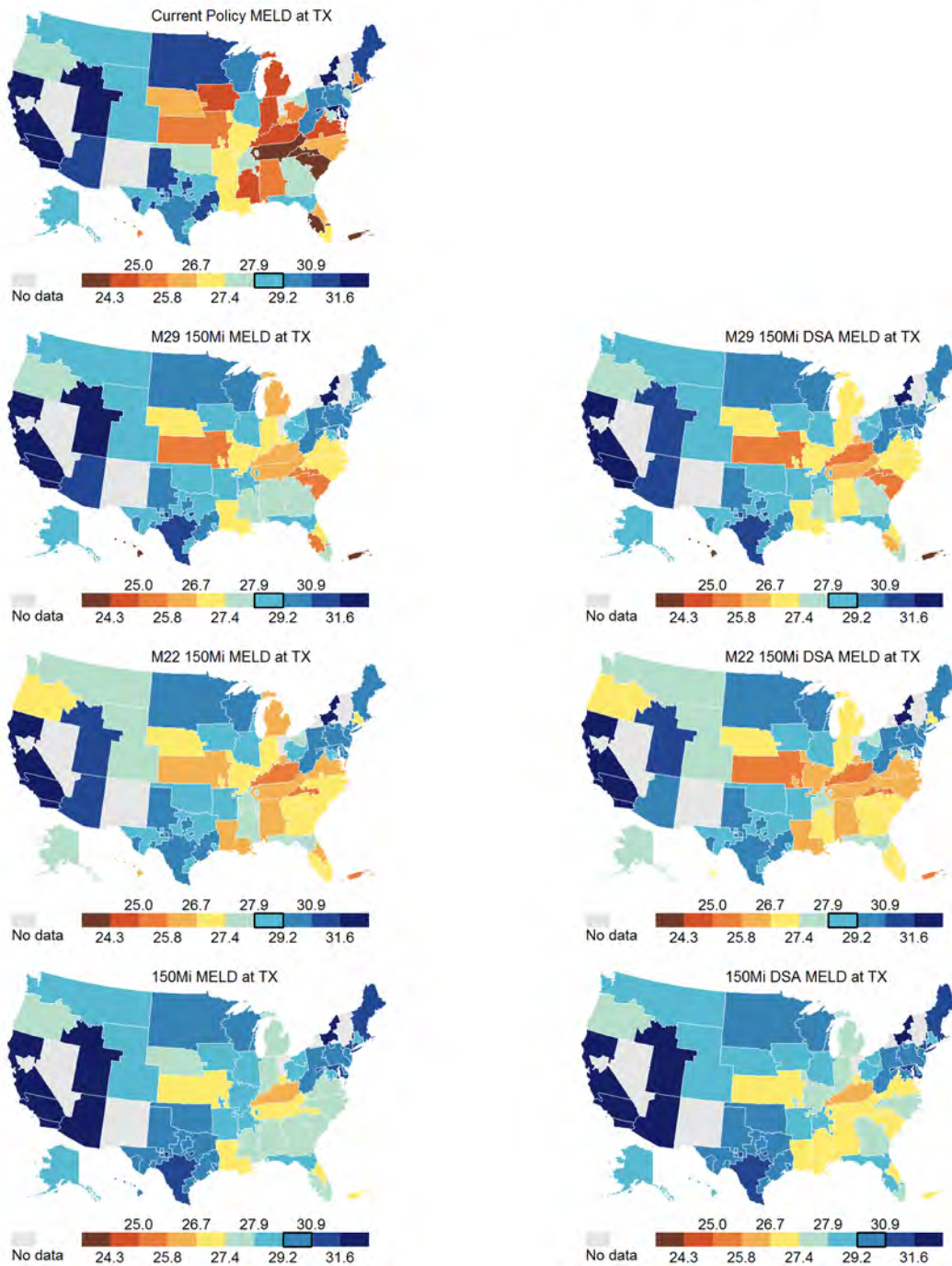


Figure 3 Maps of median allocation MELD/PELD at transplant by DSA

Maps of Median Calculated MELD/PELD at Transplant by DSA - No Exceptions

Maps of Median Calculated MELD/PELD at Transplant by DSA - No Exceptions

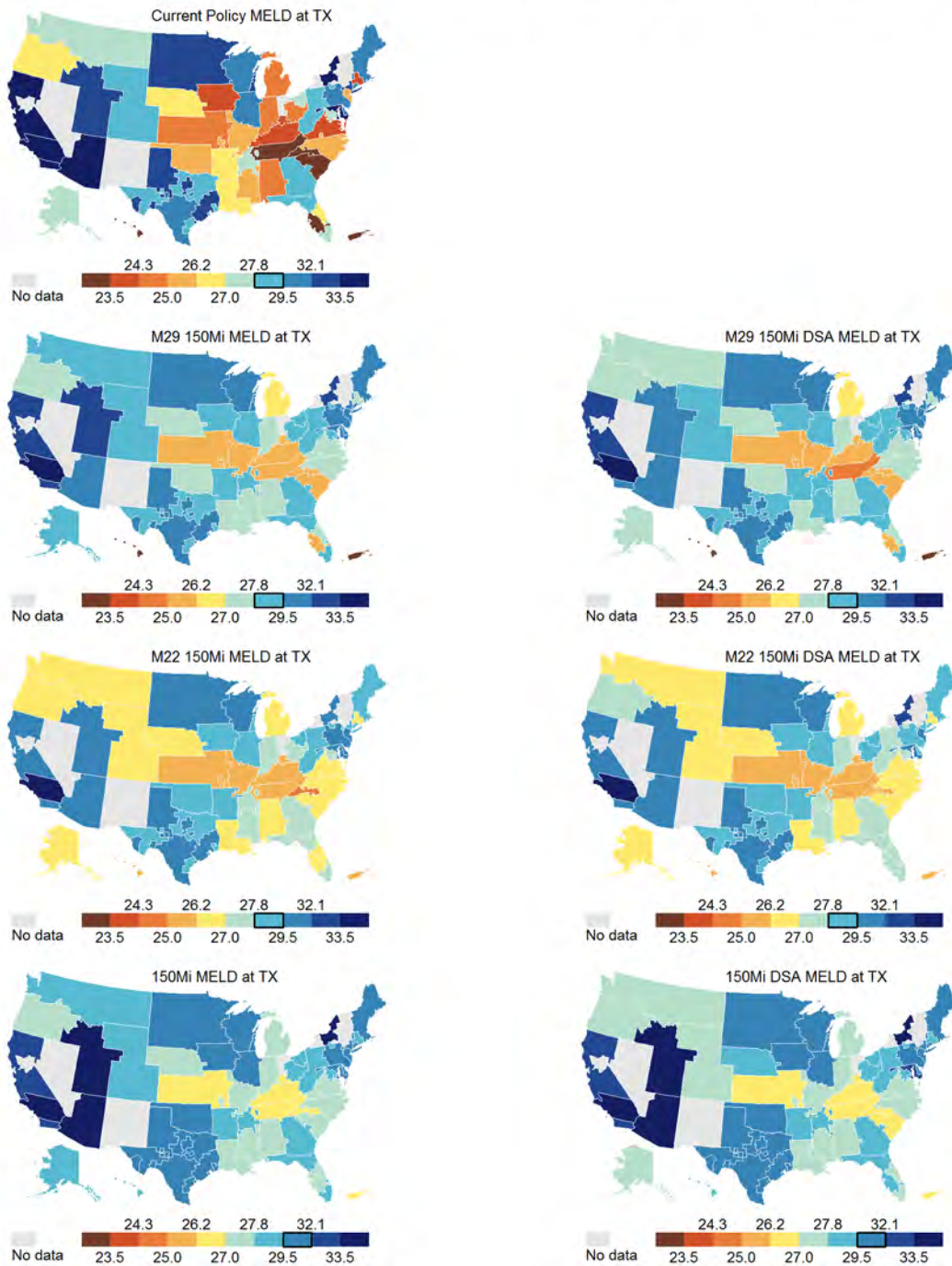


Figure 4 Maps of median calculated MELD/PELD at transplant by DSA - no exceptions

Transplant

Transplant Rates

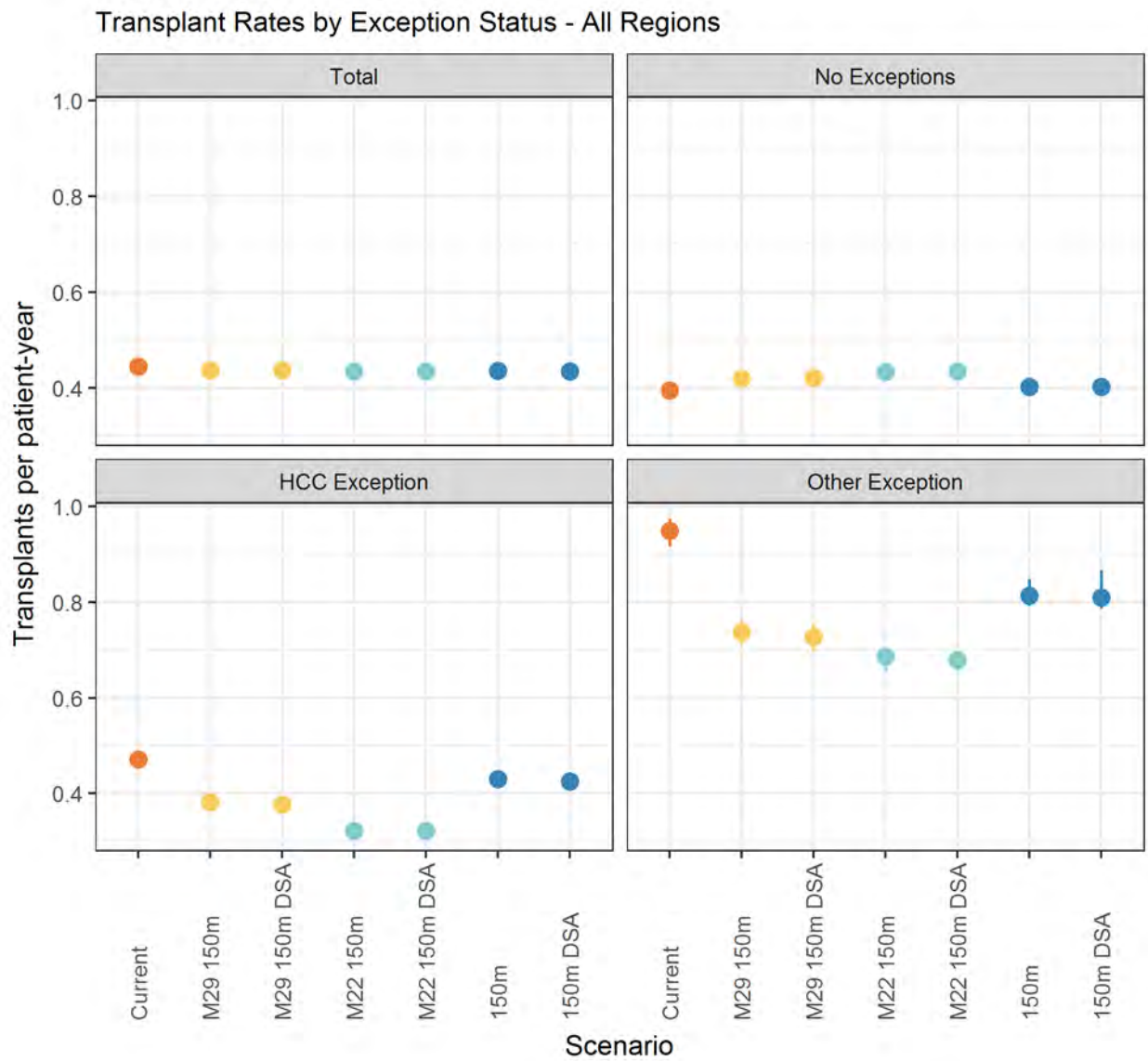


Figure 5 Transplant rates by exception status - all regions

Transplant Counts

Transplant Counts by Exception Status - All Regions

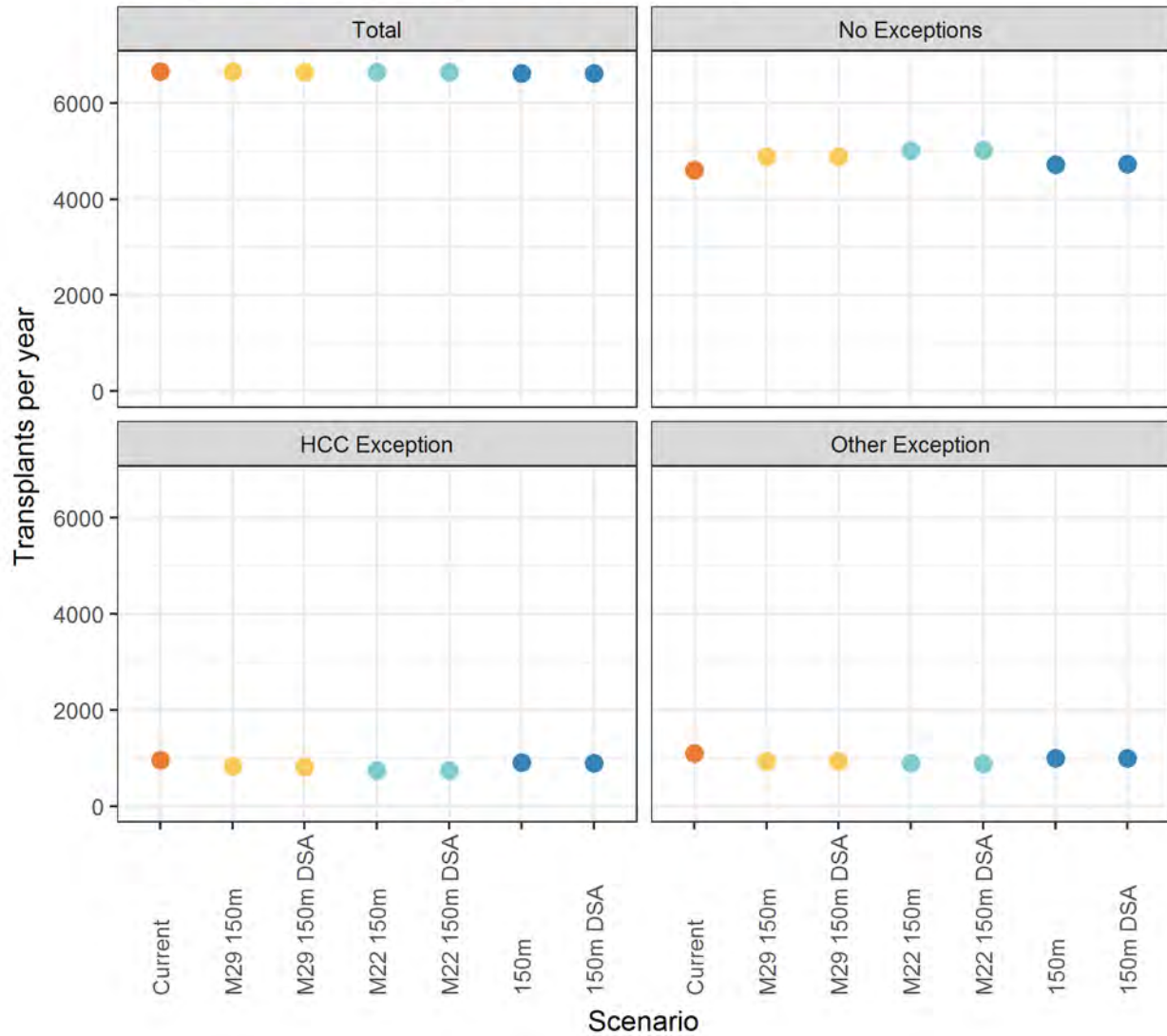


Figure 6 Transplant counts by exception status - all regions

Transplant Rates by Allocation MELD/PELD

Transplant Rates by Allocation MELD/PELD - All Regions

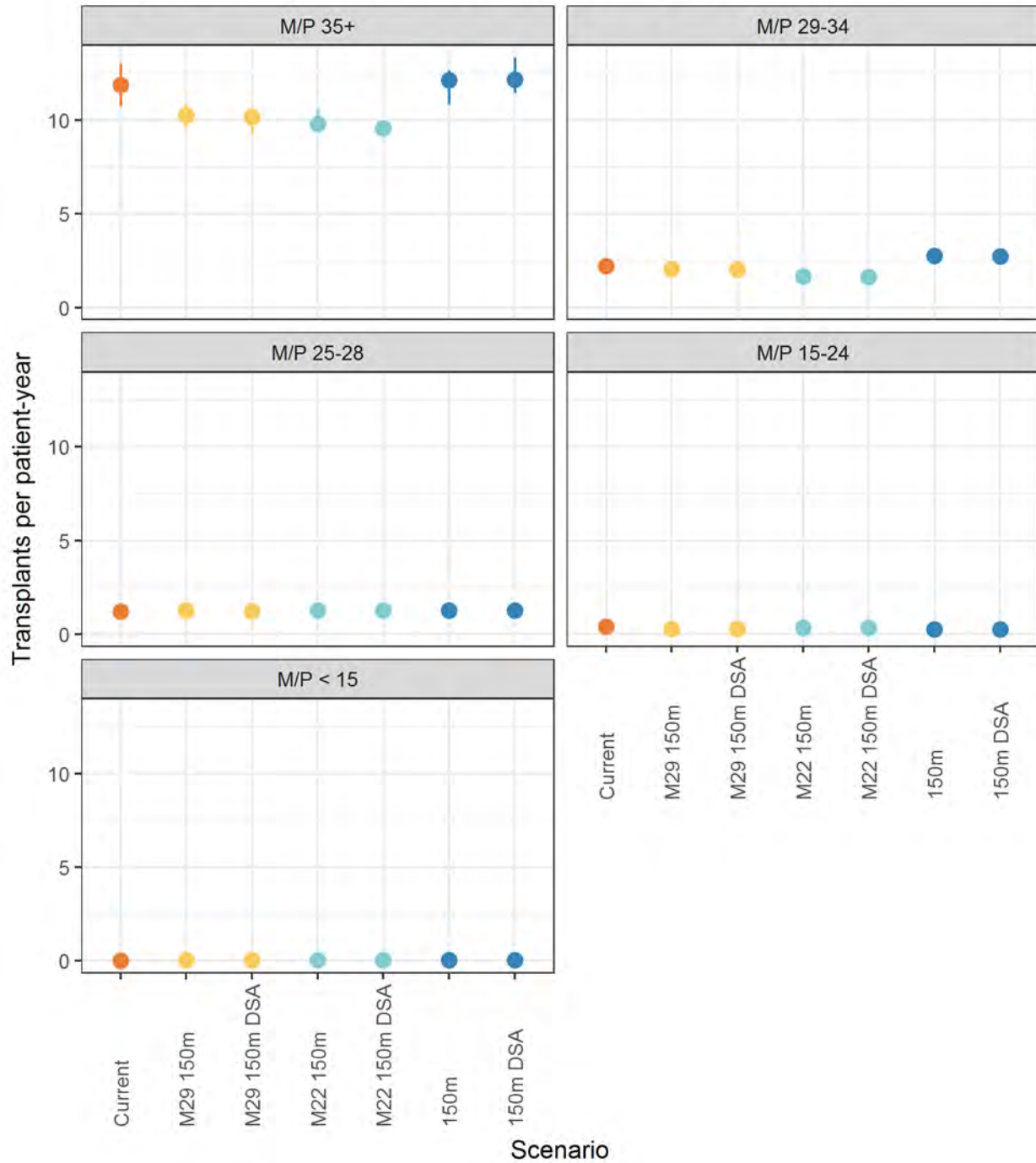


Figure 7 Transplant rates by allocation MELD/PELD - all regions

Transplant Counts by Allocation MELD/PELD

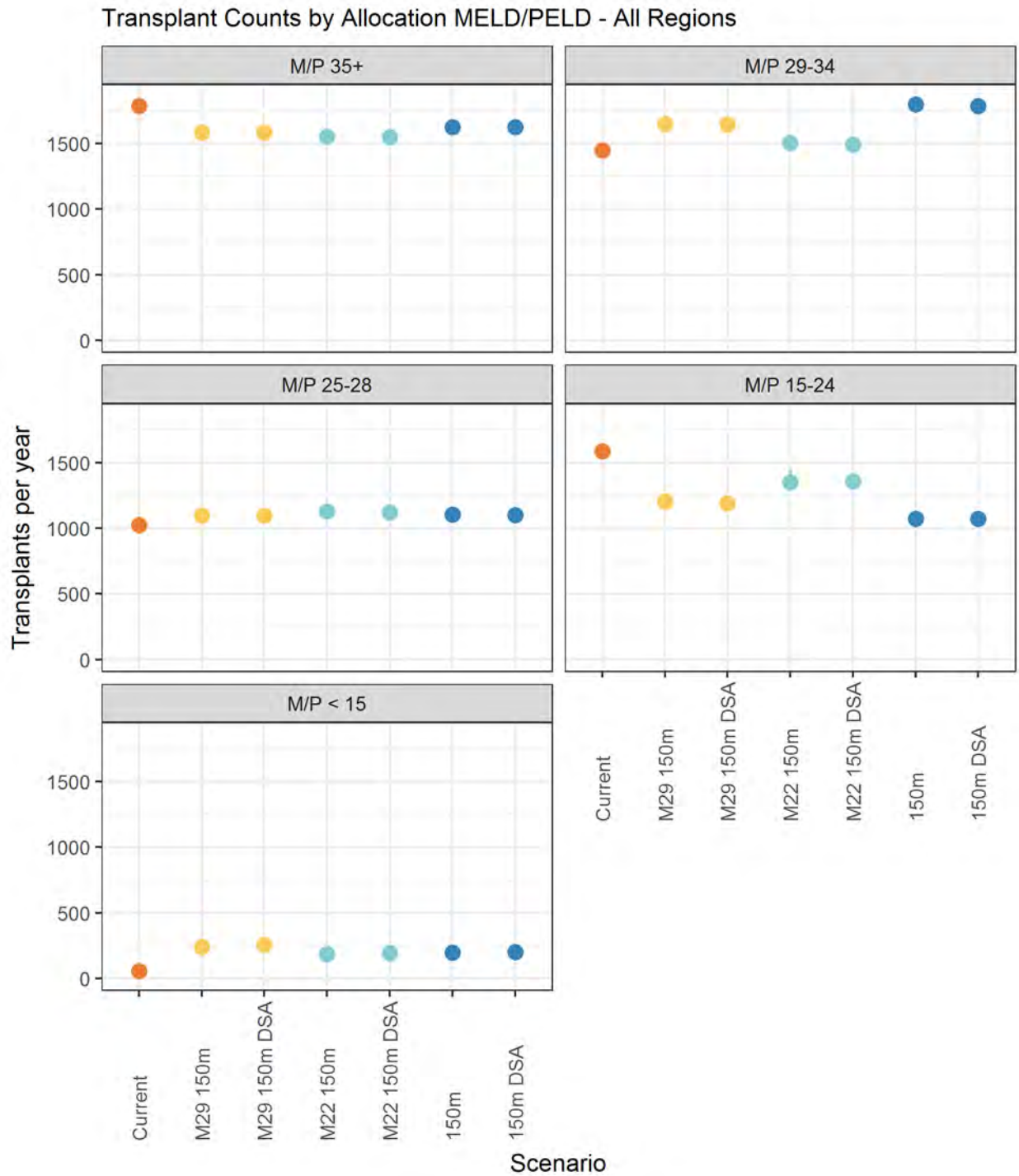


Figure 8 Transplant counts by allocation MELD/PELD - all regions

Variance in Transplant Rates by DSA

Variance in Transplant Rates by DSA by Exception Status

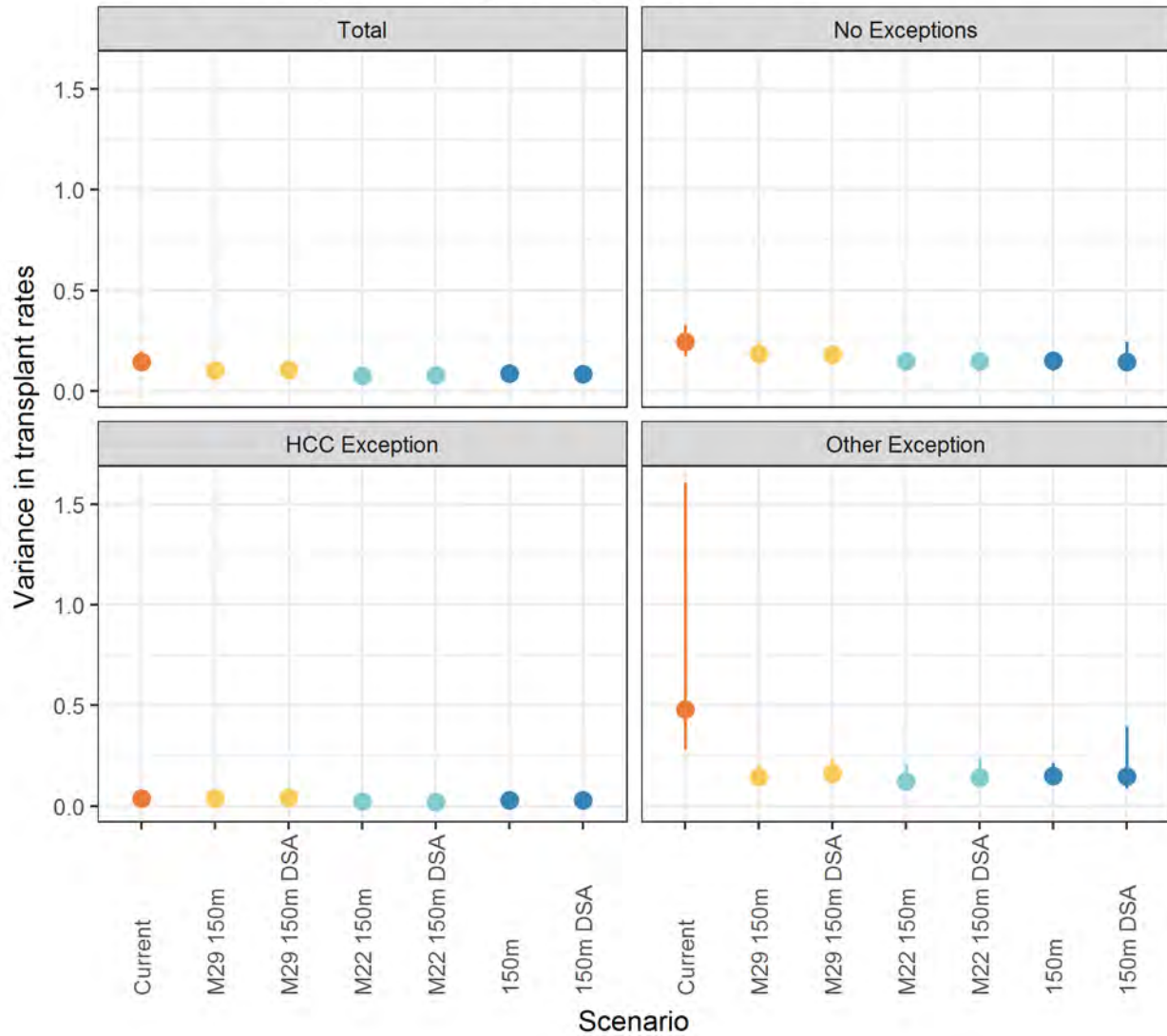


Figure 9 Variance in transplant rates by DSA by exception status

Maps of Transplant Rates by DSA

Maps of Transplant Rates by DSA

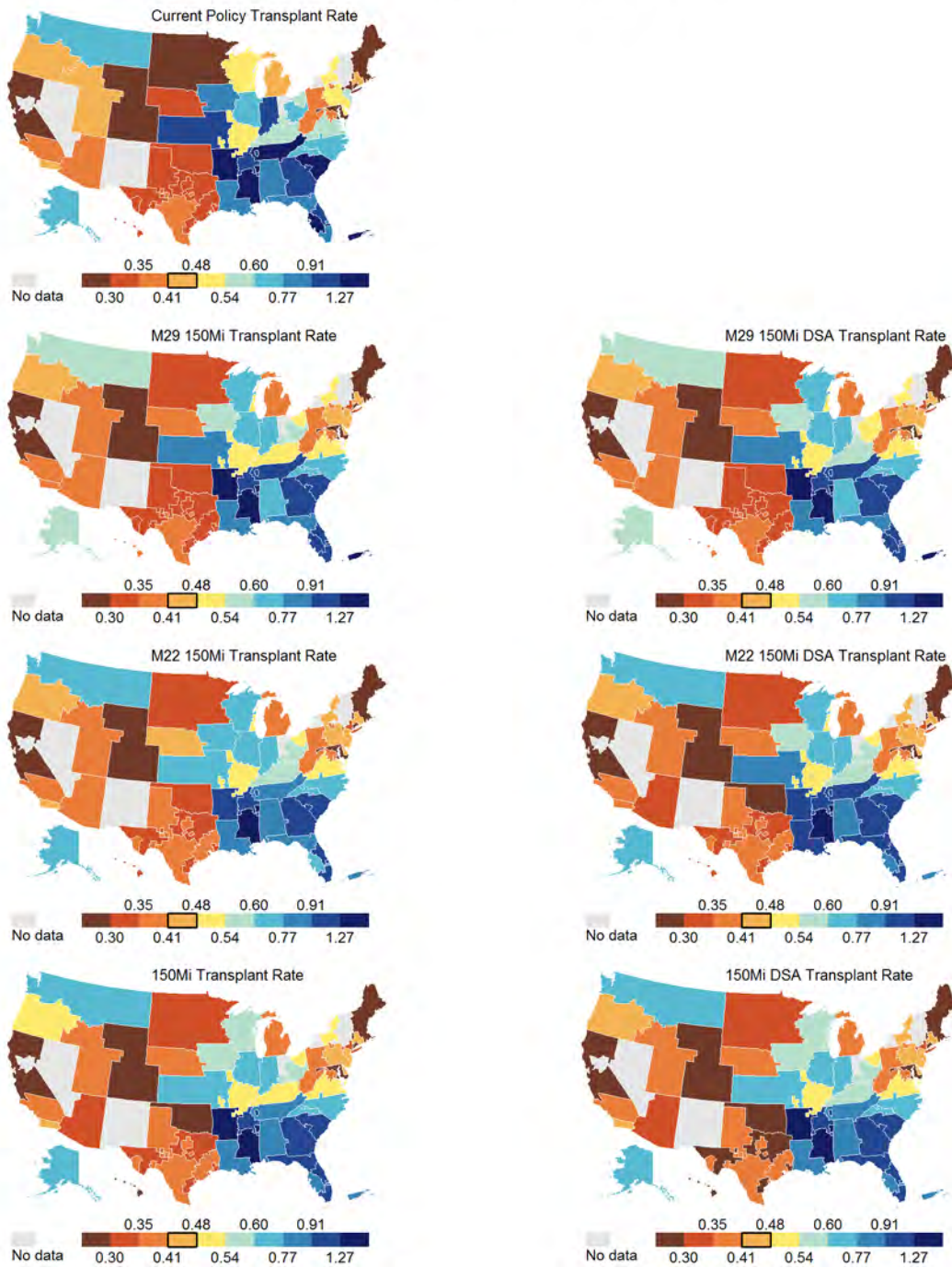


Figure 10 Maps of transplant rates by DSA

Waitlist Mortality

Waitlist Mortality Rates

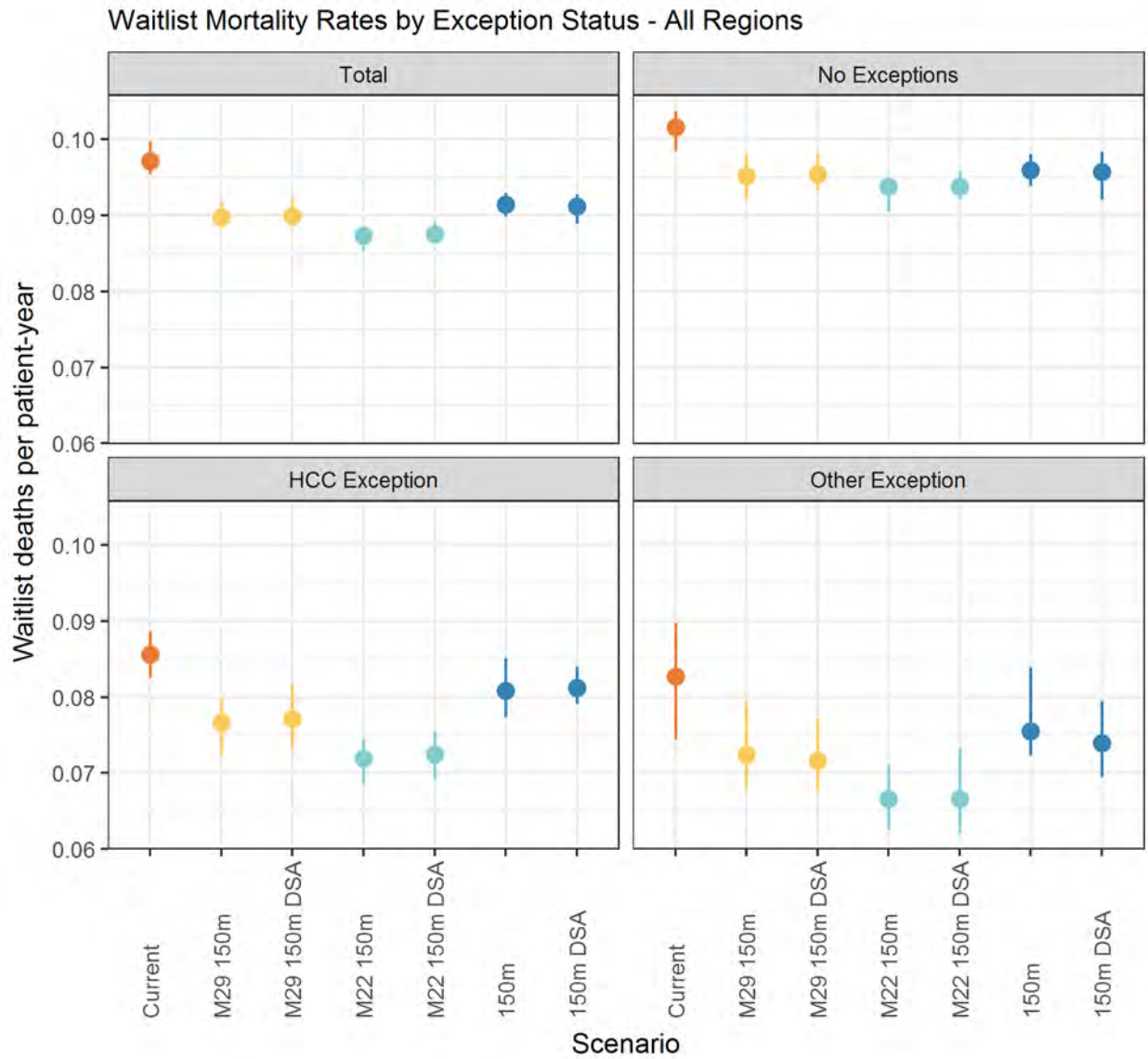


Figure 11 Waitlist mortality rates by exception status - all regions

Waitlist Mortality Counts

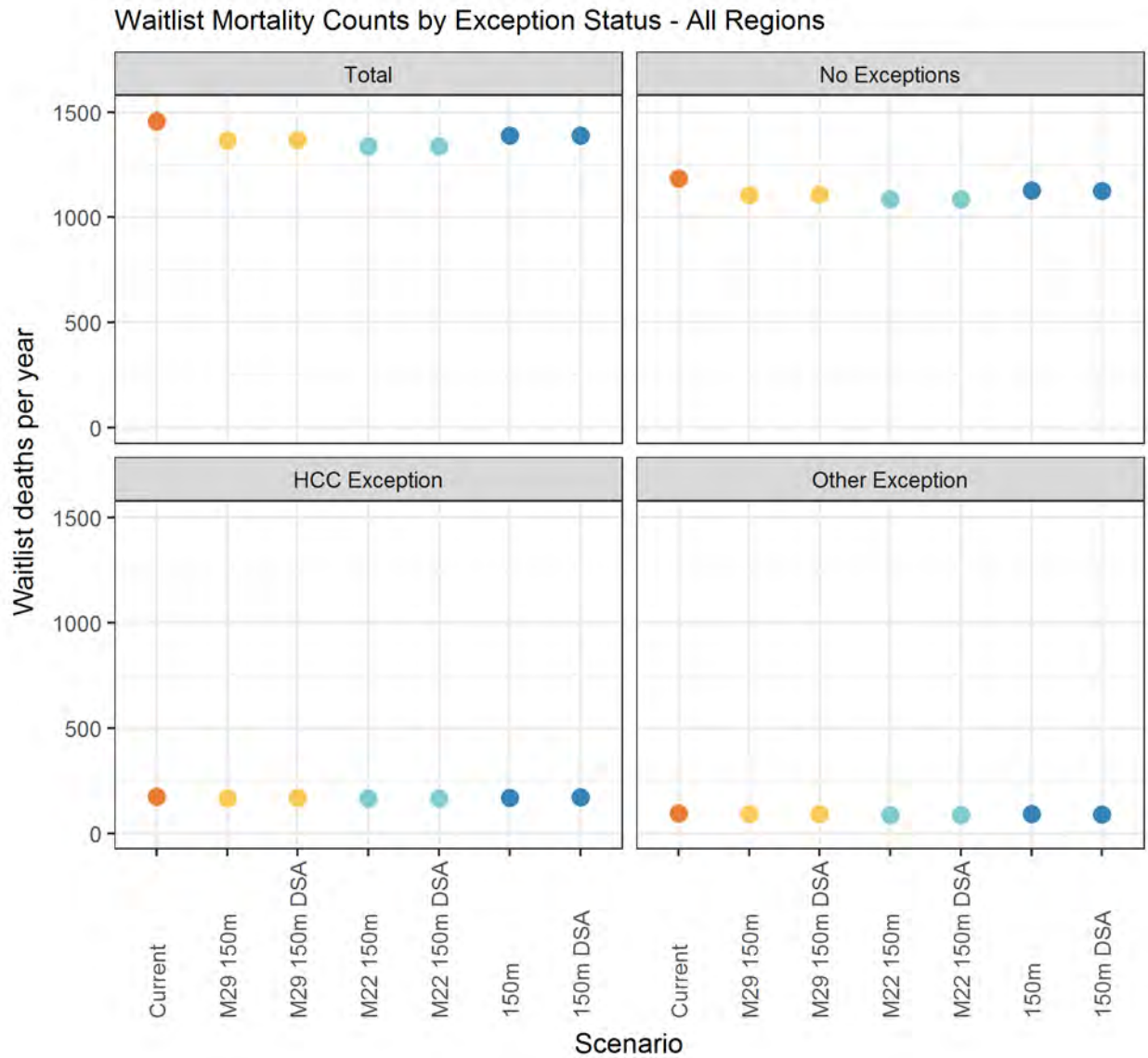


Figure 12 Waitlist mortality counts by exception status - all regions

Waitlist Mortality Rates by Allocation MELD/PELD

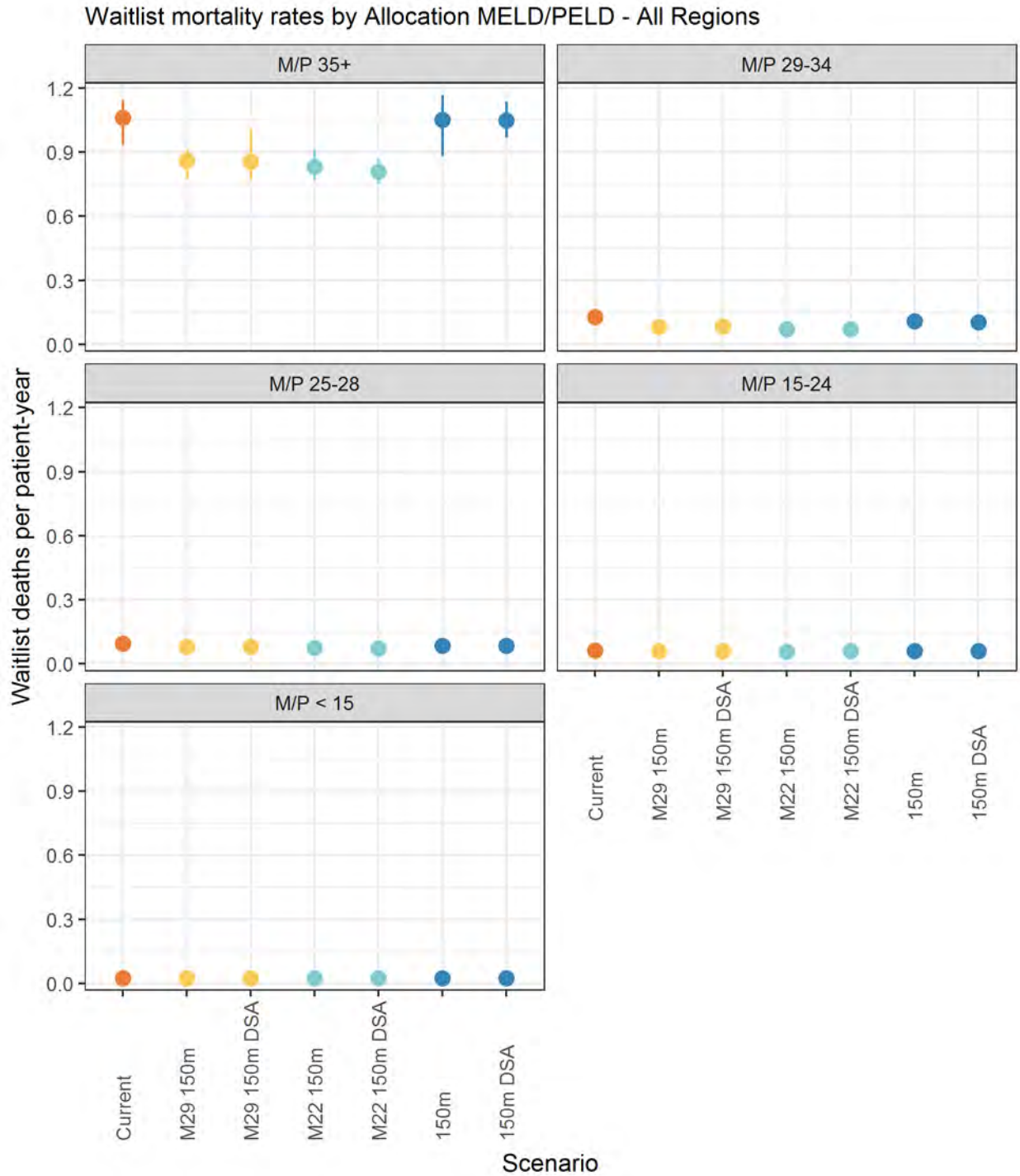


Figure 13 Waitlist mortality rates by allocation MELD/PELD - all regions

Waitlist Mortality Counts by Allocation MELD/PELD

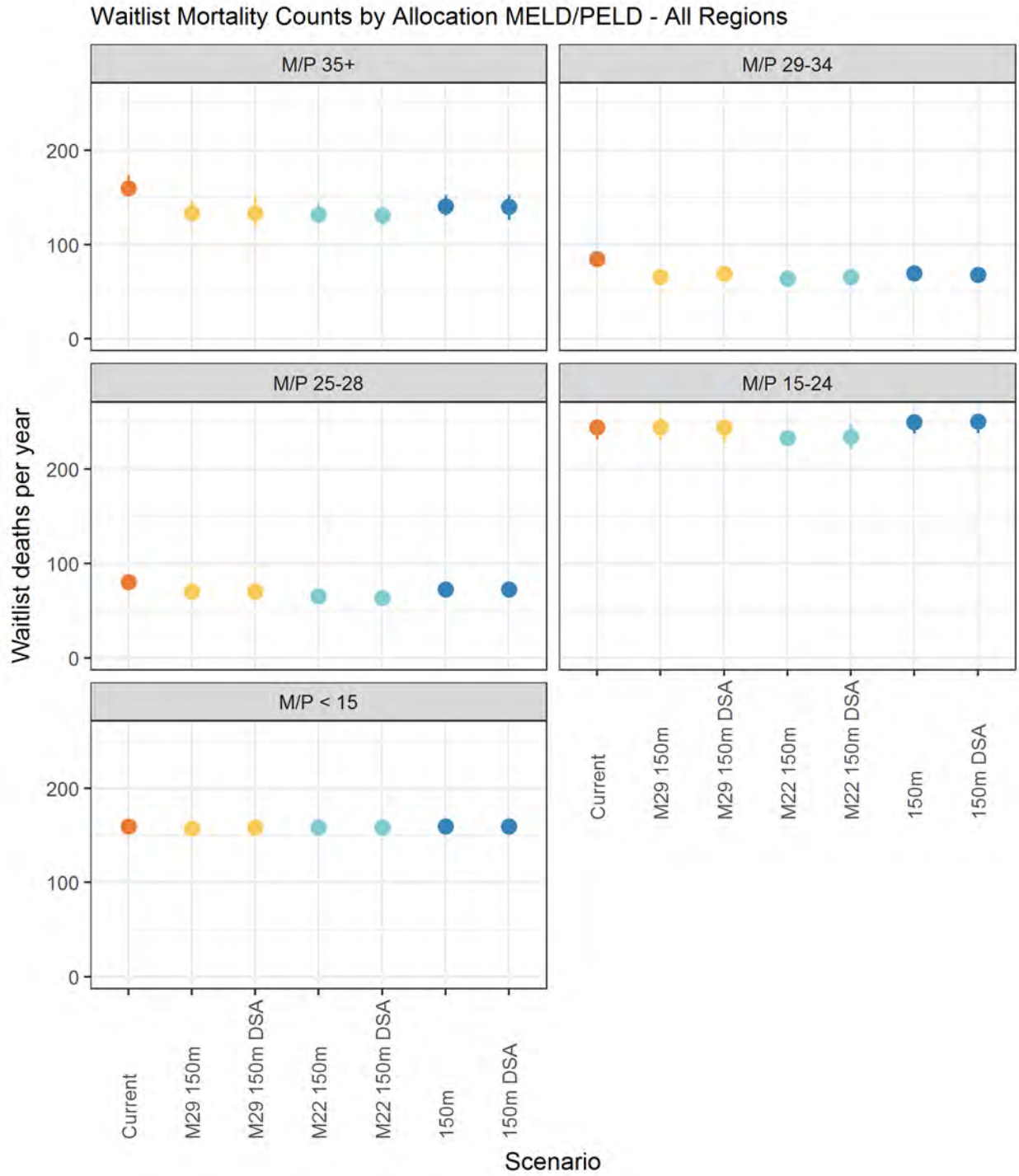


Figure 14 Waitlist mortality counts by allocation MELD/PELD - all regions

Variance in Waitlist Mortality Rates by DSA

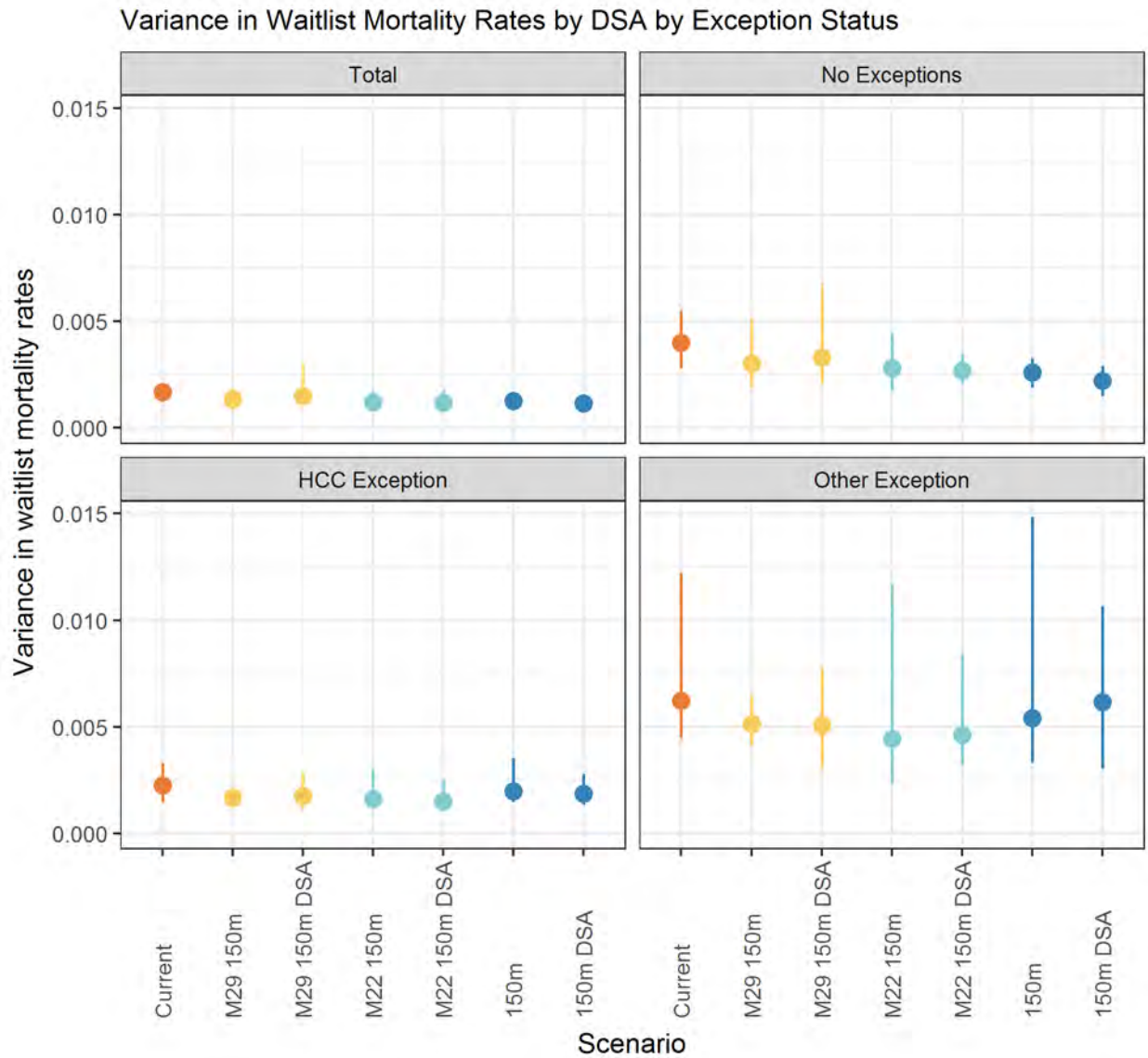


Figure 15 Variance in waitlist mortality rates by DSA by exception status

Maps of Waitlist Mortality Rates by DSA

Maps of Waitlist Mortality Rates by DSA

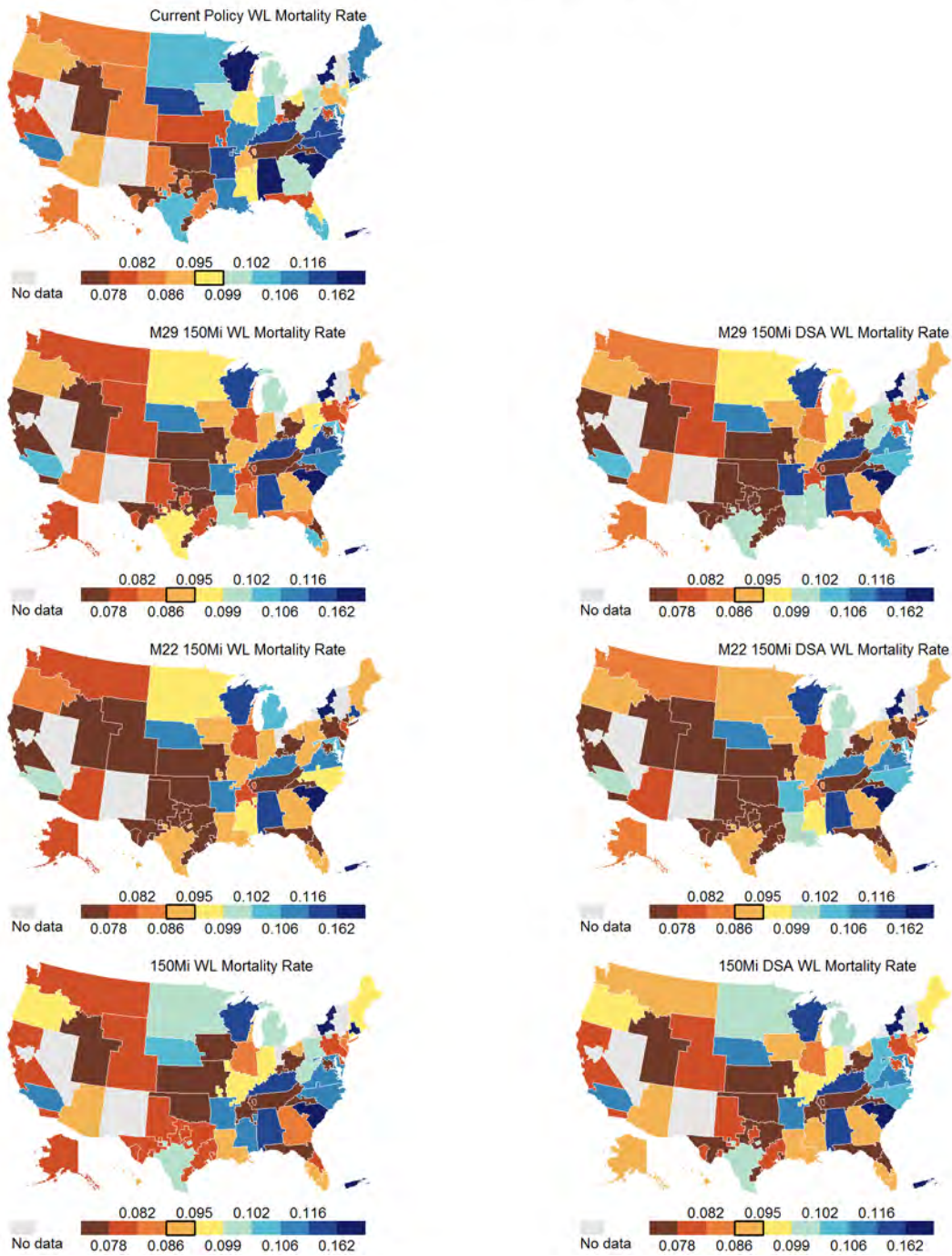


Figure 16 Maps of waitlist mortality rates by DSA

Posttransplant Mortality

Posttransplant Mortality Rates

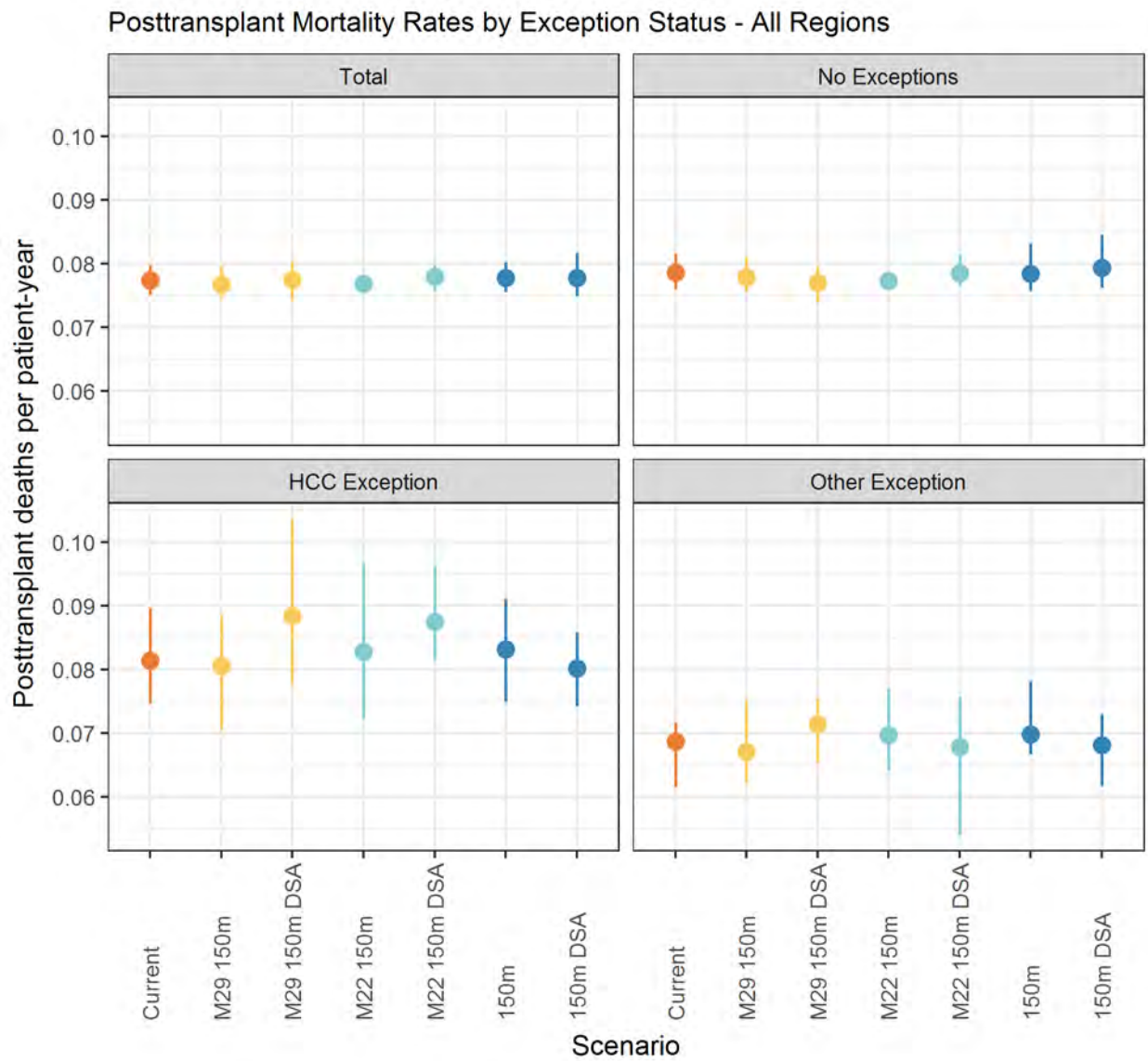


Figure 17 Posttransplant mortality rates by exception status - all regions

Posttransplant Mortality Counts



Figure 18 Posttransplant mortality counts by exception status - all regions

Transport

Median Transport Time

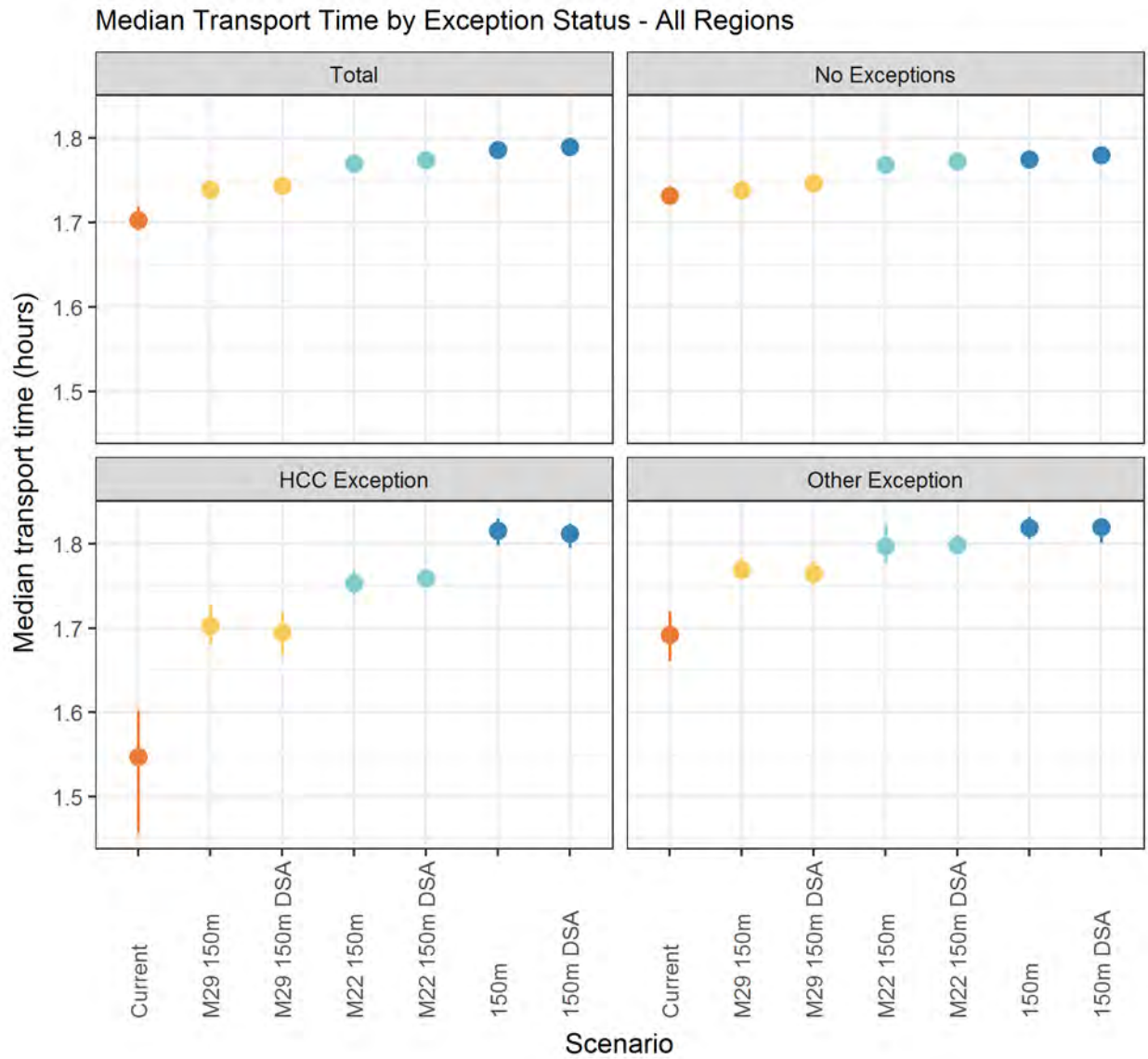


Figure 19 Median Transport Time by exception status - all regions

Median Transport Distance

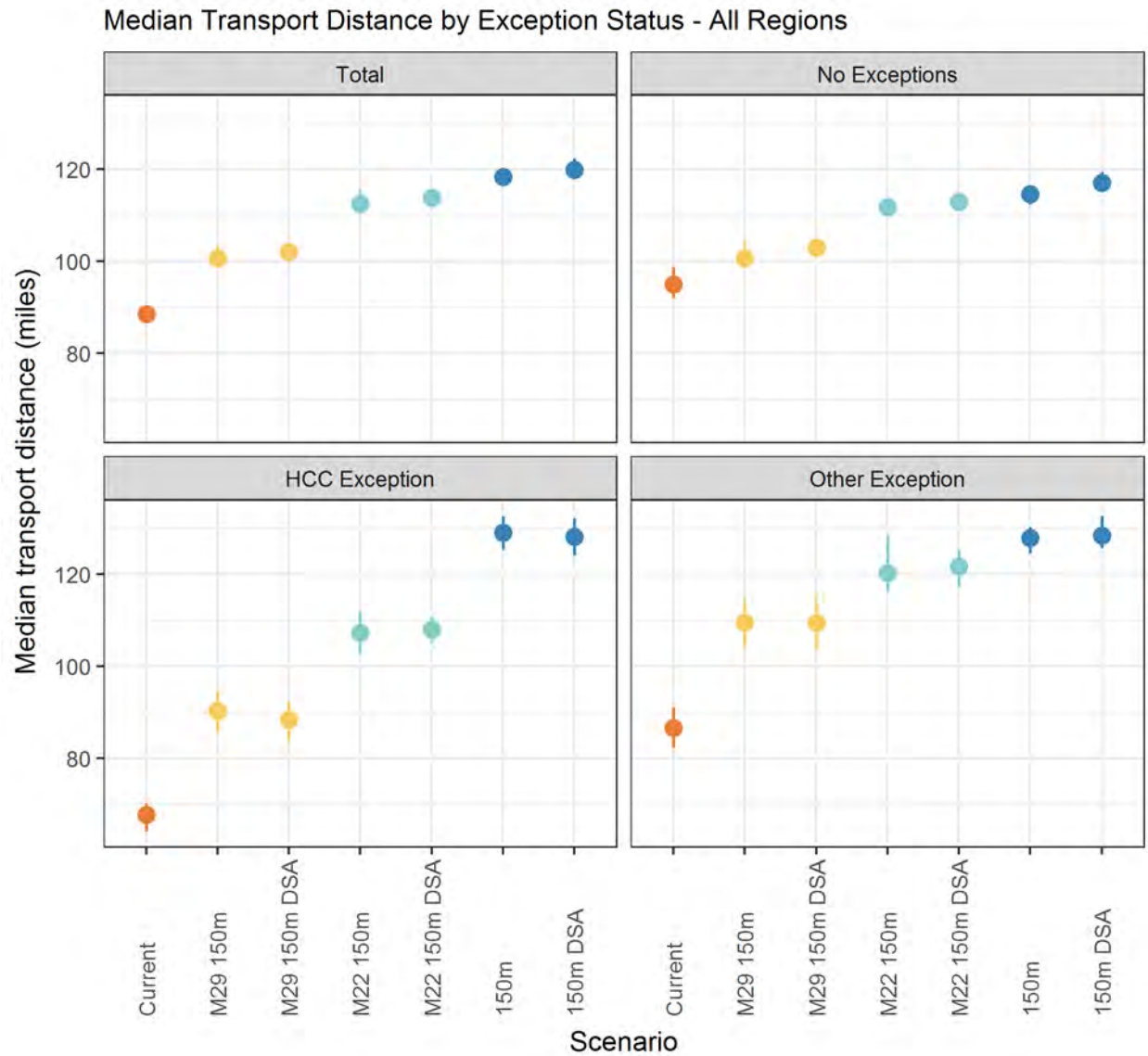


Figure 20 Median Transport Distance by exception status - all regions

Percent of Organs Flown

Percent of Organs Flown by Exception Status - All Regions

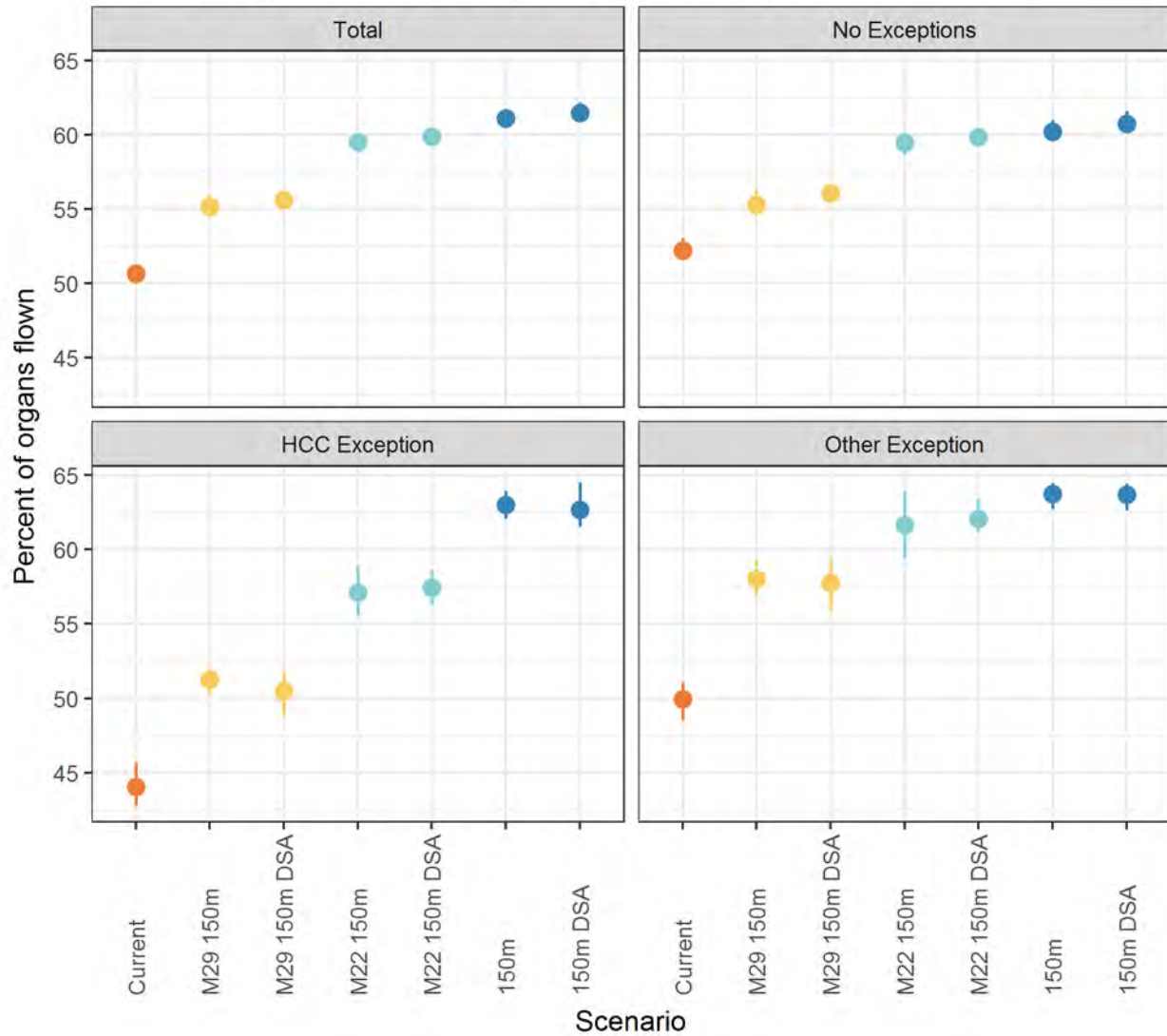


Figure 21 Percent of Organs Flown by exception status - all regions

Percent of Organs Transplanted Locally (Within Donor DSA)

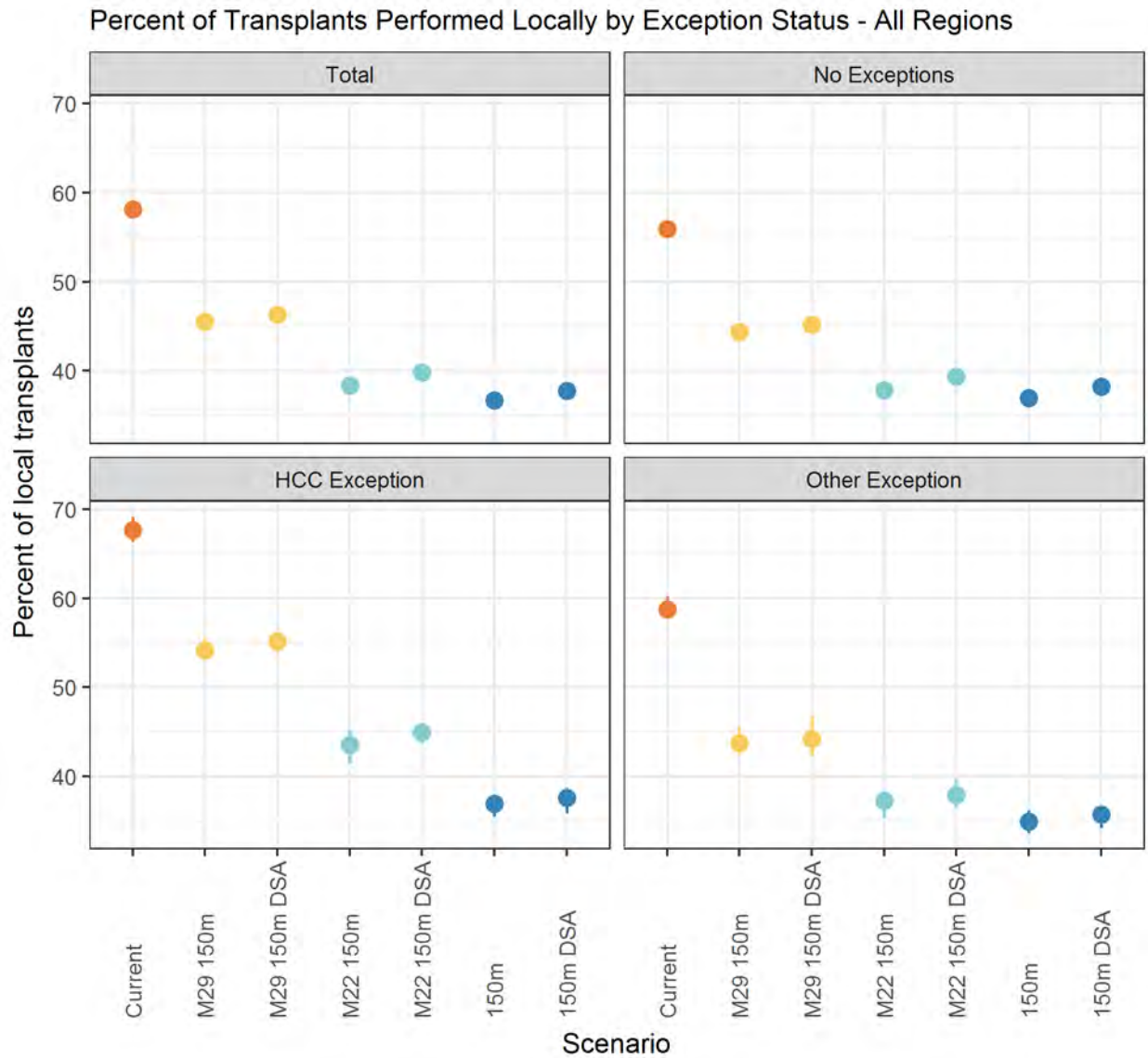


Figure 22 Percent of Organs Transplanted Locally by exception status - all regions

Appendix A: Results by UNOS region

Allocation MELD/PELD at Transplant

Median Allocation MELD/PELD at Transplant



Figure 23 Median allocation MELD/PELD at transplant by exception status - region 1

Median Allocation M/P at Transplant by Exception Status - Region 2

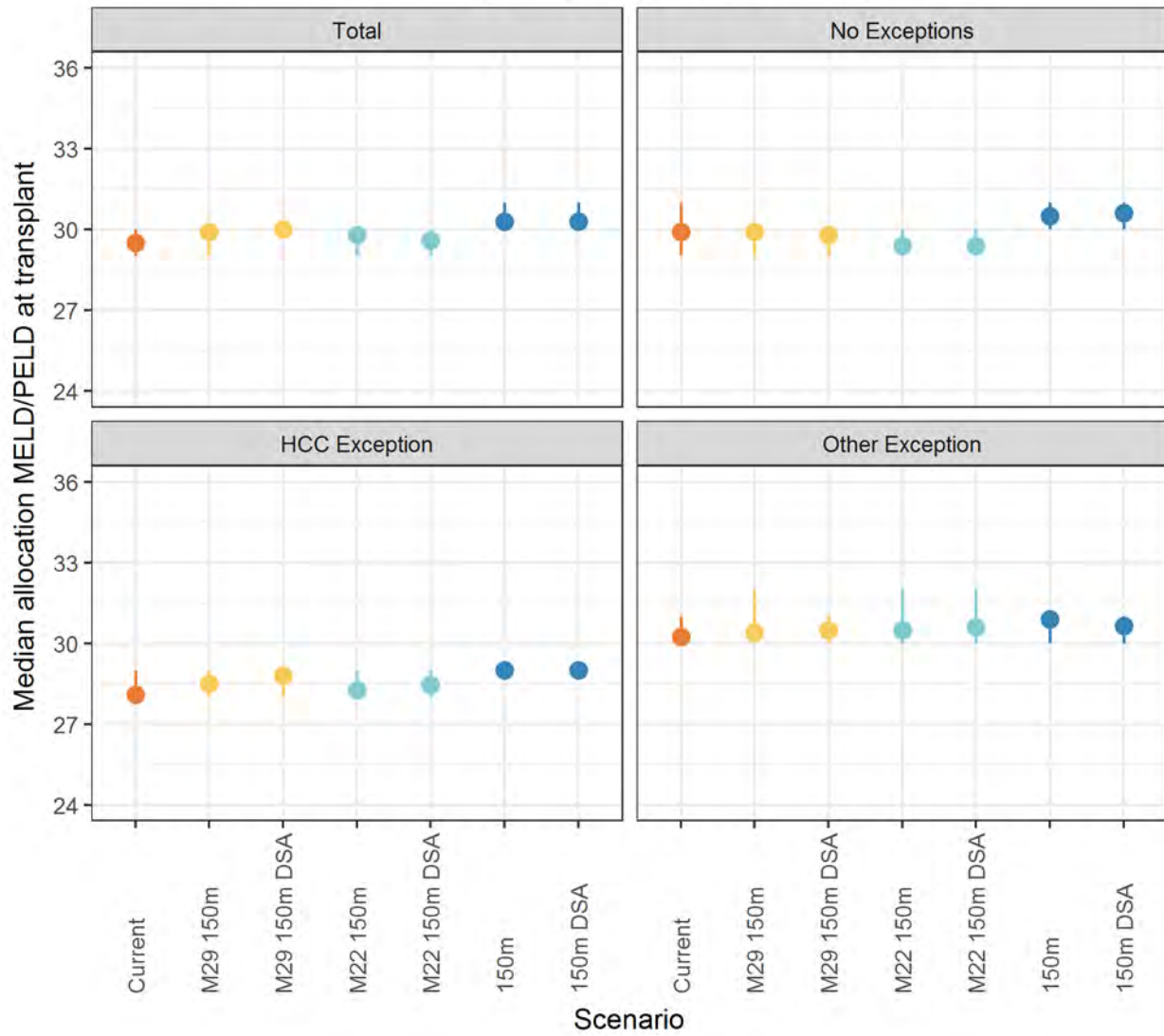


Figure 24 Median allocation MELD/PELD at transplant by exception status - region 2

Median Allocation M/P at Transplant by Exception Status - Region 3

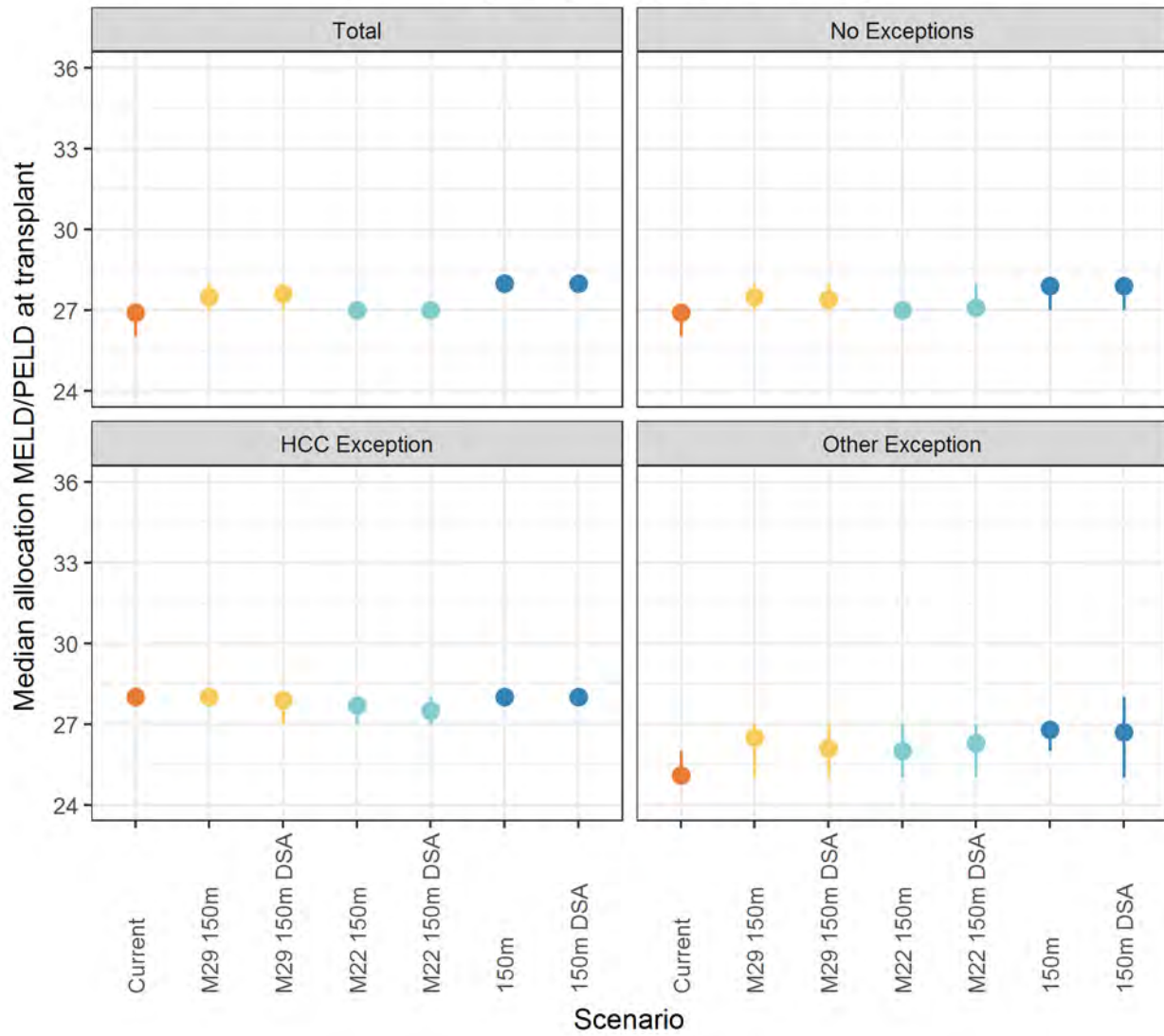


Figure 25 Median allocation MELD/PELD at transplant by exception status - region 3

Median Allocation M/P at Transplant by Exception Status - Region 4

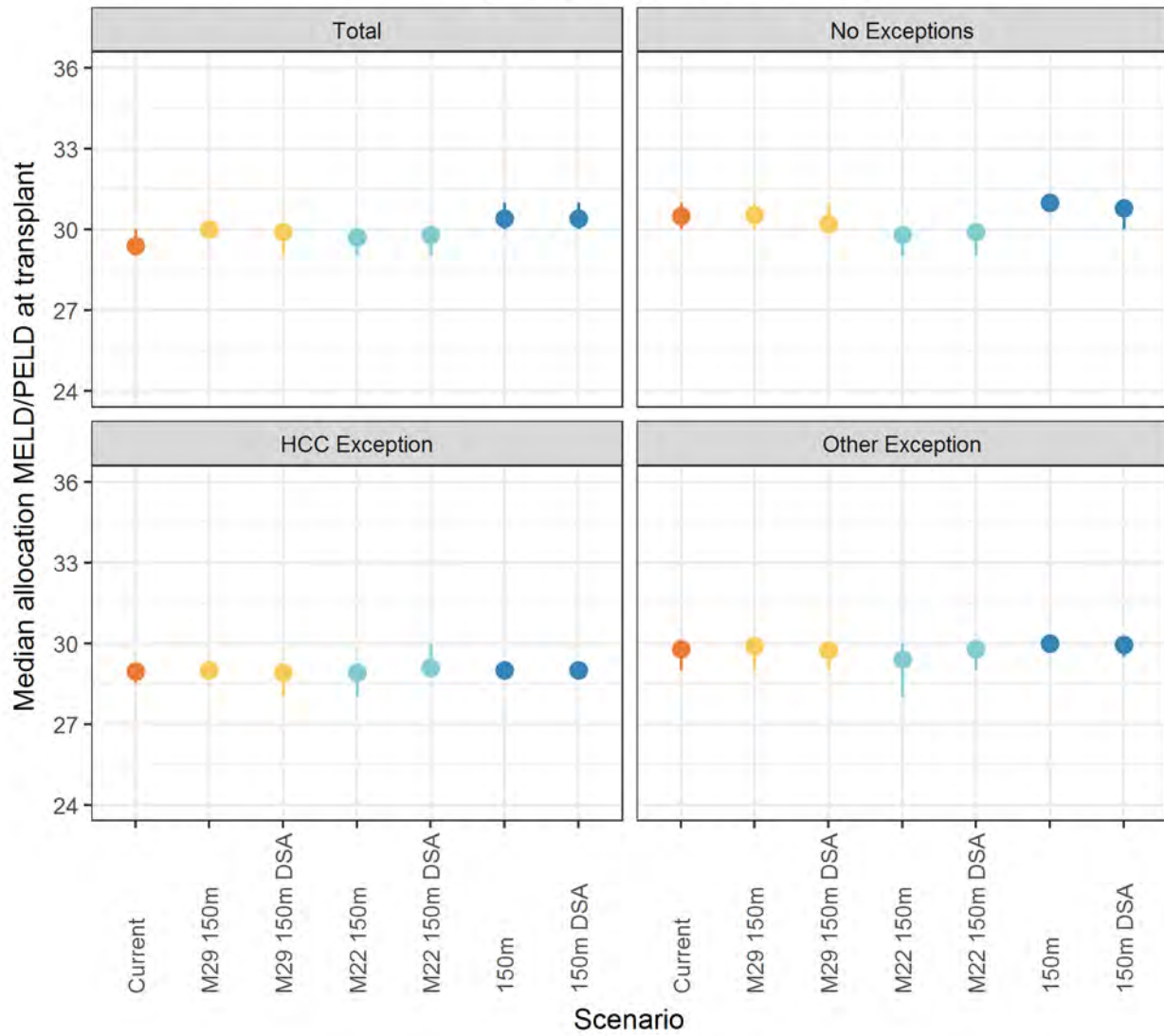


Figure 26 Median allocation MELD/PELD at transplant by exception status - region 4

Median Allocation M/P at Transplant by Exception Status - Region 5

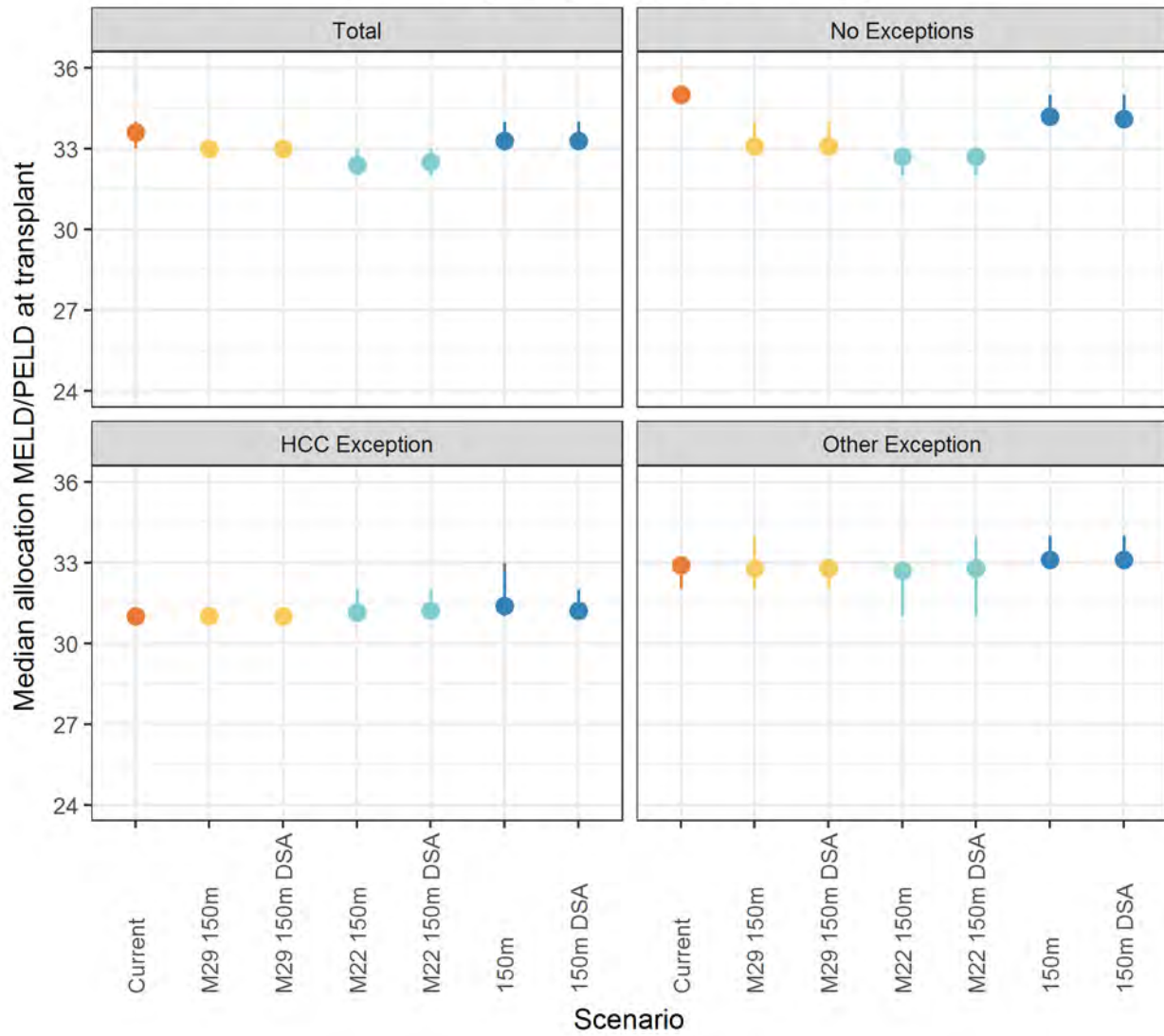


Figure 27 Median allocation MELD/PELD at transplant by exception status - region 5

Median Allocation M/P at Transplant by Exception Status - Region 6

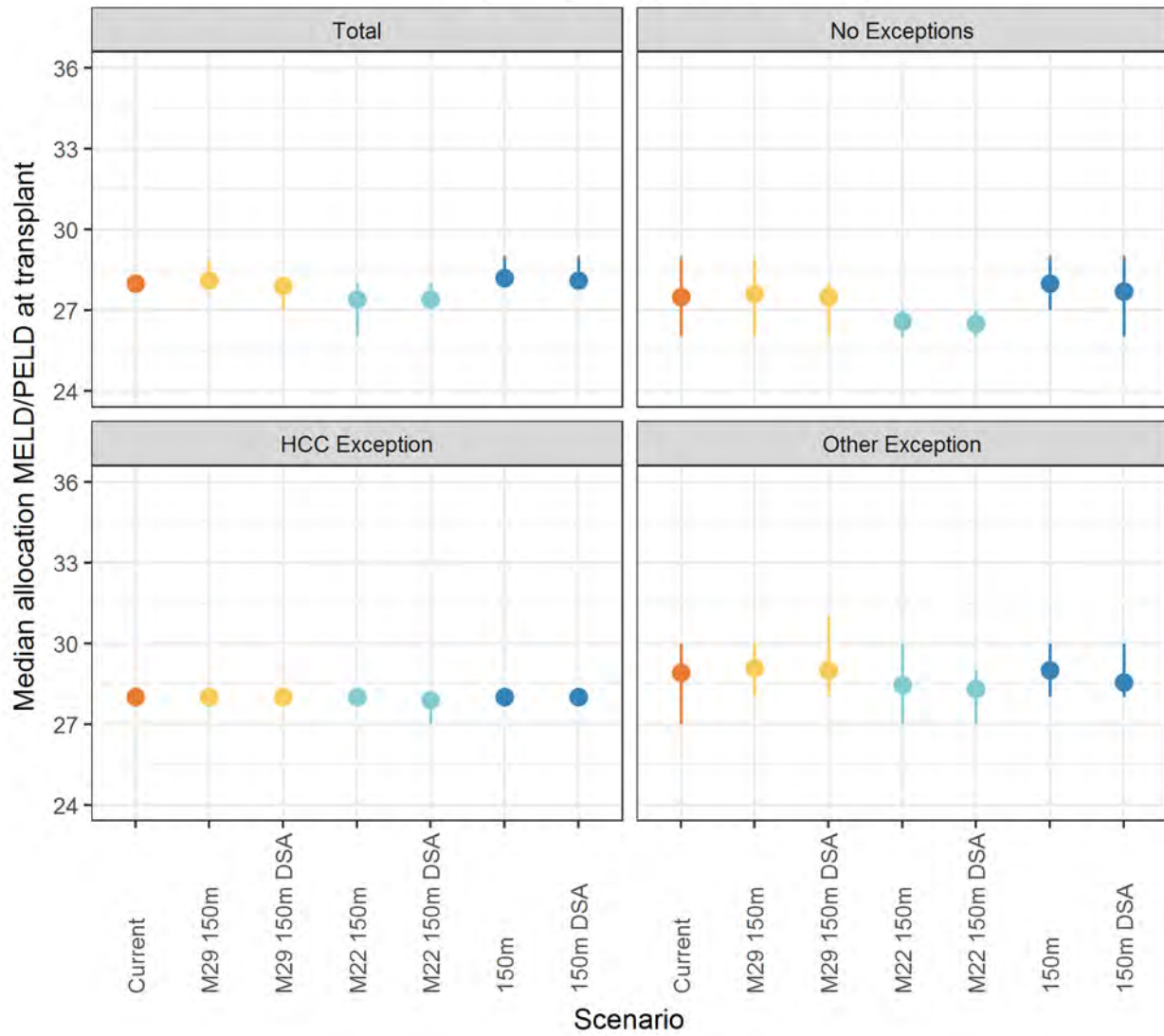


Figure 28 Median allocation MELD/PELD at transplant by exception status - region 6

Median Allocation M/P at Transplant by Exception Status - Region 7

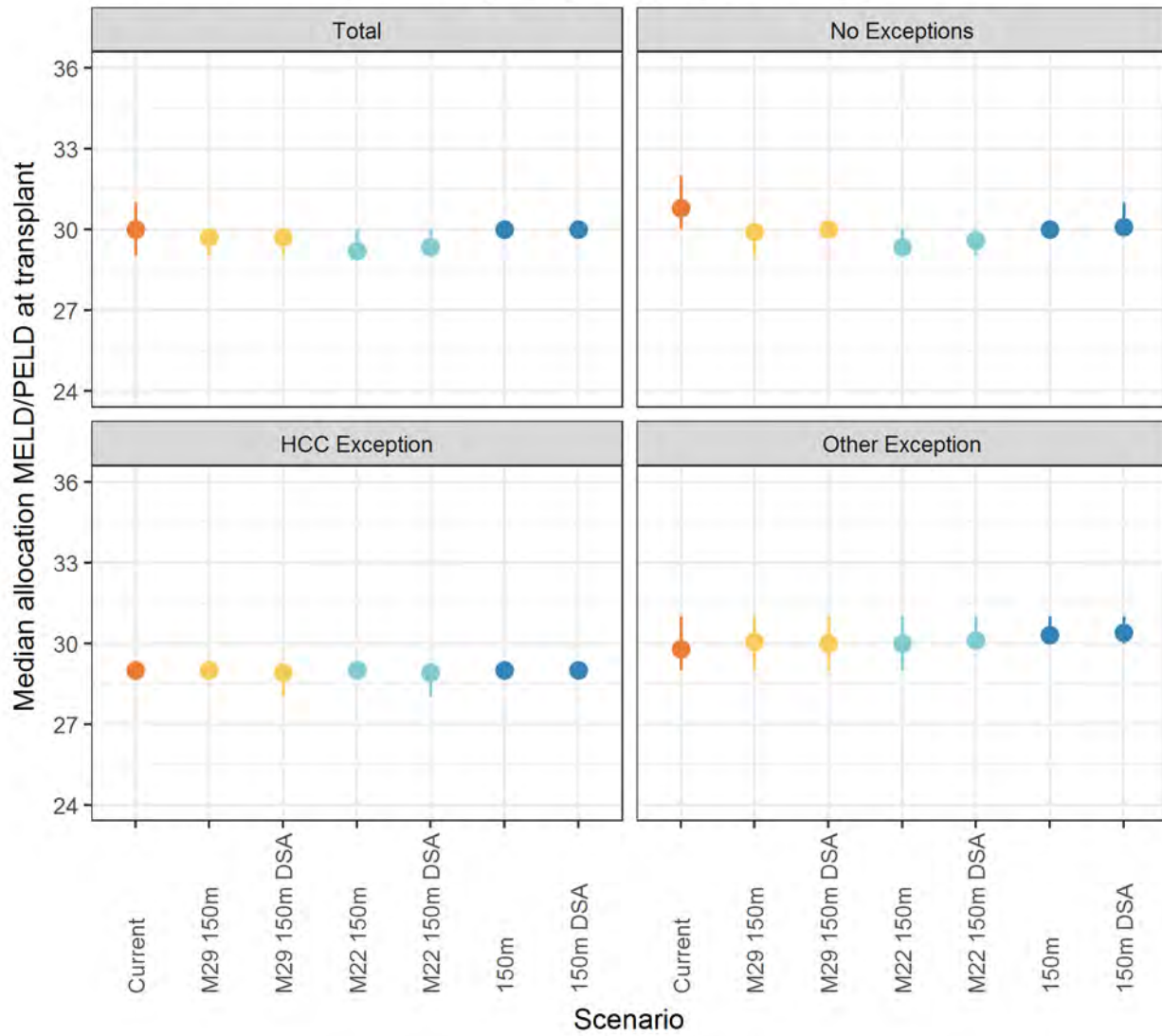


Figure 29 Median allocation MELD/PELD at transplant by exception status - region 7

Median Allocation M/P at Transplant by Exception Status - Region 8

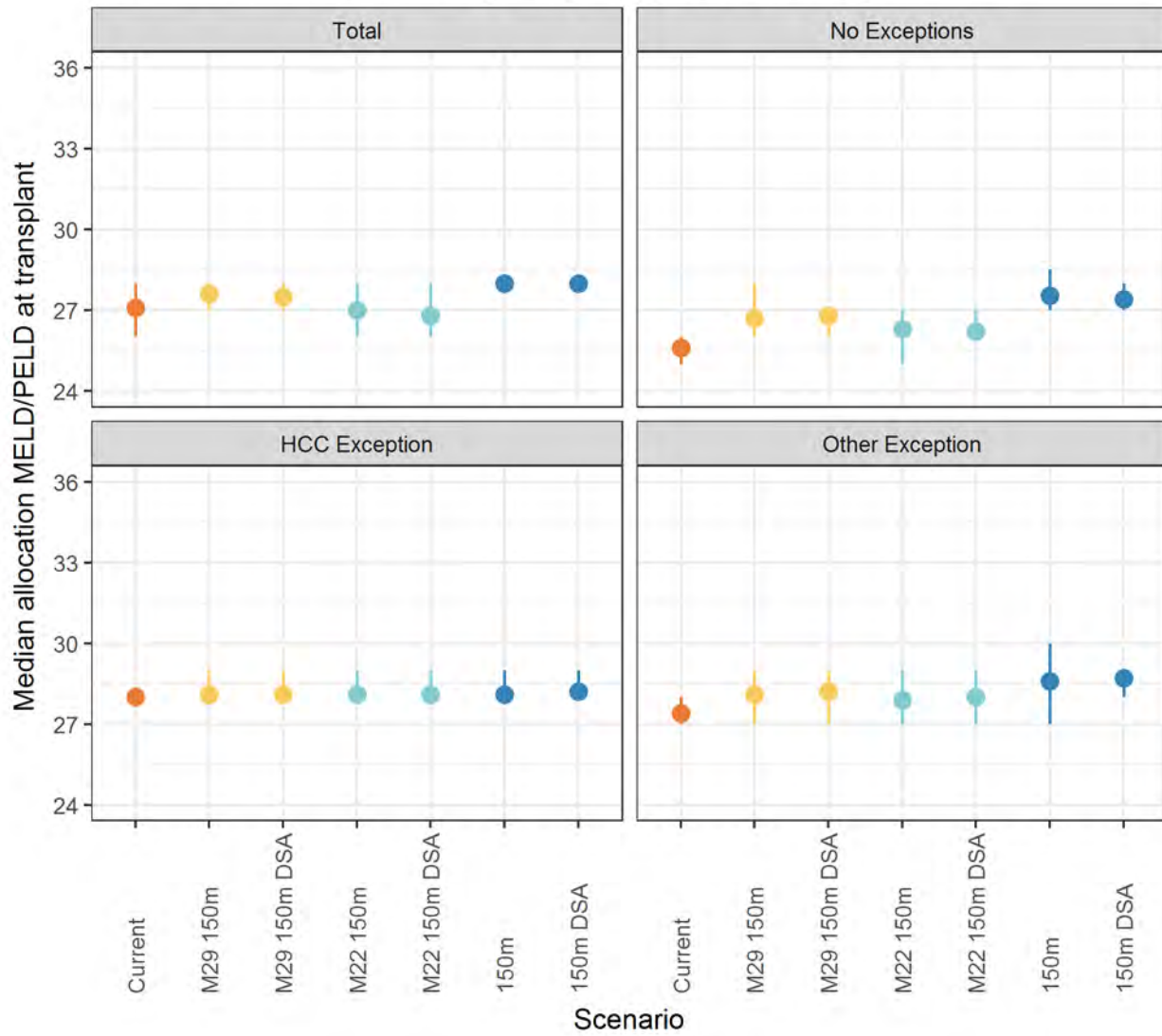


Figure 30 Median allocation MELD/PELD at transplant by exception status - region 8

Median Allocation M/P at Transplant by Exception Status - Region 9

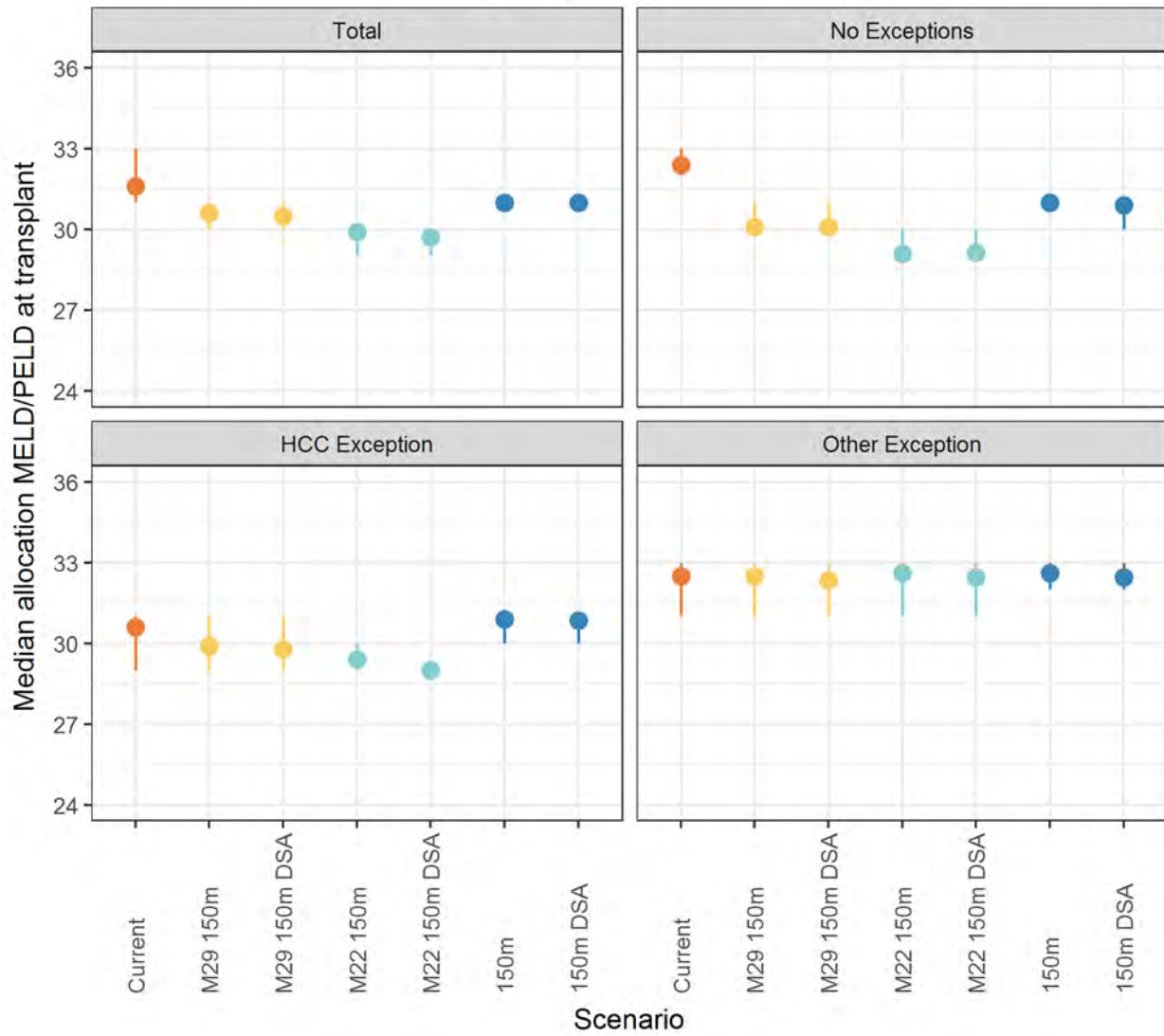


Figure 31 Median allocation MELD/PELD at transplant by exception status - region 9

Median Allocation M/P at Transplant by Exception Status - Region 10

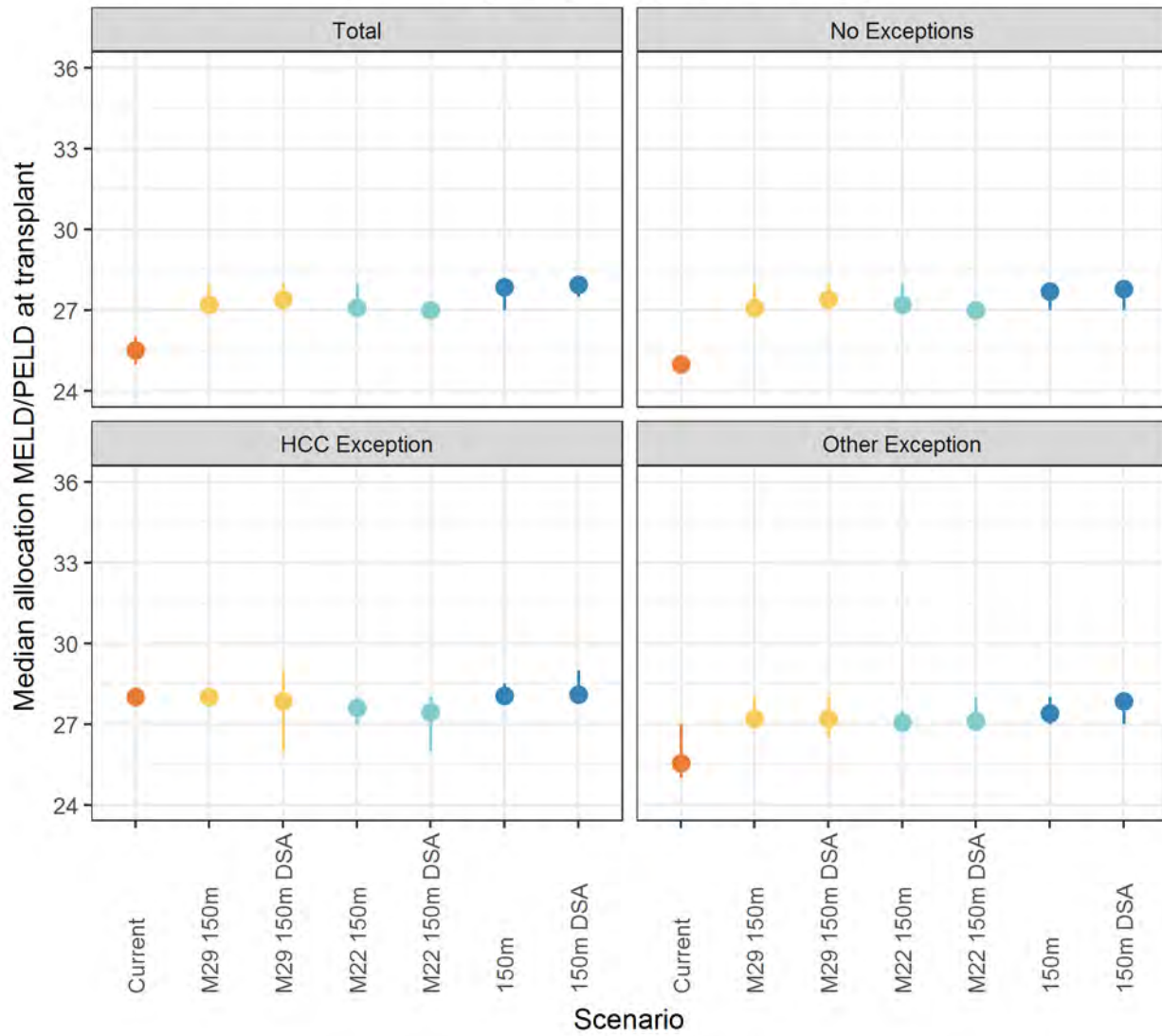


Figure 32 Median allocation MELD/PELD at transplant by exception status - region 10

Median Allocation M/P at Transplant by Exception Status - Region 11

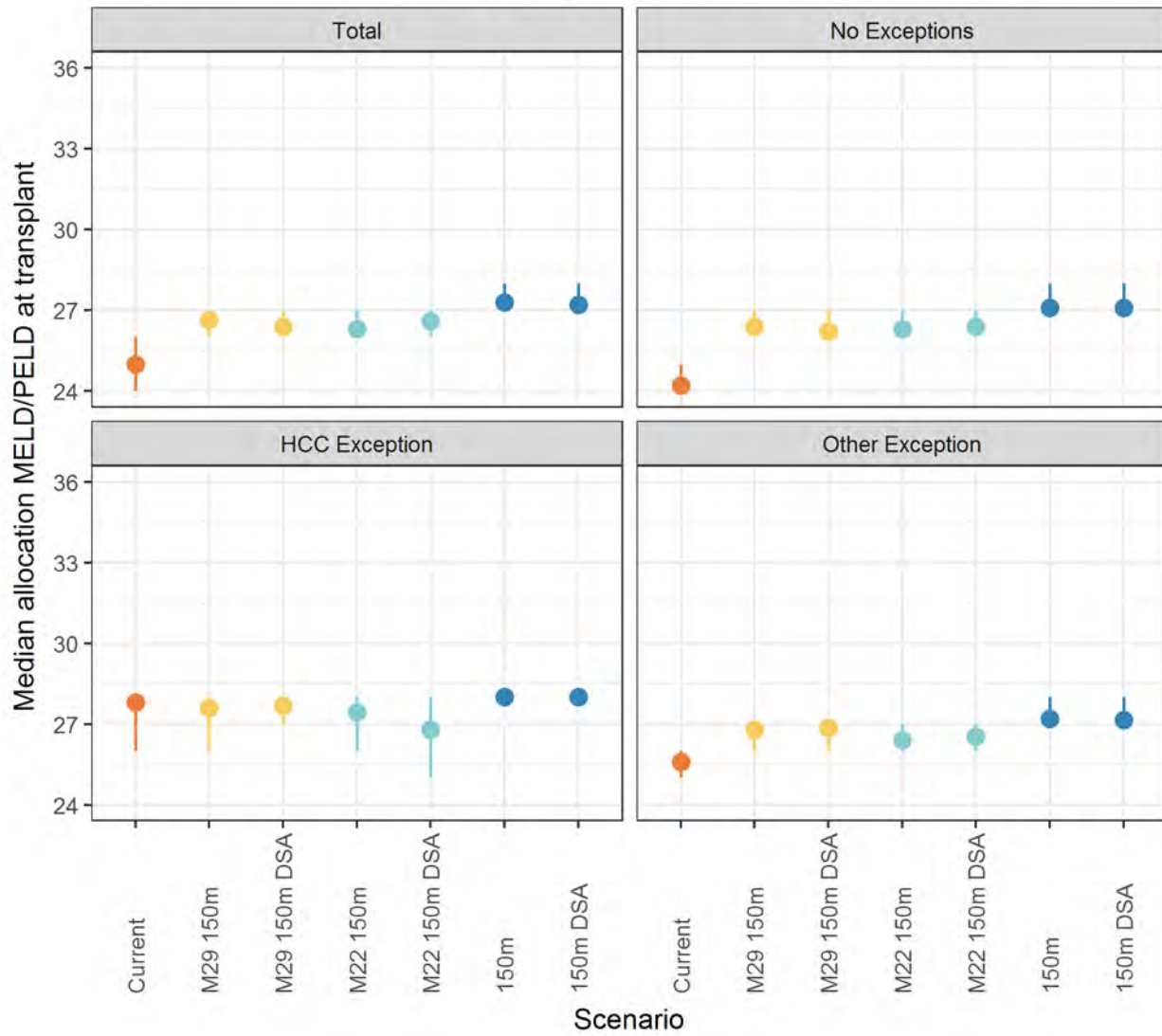


Figure 33 Median allocation MELD/PELD at transplant by exception status - region 11

Transplant

Transplant Rates

Transplant Rates by Exception Status - Region 1

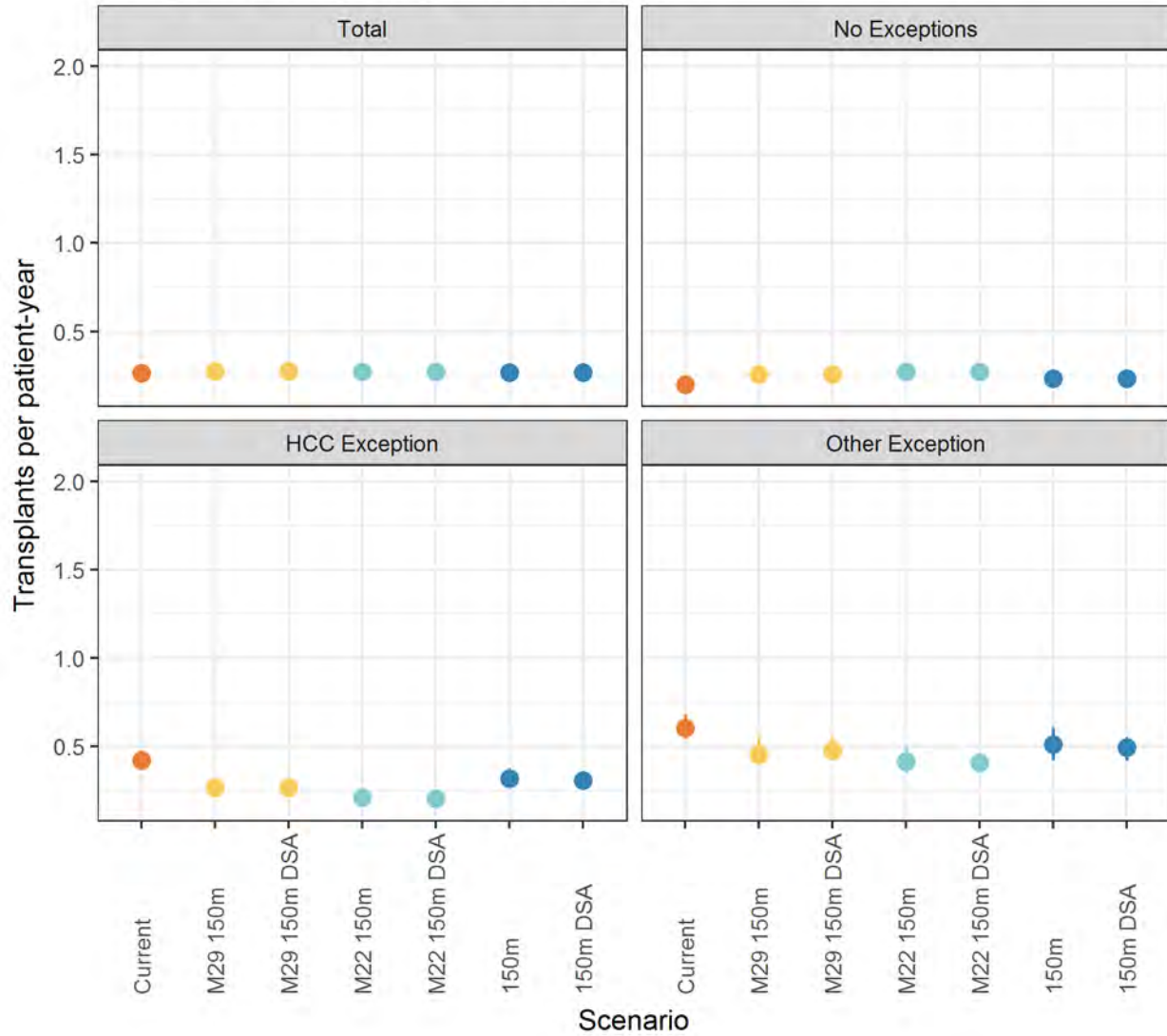


Figure 34 Transplant rates by exception status - region 1

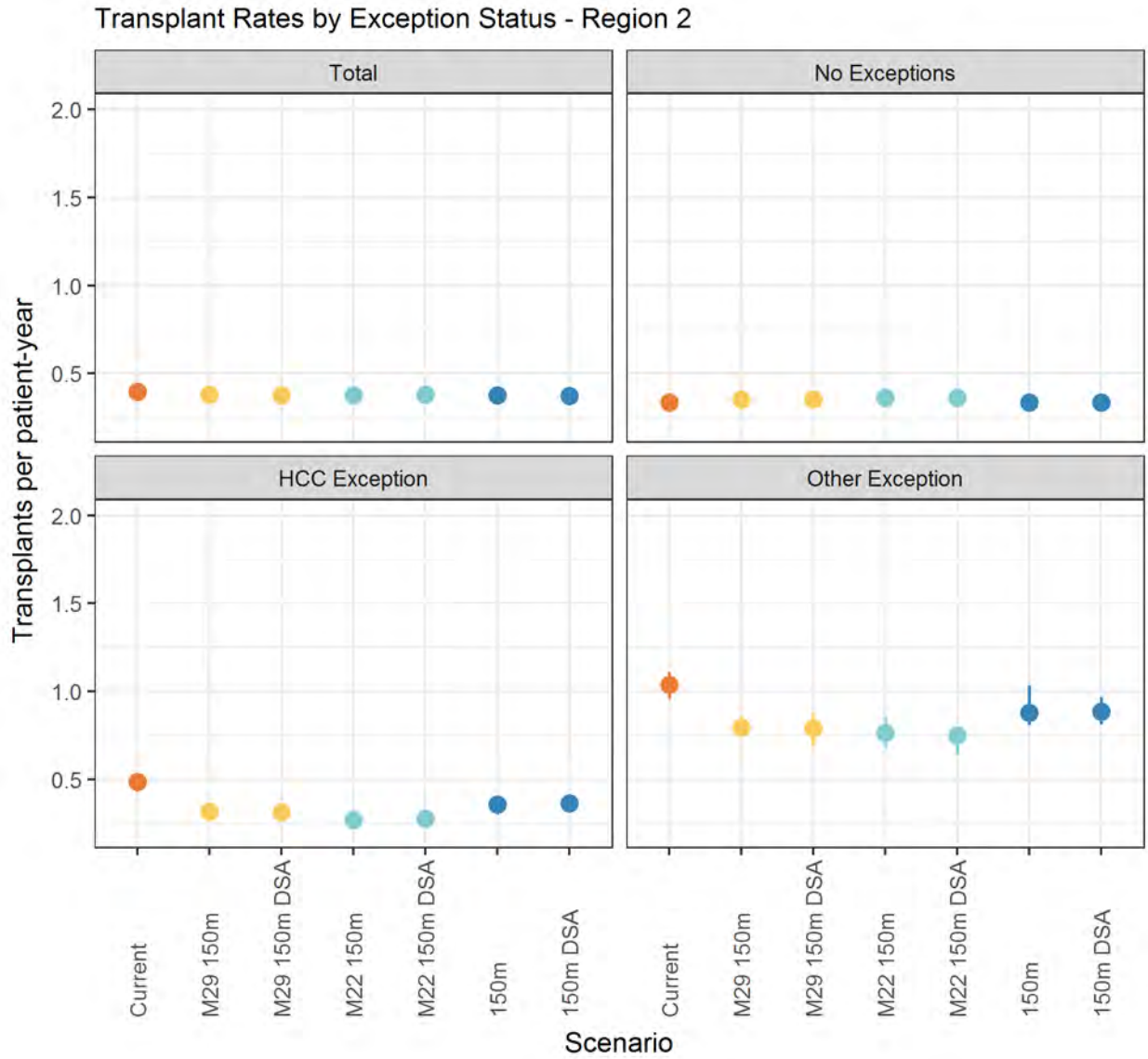


Figure 35 Transplant rates by exception status - region 2

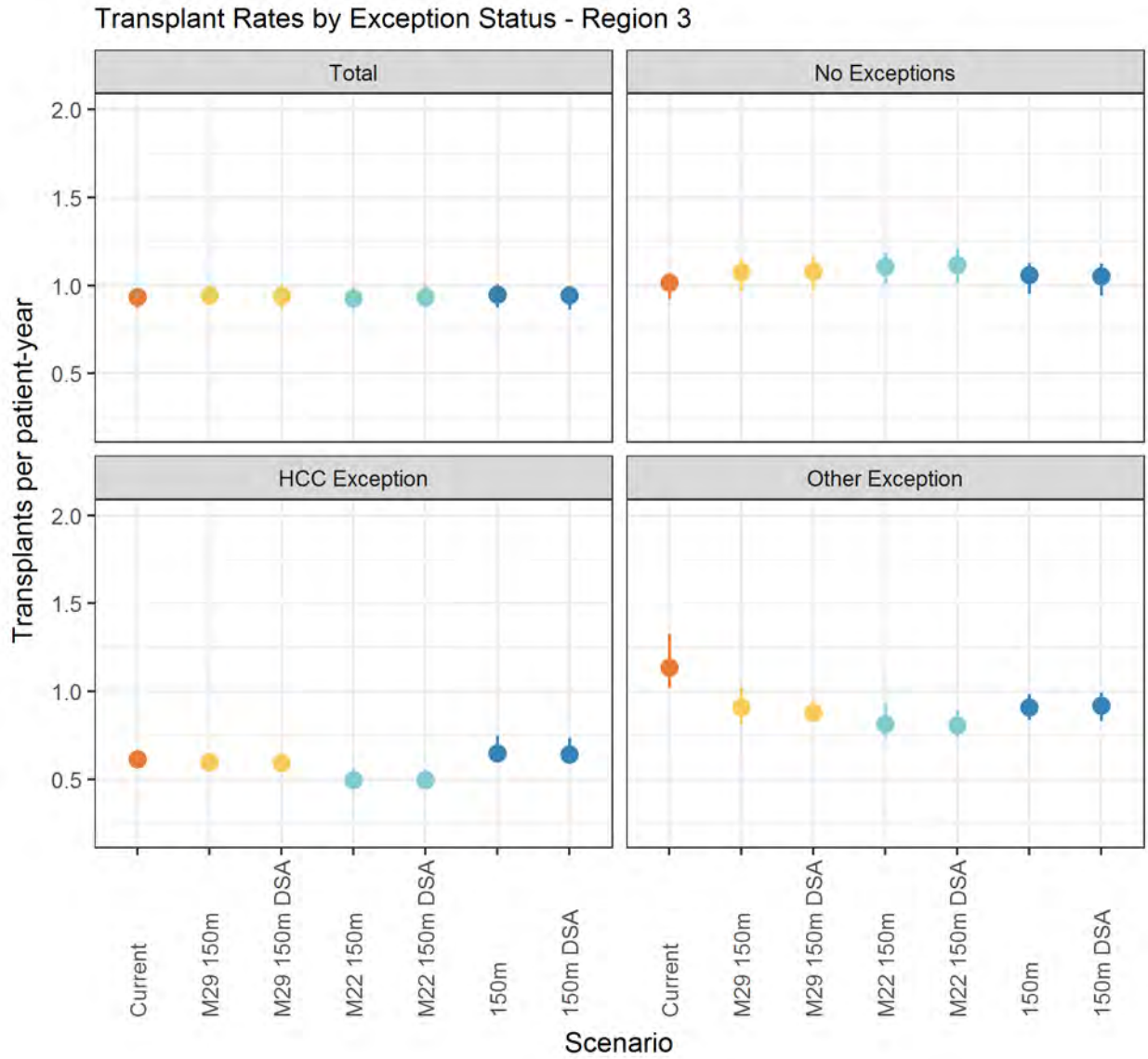


Figure 36 Transplant rates by exception status - region 3

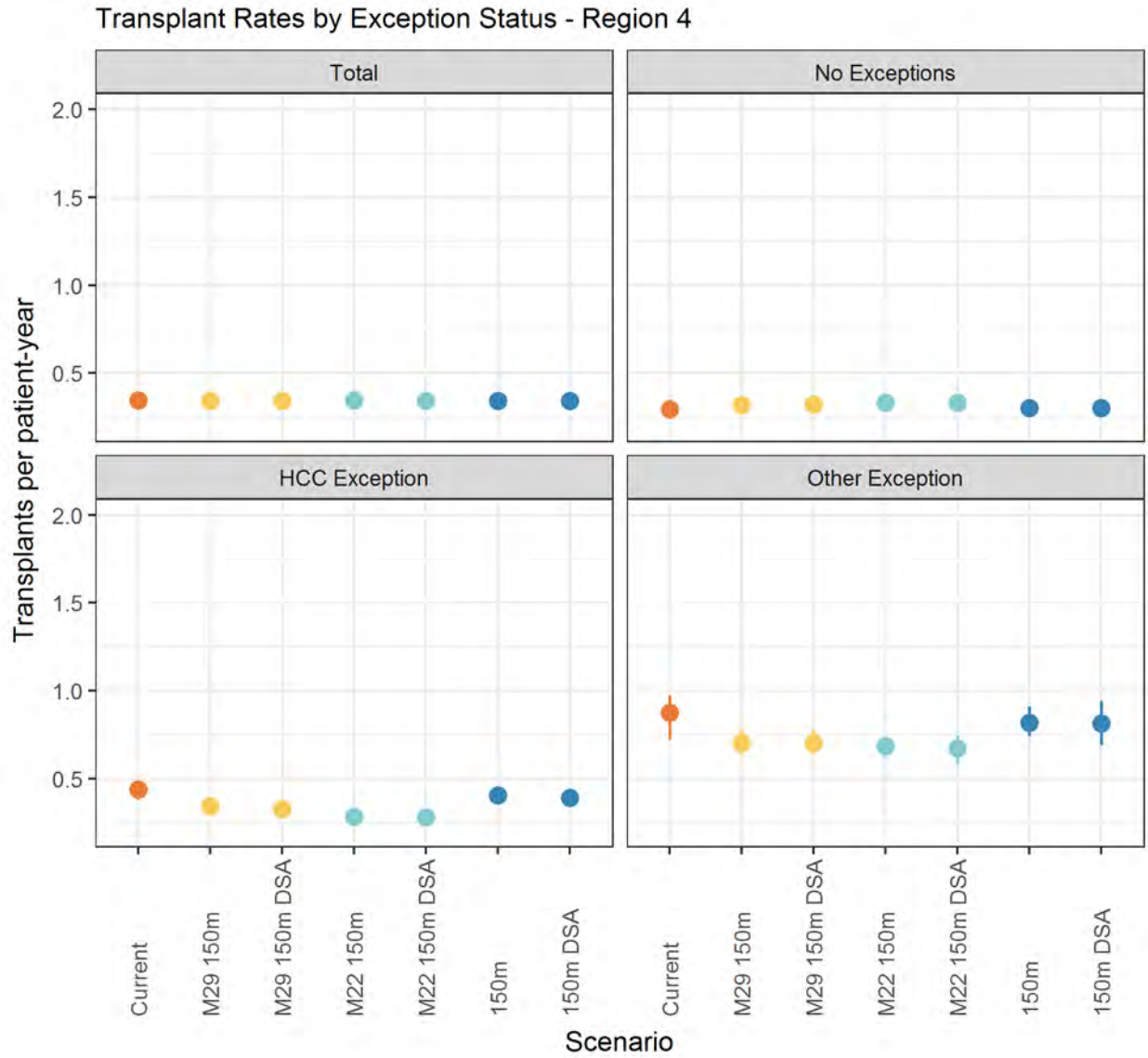


Figure 37 Transplant rates by exception status - region 4

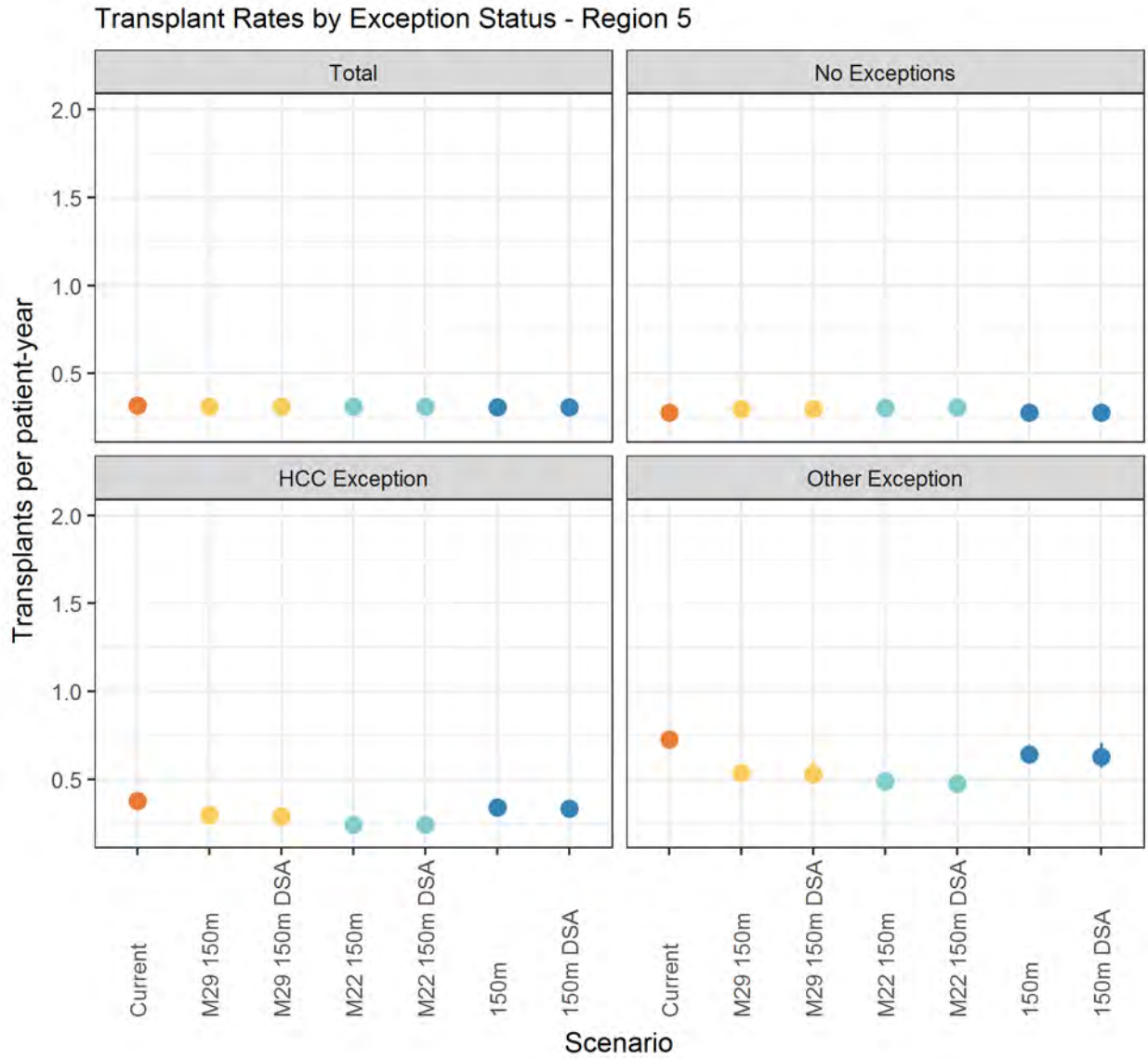


Figure 38 Transplant rates by exception status - region 5

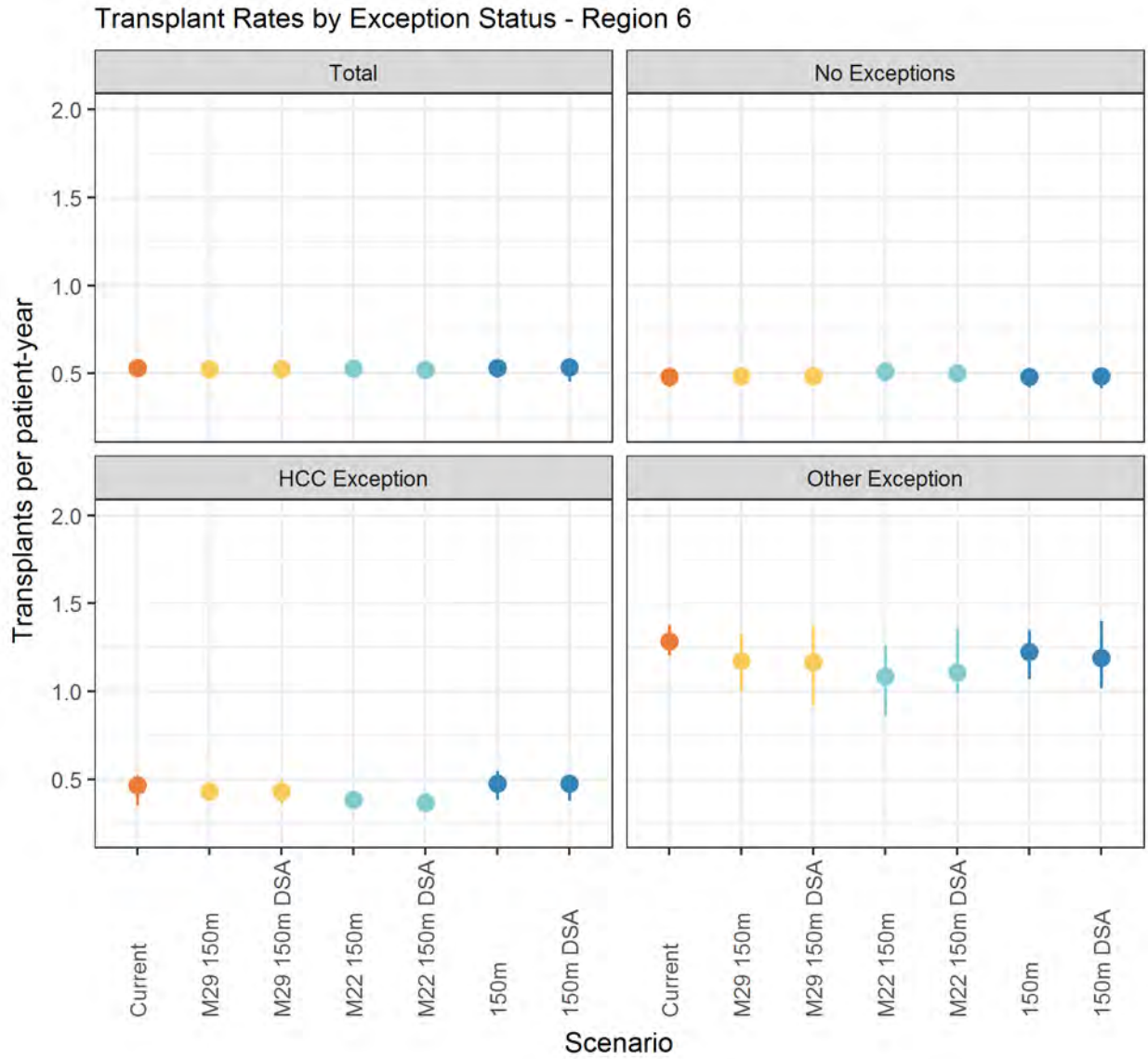


Figure 39 Transplant rates by exception status - region 6

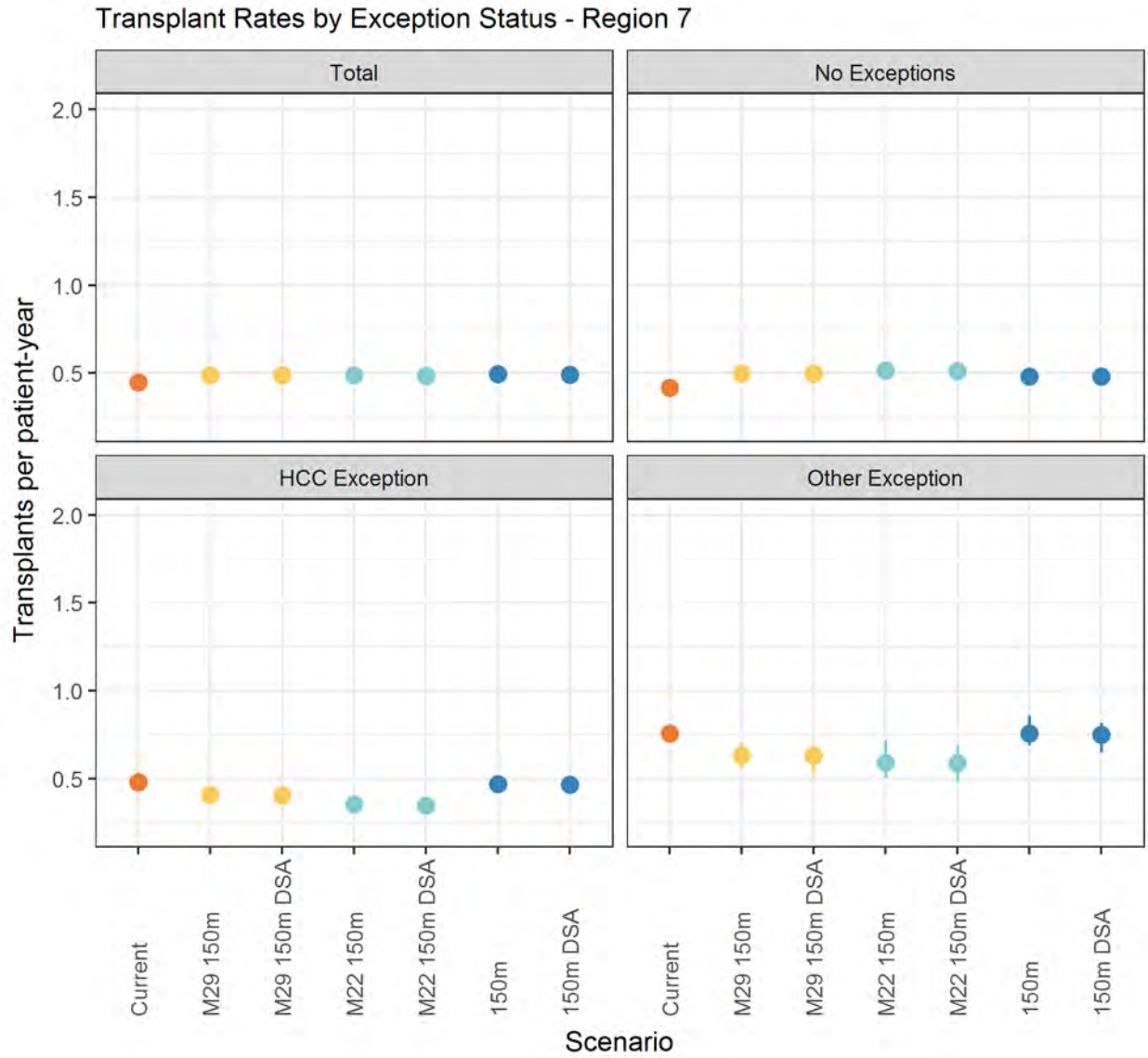


Figure 40 Transplant rates by exception status - region 7

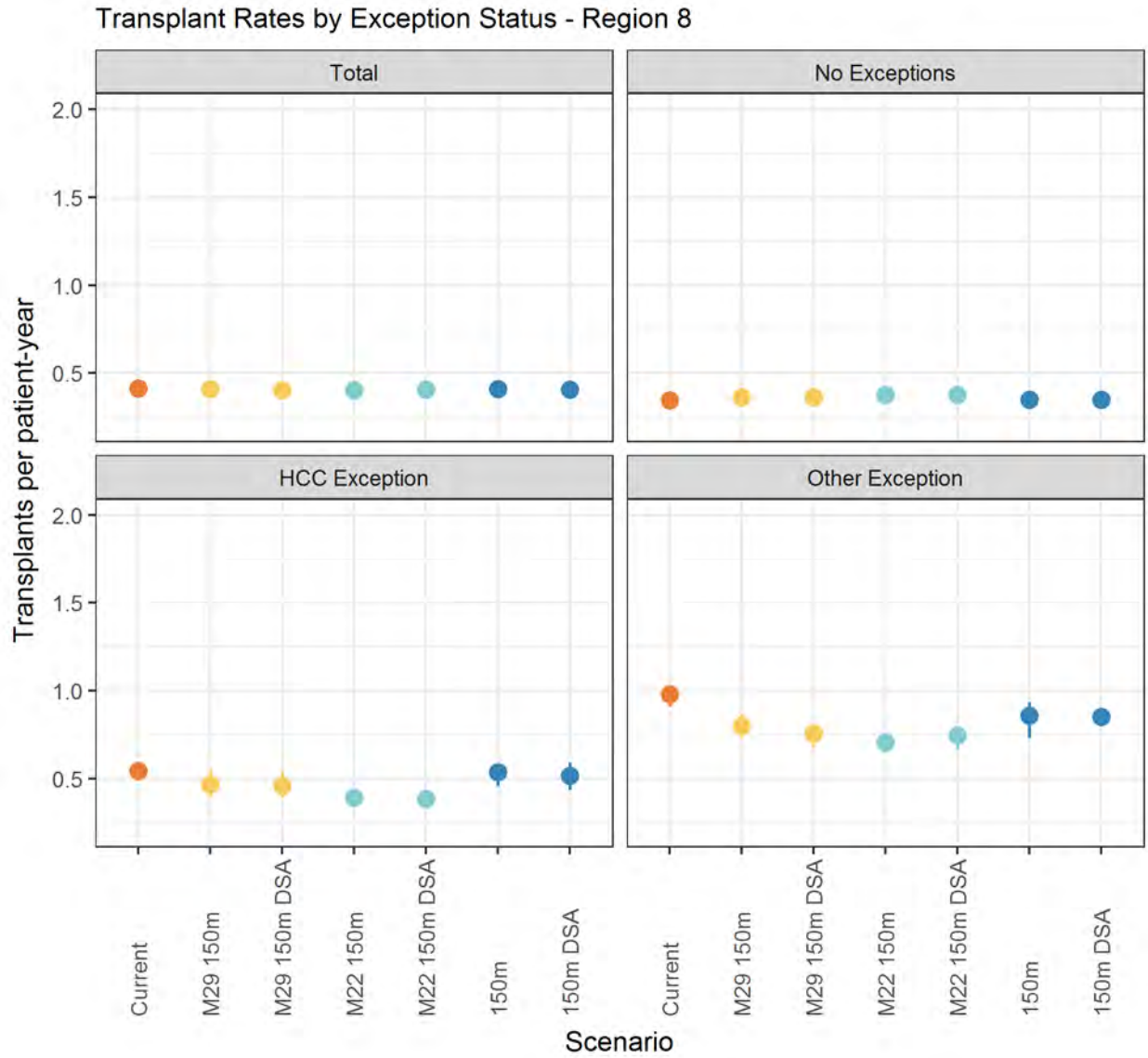


Figure 41 Transplant rates by exception status - region 8

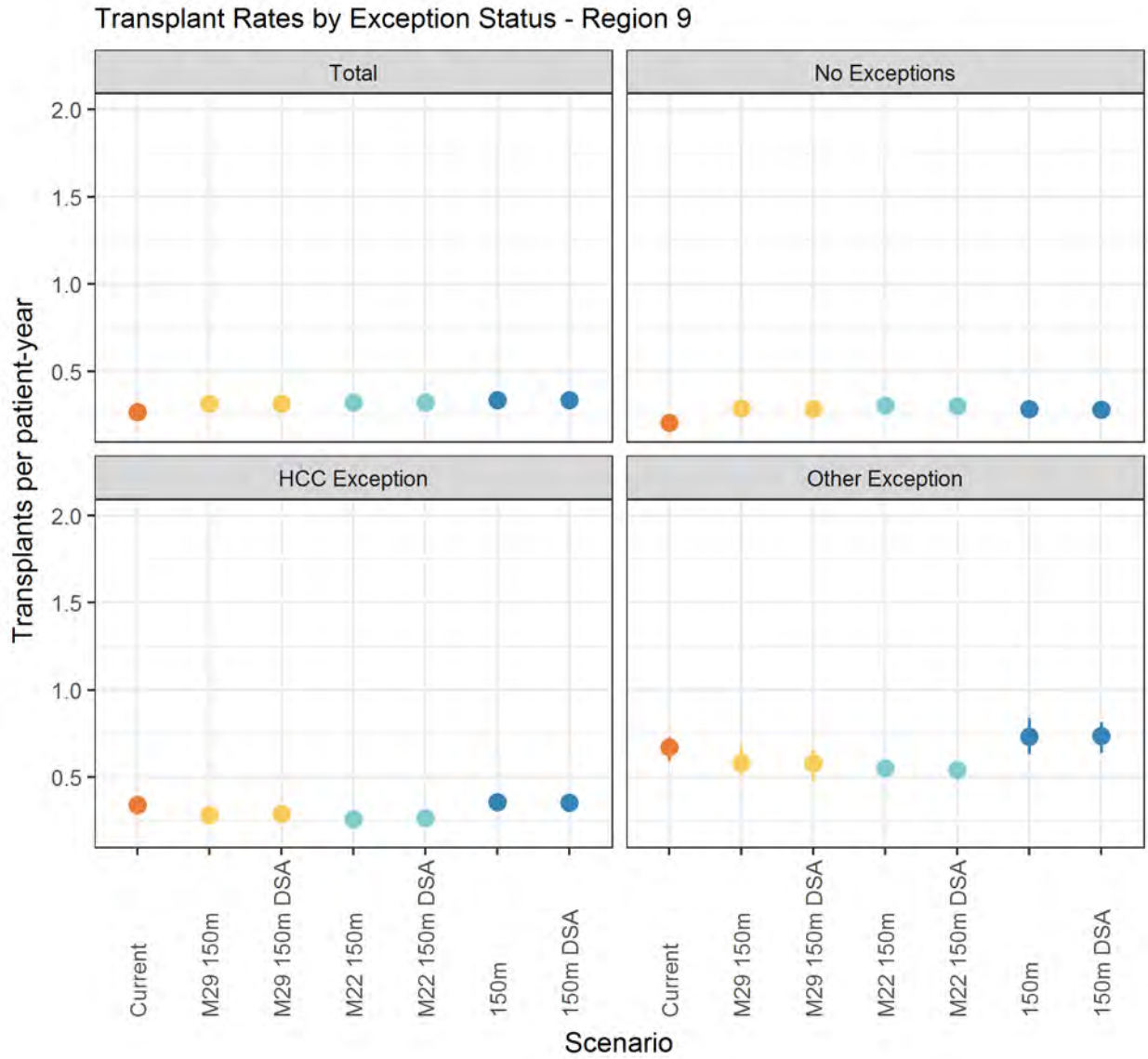


Figure 42 Transplant rates by exception status - region 9

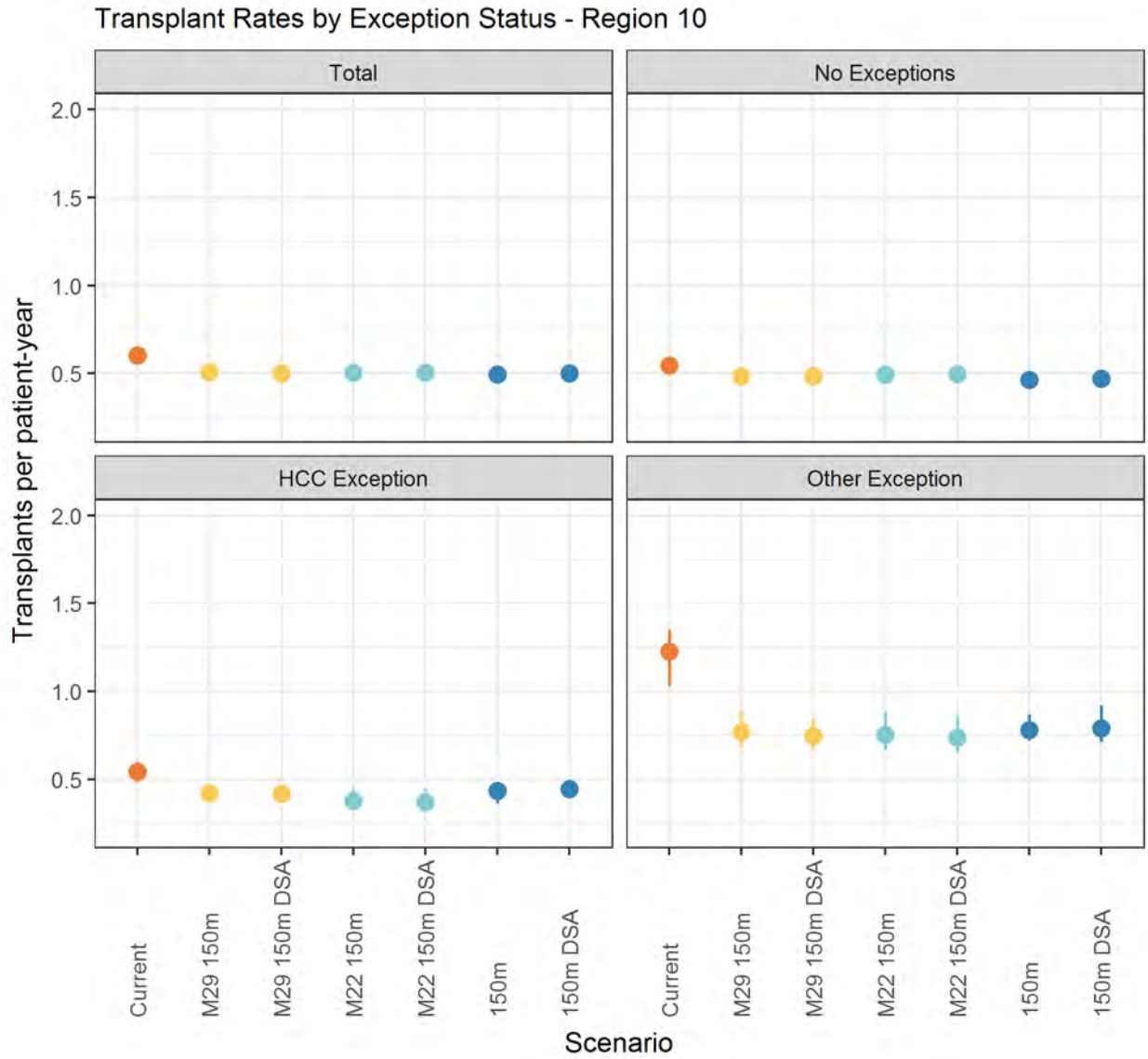


Figure 43 Transplant rates by exception status - region 10

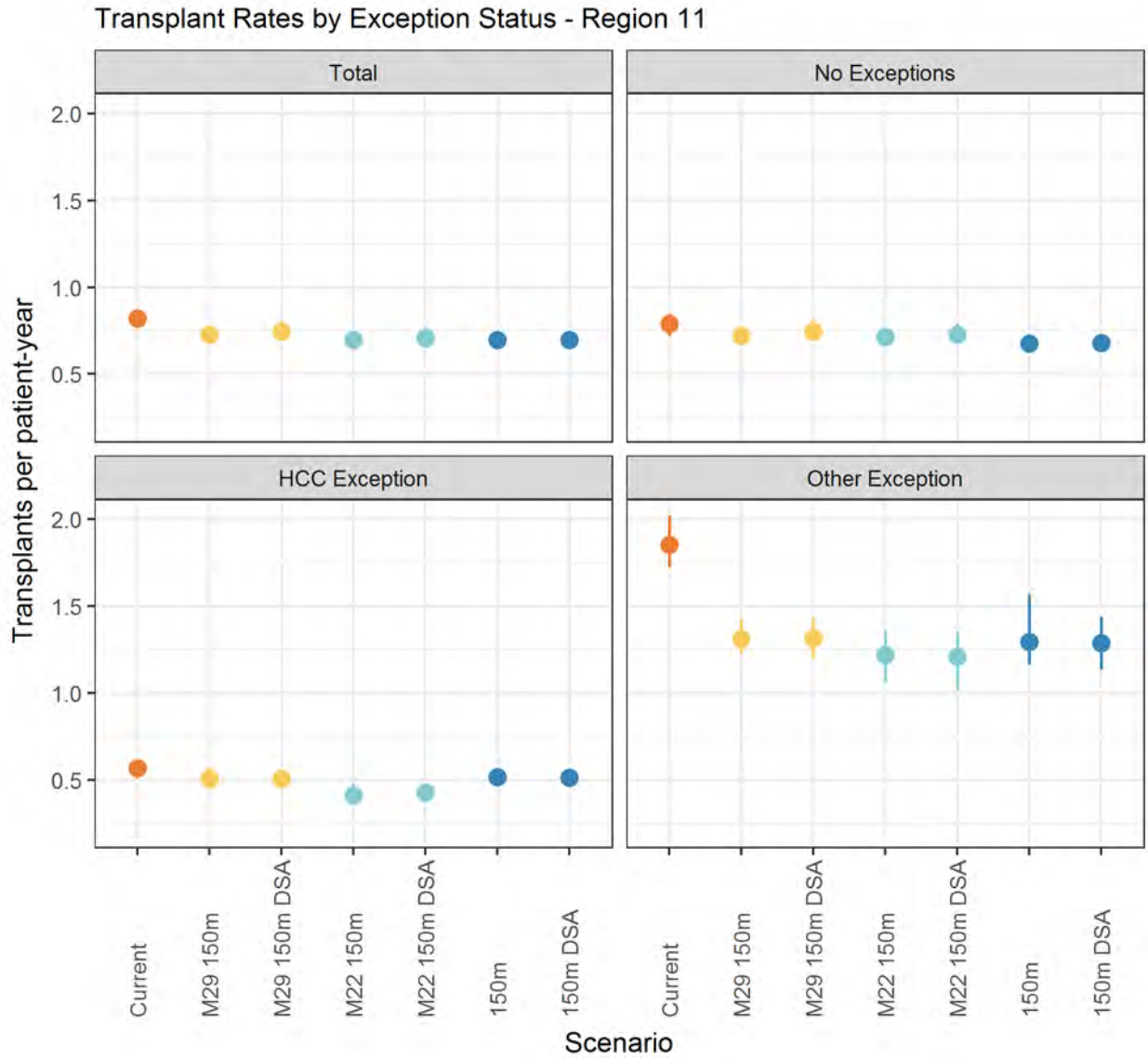


Figure 44 Transplant rates by exception status - region 11

Transplant Counts

Transplant Counts by Exception Status - Region 1

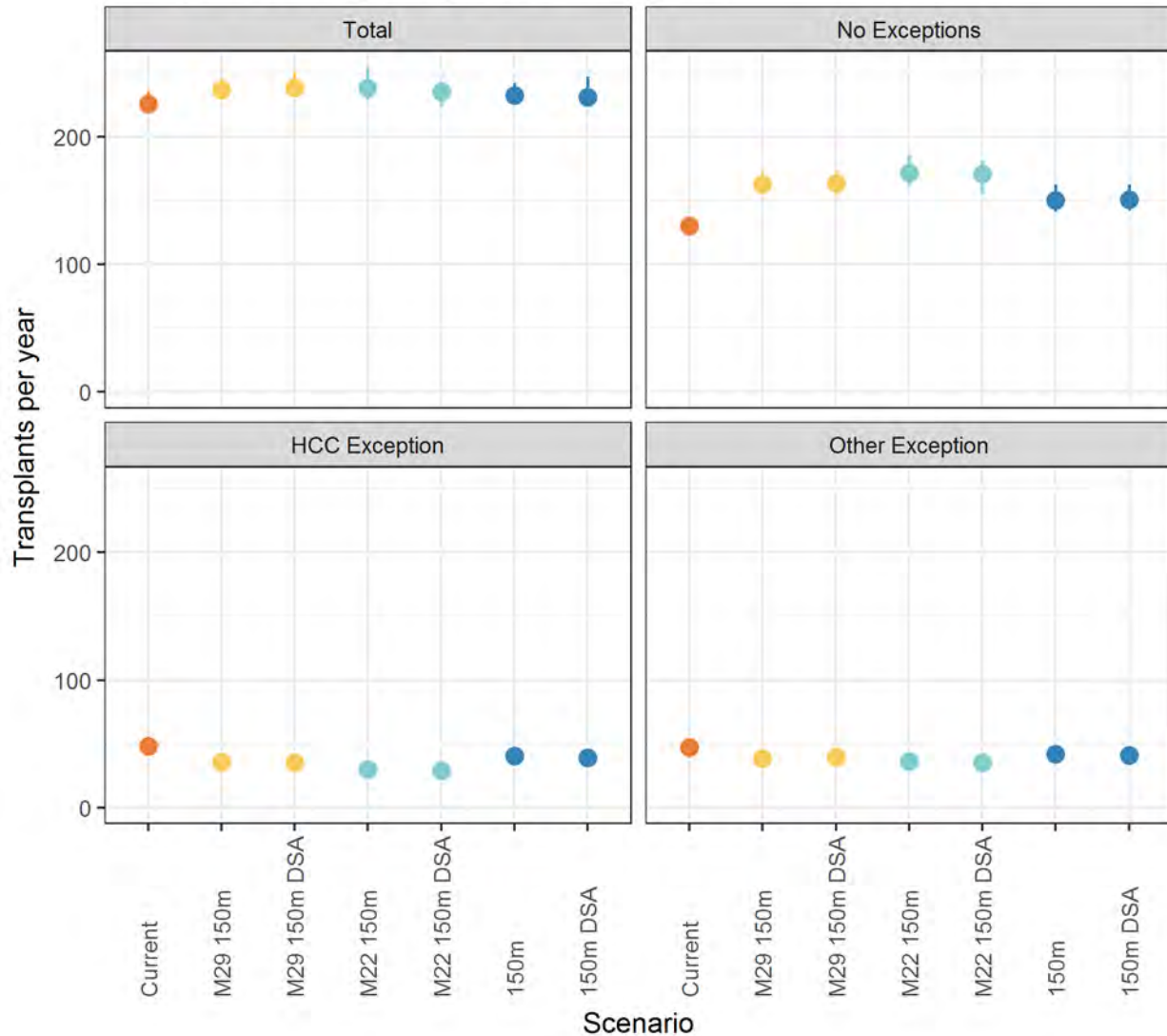


Figure 45 Transplant counts by exception status - region 1

Table 3 Transplant counts by exception status - region 1

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	225.6 (218.3,235.7)	130.3 (122.7,137)	48.1 (42,53.3)	47.2 (43.3,50)
M29 150m	236.6 (228.7,245.3)	162.4 (155.7,172)	35.5 (30,38.7)	38.6 (35,45.3)
M29 150m DSA	238.2 (232.7,250.7)	163.6 (154.3,173.7)	35.3 (32.7,38.3)	39.3 (35.7,44)
M22 150m	237.9 (228.7,254.3)	171.7 (161.7,185.3)	29.9 (25.7,33.3)	36.3 (31.7,39.3)
M22 150m DSA	235.1 (223.7,243.3)	170.8 (155,181.3)	29.1 (24.3,32.3)	35.2 (30.7,40)
150m	232.3 (224.7,241.7)	150.2 (141,162.7)	40.4 (33.3,44.7)	41.7 (36.7,49)
150m DSA	230.9 (225,247)	150.7 (142,162.7)	39.2 (36,42)	41 (36.3,44.7)

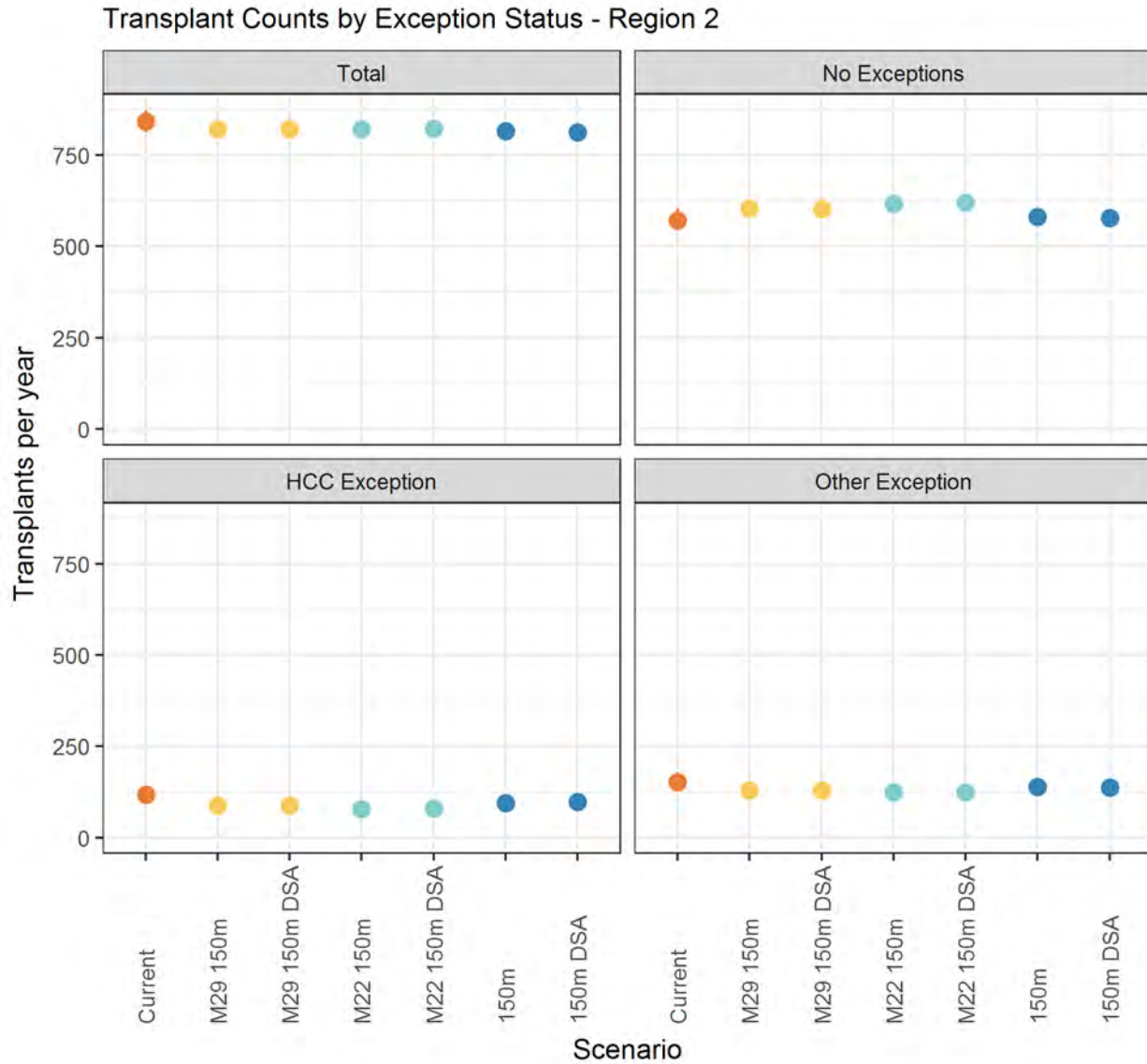


Figure 46 Transplant counts by exception status - region 2

Table 4 Transplant counts by exception status - region 2

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	842.3 (813.3,873)	571.6 (545.7,604.7)	118.2 (109,127.3)	152.4 (138,160)
M29 150m	821.2 (805.7,839.7)	603.4 (586,620.7)	88.2 (80,95.3)	129.7 (121,139.3)
M29 150m DSA	819.7 (794,840.7)	603 (582.7,620.7)	87.5 (77.7,95)	129.2 (121,140.7)
M22 150m	820.5 (803.7,837)	617.4 (606.3,632.7)	78.1 (71.3,84.7)	125 (113,130.7)
M22 150m DSA	822.6 (804.3,846.7)	619.5 (597.7,632.7)	79.3 (70,84.3)	123.9 (117,132.3)
150m	815.1 (799.3,831.3)	581.2 (560.7,597.3)	95.3 (84.7,106.3)	138.6 (128,152.3)
150m DSA	812.7 (791,837.3)	577 (559.7,594.3)	97.9 (92.7,105)	137.9 (127.7,148)

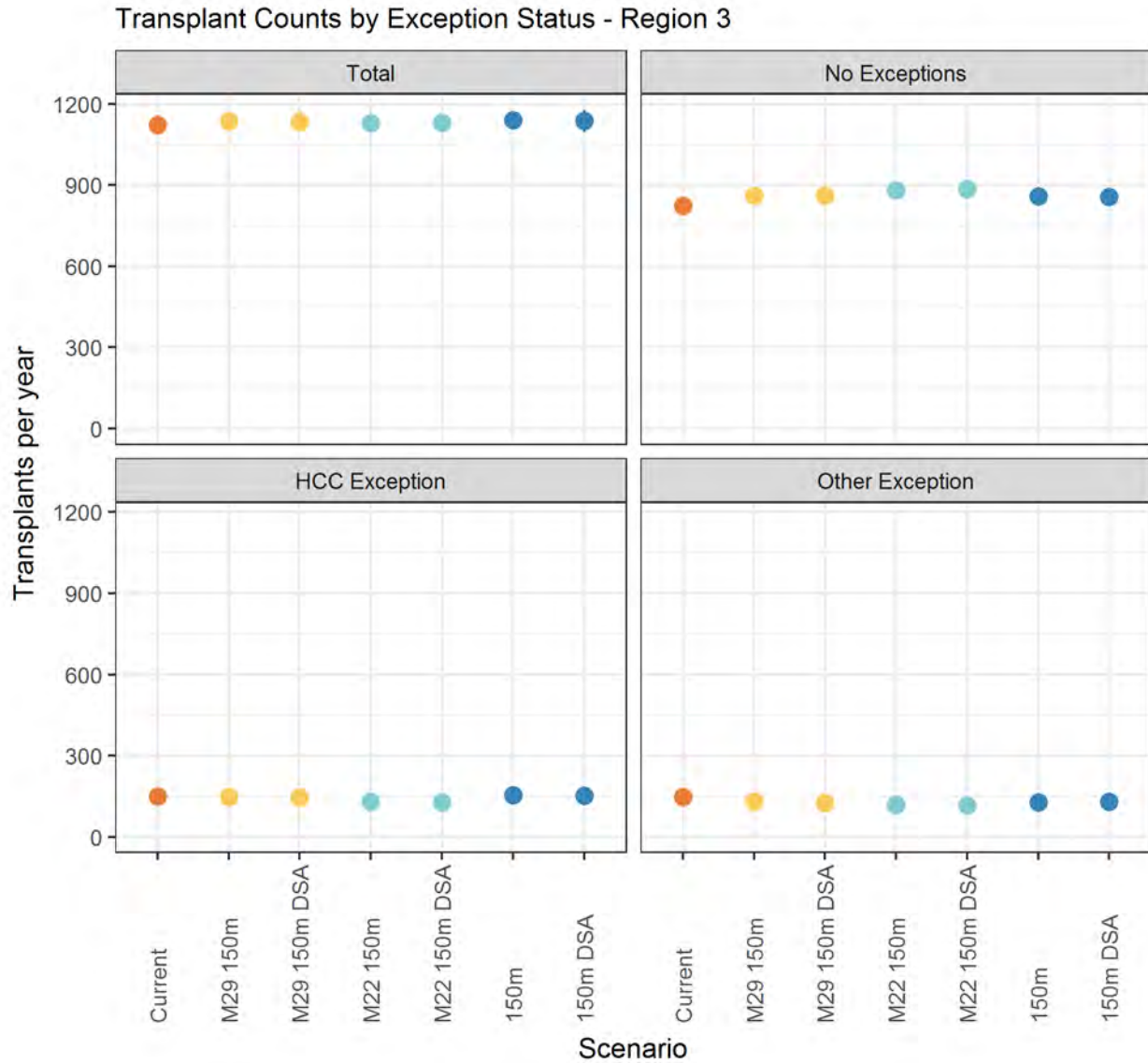


Figure 47 Transplant counts by exception status - region 3

Table 5 Transplant counts by exception status - region 3

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	1121 (1092.3,1156.7)	822.6 (798,843)	150.3 (139.3,159)	148.2 (142.3,159.3)
M29 150m	1136.2 (1111.3,1171.7)	860.5 (830.7,884)	146.5 (137.7,155.3)	129.2 (123,135.3)
M29 150m DSA	1132.6 (1098,1177.3)	860.9 (834.3,897.7)	145.3 (131.3,155.3)	126.3 (119.3,133.7)
M22 150m	1128.6 (1101.3,1163)	880.3 (854.7,908.7)	129.6 (122,138.3)	118.8 (111.7,124.7)
M22 150m DSA	1131.9 (1101.3,1164.3)	885.7 (860.3,908.7)	128.7 (121.7,135.3)	117.6 (109,128.3)
150m	1139.9 (1109.7,1173.3)	857.5 (830.3,882.7)	153.8 (143.3,163.3)	128.6 (118,138.7)
150m DSA	1137.7 (1096.3,1176.3)	857.3 (820,886.7)	151.5 (140.7,162.7)	128.9 (120.3,135.7)

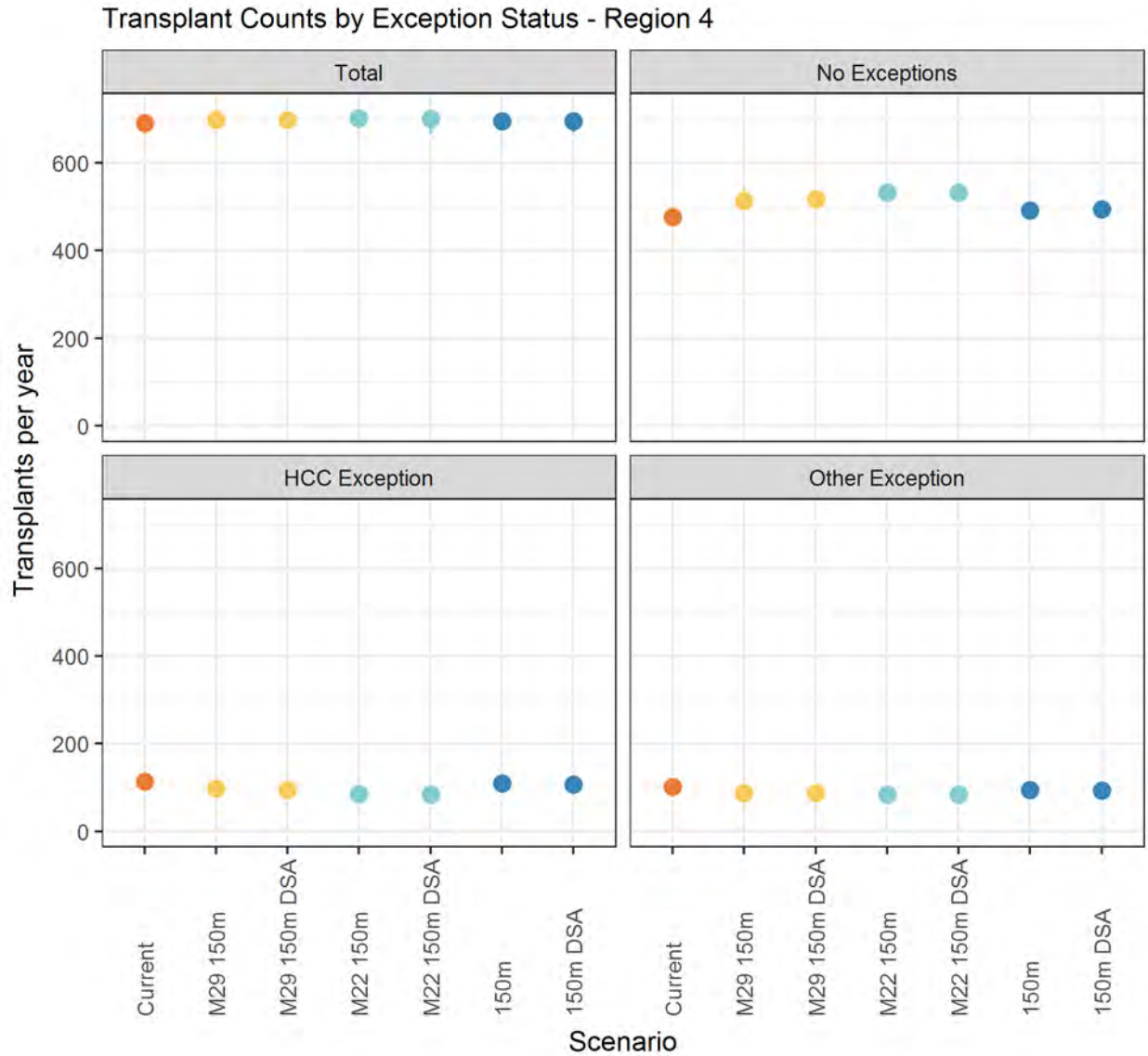


Figure 48 Transplant counts by exception status - region 4

Table 6 Transplant counts by exception status - region 4

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	691.8 (667.3,710)	476 (462.3,487)	114.1 (103.7,120.3)	101.6 (89.7,108.7)
M29 150m	698.2 (680.3,722.3)	513.8 (499.3,540.3)	97.1 (90,101.7)	87.3 (78,93)
M29 150m DSA	698 (676,715.7)	516.8 (506,527)	94 (84,101.3)	87.2 (77,94)
M22 150m	702 (679,713)	532 (518.3,545)	85.7 (77,90.3)	84.4 (77.7,90)
M22 150m DSA	700.3 (667.7,716.7)	532 (515.7,553.3)	83.9 (75,90)	84.4 (75.3,93)
150m	695.8 (675.3,713.7)	491.6 (478.7,504.7)	109.3 (102,119)	94.9 (87,100)
150m DSA	694.6 (671.3,714)	493.7 (483.7,501.3)	107.2 (101,116.3)	93.7 (86,103.3)

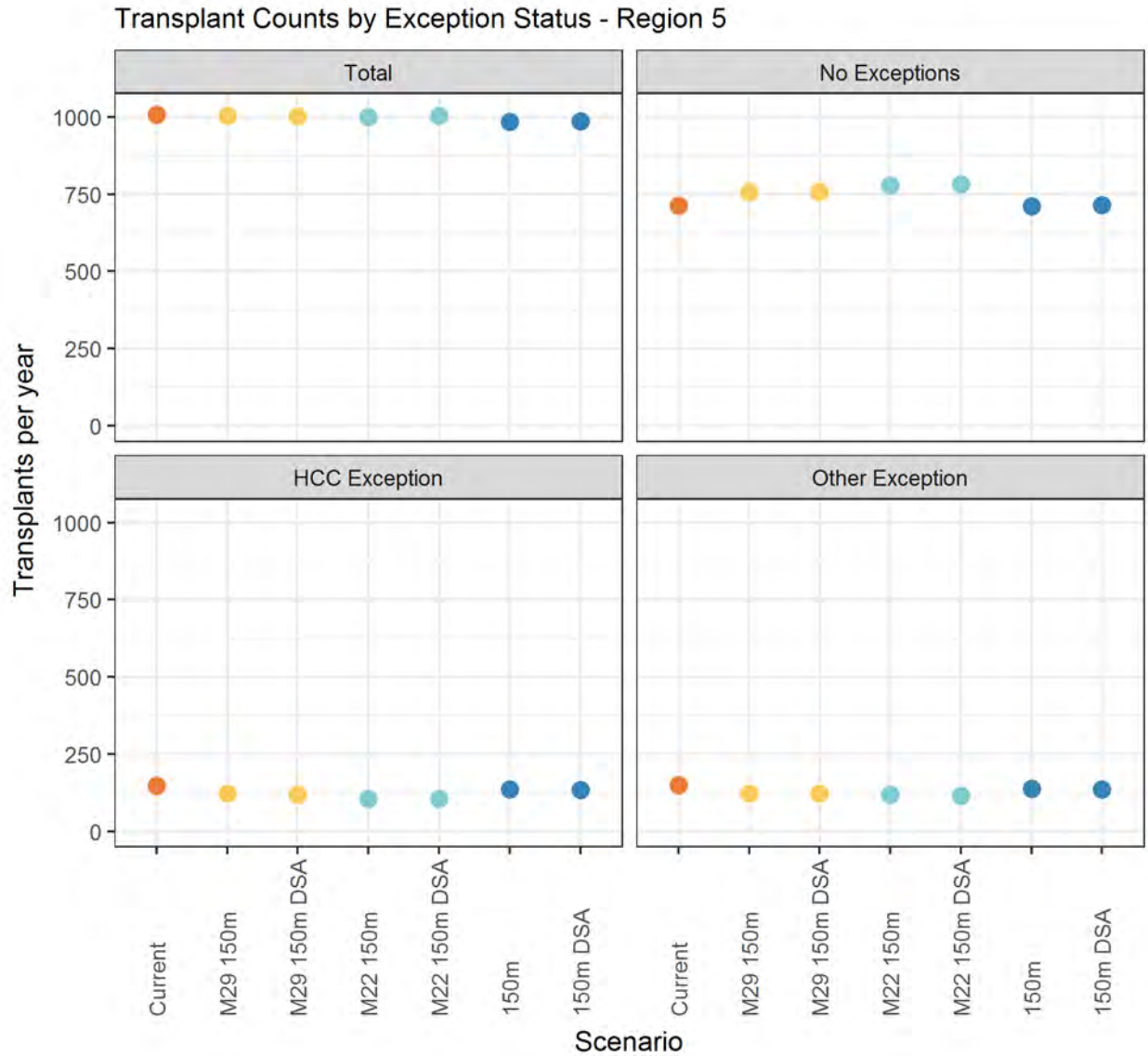


Figure 49 Transplant counts by exception status - region 5

Table 7 Transplant counts by exception status - region 5

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	1008.5 (982.7,1022.7)	712.2 (691,723.7)	146.8 (137.3,153.7)	149.5 (141.7,157.7)
M29 150m	1003.4 (984.7,1025)	757.7 (735.3,776.7)	122 (118,130)	123.7 (118.7,128.7)
M29 150m DSA	1001.1 (979,1018)	757.8 (739.7,776.3)	119.8 (112.3,126.7)	123.5 (116,136.7)
M22 150m	1000.8 (977.7,1021)	778.1 (754.7,794.3)	104.6 (92.7,112.3)	118.2 (112.7,125.3)
M22 150m DSA	1003.5 (980.3,1014.7)	782.7 (755.3,804.7)	105.5 (89,114.7)	115.3 (106,122.3)
150m	985.5 (964.3,1002)	711.4 (693.7,724.7)	135.9 (127,143.7)	138.2 (127.7,148.3)
150m DSA	986.3 (959,1015)	715.7 (694.7,739.7)	133.8 (125.3,140)	136.8 (128,146)

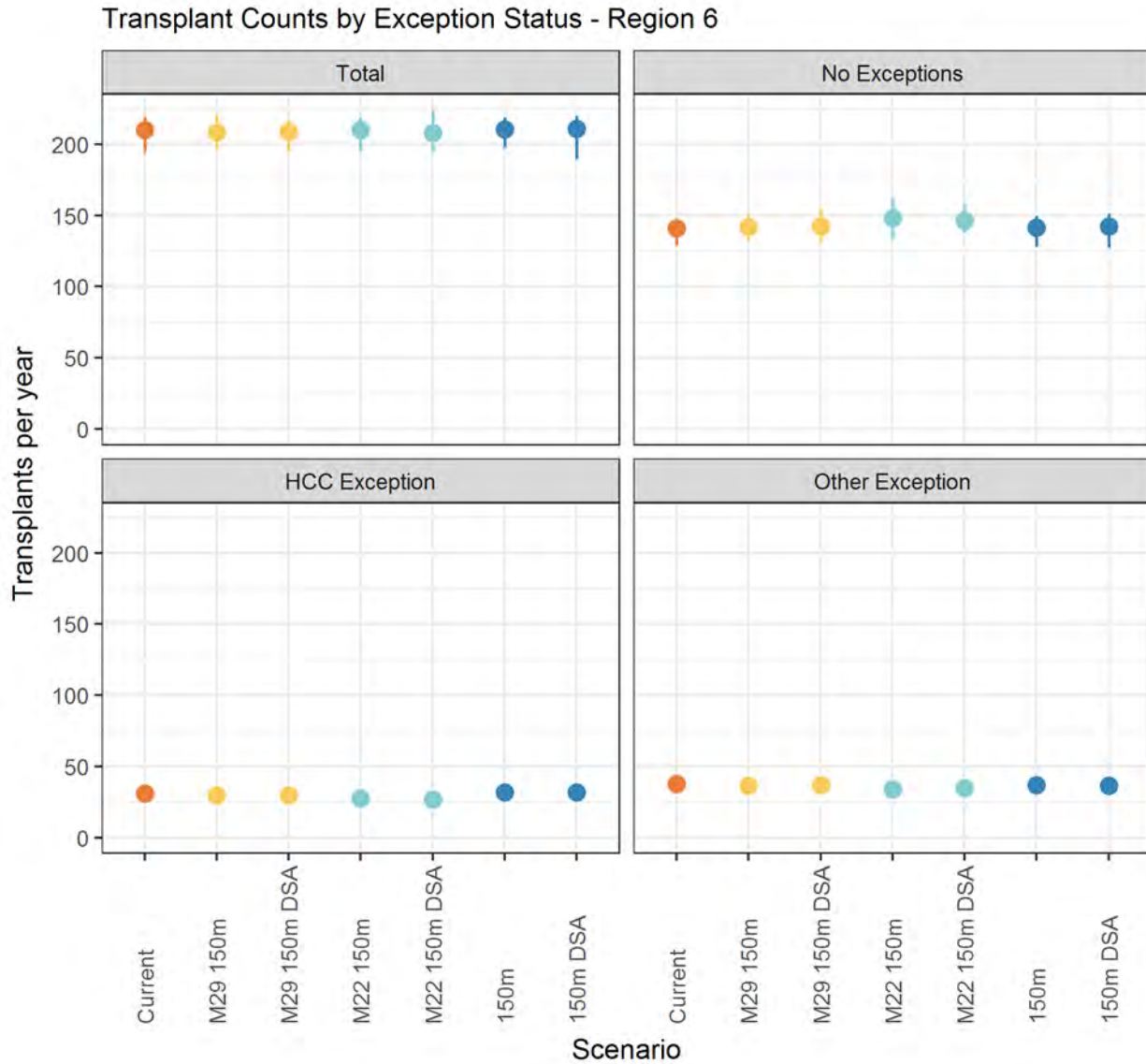


Figure 50 Transplant counts by exception status - region 6

Table 8 Transplant counts by exception status - region 6

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	209.9 (194,219)	141.2 (128.7,147.3)	31 (29,34.7)	37.7 (36.3,41)
M29 150m	208.5 (196.3,220)	142 (131.7,151.3)	29.7 (26.3,35)	36.7 (33.7,42)
M29 150m DSA	208.8 (195,216.3)	142.2 (130.7,154.3)	29.8 (26.7,33.7)	36.8 (32.3,39)
M22 150m	209.9 (195,218.7)	148.1 (133.3,162)	27.7 (24,32)	34.1 (28,40)
M22 150m DSA	208.2 (194.3,224)	146.4 (137.7,158.3)	26.8 (23.7,31.3)	35 (30,41.3)
150m	210.7 (197.3,218.7)	141.6 (128,149.7)	32 (27.7,36.3)	37.1 (32.3,40)
150m DSA	210.7 (189.7,219.7)	142.5 (127,151)	31.8 (27.7,35.7)	36.4 (31.3,42.3)

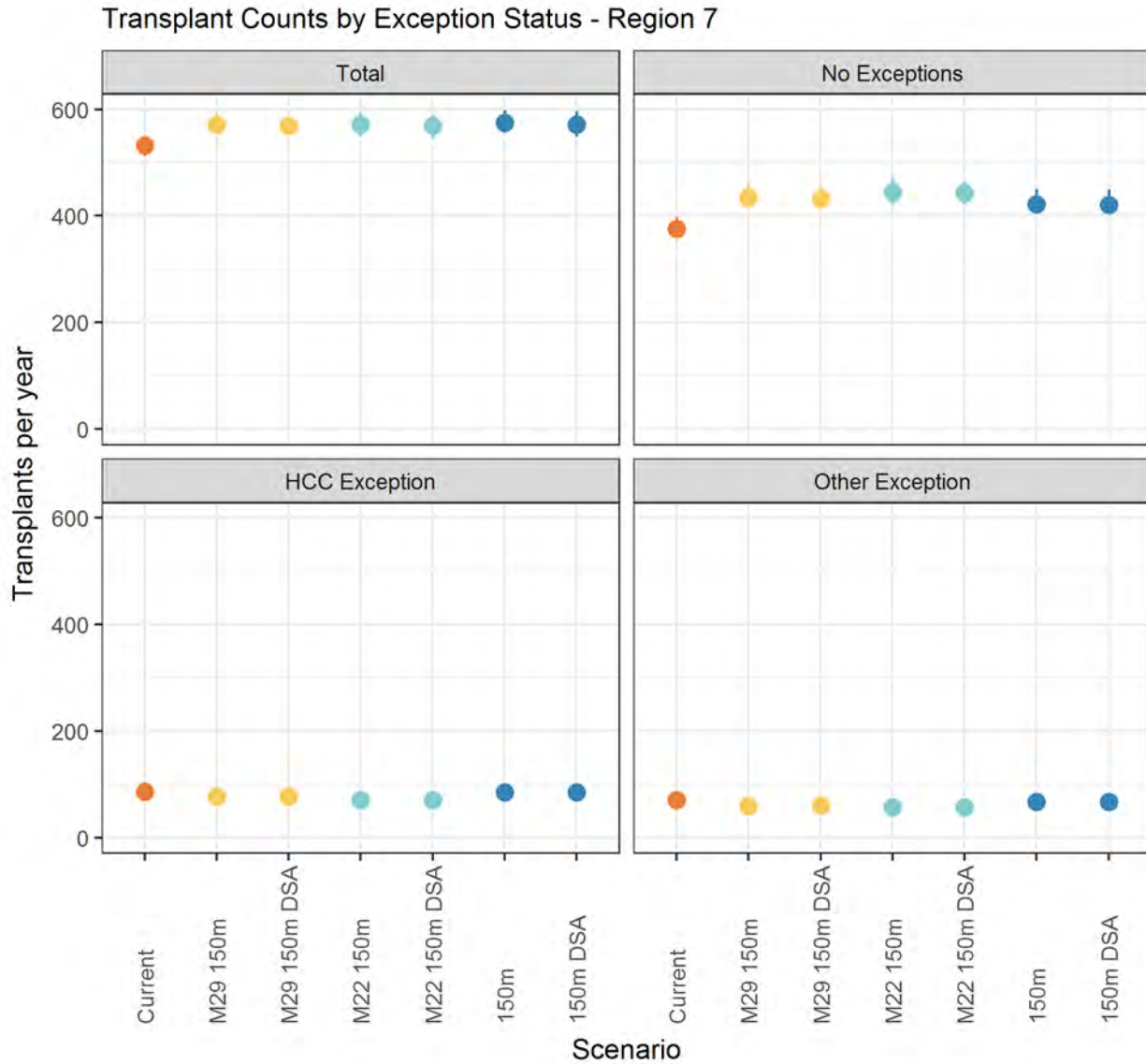


Figure 51 Transplant counts by exception status - region 7

Table 9 Transplant counts by exception status - region 7

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	532.1 (511.3,550)	375.4 (358.7,397.3)	86.5 (78.7,94)	70.1 (63.3,77)
M29 150m	570.9 (552.3,591.7)	433.6 (416,459.7)	77.8 (69.3,84.3)	59.5 (54.3,67.7)
M29 150m DSA	569.1 (552,587.3)	432.1 (418,456)	77.1 (72.3,85.3)	59.9 (56.3,64.7)
M22 150m	571.2 (549.7,593.3)	443.9 (420.7,474)	70.4 (63.3,75.7)	56.9 (49.3,66.3)
M22 150m DSA	569.4 (546,589)	442.9 (422,465.3)	70 (65.3,76)	56.5 (51.7,67.3)
150m	574.2 (556,598.3)	421.8 (403.7,449.3)	85.3 (79.3,93)	67.2 (61.7,77.3)
150m DSA	571.7 (549,596)	420.2 (402.3,449)	84.7 (79.3,90.7)	66.8 (58,75.7)

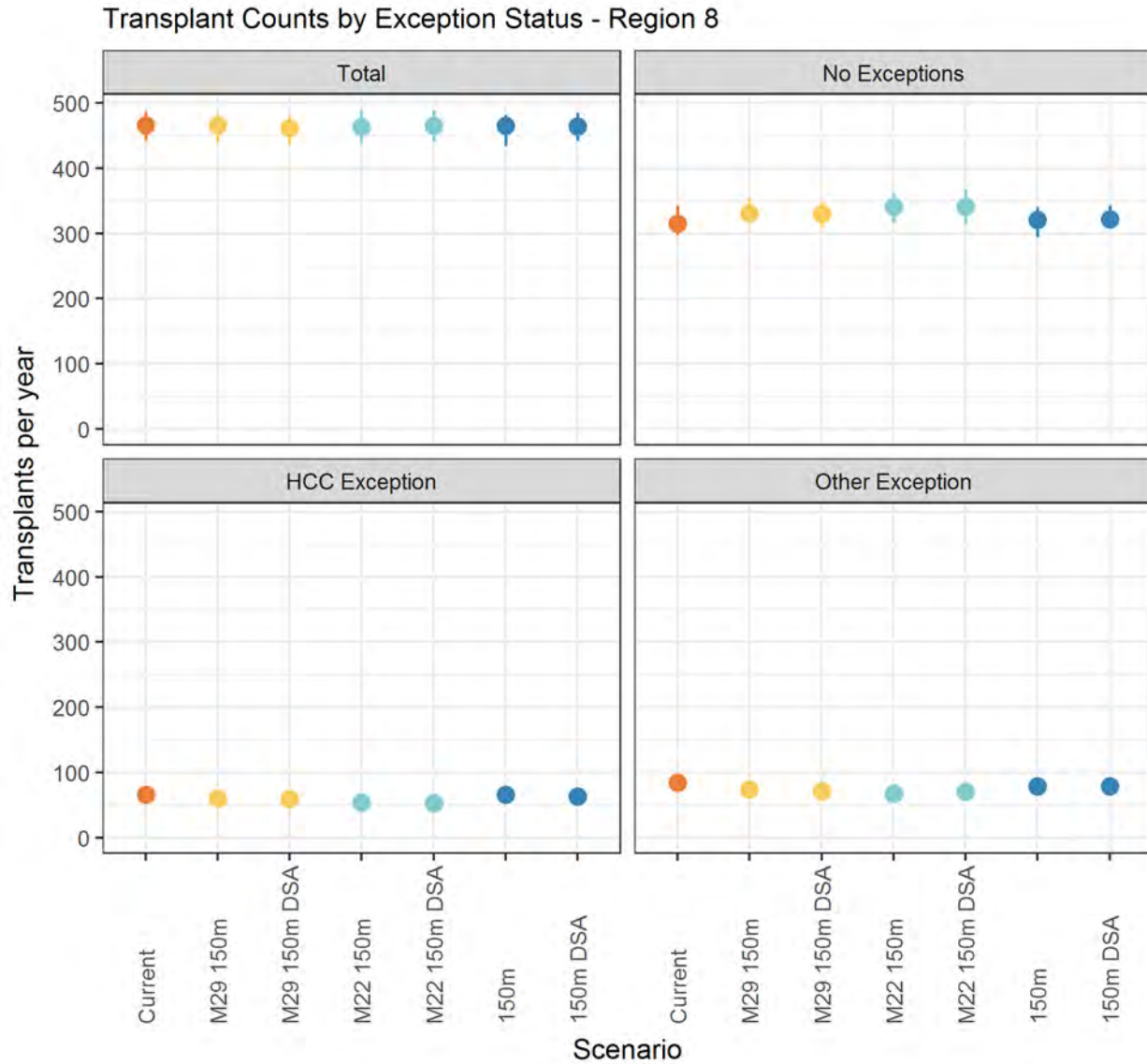


Figure 52 Transplant counts by exception status - region 8

Table 10 Transplant counts by exception status - region 8

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	466.4 (442.3,486.7)	315.7 (297.3,342.7)	66.3 (57.7,71.7)	84.4 (77,97.7)
M29 150m	465.9 (439.7,482.7)	330.9 (314.3,353.7)	60.4 (53.3,66.3)	74.5 (66,88)
M29 150m DSA	461.5 (435.7,479.7)	330.1 (308.7,348.7)	59.6 (53.7,65.7)	71.8 (62,79)
M22 150m	463.2 (438.7,489)	341.4 (316,361.3)	53.9 (51.3,59)	67.9 (62.3,75.7)
M22 150m DSA	464.8 (439,488)	341.3 (313,367)	53.1 (48.3,56.3)	70.4 (61.7,74.3)
150m	465.4 (433.7,481.7)	320.8 (294,339.7)	66 (59,71)	78.5 (67.3,87.7)
150m DSA	463.7 (442,484.7)	321.9 (307,342.7)	63.5 (57.7,70.3)	78.4 (72.3,86)

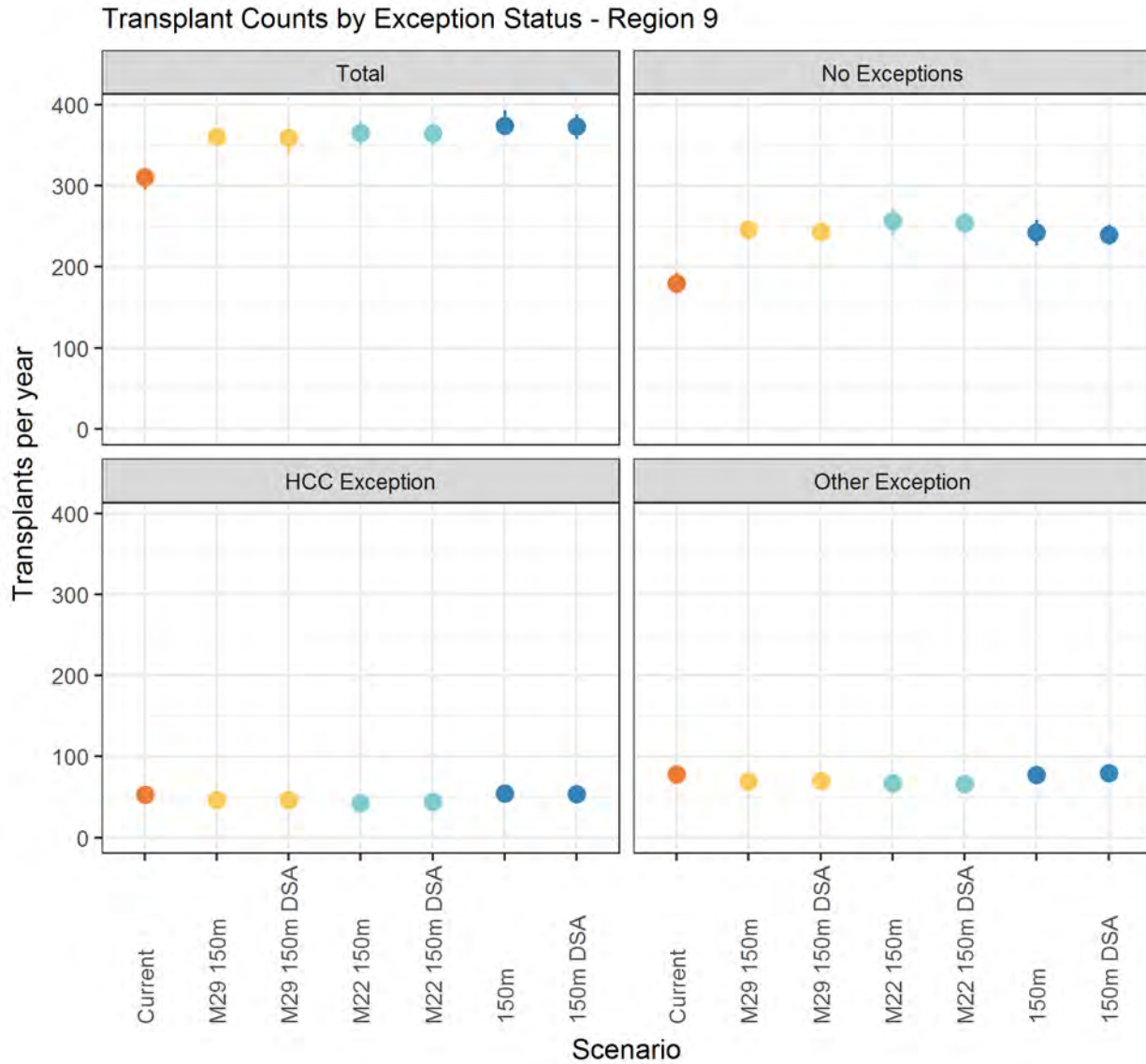


Figure 53 Transplant counts by exception status - region 9

Table 11 Transplant counts by exception status - region 9

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	310.5 (295,322.3)	179.4 (167,193)	52.9 (50.3,56.7)	78.2 (74.3,82.3)
M29 150m	361.1 (348.7,371)	245.9 (233,257.3)	46 (42.3,53)	69.1 (60.7,76)
M29 150m DSA	359.5 (339.7,367.7)	243.1 (233.3,252.7)	46.3 (41.7,50.3)	70 (60.3,77.7)
M22 150m	365.6 (350.7,379)	256.4 (240,270.7)	42.5 (39,47.3)	66.7 (62,73.7)
M22 150m DSA	364.5 (349.7,377.3)	254.4 (241.3,267)	43.8 (40.3,45.7)	66.3 (60.3,75.3)
150m	374.3 (362.7,393.3)	242.2 (226,257.7)	54.5 (50.7,58.7)	77.7 (70.3,83.3)
150m DSA	373.4 (357.7,388)	239.9 (226.7,252)	53.9 (50,60)	79.6 (74.7,84.7)

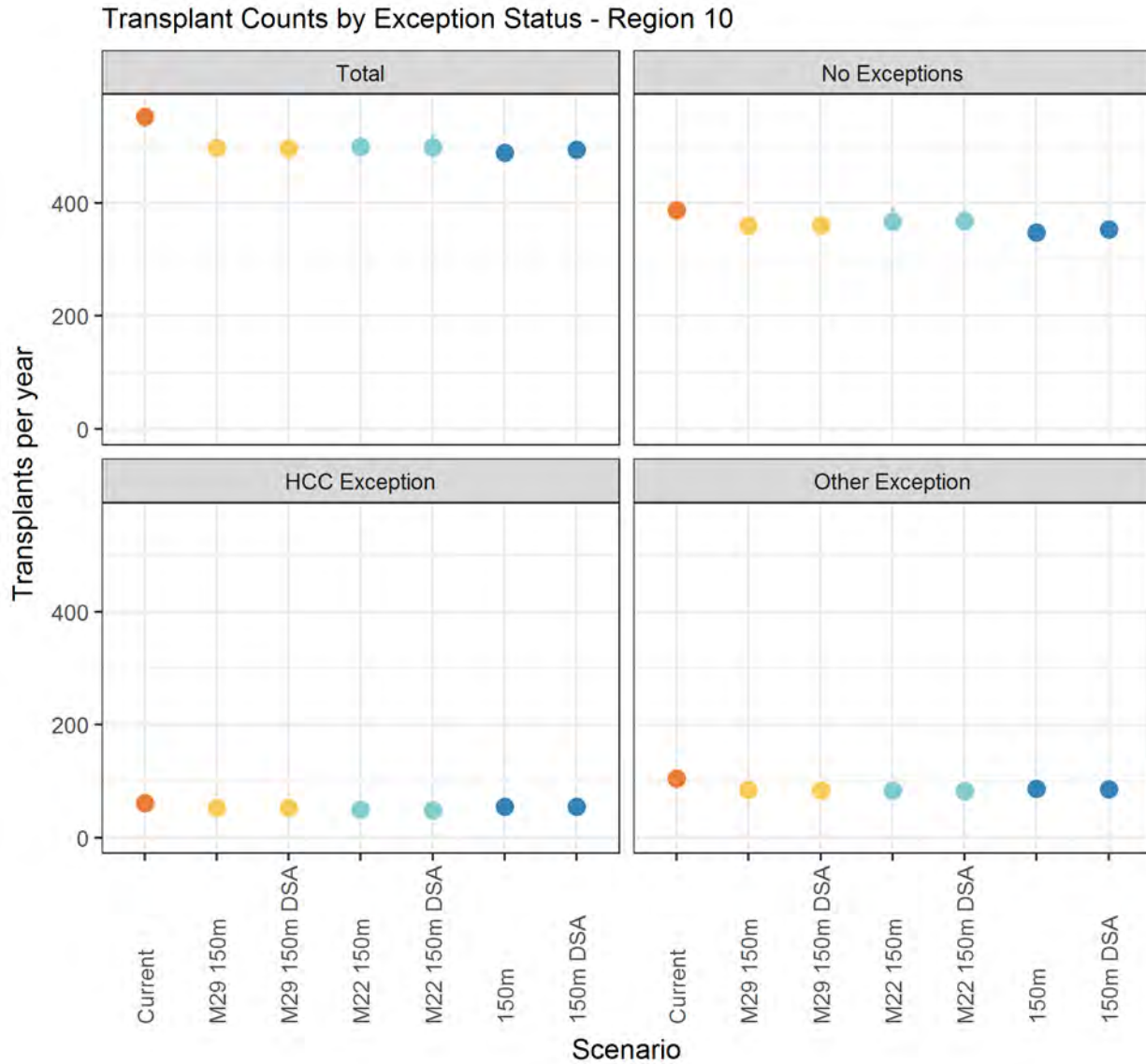


Figure 54 Transplant counts by exception status - region 10

Table 12 Transplant counts by exception status - region 10

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	552.1 (540,564.3)	386.8 (375.7,396.7)	61 (55.7,65.7)	104.3 (100.7,110)
M29 150m	497.6 (481.7,507.7)	359.8 (351.3,371.3)	52.8 (47.7,57.3)	85 (80,90.7)
M29 150m DSA	496.3 (477.7,509.3)	360.4 (345.7,372.3)	52.5 (47.3,56.7)	83.4 (79.7,88.7)
M22 150m	500 (491,517.7)	367.1 (353,390)	49.3 (41.3,52.3)	83.5 (79,91.7)
M22 150m DSA	498.6 (479,521)	368.3 (352.7,387.7)	48 (41.3,54)	82.3 (74.7,89.7)
150m	489.4 (474.3,501.3)	348.3 (337.7,361.3)	54.5 (49.3,62.3)	86.6 (81,90.3)
150m DSA	494.5 (481.7,507)	353.4 (345.3,363.3)	55.1 (50,63.3)	86.1 (80,94.7)

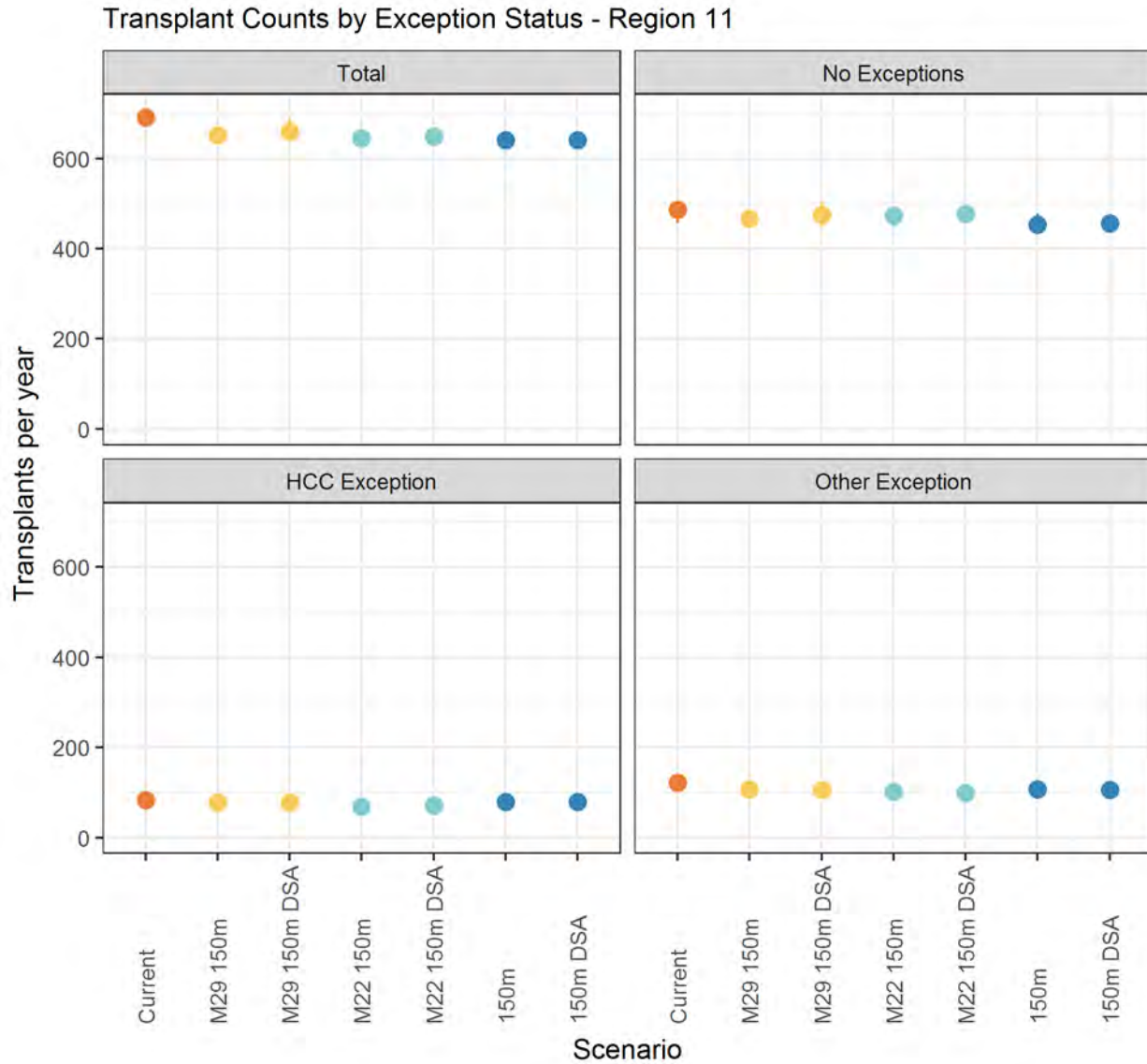


Figure 55 Transplant counts by exception status - region 11

Table 13 Transplant counts by exception status - region 11

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	690.9 (671.7,707)	485.7 (457.3,505.3)	83.3 (77.7,89.3)	121.9 (116.7,135.3)
M29 150m	651.2 (632.3,669.3)	466.5 (456.7,482.7)	78 (67.3,84.7)	106.7 (101.7,113.3)
M29 150m DSA	659 (640.3,686.3)	475 (449,503.3)	77.7 (72,83)	106.2 (101.7,116.3)
M22 150m	644.4 (624.3,659.3)	473.6 (447.7,493.3)	68.2 (61,78)	102.5 (97,109.7)
M22 150m DSA	648.2 (633.3,660.7)	477.5 (462.7,492)	70.8 (63.3,77.3)	99.8 (90.7,108.7)
150m	640.6 (626,661)	453.8 (441,476.7)	79.6 (72.7,87.7)	107.2 (104,112.3)
150m DSA	640.7 (629.7,652.7)	455.7 (439.7,469.3)	79.1 (68,87)	106 (100.7,110.3)

Waitlist Mortality

Waitlist Mortality Rates

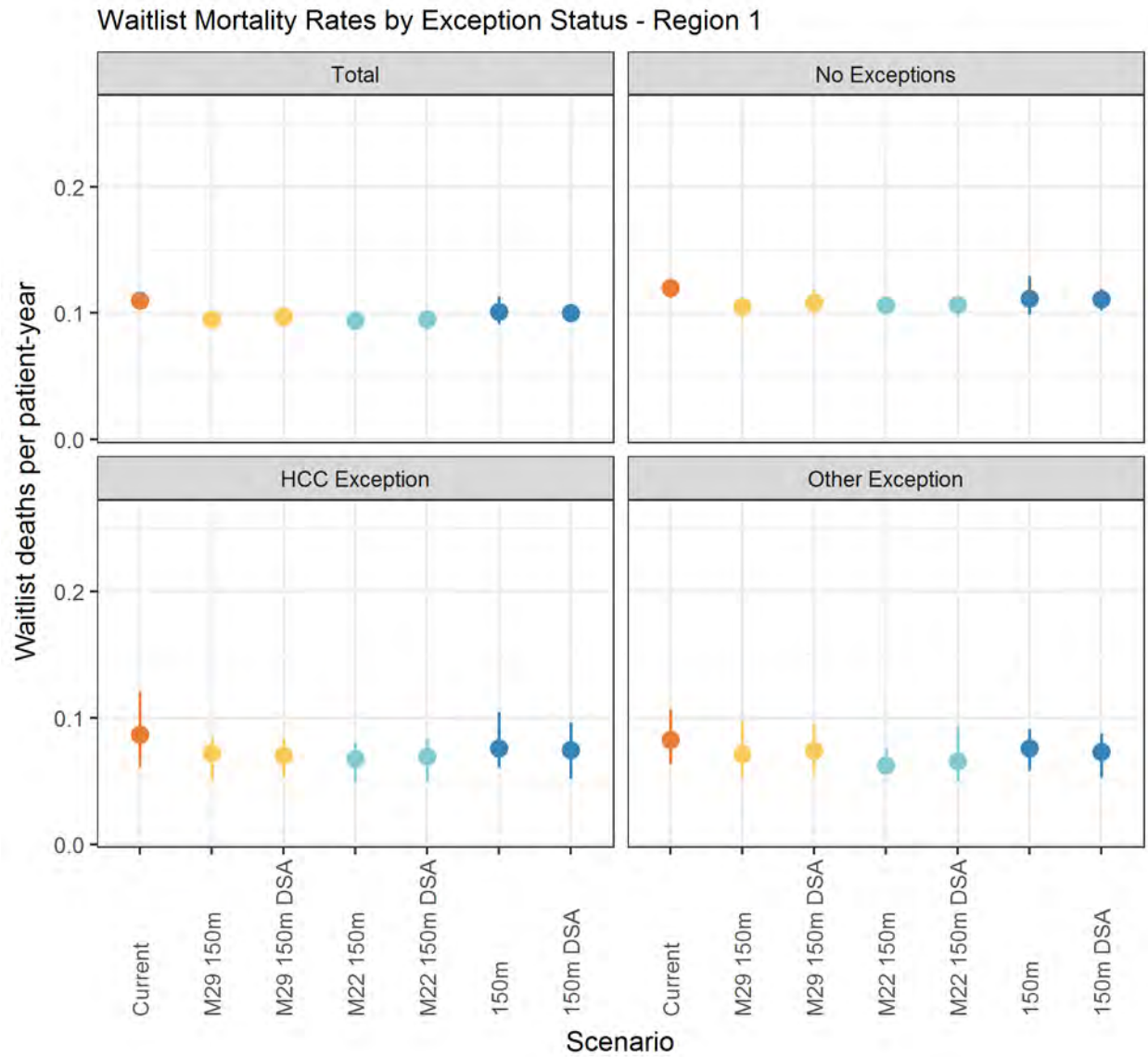


Figure 56 Waitlist mortality rates by exception status - region 1

Waitlist Mortality Rates by Exception Status - Region 2

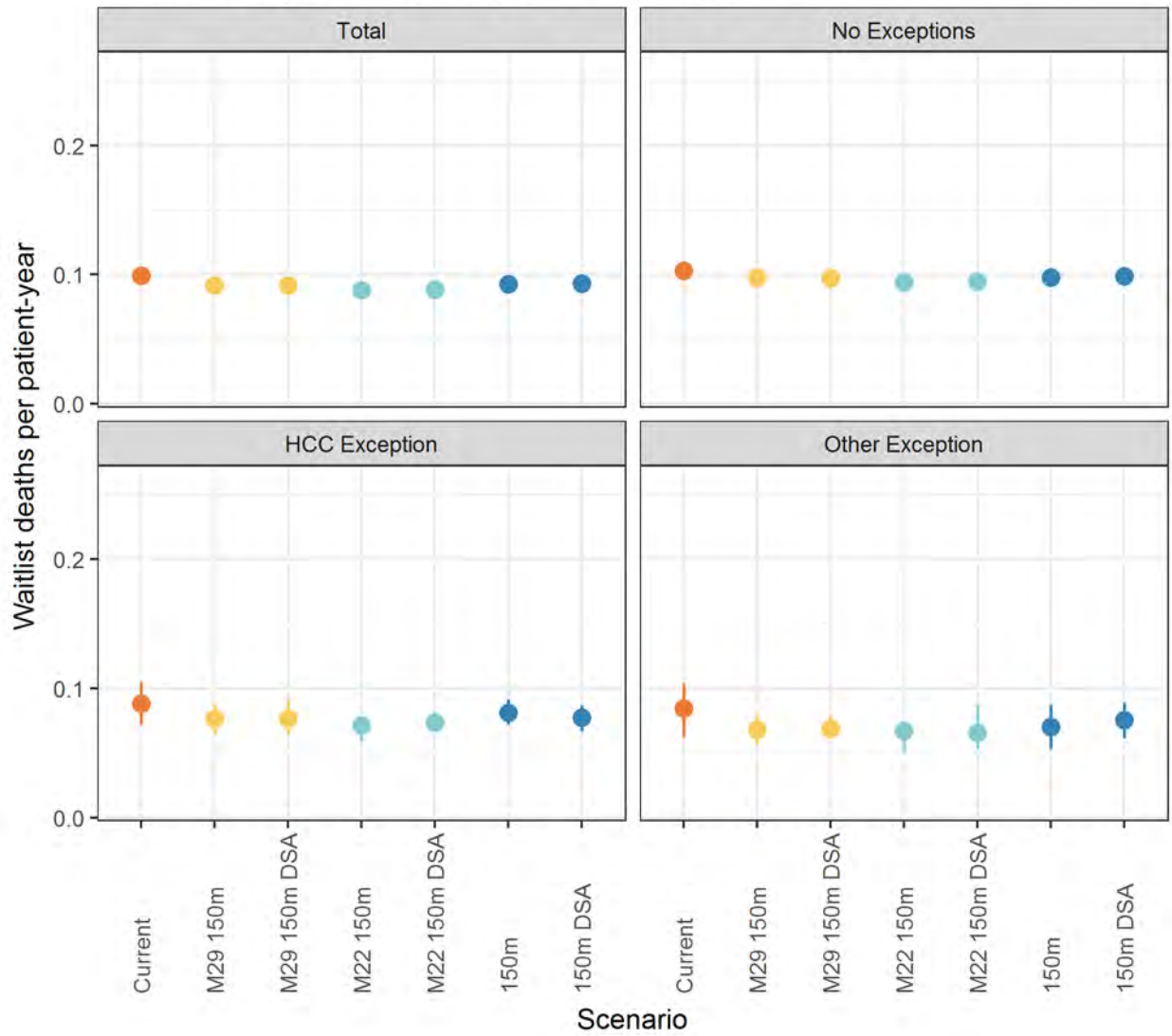


Figure 57 Waitlist mortality rates by exception status - region 2

Waitlist Mortality Rates by Exception Status - Region 3

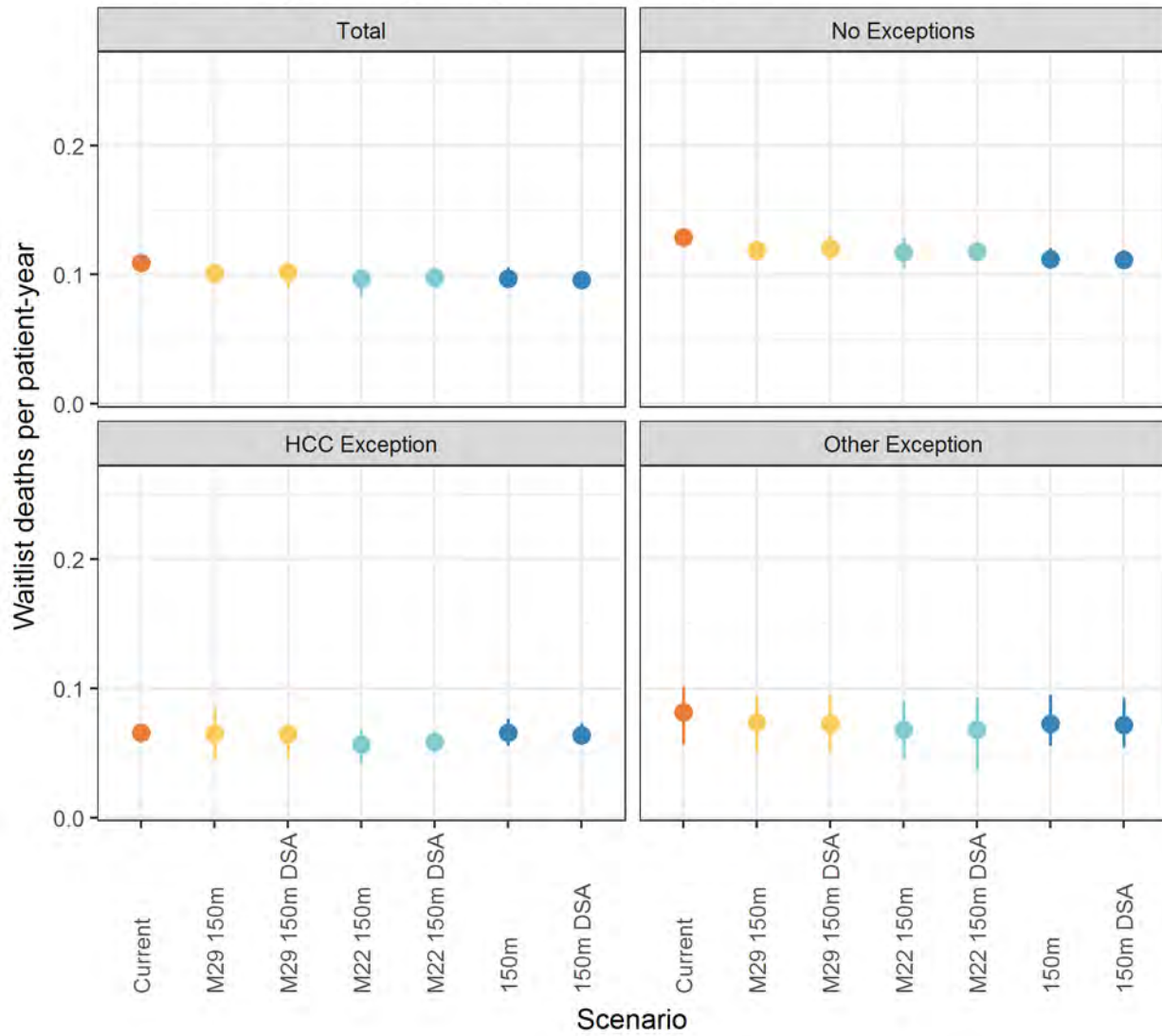


Figure 58 Waitlist mortality rates by exception status - region 3

Waitlist Mortality Rates by Exception Status - Region 4

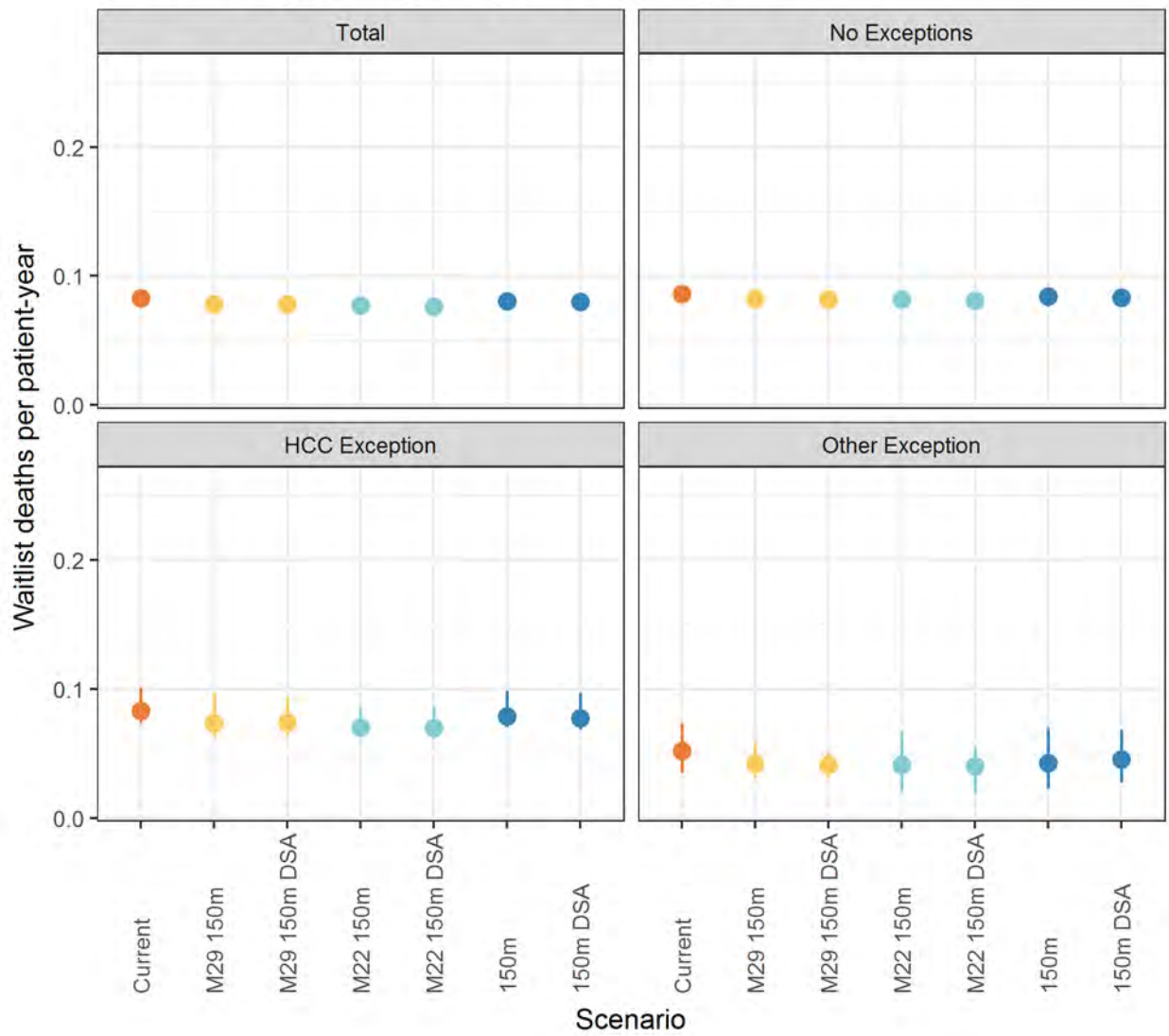


Figure 59 Waitlist mortality rates by exception status - region 4

Waitlist Mortality Rates by Exception Status - Region 5

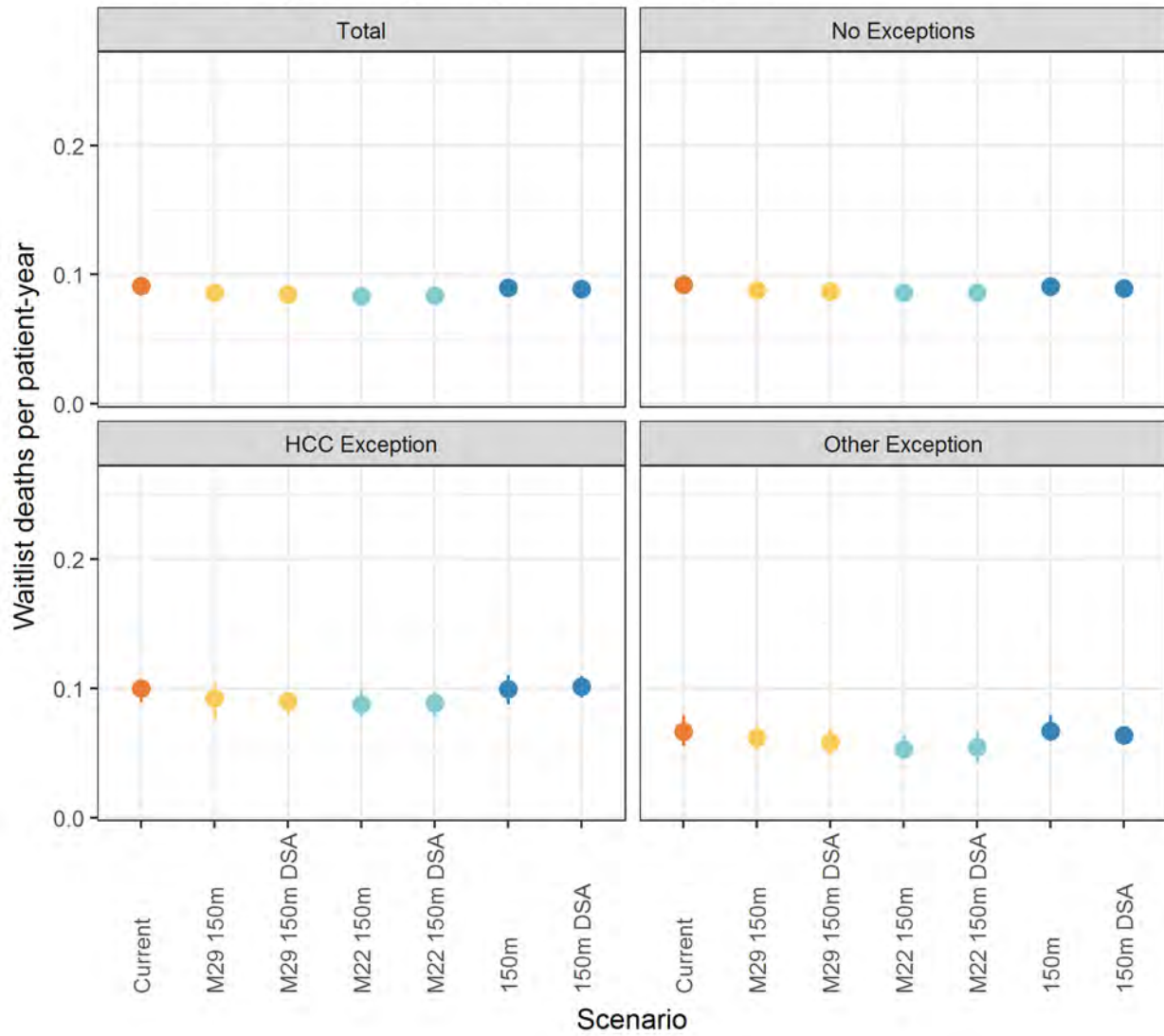


Figure 60 Waitlist mortality rates by exception status - region 5

Waitlist Mortality Rates by Exception Status - Region 6

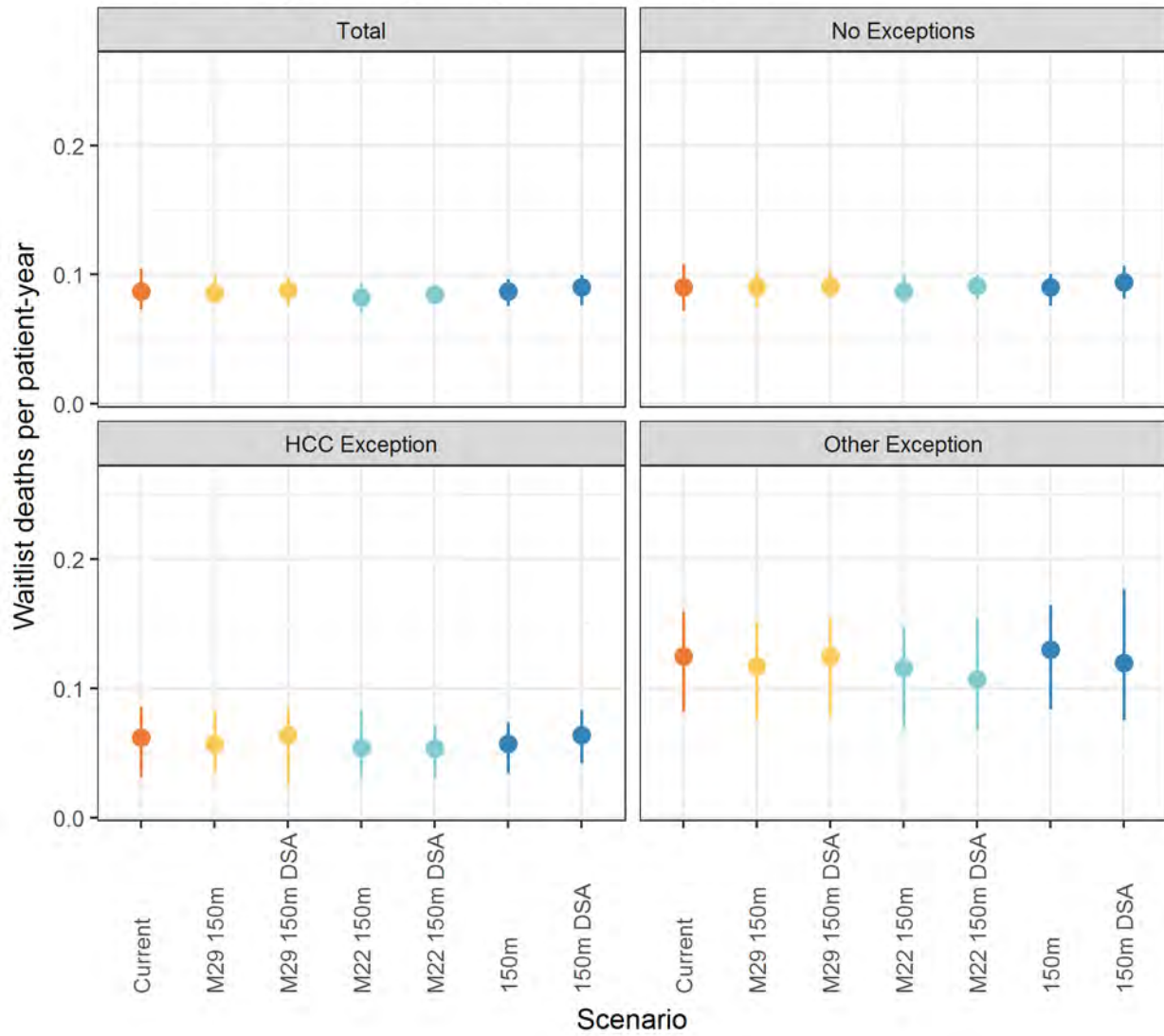


Figure 61 Waitlist mortality rates by exception status - region 6

Waitlist Mortality Rates by Exception Status - Region 7

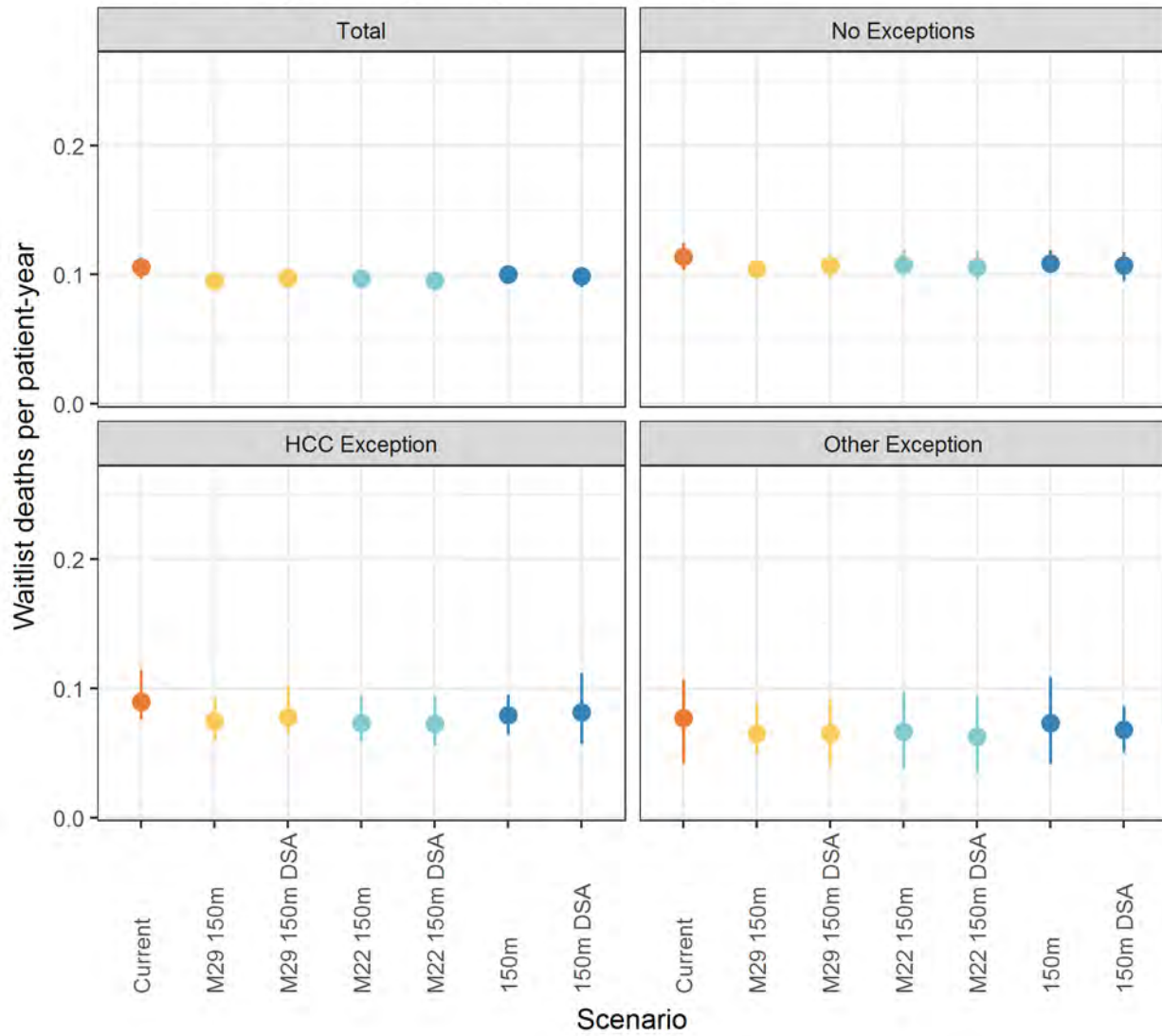


Figure 62 Waitlist mortality rates by exception status - region 7

Waitlist Mortality Rates by Exception Status - Region 8

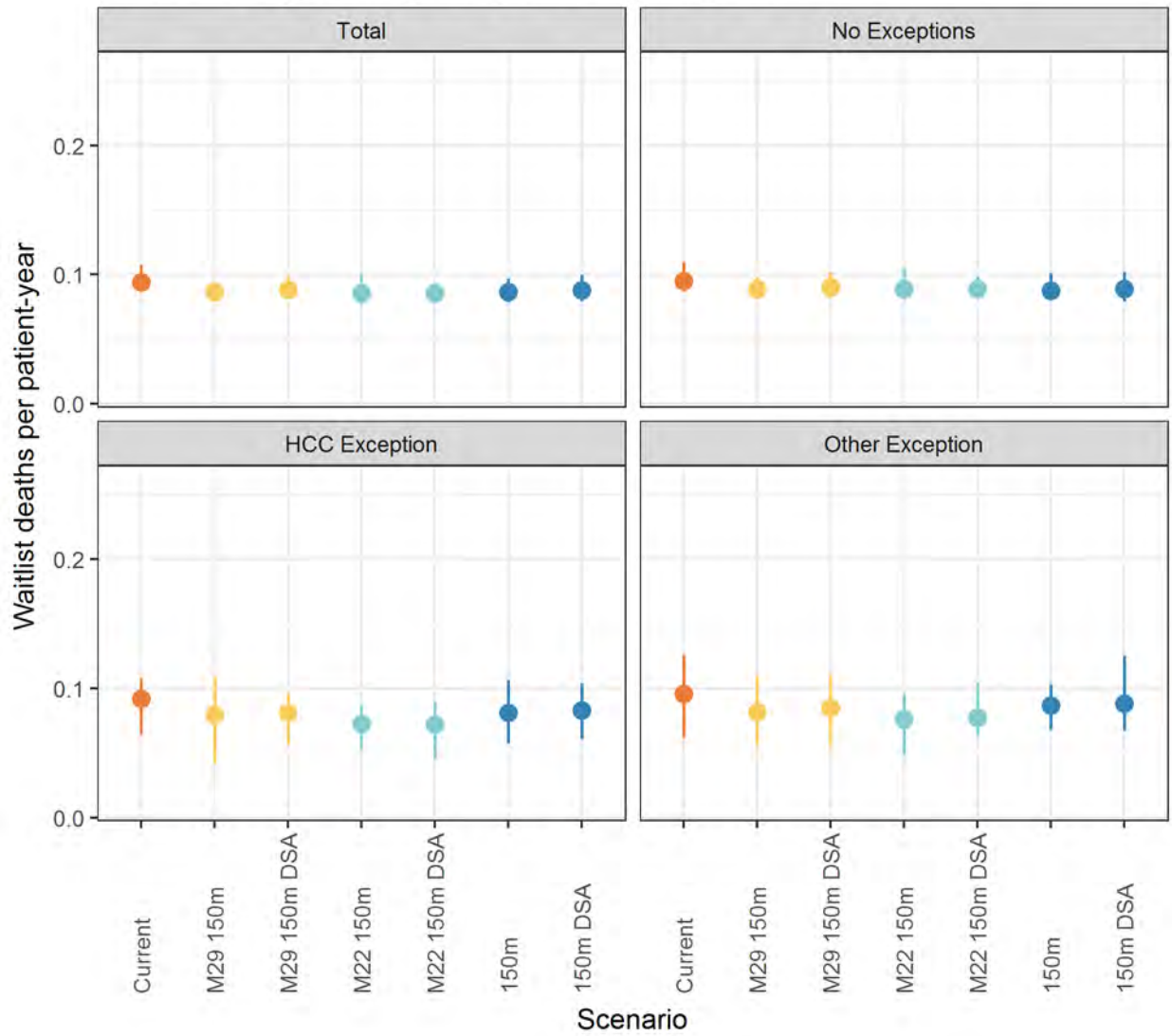


Figure 63 Waitlist mortality rates by exception status - region 8

Waitlist Mortality Rates by Exception Status - Region 9

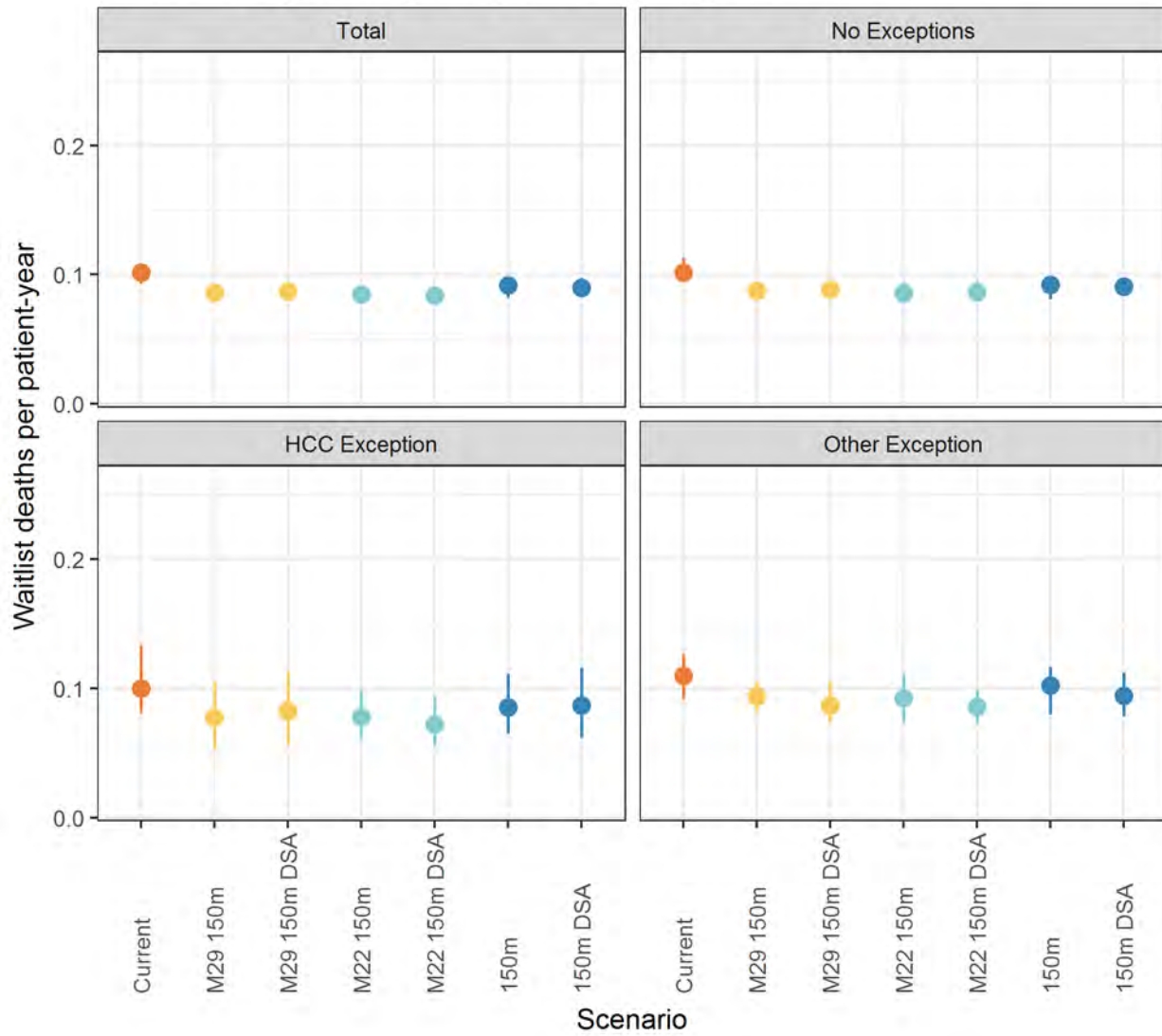


Figure 64 Waitlist mortality rates by exception status - region 9

Waitlist Mortality Rates by Exception Status - Region 10

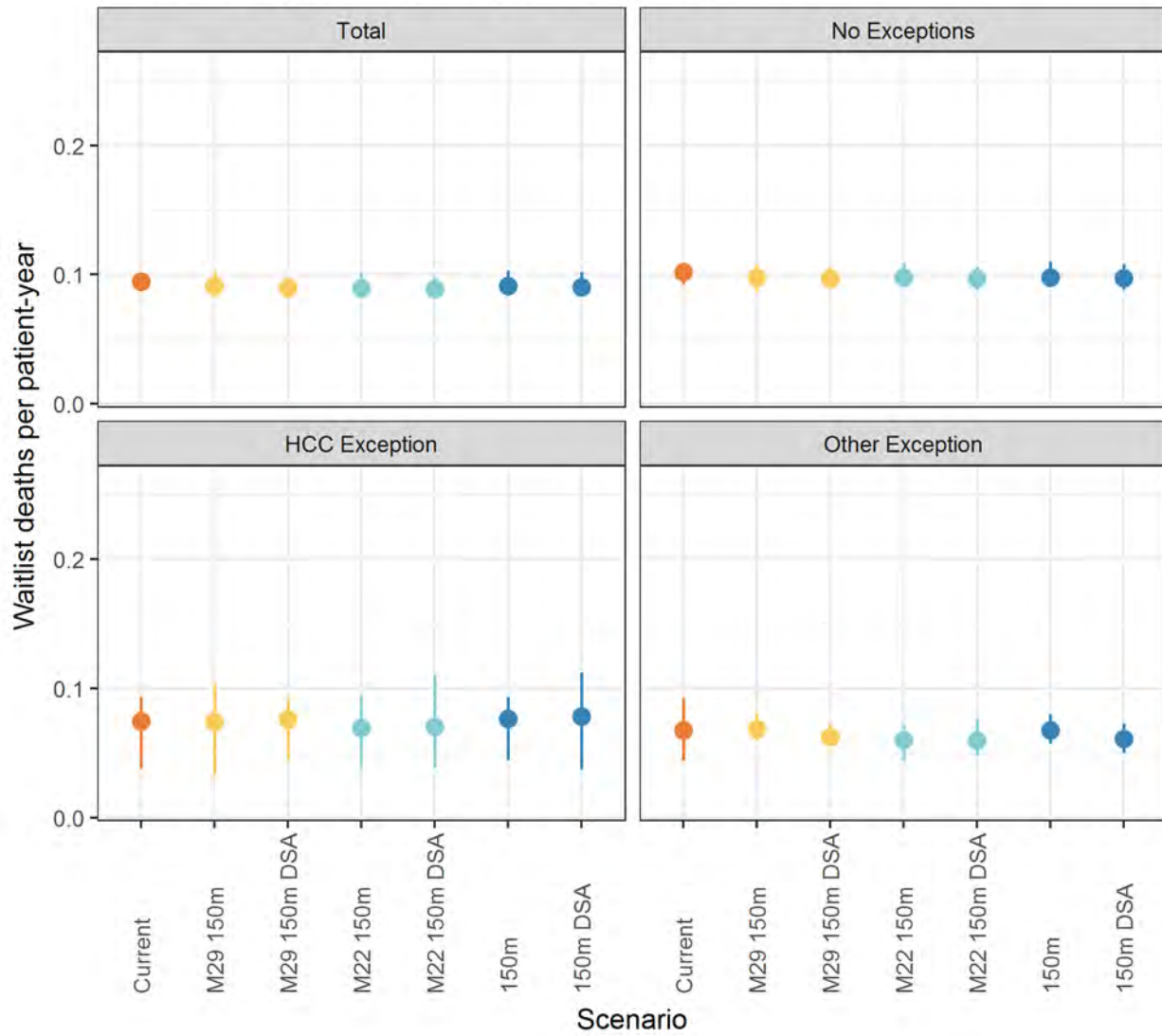


Figure 65 Waitlist mortality rates by exception status - region 10

Waitlist Mortality Rates by Exception Status - Region 11

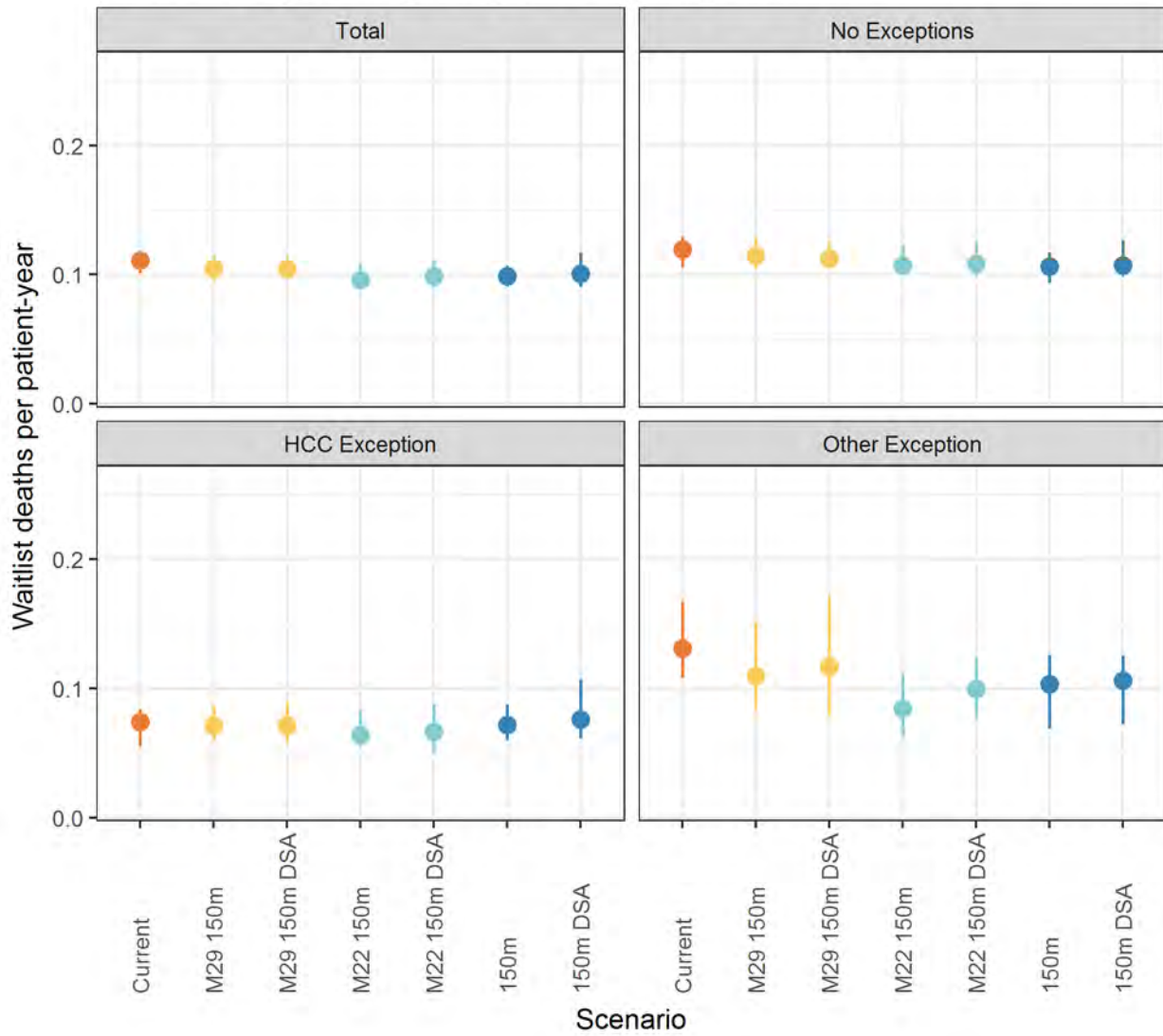


Figure 66 Waitlist mortality rates by exception status - region 11

Waitlist Mortality Counts

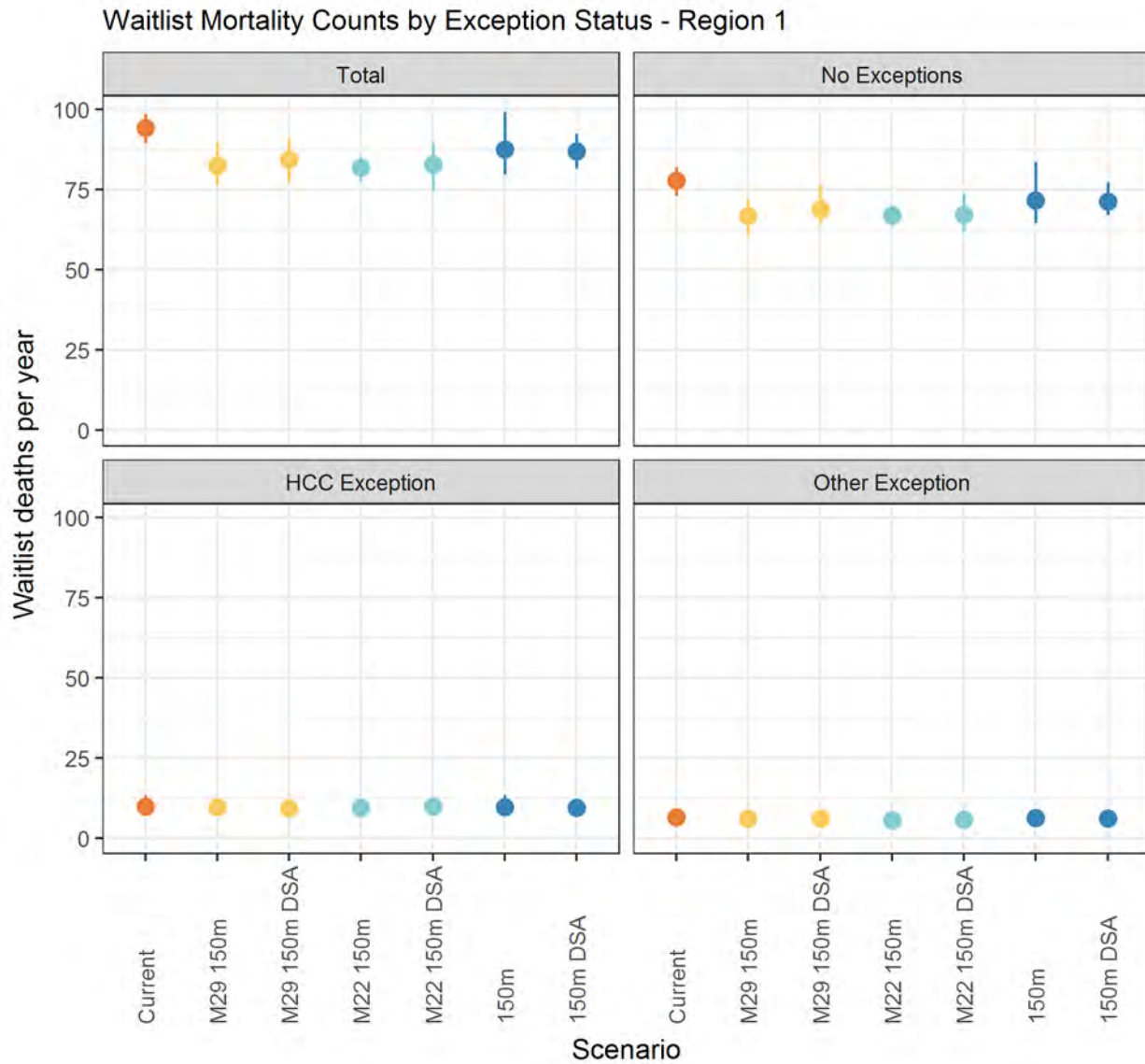


Figure 67 Waitlist mortality counts by exception status - region 1

Table 14 Waitlist mortality counts by exception status - region 1

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	94.2 (89.7,98.7)	77.9 (73,82)	9.9 (7.3,13.3)	6.5 (4.7,9)
M29 150m	82.5 (76.3,90)	66.8 (60.7,72.3)	9.6 (7,11.3)	6.1 (4.7,8.7)
M29 150m DSA	84.4 (77.3,91)	68.9 (64,76.7)	9.4 (7.3,11.3)	6.1 (4.3,8.3)
M22 150m	82 (77.7,85.3)	67 (63.7,70)	9.5 (7,11.3)	5.5 (4.3,7)
M22 150m DSA	82.9 (74.7,89.7)	67.3 (62,73.7)	9.9 (7.3,12)	5.7 (4.3,8.7)
150m	87.6 (79.7,99.3)	71.7 (64.7,83.7)	9.6 (8,13.3)	6.3 (4.3,8.3)
150m DSA	87 (81.7,92.3)	71.3 (67,77.3)	9.5 (7,12)	6.1 (4.3,8)

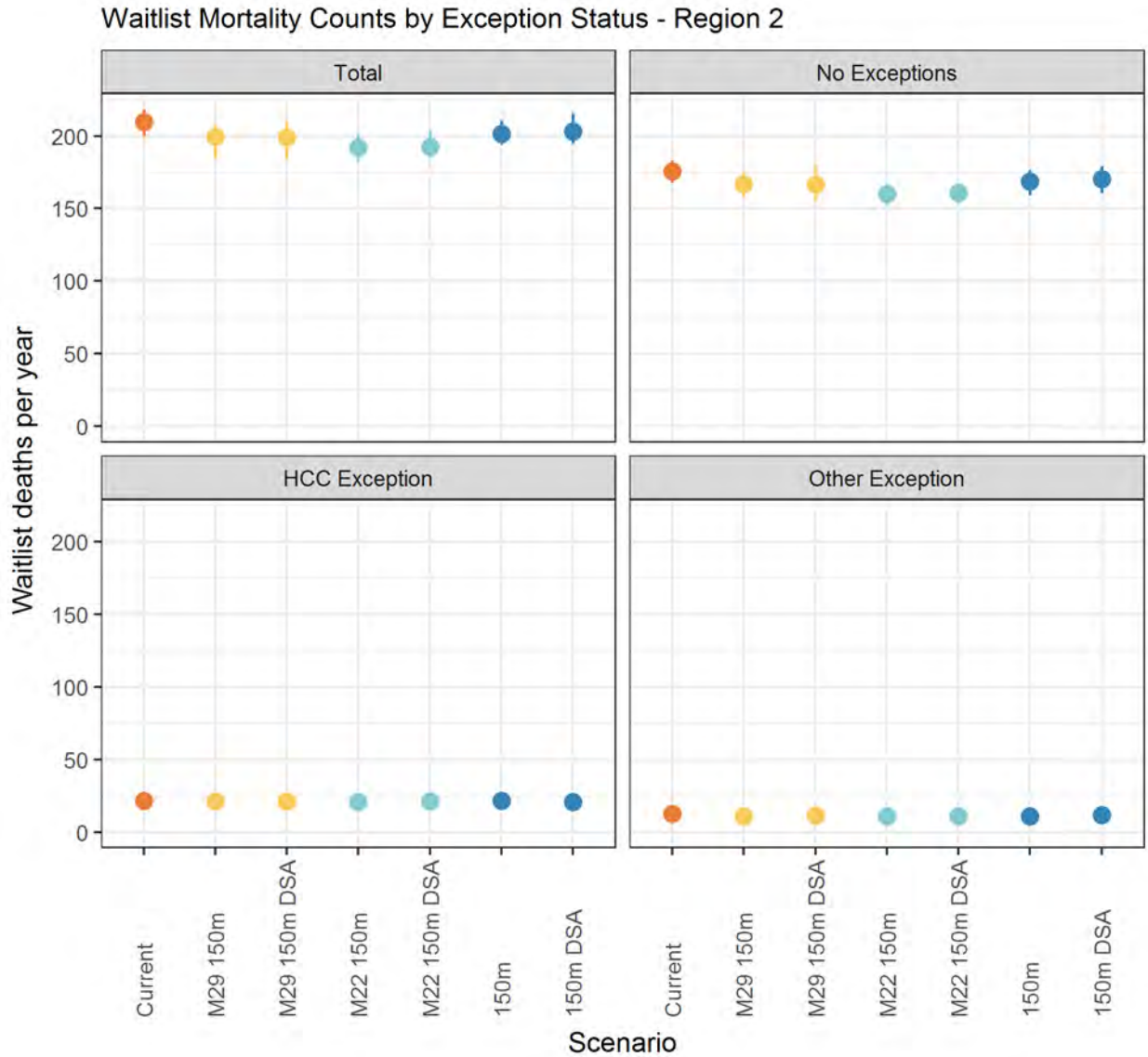


Figure 68 Waitlist mortality counts by exception status - region 2

Table 15 Waitlist mortality counts by exception status - region 2

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	209.7 (199.3,218.3)	175.8 (168,183)	21.5 (16.3,25)	12.4 (9,15.3)
M29 150m	199.4 (184.7,207.3)	167 (158,175.3)	21.3 (17.3,24)	11.1 (9.3,13)
M29 150m DSA	199.1 (183.7,209.7)	166.5 (154.7,179.7)	21.3 (17.3,26.7)	11.3 (10,13.3)
M22 150m	191.9 (182.7,200.7)	160.2 (151.7,167)	20.7 (16.3,23)	11 (8.7,12)
M22 150m DSA	192.6 (185,204)	160.7 (153.3,165.3)	21.1 (19,24)	10.8 (8.3,14.7)
150m	201.4 (194,210.3)	168.5 (159.3,176.7)	21.8 (19,25.7)	11.1 (8.7,14.3)
150m DSA	203.1 (194.3,215.3)	170.4 (160.7,179.3)	21 (17.3,24.3)	11.8 (9.7,14)

Waitlist Mortality Counts by Exception Status - Region 3

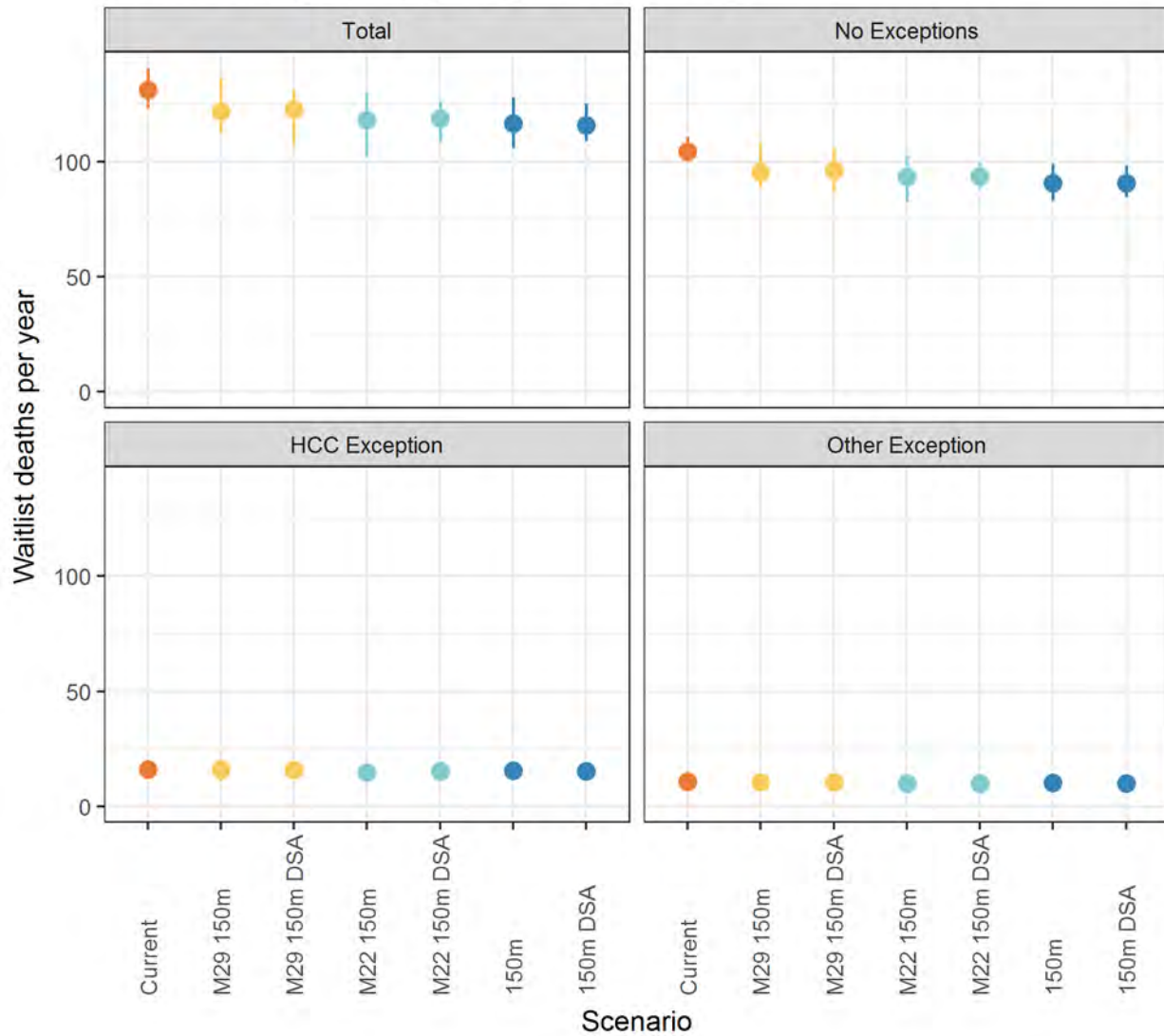


Figure 69 Waitlist mortality counts by exception status - region 3

Table 16 Waitlist mortality counts by exception status - region 3

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	131.2 (123.3,140.7)	104.5 (99.7,110.7)	16 (14.3,18.3)	10.7 (7.7,13.7)
M29 150m	121.9 (112.3,136.3)	95.4 (88.7,108)	16 (11.3,19.7)	10.5 (7,13)
M29 150m DSA	122.8 (107,131.3)	96.4 (86.7,105.7)	15.9 (11.7,18.7)	10.5 (7,13.7)
M22 150m	118.2 (102,130)	93.4 (82.3,102.7)	14.8 (11.7,16.7)	10 (6.7,12.3)
M22 150m DSA	118.8 (108.3,126)	93.6 (88.3,99.3)	15.2 (13.3,17)	10 (5.3,13)
150m	116.5 (105.7,128)	90.6 (83,99)	15.6 (12.3,17.7)	10.3 (7,12.7)
150m DSA	115.9 (109,125.3)	90.7 (84.7,98.3)	15.1 (13.3,18)	10.1 (7.3,12.7)

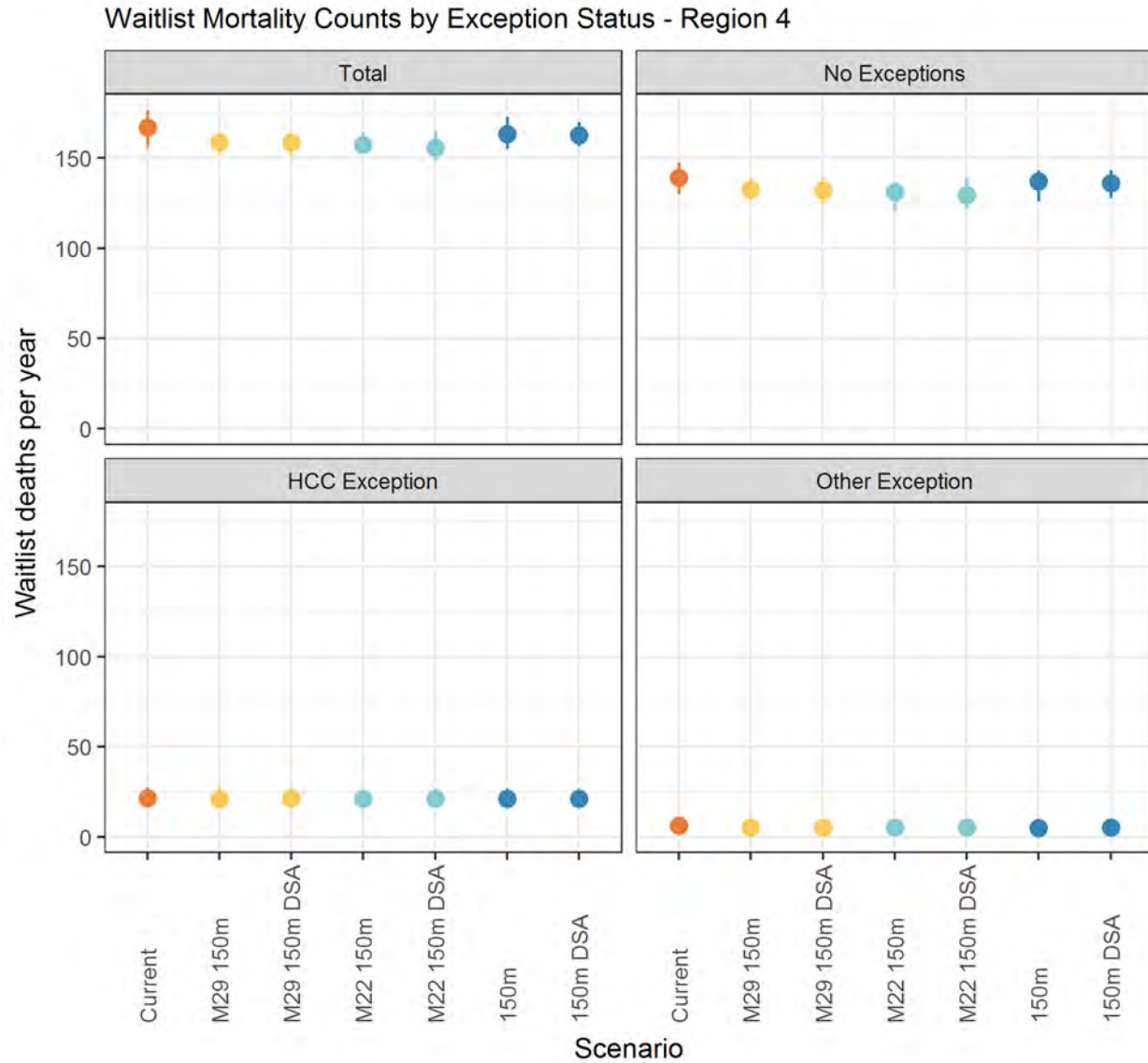


Figure 70 Waitlist mortality counts by exception status - region 4

Table 17 Waitlist mortality counts by exception status - region 4

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	167 (155.7,176.7)	139.3 (130,147.3)	21.6 (19.3,27.3)	6.1 (4,9)
M29 150m	158.6 (151.3,164.3)	132.5 (126.3,139)	20.9 (18,27.3)	5.3 (4,7)
M29 150m DSA	158.6 (150.7,164.7)	132.2 (125,139.3)	21.3 (18,27)	5.1 (4,6.7)
M22 150m	157.5 (152.3,164.3)	131.2 (120.7,136.3)	21.2 (19,26.3)	5.1 (2.7,8.7)
M22 150m DSA	155.7 (148.3,165)	129.5 (122.3,139)	21.1 (19.3,26.7)	5.1 (2.3,7.3)
150m	163.5 (155,173)	137.3 (126,143)	21.3 (19,26.7)	5 (2.7,8.7)
150m DSA	162.6 (156.3,170)	136.1 (128,143)	21.3 (19.3,26.3)	5.2 (3.3,7.7)

Waitlist Mortality Counts by Exception Status - Region 5

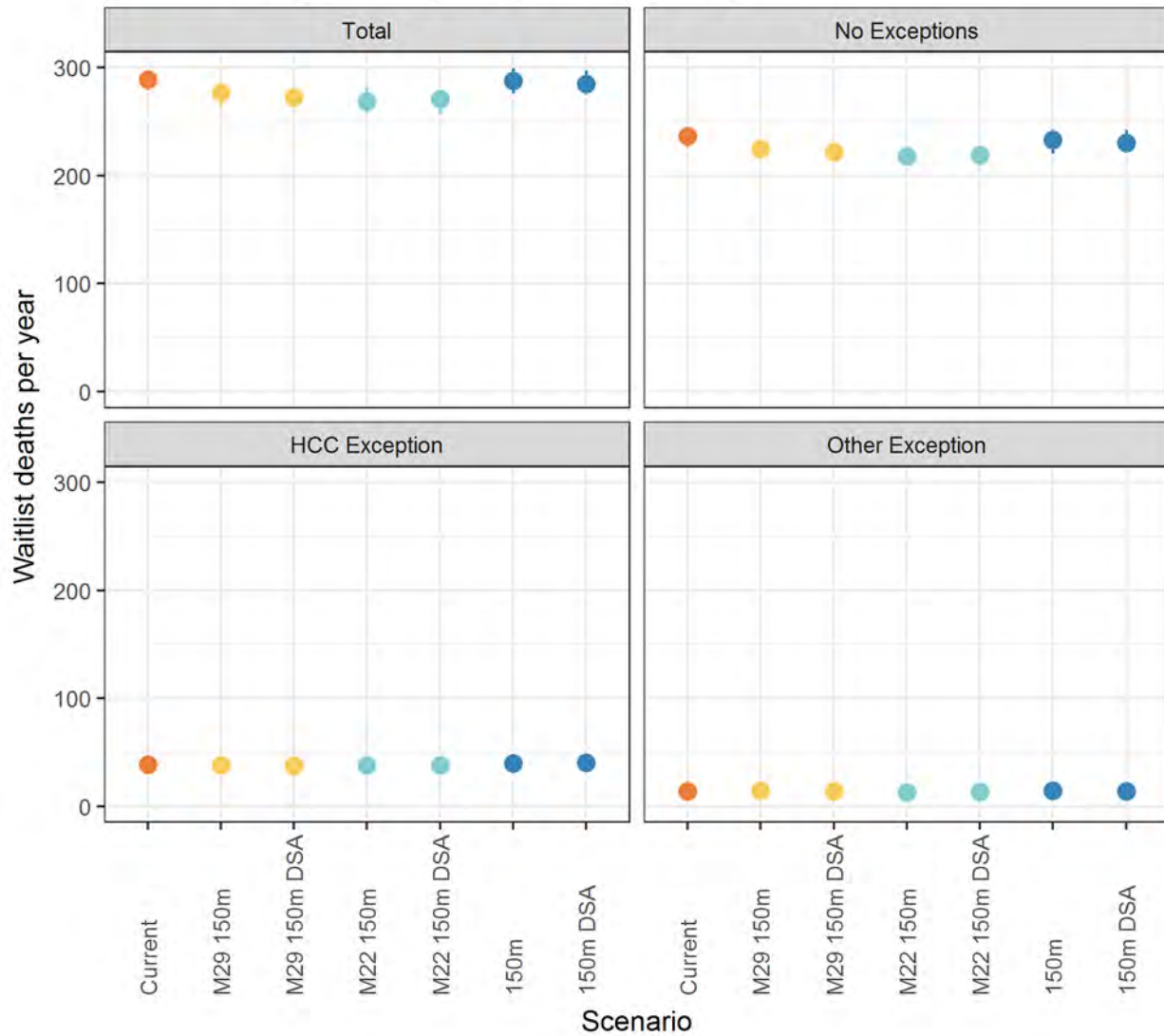


Figure 71 Waitlist mortality counts by exception status - region 5

Table 18 Waitlist mortality counts by exception status - region 5

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	288.9 (281.3,295)	236.4 (226.7,244.3)	38.8 (35.7,41.3)	13.7 (11.7,16.3)
M29 150m	277 (264,283)	224.5 (214.7,230)	38.1 (33,42.3)	14.3 (12,16.7)
M29 150m DSA	272.7 (264.3,281.3)	221.7 (216.7,227.7)	37.3 (32.7,40.7)	13.7 (11,16.3)
M22 150m	268.9 (258,282.3)	218.1 (210.7,227)	38 (34,42.3)	12.8 (11,15.7)
M22 150m DSA	270.8 (256.7,277)	219.2 (209.7,225.3)	38.4 (33.7,42)	13.2 (10.7,16.3)
150m	287.7 (276,299.7)	233.4 (220.3,242.3)	39.8 (35,43.7)	14.4 (12.7,16.3)
150m DSA	285 (275.3,297.7)	230.5 (223.7,242.3)	40.5 (37.7,43.7)	13.9 (11.7,15.3)

Waitlist Mortality Counts by Exception Status - Region 6

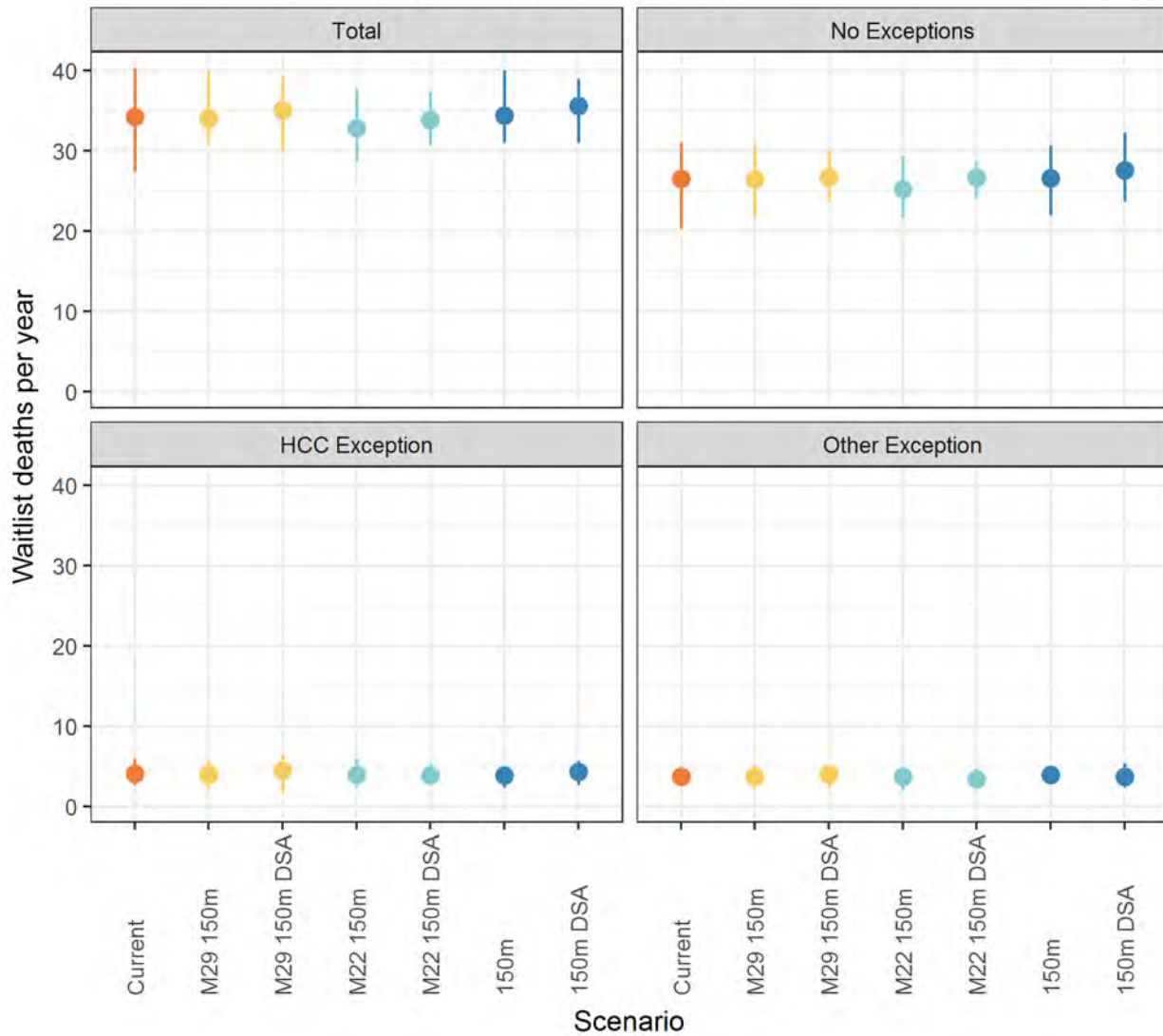


Figure 72 Waitlist mortality counts by exception status - region 6

Table 19 Waitlist mortality counts by exception status - region 6

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	34.3 (27.3,40.3)	26.5 (20.3,31)	4.1 (2.7,6)	3.7 (2.7,4.7)
M29 150m	34.1 (30.7,40)	26.4 (21.7,30.7)	3.9 (2.3,5.7)	3.7 (2.3,5)
M29 150m DSA	35.1 (30,39.3)	26.7 (23.7,30)	4.4 (1.7,6.3)	4 (2.3,5)
M22 150m	32.8 (28.7,37.7)	25.2 (21.7,29.3)	3.9 (2.3,6)	3.7 (2.4,7)
M22 150m DSA	33.9 (30.7,37.3)	26.7 (24,28.7)	3.9 (2.7,5.3)	3.4 (2.3,4.7)
150m	34.4 (31,40)	26.6 (22,30.7)	3.8 (2.3,5)	3.9 (3,5)
150m DSA	35.6 (31,39)	27.6 (23.7,32.3)	4.3 (2.7,5.7)	3.7 (2.3,5.3)

Waitlist Mortality Counts by Exception Status - Region 7

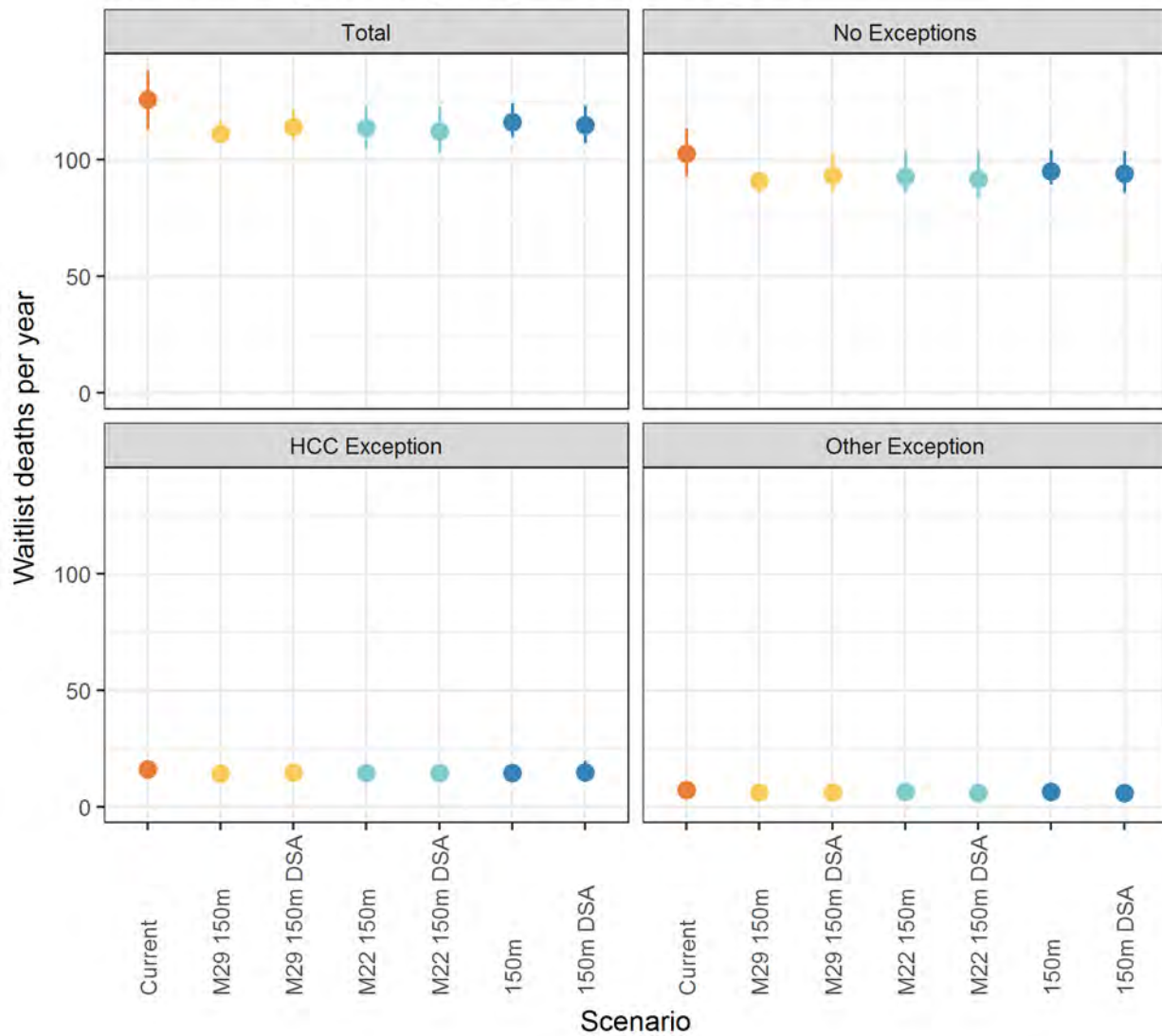


Figure 73 Waitlist mortality counts by exception status - region 7

Table 20 Waitlist mortality counts by exception status - region 7

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	126 (113,138.7)	102.7 (93,113.7)	16.2 (13.7,19.3)	7.1 (4,9.7)
M29 150m	111.4 (107.3,117)	91 (85.7,95)	14.2 (12,17)	6.2 (4.7,8)
M29 150m DSA	114.2 (108.7,122)	93.2 (86.3,102.7)	14.8 (12.3,18.7)	6.2 (3.7,8)
M22 150m	113.7 (104.7,123)	92.8 (85.7,104)	14.5 (12.3,18)	6.4 (3.7,9.3)
M22 150m DSA	112.4 (103,122.7)	91.8 (83.3,103.7)	14.6 (11.7,18.3)	6 (3.3,8.7)
150m	116.1 (109.7,124.3)	95.2 (89.3,104.3)	14.4 (12,17)	6.5 (4,9.7)
150m DSA	115 (107,123.3)	94 (85.7,103.7)	14.9 (10.7,19.7)	6 (4.3,7.3)

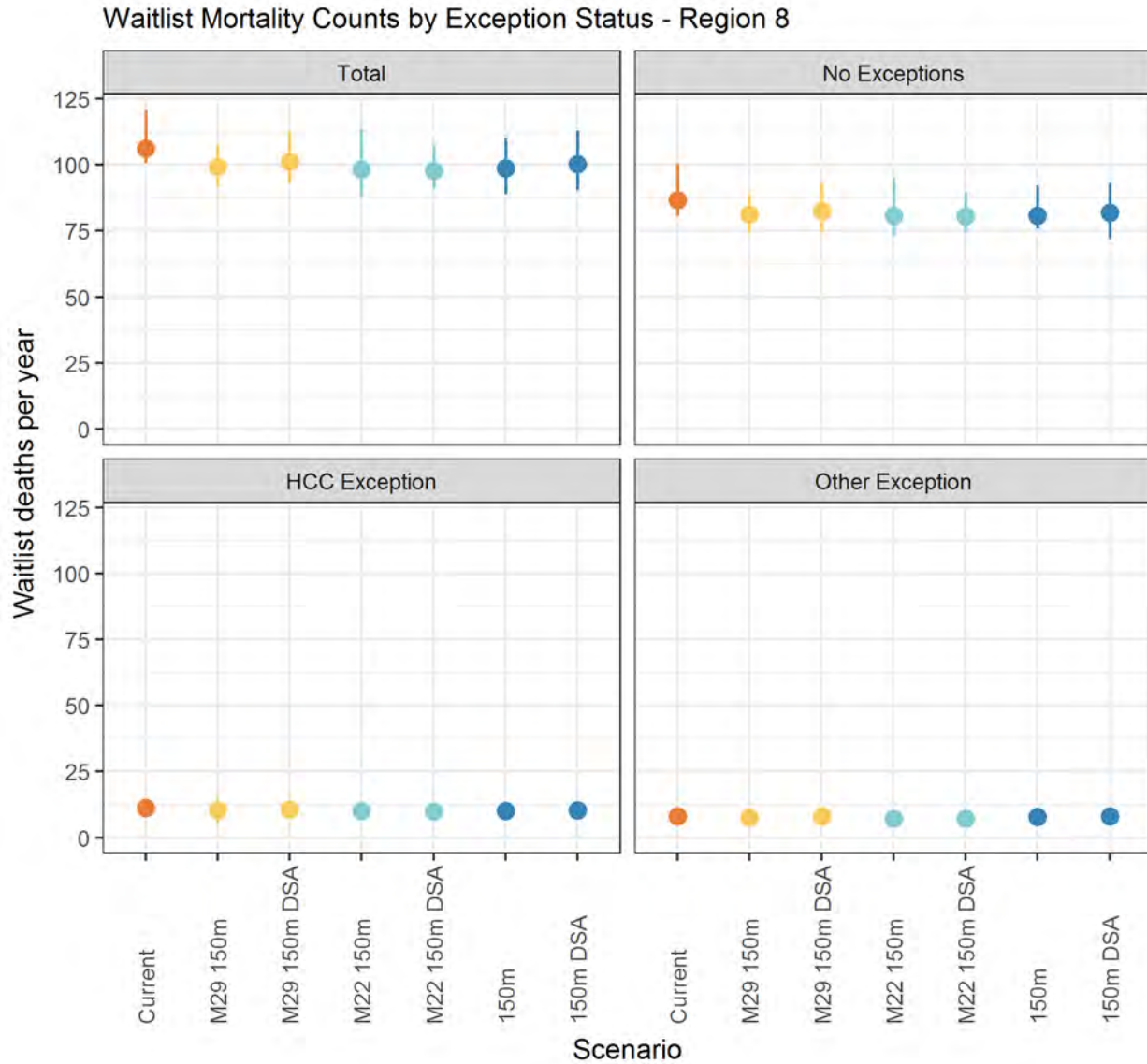


Figure 74 Waitlist mortality counts by exception status - region 8

Table 21 Waitlist mortality counts by exception status - region 8

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	106.1 (100.7,120.7)	86.7 (80.7,100.3)	11.2 (8.3,13)	8.2 (6,11)
M29 150m	99.1 (91.7,107.7)	81.2 (74,88.7)	10.3 (5.7,14.3)	7.6 (5.3,10)
M29 150m DSA	101.2 (92.7,113)	82.5 (74.3,93)	10.6 (7.7,12.7)	8.1 (5,11.7)
M22 150m	98.1 (87.7,113.3)	80.7 (73,95)	10.1 (7.3,12.3)	7.3 (5.3,9.3)
M22 150m DSA	97.9 (91,107.3)	80.6 (74,89.7)	10 (6.7,12.3)	7.3 (5.7,9.3)
150m	98.8 (89,110)	80.7 (75.7,92)	10.1 (7,12.7)	8 (6,9.3)
150m DSA	100.3 (90.3,113)	81.9 (72,93)	10.3 (7,12.3)	8.1 (6,11.3)

Waitlist Mortality Counts by Exception Status - Region 9

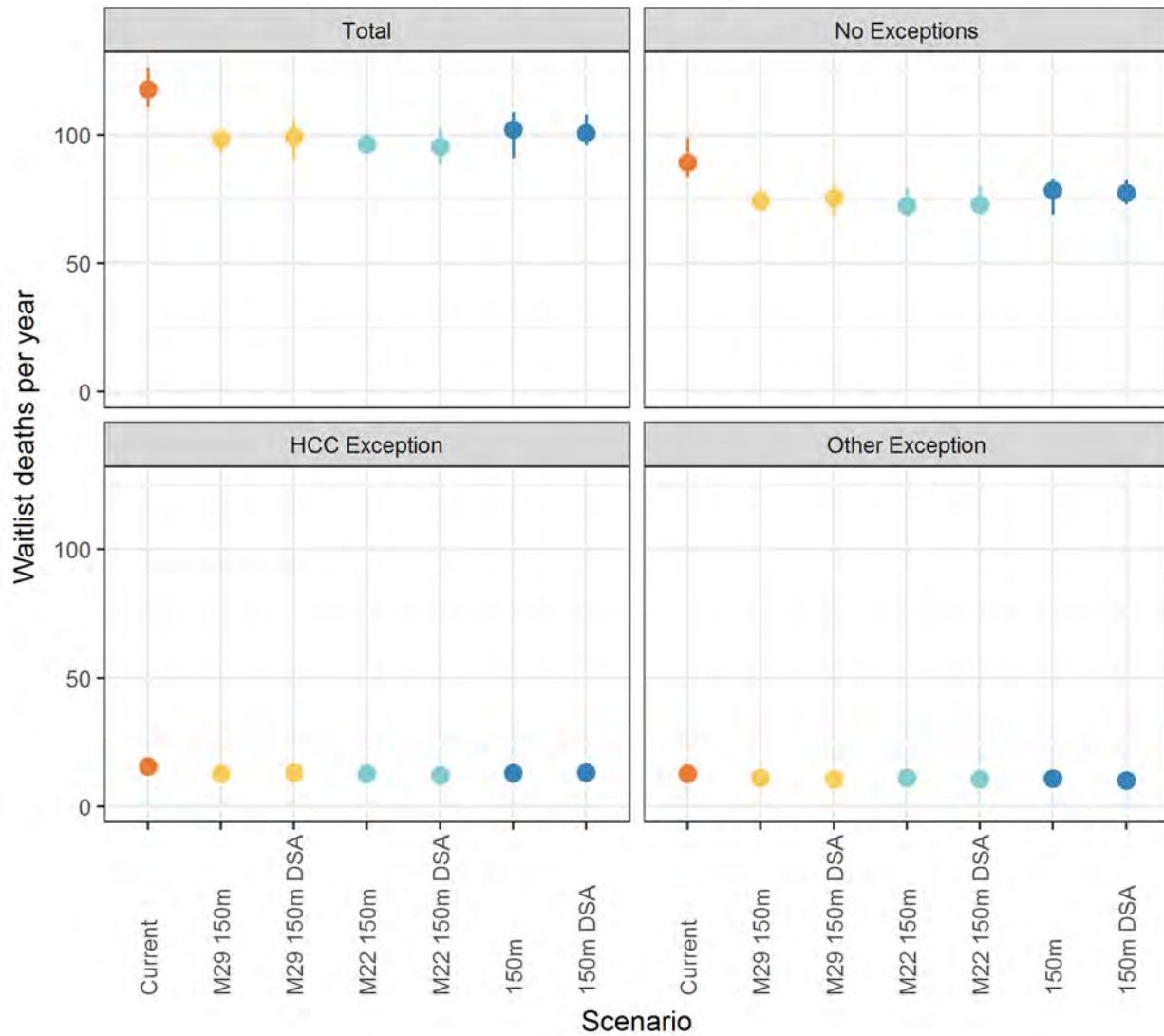


Figure 75 Waitlist mortality counts by exception status - region 9

Table 22 Waitlist mortality counts by exception status - region 9

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	117.6 (110.7,126)	89.3 (83.7,99)	15.5 (12,19)	12.8 (11.7,14.7)
M29 150m	98.2 (93.3,101.7)	74.5 (70.3,79)	12.6 (8.7,15.3)	11.2 (9,12.3)
M29 150m DSA	99.2 (90,105.7)	75.4 (68.7,81)	13.2 (9,17)	10.5 (8.7,13.3)
M22 150m	96.3 (92.7,100.3)	72.4 (68,79)	12.8 (10,15.3)	11.1 (8.7,13)
M22 150m DSA	95.4 (88.3,102.7)	73 (68.7,80)	11.9 (9,14)	10.5 (9,12)
150m	102.2 (91,108.7)	78.3 (69,83)	13 (10,16.3)	10.8 (7.7,12)
150m DSA	100.8 (96,107.7)	77.4 (73,82.3)	13.2 (9.7,16)	10.2 (8.7,11.7)

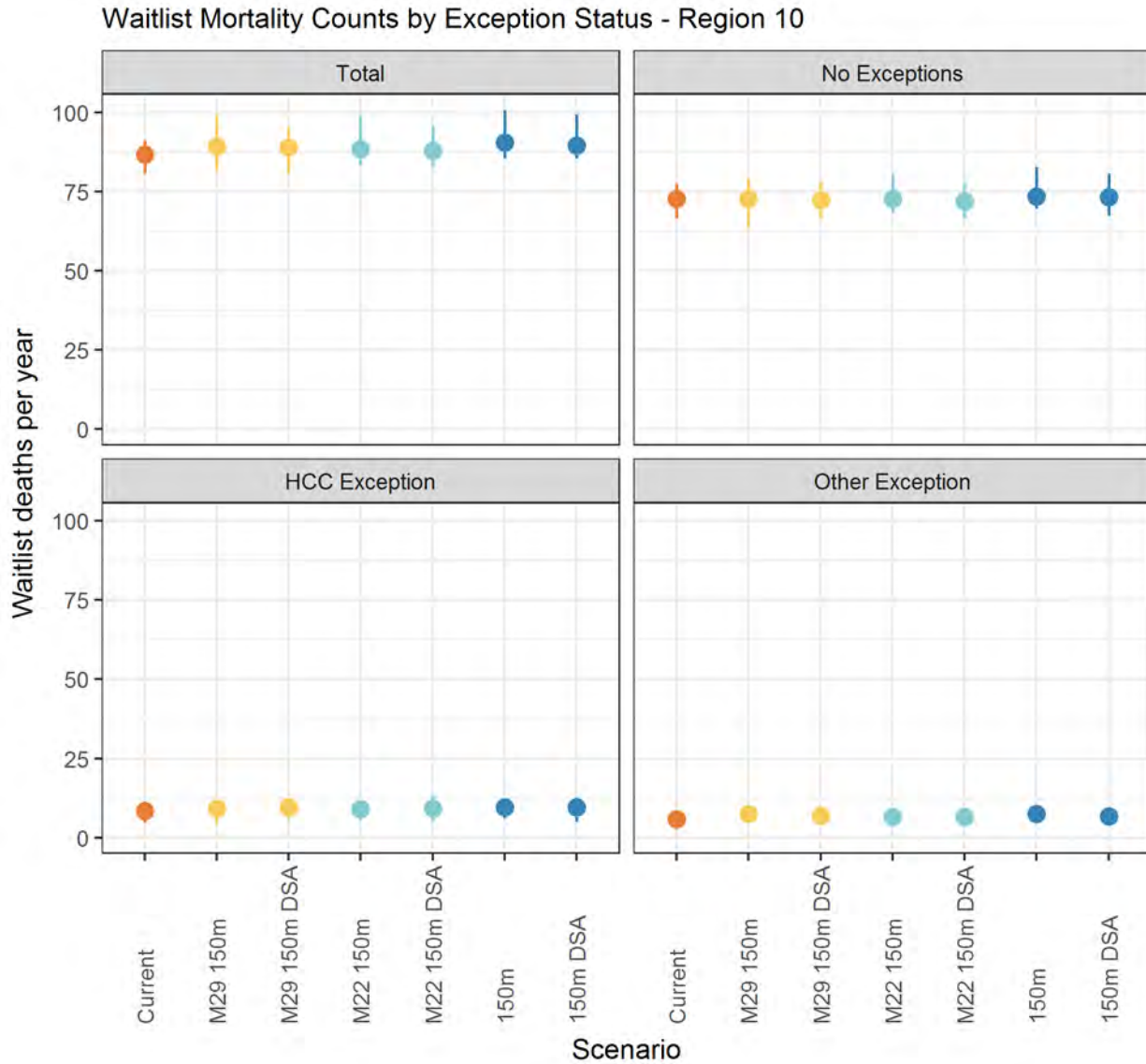


Figure 76 Waitlist mortality counts by exception status - region 10

Table 23 Waitlist mortality counts by exception status - region 10

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	86.7 (80.7,91)	72.6 (66.3,77.3)	8.4 (4.7,10.7)	5.7 (4,8)
M29 150m	89.4 (81.3,99.3)	72.6 (63.7,79.3)	9.2 (4.3,12)	7.5 (6.7,8.7)
M29 150m DSA	88.9 (80.7,95.3)	72.3 (66.3,78)	9.5 (6,12)	7 (5.7,8.3)
M22 150m	88.4 (83.3,99)	72.7 (68.3,80.7)	9.1 (5.7,11.3)	6.6 (5,7.7)
M22 150m DSA	87.7 (82.7,95.7)	72 (66.7,77.7)	9.1 (5.3,13.3)	6.6 (5.7,8.3)
150m	90.5 (85.3,100.7)	73.5 (69.7,82.7)	9.5 (6,11.7)	7.5 (6.7,8)
150m DSA	89.5 (85.3,99.3)	73.1 (67.3,80.7)	9.7 (5,12.7)	6.7 (5.3,7.7)

Waitlist Mortality Counts by Exception Status - Region 11

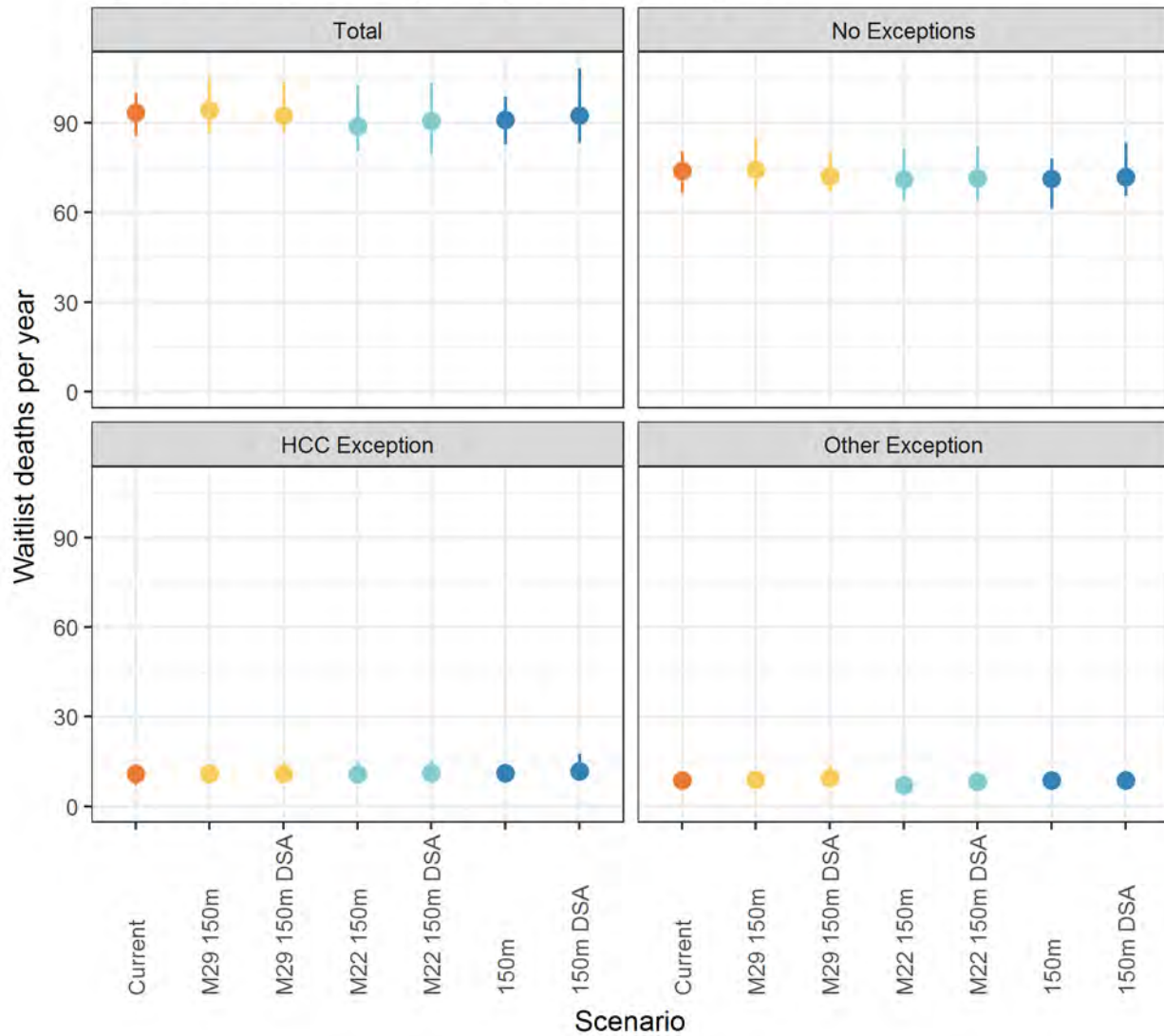


Figure 77 Waitlist mortality counts by exception status - region 11

Table 24 Waitlist mortality counts by exception status - region 11

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	93.4 (85.7,100)	73.9 (66.3,80.3)	10.9 (7,13)	8.6 (7.3,10.3)
M29 150m	94.2 (86.3,105.3)	74.2 (68,84.7)	11 (8.3,13.7)	9 (7,12)
M29 150m DSA	92.5 (86.7,103.7)	72 (67,80)	11 (8,14.7)	9.5 (6,13.7)
M22 150m	88.8 (80.7,102.3)	71 (64,81.3)	10.7 (8,14.7)	7.1 (5,9.7)
M22 150m DSA	90.7 (79.3,103.3)	71.4 (63.7,82)	11.1 (7.7,15.3)	8.2 (6.3,10.7)
150m	91 (82.7,98.7)	71.3 (61.3,78)	11.1 (8.3,13.7)	8.6 (6,10.7)
150m DSA	92.5 (83.3,108.3)	71.9 (65.7,83.3)	11.8 (9,17.7)	8.8 (6,12)

Posttransplant Mortality

Posttransplant Mortality Rates

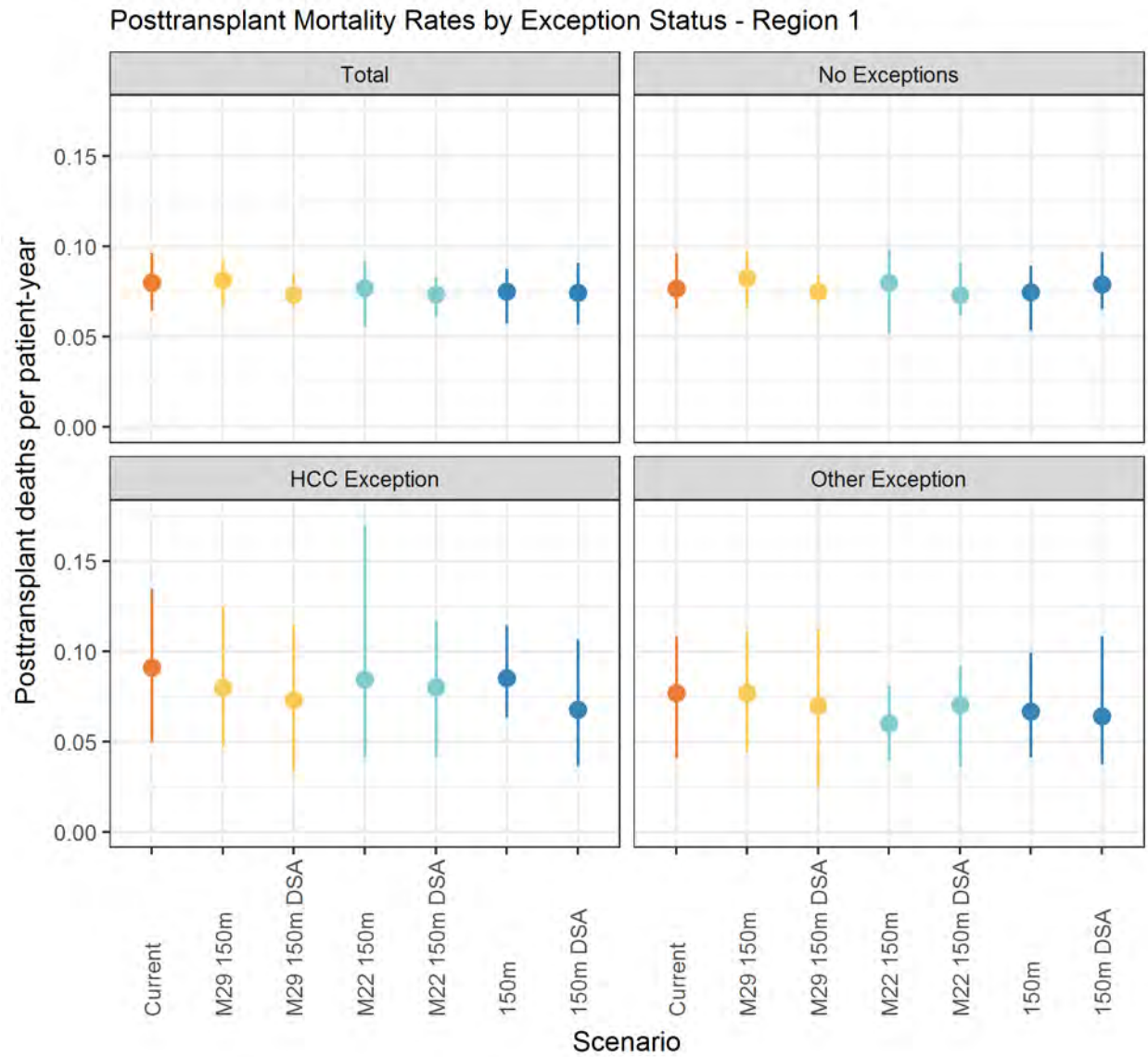


Figure 78 Posttransplant mortality rates by exception status - region 1

Posttransplant Mortality Rates by Exception Status - Region 2

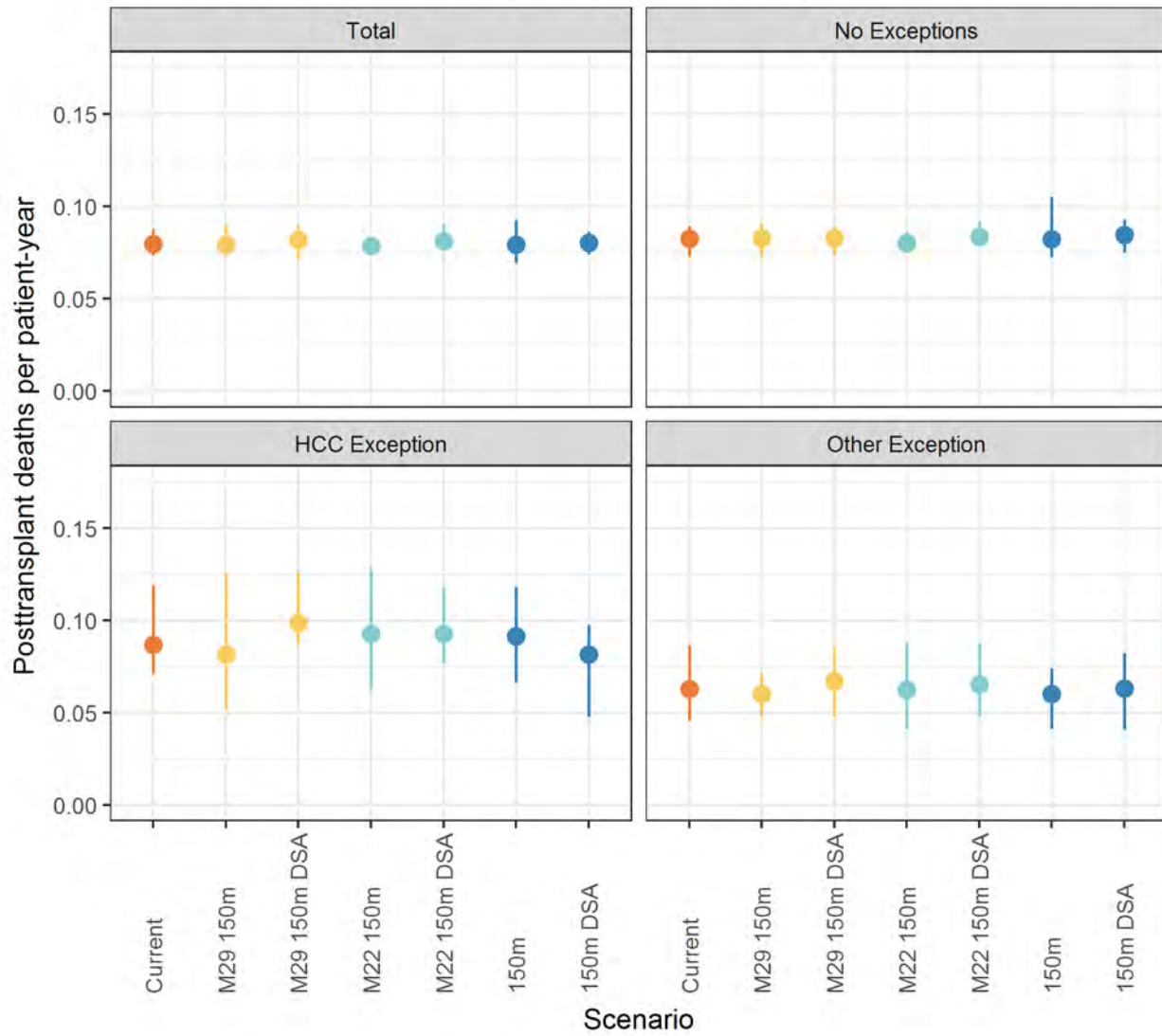


Figure 79 Posttransplant mortality rates by exception status - region 2

Posttransplant Mortality Rates by Exception Status - Region 3

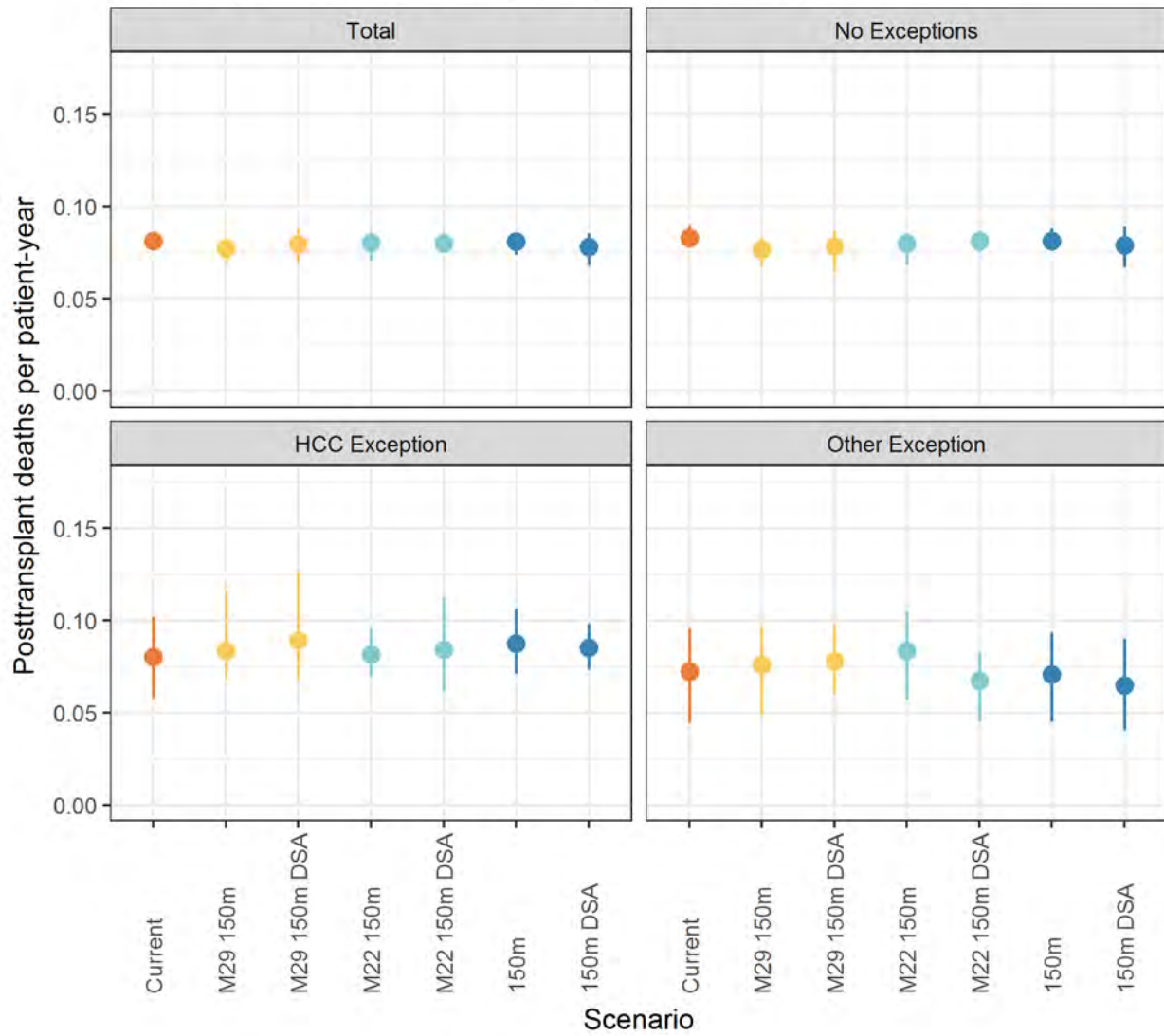


Figure 80 Posttransplant mortality rates by exception status - region 3

Posttransplant Mortality Rates by Exception Status - Region 4

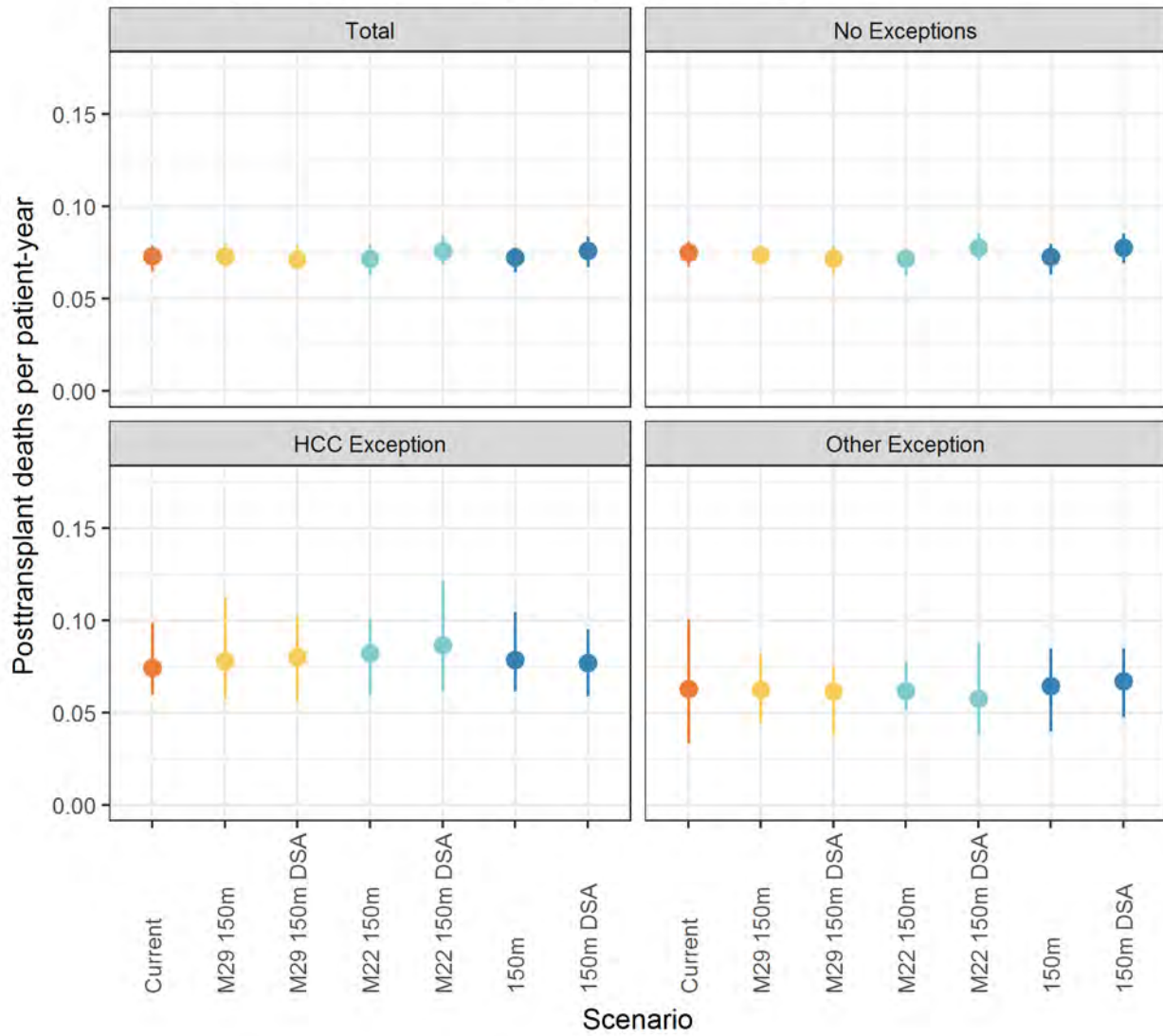


Figure 81 Posttransplant mortality rates by exception status - region 4

Posttransplant Mortality Rates by Exception Status - Region 5

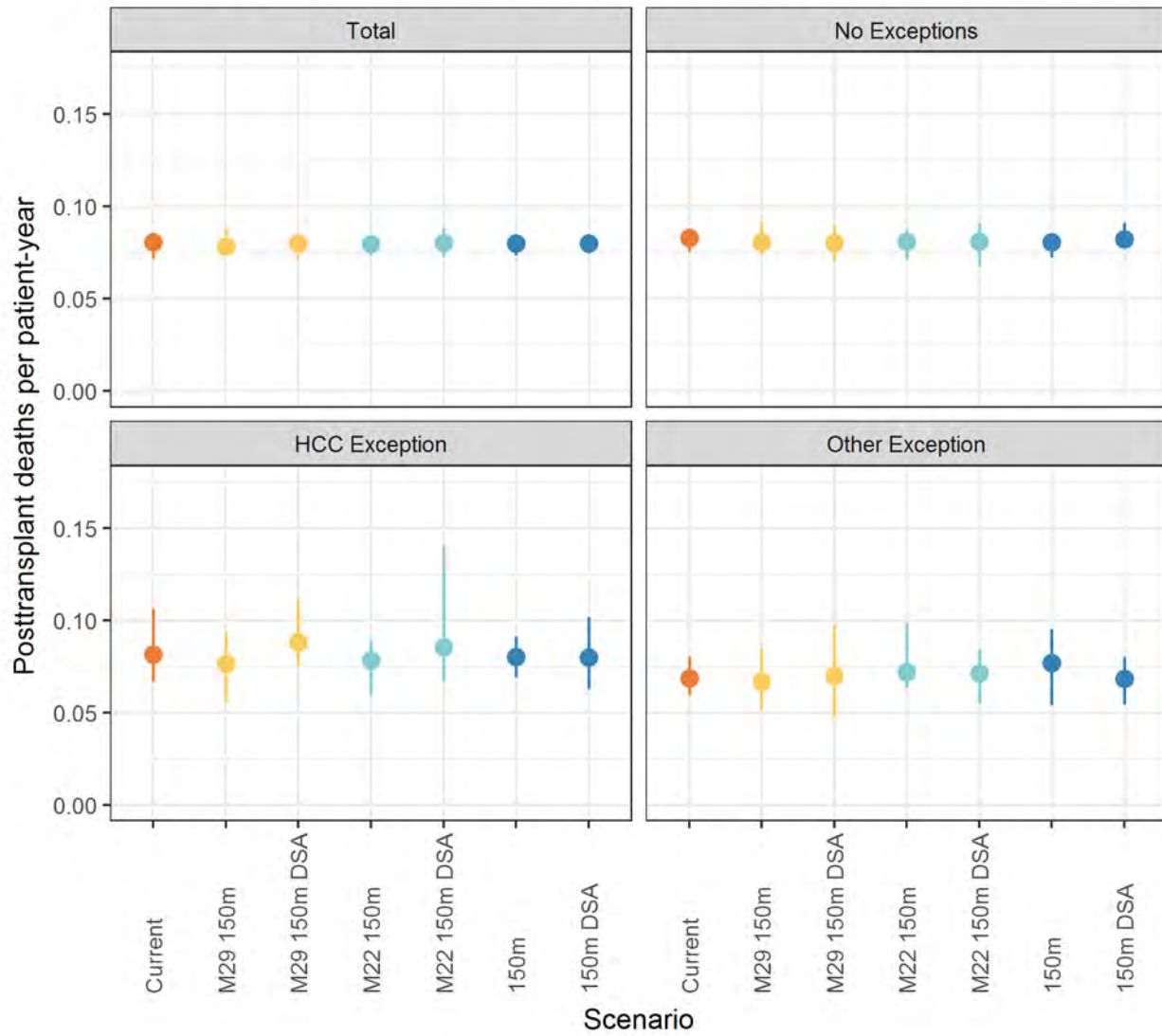


Figure 82 Posttransplant mortality rates by exception status - region 5

Posttransplant Mortality Rates by Exception Status - Region 6

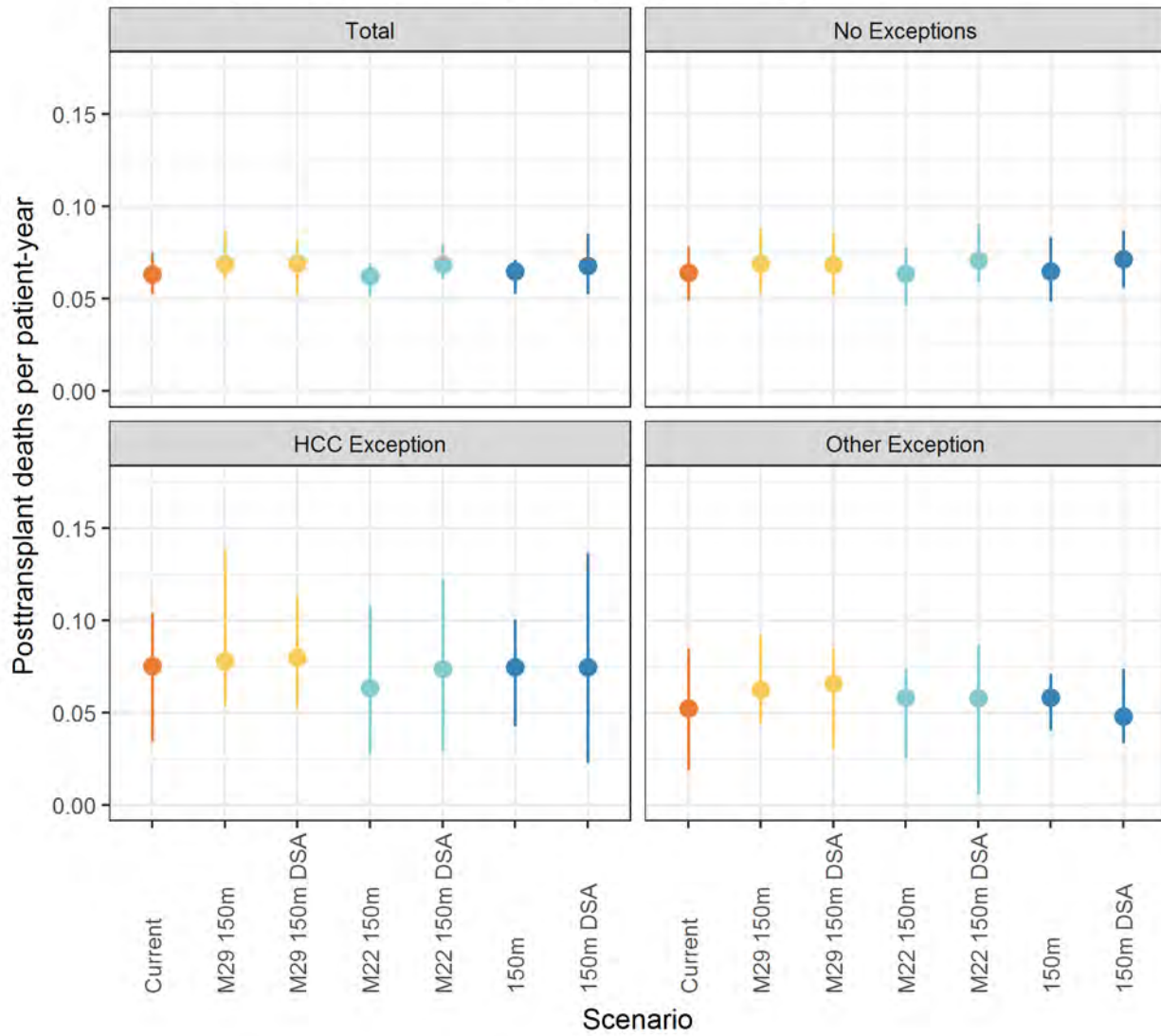


Figure 83 Posttransplant mortality rates by exception status - region 6

Posttransplant Mortality Rates by Exception Status - Region 7

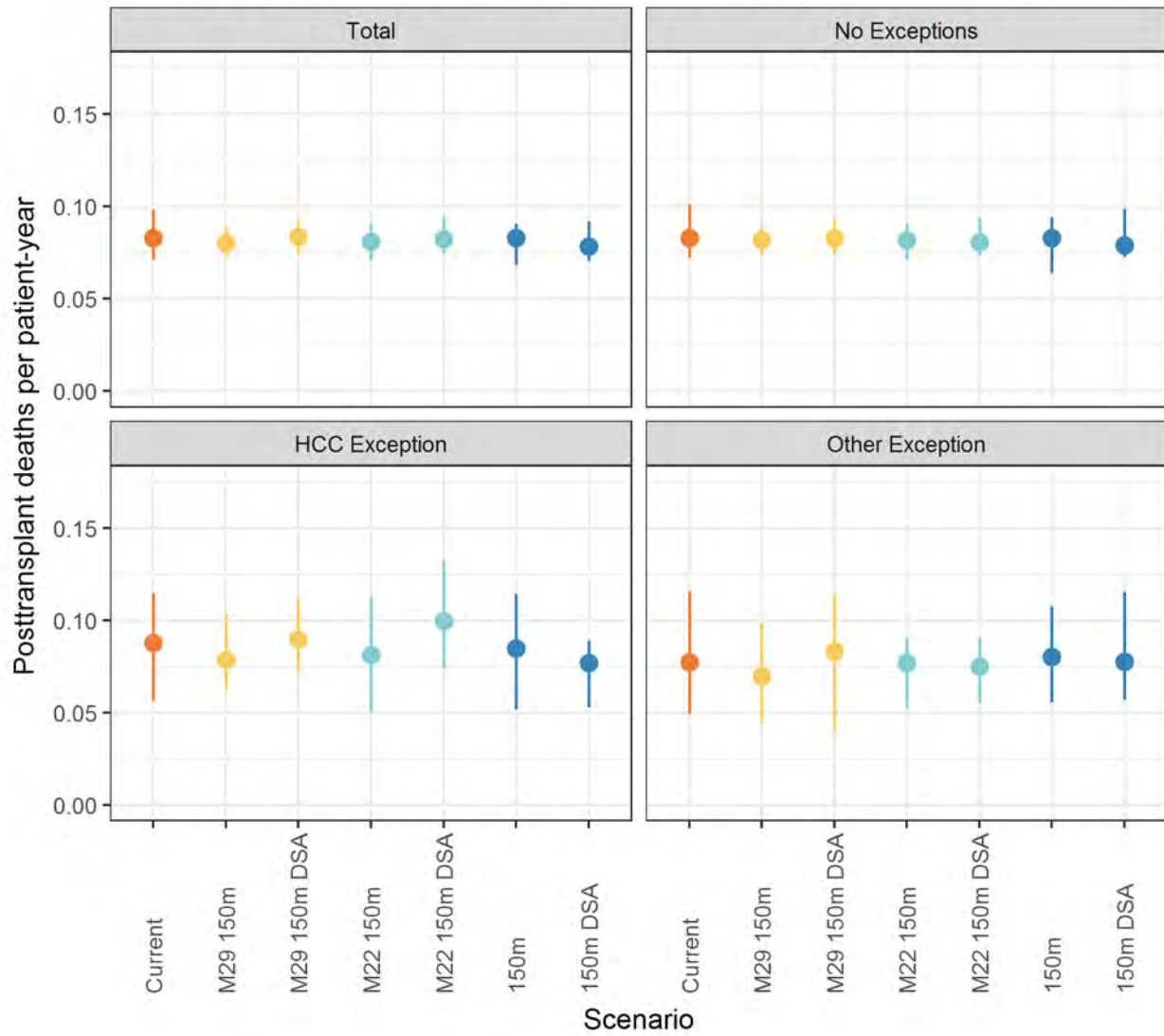


Figure 84 Posttransplant mortality rates by exception status - region 7

Posttransplant Mortality Rates by Exception Status - Region 8

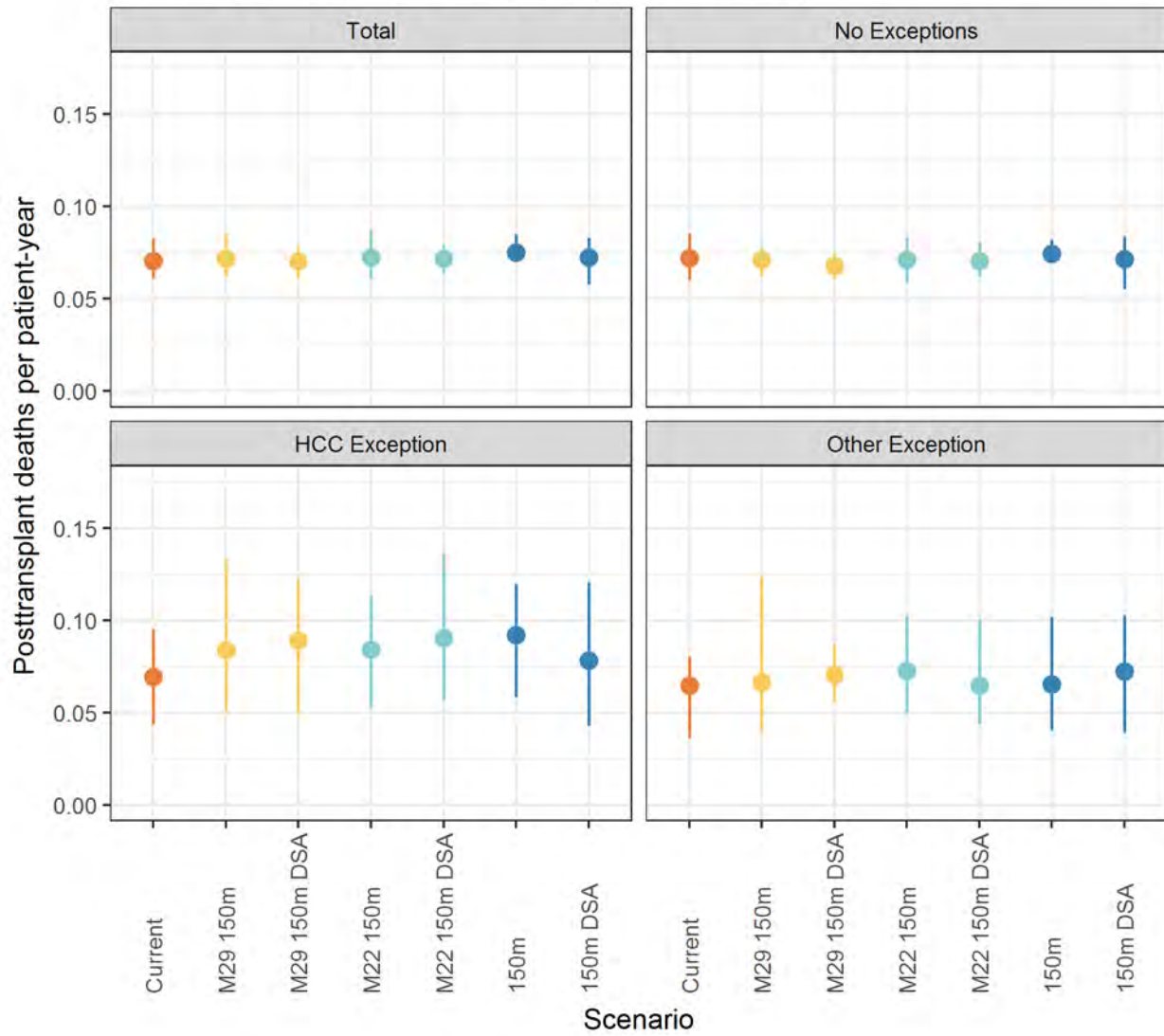


Figure 85 Posttransplant mortality rates by exception status - region 8

Posttransplant Mortality Rates by Exception Status - Region 9

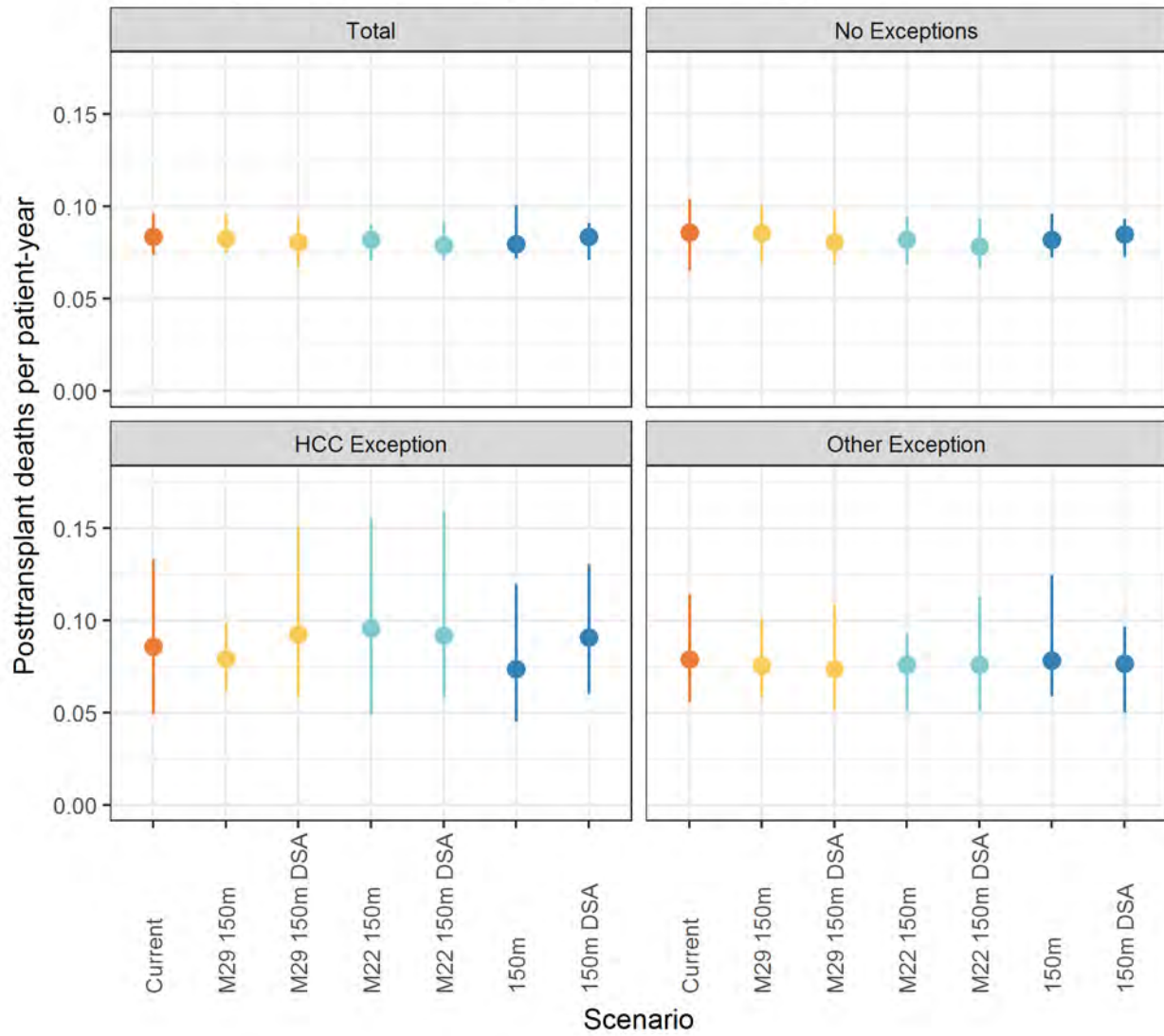


Figure 86 Posttransplant mortality rates by exception status - region 9

Posttransplant Mortality Rates by Exception Status - Region 10

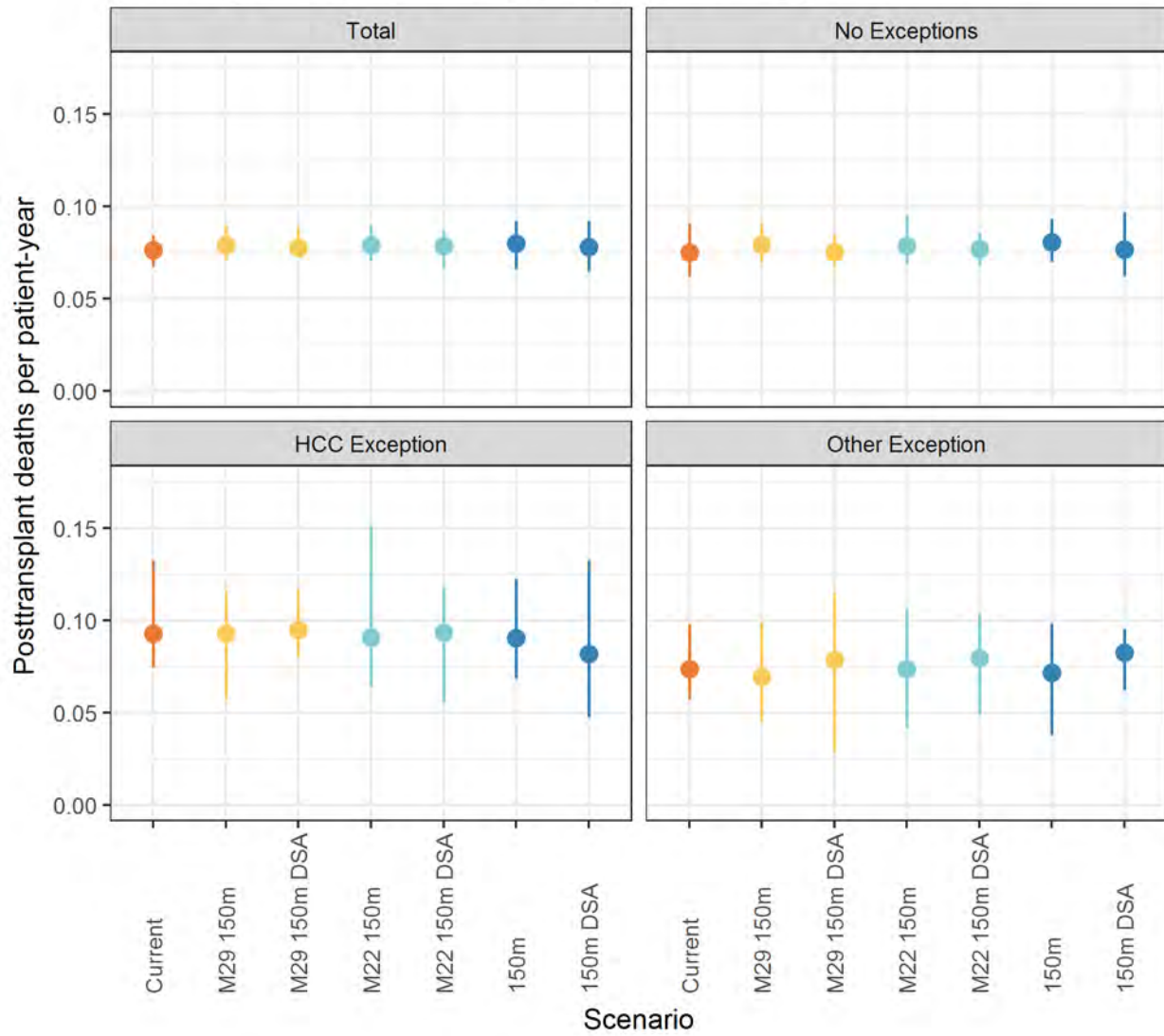


Figure 87 Posttransplant mortality rates by exception status - region 10

Posttransplant Mortality Rates by Exception Status - Region 11

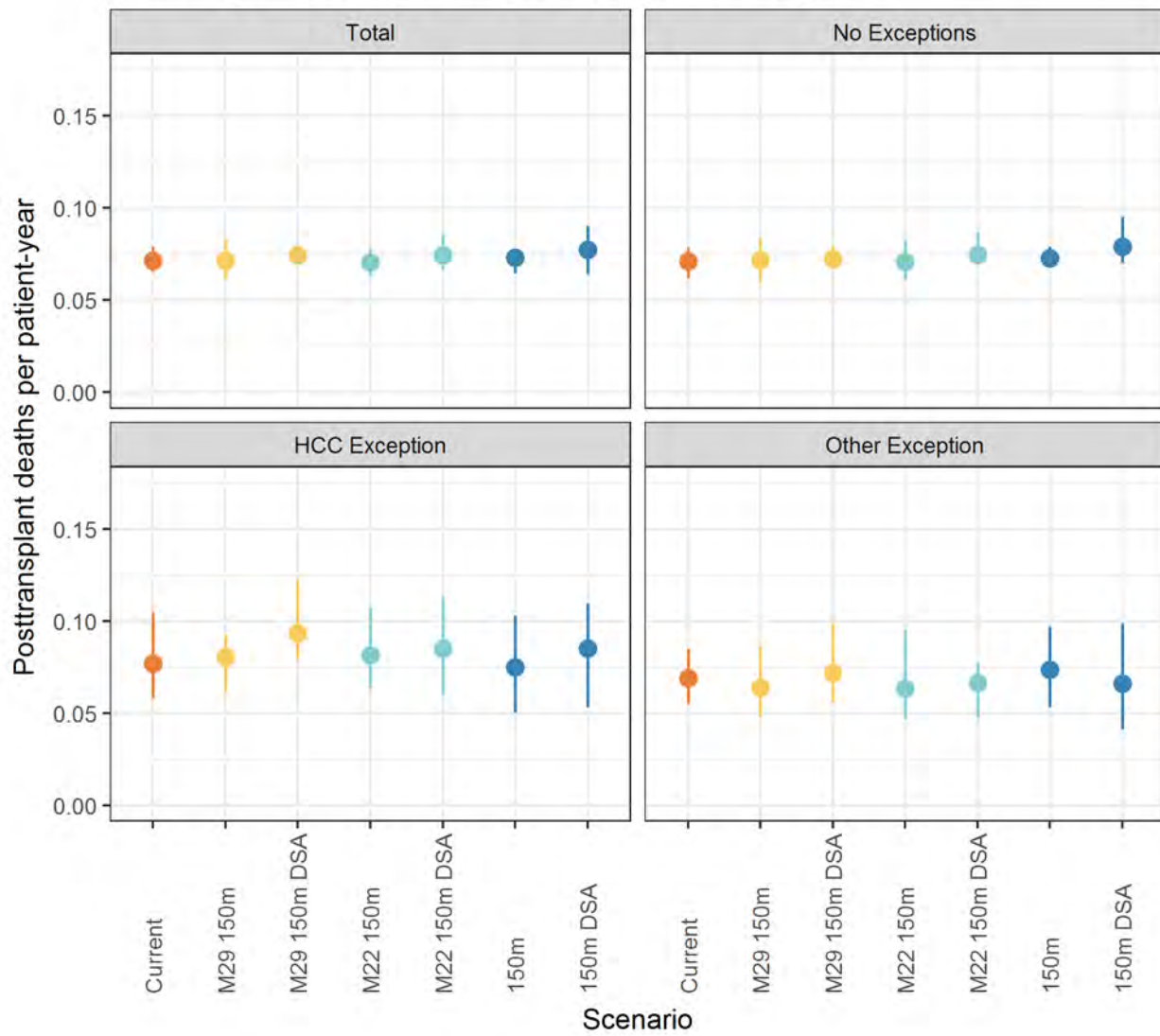


Figure 88 Posttransplant mortality rates by exception status - region 11

Posttransplant Mortality Counts

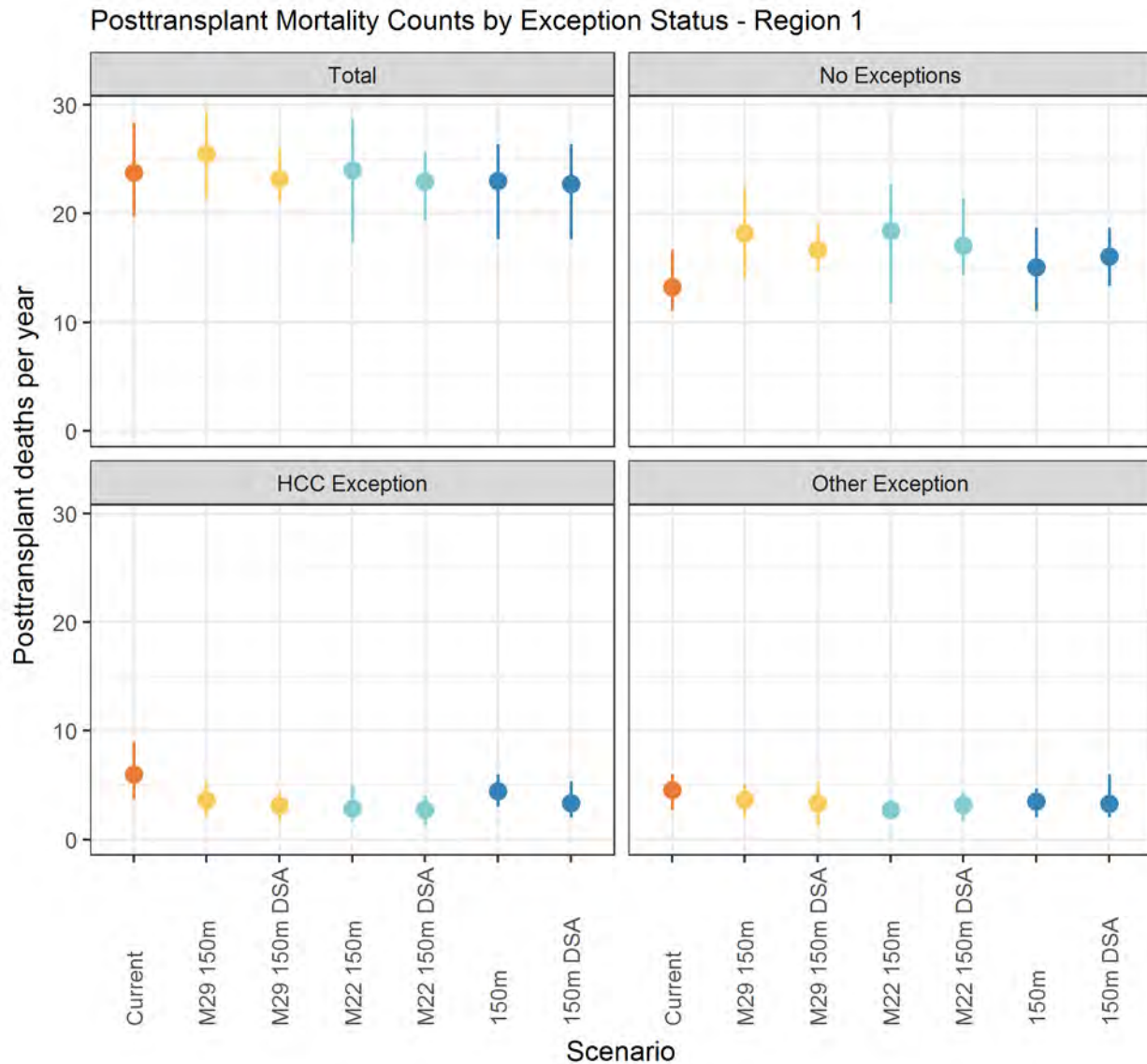


Figure 89 Posttransplant mortality counts by exception status - region 1

Table 25 Posttransplant mortality counts by exception status - region 1

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	23.8 (19.7,28.3)	13.2 (11,16.7)	6 (3.7,9)	4.6 (2.7,6)
M29 150m	25.5 (21.3,29.3)	18.2 (14,22.3)	3.6 (2,5.3)	3.7 (2,5)
M29 150m DSA	23.1 (21,26)	16.7 (14.7,19)	3.1 (1.7,4.3)	3.3 (1.3,5.3)
M22 150m	24 (17.3,28.7)	18.4 (11.7,22.7)	2.8 (1.7,5)	2.8 (2,3.7)
M22 150m DSA	22.9 (19.3,25.7)	17 (14.3,21.3)	2.7 (1.3,4)	3.2 (1.7,4.3)
150m	23 (17.7,26.3)	15.1 (11,18.7)	4.4 (3,6)	3.5 (2.4,7)
150m DSA	22.7 (17.7,26.3)	16 (13.3,18.7)	3.4 (2,5.3)	3.3 (2,6)

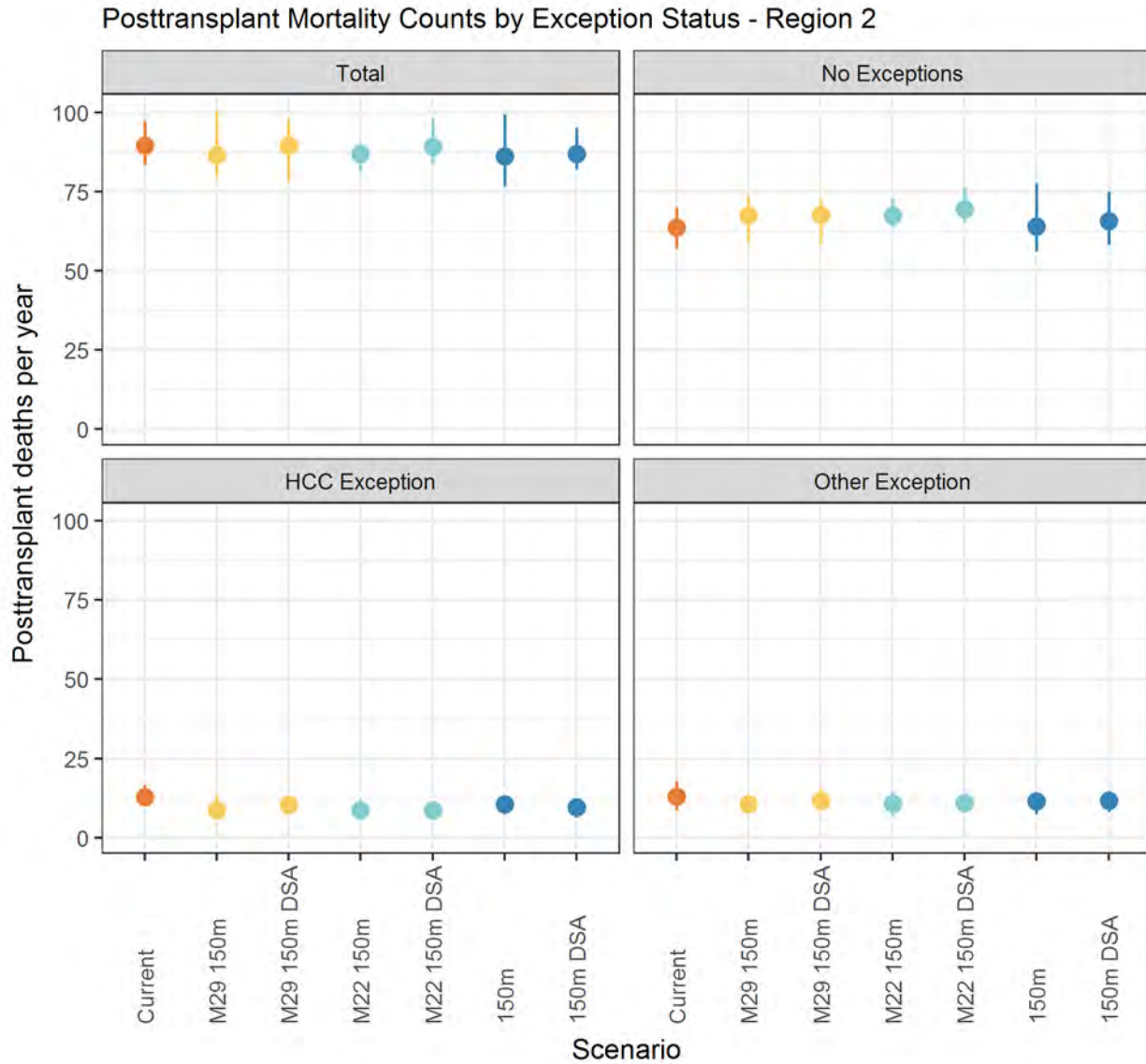


Figure 90 Posttransplant mortality counts by exception status - region 2

Table 26 Posttransplant mortality counts by exception status - region 2

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	89.5 (83.3,97.3)	63.7 (57,70)	12.8 (10,16.7)	13.1 (8.7,18)
M29 150m	86.6 (79.7,100.7)	67.3 (58.7,73.7)	8.7 (5.7,13.3)	10.6 (8.3,13.7)
M29 150m DSA	89.5 (78,98)	67.5 (58.3,72.3)	10.3 (9.3,13.3)	11.7 (9.3,15.7)
M22 150m	86.8 (81.3,90.3)	67.4 (63.7,72.7)	8.7 (6,12)	10.7 (7,14.3)
M22 150m DSA	89.1 (83.7,98)	69.4 (65.3,76.3)	8.7 (6.7,10.7)	10.9 (9,14)
150m	86 (76.7,99.3)	64 (56,77.7)	10.6 (7.3,13.3)	11.4 (7.3,14.3)
150m DSA	86.9 (82,95)	65.6 (58,75)	9.6 (6.3,11.3)	11.7 (8,14.7)

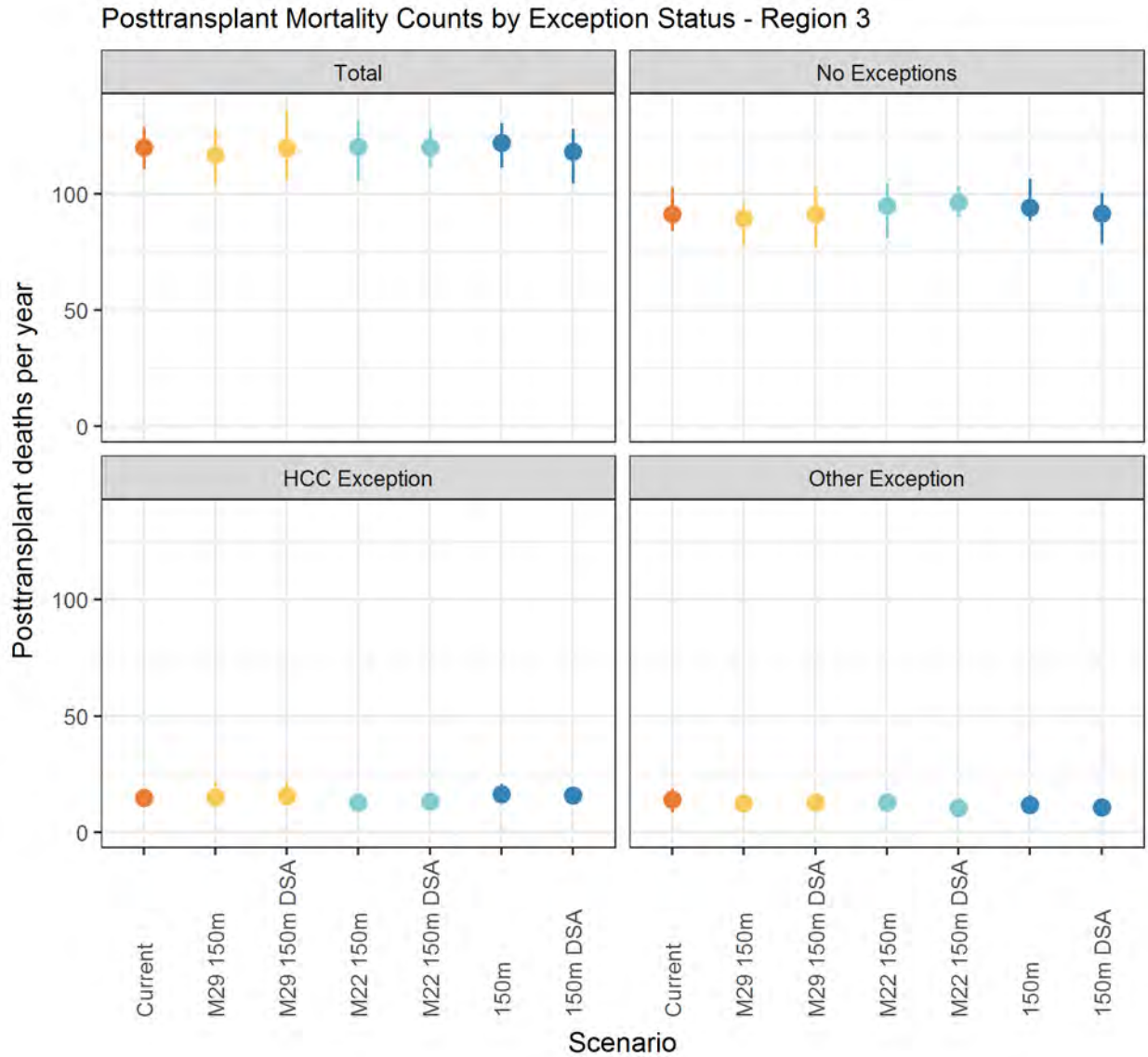


Figure 91 Posttransplant mortality counts by exception status - region 3

Table 27 Posttransplant mortality counts by exception status - region 3

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	119.8 (110.7,128.7)	91.2 (84,102.7)	14.7 (11,18.3)	13.9 (8.3,18.7)
M29 150m	116.9 (104,128.3)	89.4 (78,95.7)	15 (12.3,21)	12.5 (8.7,14.3)
M29 150m DSA	119.6 (105.7,136.3)	91.2 (77,103.3)	15.6 (11.7,21.7)	12.8 (9.3,16)
M22 150m	120.3 (105.7,131.7)	94.8 (81,104.3)	12.8 (11.3,14)	12.7 (8.7,16)
M22 150m DSA	120 (111.3,128.3)	96.4 (89.7,103.3)	13.3 (9.7,17)	10.4 (7.7,12.7)
150m	122.1 (111.3,130.3)	94.1 (88.3,106.3)	16.3 (13.3,20.7)	11.7 (7.7,16)
150m DSA	118.2 (104.3,128)	91.6 (78.3,100.3)	15.9 (14.7,19)	10.7 (7,13.7)

Posttransplant Mortality Counts by Exception Status - Region 4

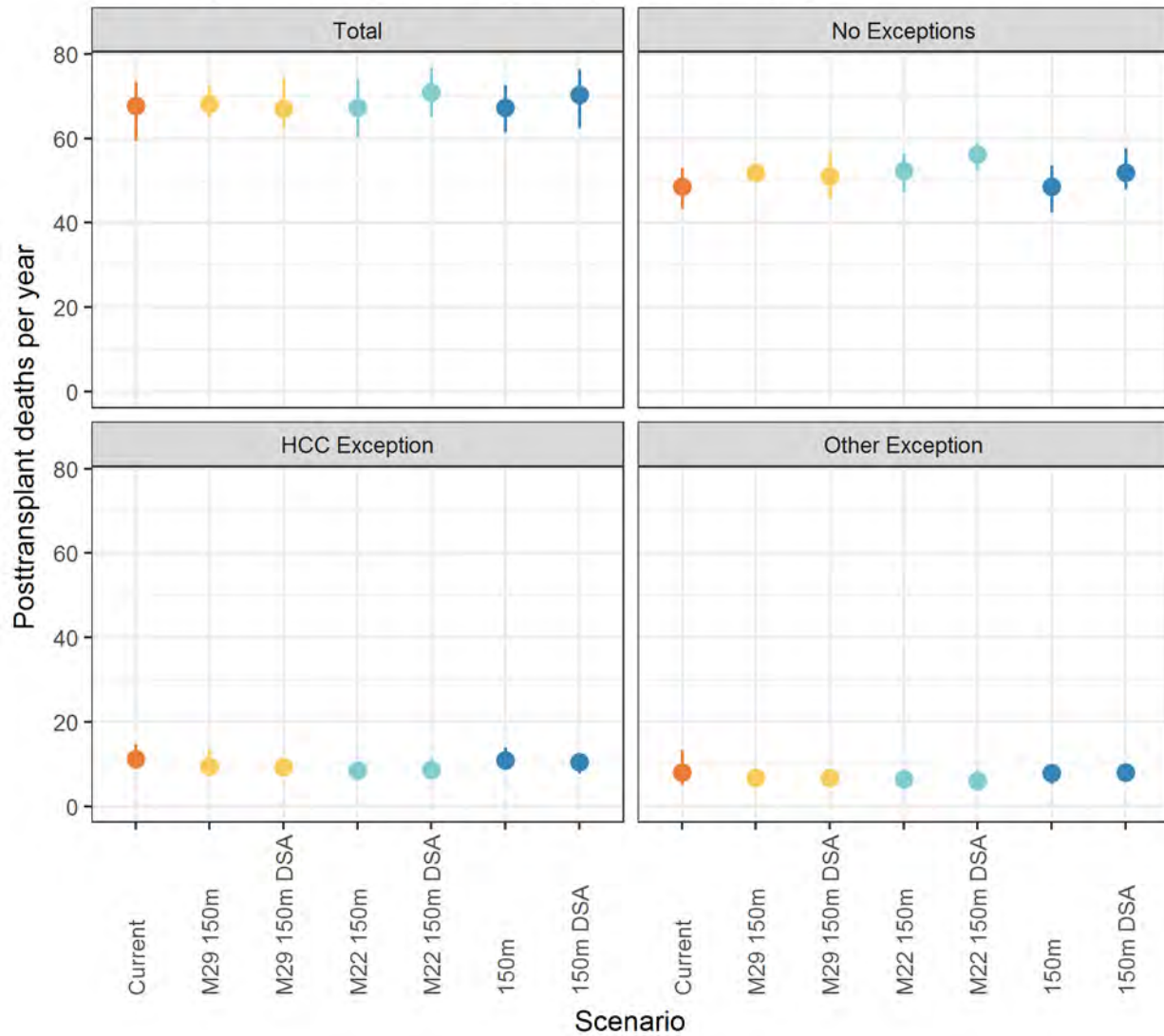


Figure 92 Posttransplant mortality counts by exception status - region 4

Table 28 Posttransplant mortality counts by exception status - region 4

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	67.8 (59.3,73.3)	48.6 (43.3,53)	11.2 (9,14.7)	8 (5,13.3)
M29 150m	68.1 (65,72.3)	51.8 (49.7,54)	9.5 (7.3,13.7)	6.8 (4.7,8.7)
M29 150m DSA	67.1 (62.7,74.3)	51 (45.7,56.7)	9.3 (7,11)	6.8 (4.3,8)
M22 150m	67.2 (60.3,74)	52.3 (47.3,56.3)	8.5 (6.3,10.3)	6.5 (5.7,7.7)
M22 150m DSA	70.9 (65,76.7)	56.2 (52.3,59)	8.7 (6.3,11.3)	6 (4,8.7)
150m	67.3 (61.3,72.7)	48.6 (42.3,53.7)	10.9 (9.3,14)	7.8 (5.3,10)
150m DSA	70.4 (62.3,76.3)	51.9 (48,57.7)	10.4 (7.7,12.7)	8 (5.7,9.3)

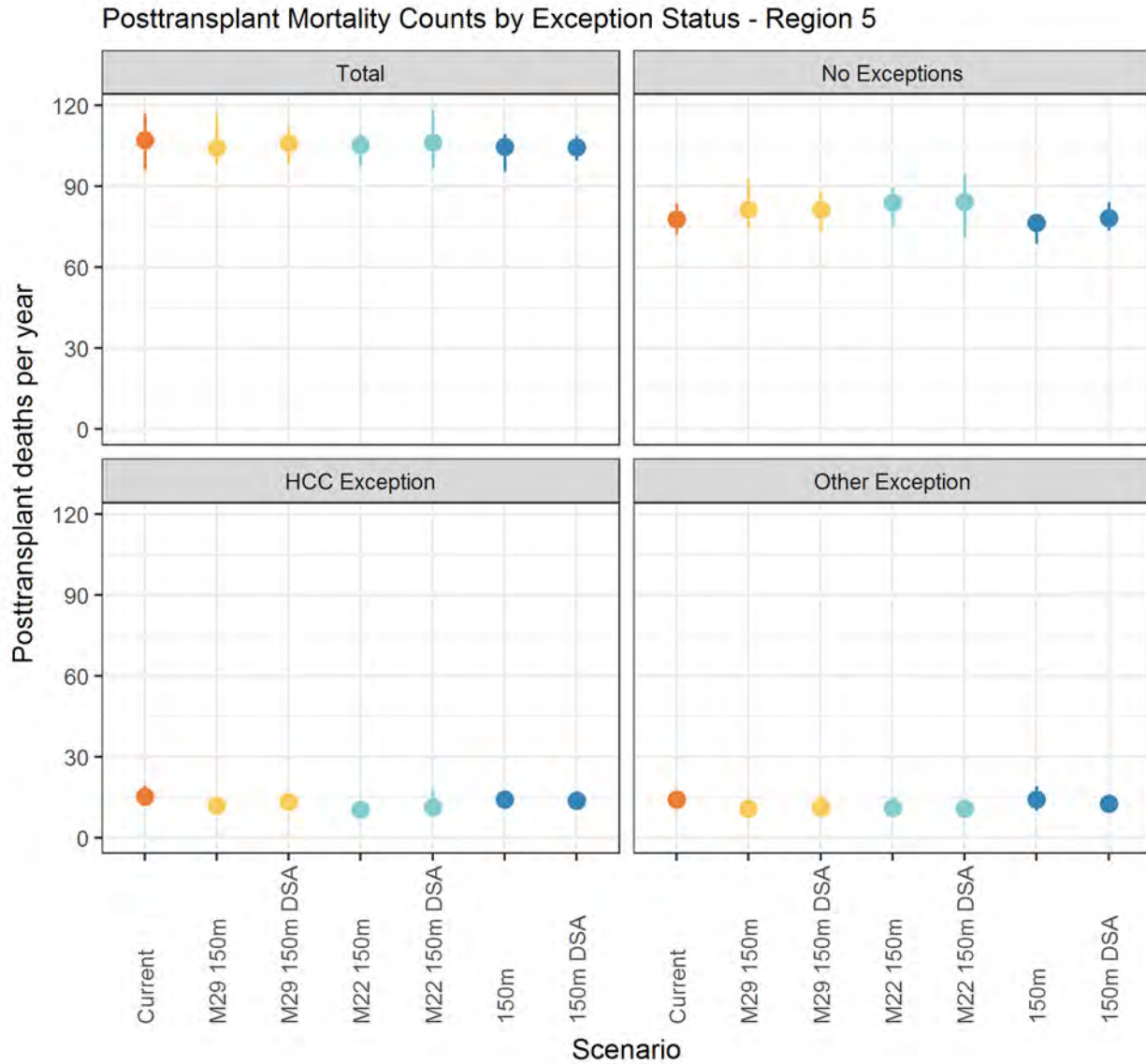


Figure 93 Posttransplant mortality counts by exception status - region 5

Table 29 Posttransplant mortality counts by exception status - region 5

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	107.2 (96,117)	77.8 (72.3,83.7)	15.3 (12,19.3)	14.1 (11.7,16.7)
M29 150m	104.4 (98,117)	81.5 (74.7,93)	11.9 (8.7,14.7)	10.9 (9,13.7)
M29 150m DSA	106 (98.3,111.7)	81.3 (73.3,88)	13.4 (11.7,16.3)	11.4 (8.7,16)
M22 150m	105.4 (97.3,109.7)	84 (75,89.7)	10.4 (8.3,12)	11 (10,15)
M22 150m DSA	106.4 (96.7,118.3)	84.3 (70.7,94.7)	11.3 (7.7,17.7)	10.7 (8.7,13.3)
150m	104.8 (95.3,109.3)	76.4 (68.7,79.7)	14.1 (12,16.3)	14.3 (10,19)
150m DSA	104.6 (99.7,108.7)	78.2 (73.7,84)	13.7 (11,17.3)	12.7 (10.7,15)

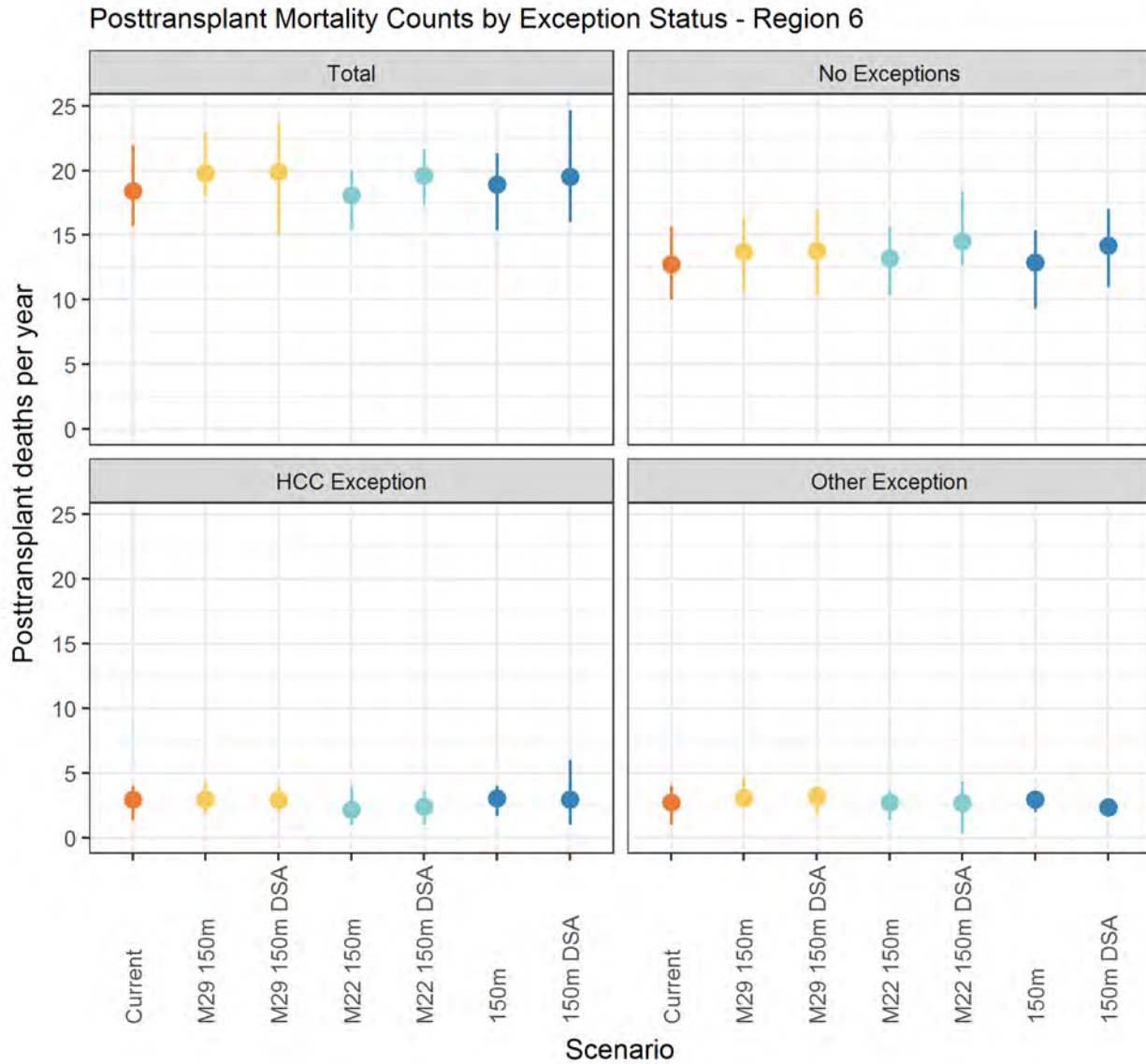


Figure 94 Posttransplant mortality counts by exception status - region 6

Table 30 Posttransplant mortality counts by exception status - region 6

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	18.4 (15.7,22)	12.7 (10,15.7)	2.9 (1.3,4)	2.7 (1,4)
M29 150m	19.8 (18,23)	13.7 (10.7,16.3)	3 (2,4.3)	3.1 (2.3,4.7)
M29 150m DSA	19.9 (15,23.7)	13.8 (10.3,17)	2.9 (2,4)	3.2 (1.7,4)
M22 150m	18.1 (15.3,20)	13.2 (10.3,15.7)	2.2 (1,4)	2.7 (1.3,3.7)
M22 150m DSA	19.6 (17.3,21.7)	14.5 (12.7,18.3)	2.4 (1,3.7)	2.7 (0.3,4.3)
150m	18.9 (15.3,21.3)	12.9 (9.3,15.3)	3 (1.7,4)	3 (2,3.7)
150m DSA	19.5 (16,24.7)	14.2 (11,17)	3 (1,6)	2.4 (1.7,3)

Posttransplant Mortality Counts by Exception Status - Region 7

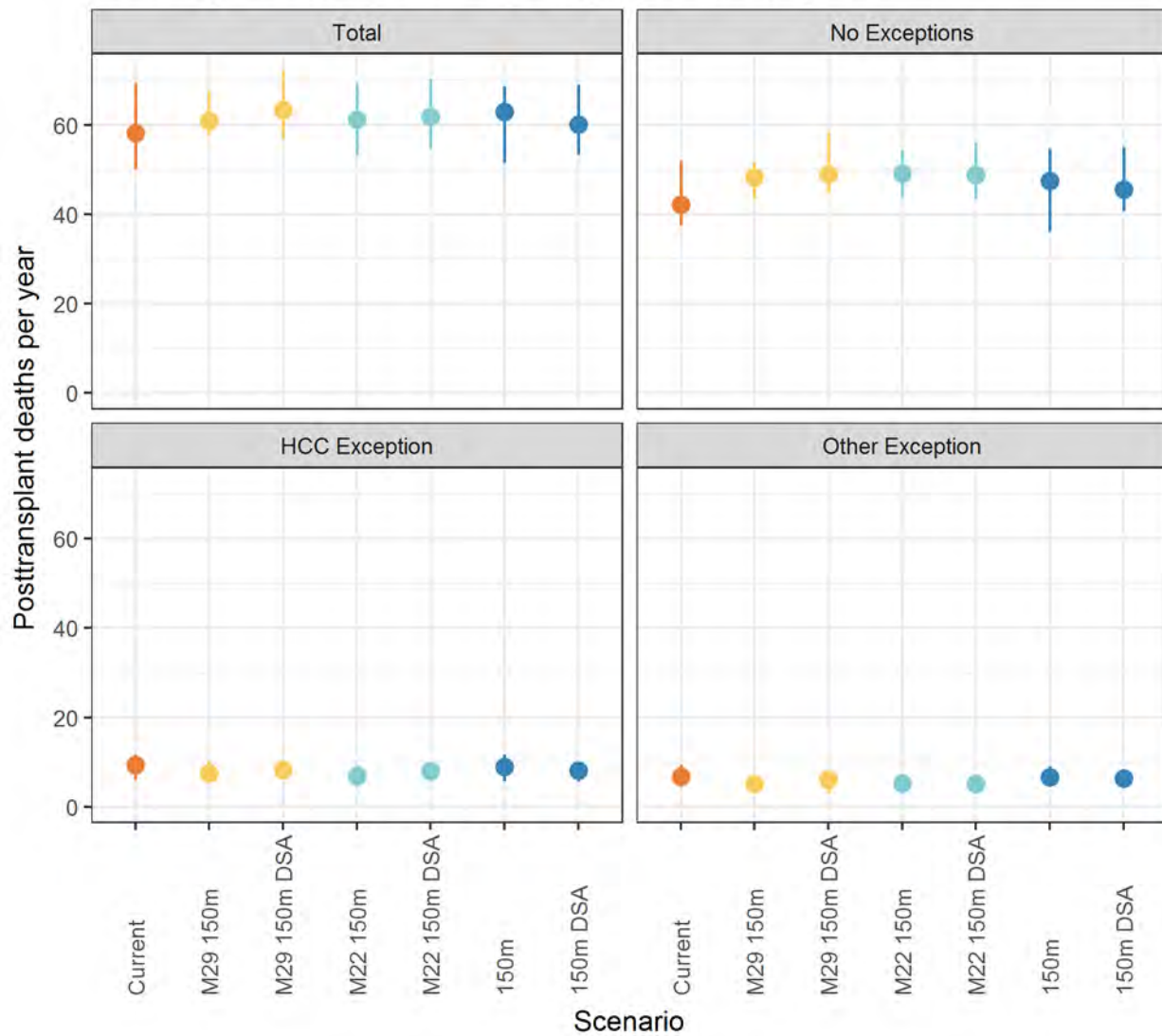


Figure 95 Posttransplant mortality counts by exception status - region 7

Table 31 Posttransplant mortality counts by exception status - region 7

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	58.2 (50,69.3)	42.1 (37.3,52)	9.4 (6,11.7)	6.7 (4.3,9.3)
M29 150m	61 (57.7,67.7)	48.3 (43.3,51.7)	7.5 (6,10.3)	5.2 (3,6.7)
M29 150m DSA	63.3 (56.7,72.3)	49 (44.7,58.3)	8.3 (7,9.7)	6 (3,8)
M22 150m	61.2 (53,69.3)	49 (43.7,54.3)	6.9 (4.3,9.3)	5.3 (3.7,6)
M22 150m DSA	61.9 (54.7,70.3)	48.8 (43.3,56)	8 (6.3,10)	5.1 (3.3,6.7)
150m	63 (51.3,68.7)	47.5 (36,54.7)	8.9 (5.7,11.7)	6.6 (4.7,9)
150m DSA	60 (53.3,69)	45.5 (40.7,55)	8.1 (5.7,9.7)	6.4 (5,8.3)

Posttransplant Mortality Counts by Exception Status - Region 8

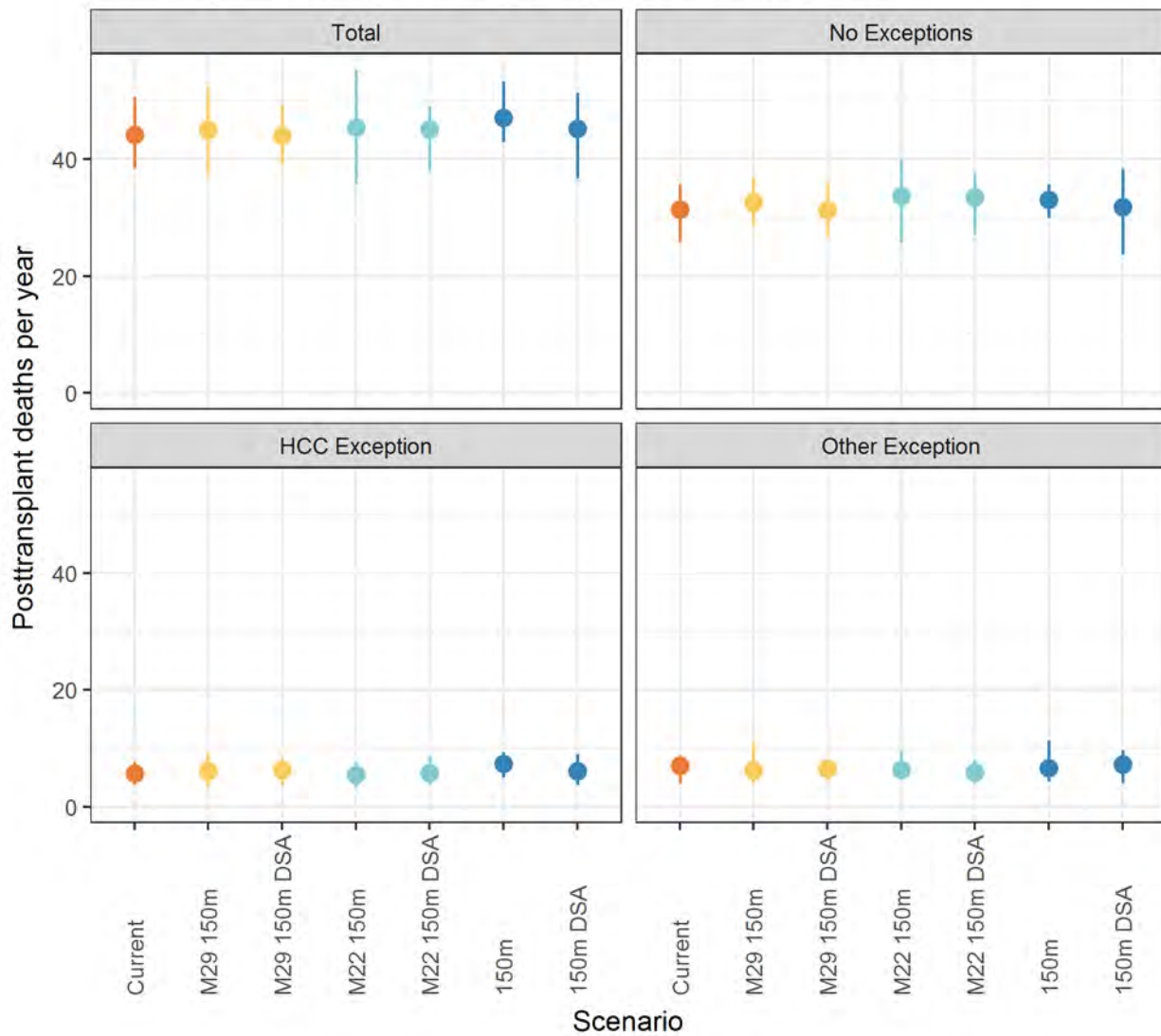


Figure 96 Posttransplant mortality counts by exception status - region 8

Table 32 Posttransplant mortality counts by exception status - region 8

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	44.2 (38.3,50.7)	31.4 (25.7,35.7)	5.7 (3.7,7.7)	7.1 (4,8.7)
M29 150m	45 (37.3,52.3)	32.7 (28.7,37)	6.1 (3.3,9.3)	6.2 (4,11)
M29 150m DSA	44.1 (39,49.3)	31.3 (26.7,36)	6.3 (3.7,8.3)	6.5 (4.7,8)
M22 150m	45.5 (35.7,55.3)	33.7 (25.7,40)	5.4 (3.3,7.7)	6.3 (4.7,9.7)
M22 150m DSA	45.1 (38,49)	33.5 (27,37.7)	5.8 (3.7,8.7)	5.9 (4,8)
150m	47.1 (43,53.3)	33 (30,35.7)	7.4 (5,9.3)	6.7 (4.3,11.3)
150m DSA	45.3 (36.7,51.3)	31.9 (23.7,38.3)	6.1 (3.7,9)	7.3 (4,9.7)

Posttransplant Mortality Counts by Exception Status - Region 9

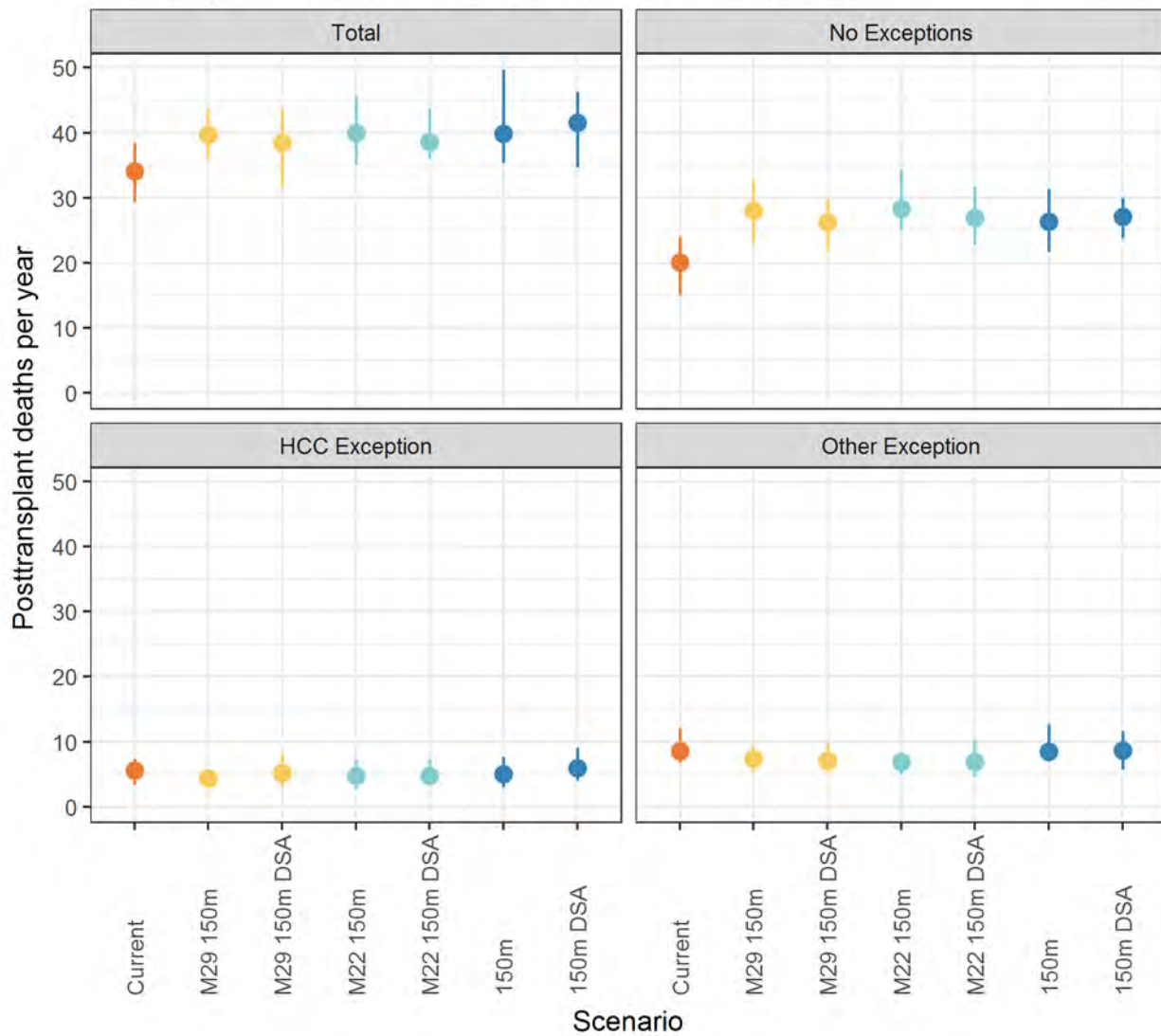


Figure 97 Posttransplant mortality counts by exception status - region 9

Table 33 Posttransplant mortality counts by exception status - region 9

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	34.1 (29.3,38.3)	20 (15,24)	5.5 (3.3,7.3)	8.5 (6.7,12)
M29 150m	39.7 (36,43.7)	28 (23,32.7)	4.4 (3.3,5.3)	7.3 (5.3,9.3)
M29 150m DSA	38.4 (31.7,43.7)	26.2 (21.7,29.7)	5.2 (3,8)	7 (5.3,9.7)
M22 150m	40 (35,45.7)	28.3 (25,34.3)	4.8 (2.7,7.3)	6.9 (5,8.3)
M22 150m DSA	38.5 (36,43.7)	26.9 (22.7,31.7)	4.7 (3.3,7.3)	6.9 (4.7,10.3)
150m	39.8 (35.3,49.7)	26.4 (21.7,31.3)	5 (3,7.7)	8.5 (7,12.7)
150m DSA	41.6 (34.7,46.3)	27 (23.7,30)	5.9 (4,9)	8.6 (5.7,11.7)

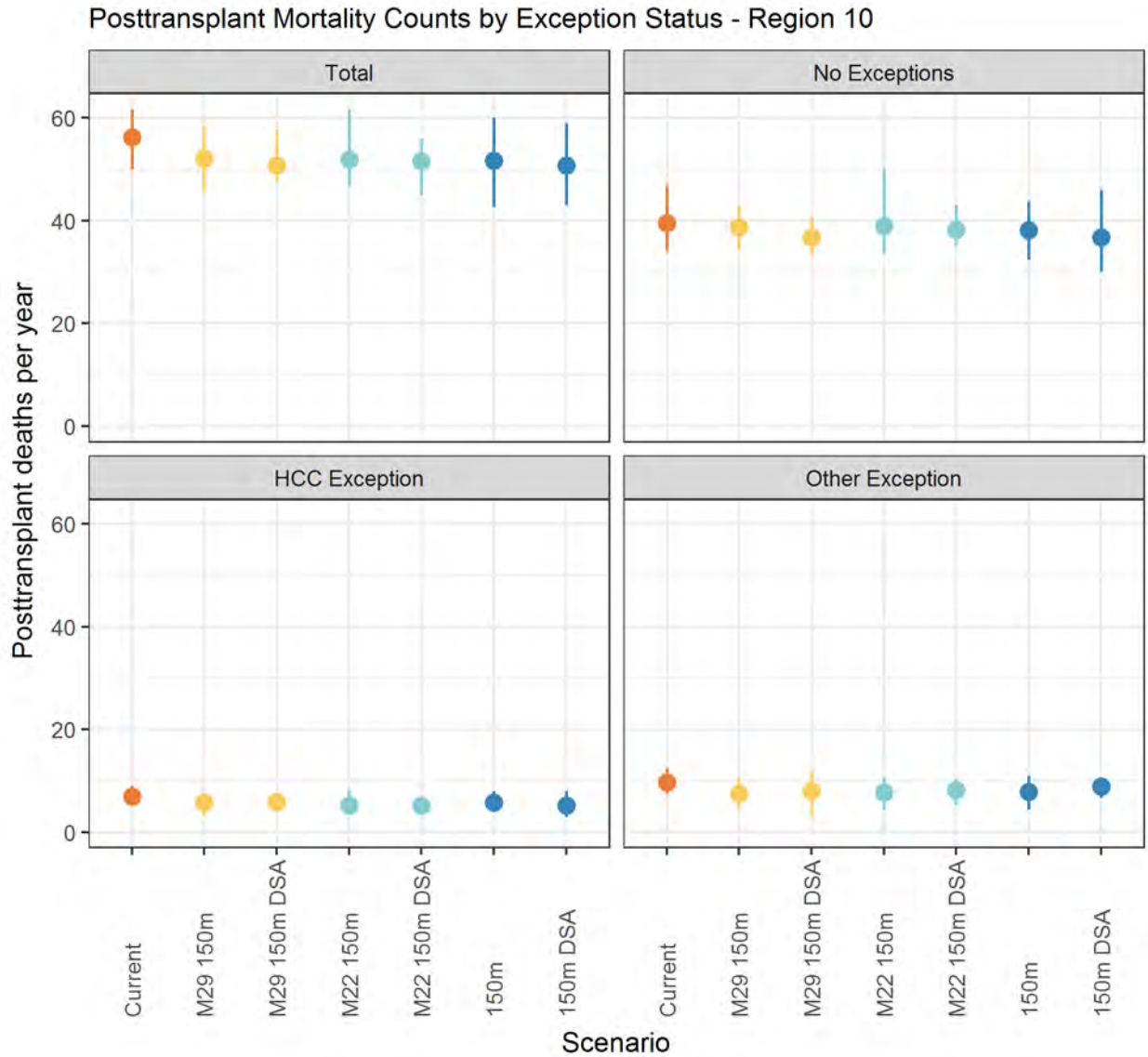


Figure 98 Posttransplant mortality counts by exception status - region 10

Table 34 Posttransplant mortality counts by exception status - region 10

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	56.2 (50,61.7)	39.6 (34,47)	6.9 (5.7,9)	9.7 (7.3,12.3)
M29 150m	52 (45.7,58.3)	38.8 (34.3,43)	5.7 (3.3,7.7)	7.5 (4.7,10.7)
M29 150m DSA	50.8 (47.7,57.7)	36.8 (33.3,40.7)	5.9 (5,6.7)	8.1 (3,11.7)
M22 150m	51.9 (46.7,61.7)	38.9 (33.7,50.3)	5.2 (3.3,8.3)	7.8 (4.3,10.7)
M22 150m DSA	51.6 (45,56)	38.2 (35,43)	5.2 (3.3,6.7)	8.2 (5.3,10.3)
150m	51.7 (42.7,60)	38.1 (32.3,43.7)	5.8 (4.7,8)	7.8 (4.3,11)
150m DSA	50.8 (43,59)	36.7 (30,46)	5.2 (3,8)	8.9 (6.7,10)

Posttransplant Mortality Counts by Exception Status - Region 11

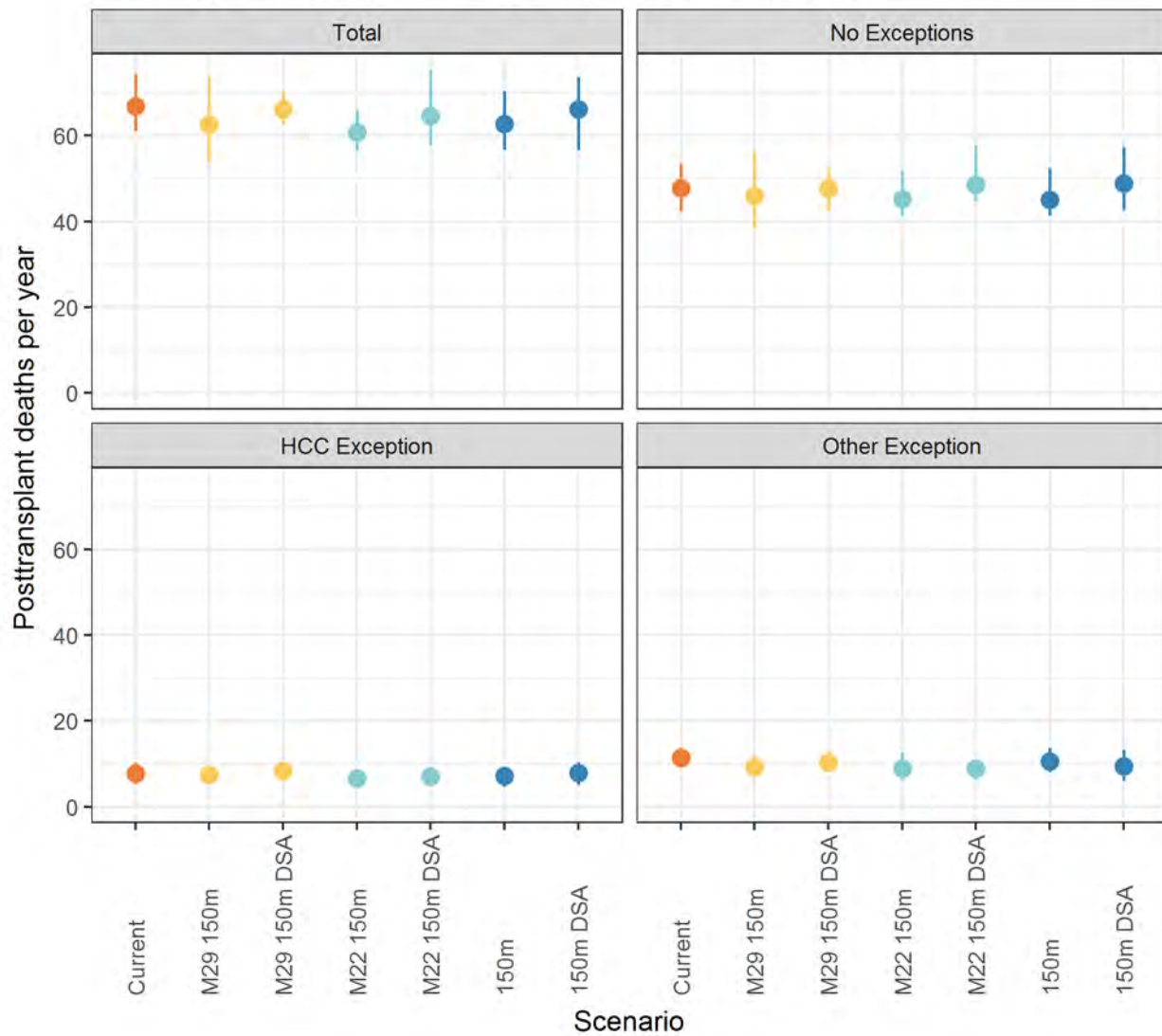


Figure 99 Posttransplant mortality counts by exception status - region 11

Table 35 Posttransplant mortality counts by exception status - region 11

Scenario	Total	No Exceptions	HCC Exception	Other Exception
Current	66.8 (61,74.3)	47.7 (42.3,53.3)	7.7 (5.3,10.3)	11.4 (9,13.7)
M29 150m	62.6 (53.7,73.7)	45.9 (38.3,56.3)	7.5 (5.7,8.7)	9.2 (7,12)
M29 150m DSA	66.1 (62.7,70.3)	47.6 (42.3,52.7)	8.3 (7,10.3)	10.2 (8,13)
M22 150m	60.7 (56.3,66)	45.2 (41.3,51.7)	6.6 (5.3,8.7)	8.8 (6,12.7)
M22 150m DSA	64.5 (57.7,75.3)	48.6 (44.7,57.7)	7 (5,9.3)	8.9 (6.3,10.7)
150m	62.8 (56.7,70.3)	45 (41.3,52.3)	7.2 (4.7,9.3)	10.6 (8,13.7)
150m DSA	66.1 (56.7,73.7)	48.9 (42.7,57.3)	7.8 (5,10.3)	9.4 (6,13.3)

Transport

Median Transport Time

Median Transport Time by Exception Status - Region 1

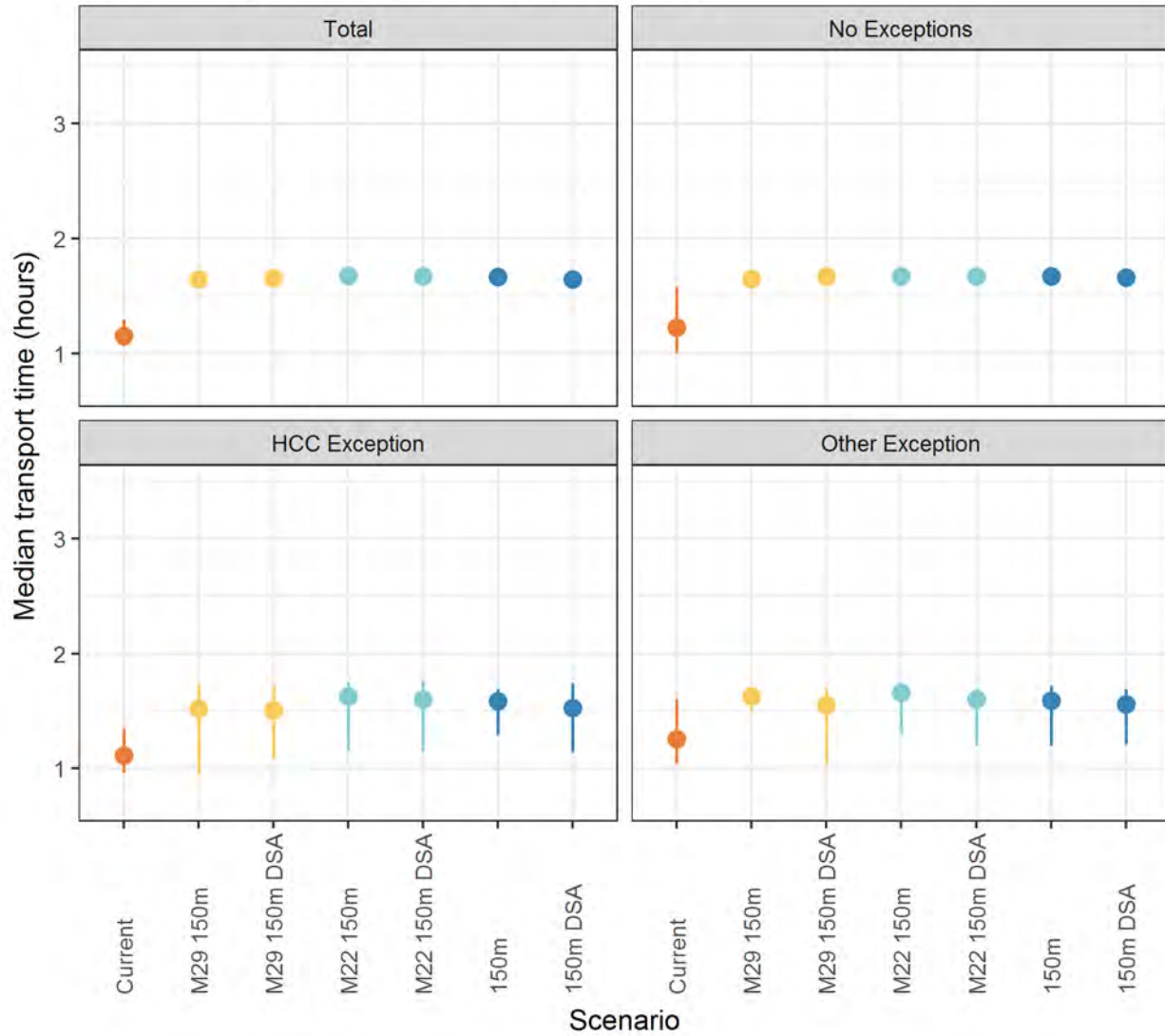


Figure 100 Median Transport Time by exception status - region 1

Median Transport Time by Exception Status - Region 2

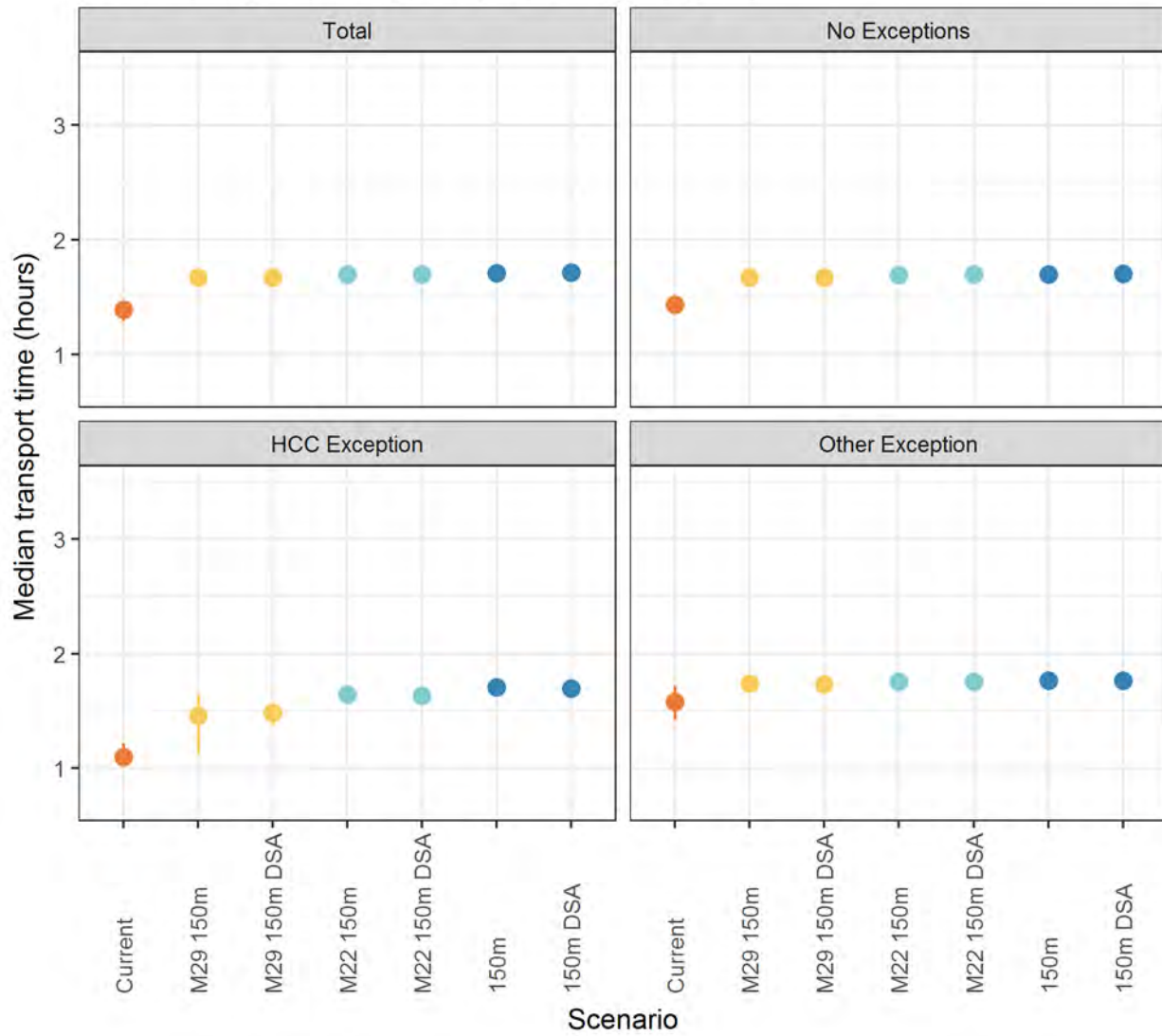


Figure 101 Median Transport Time by exception status - region 2

Median Transport Time by Exception Status - Region 3

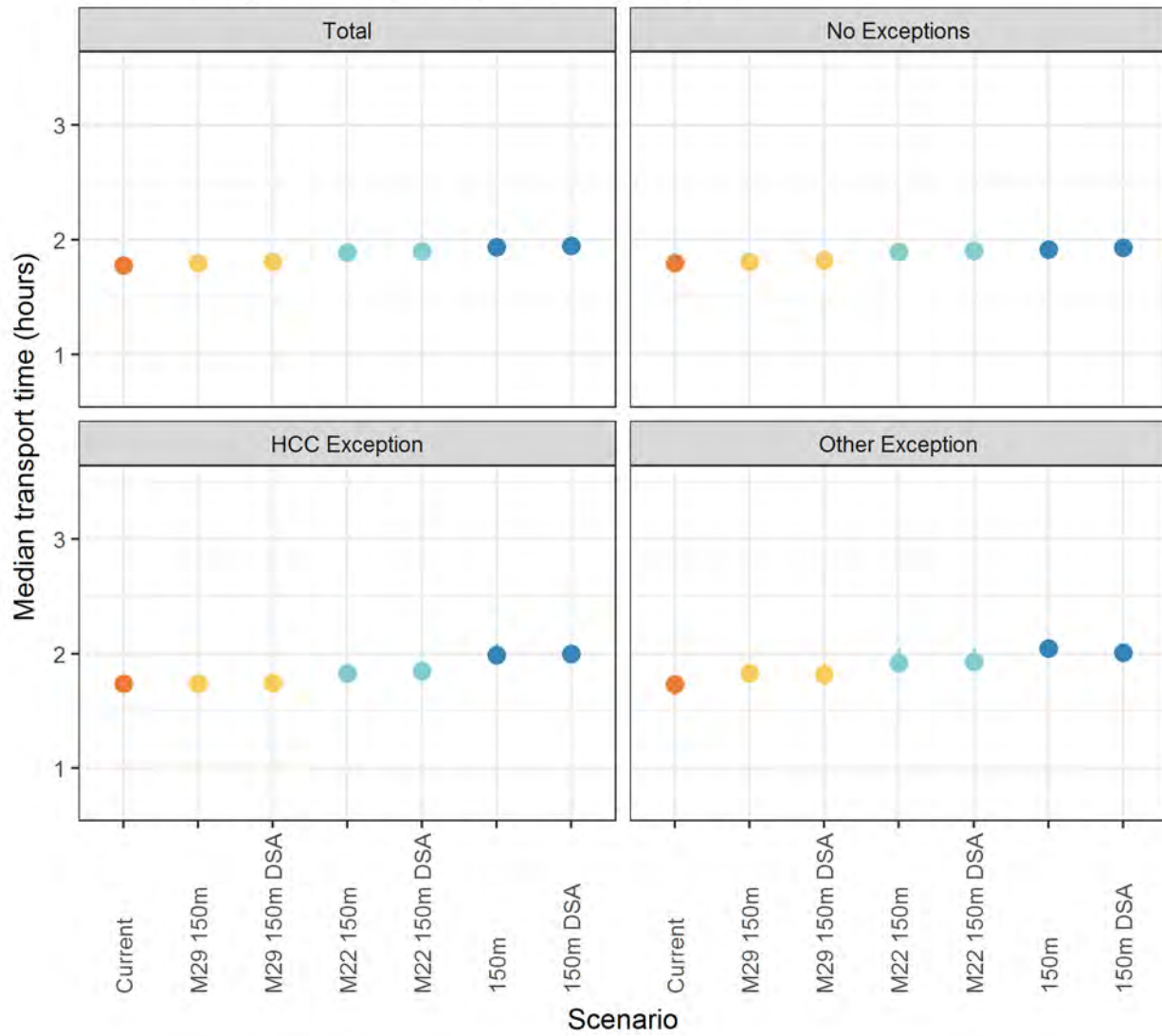


Figure 102 Median Transport Time by exception status - region 3

Median Transport Time by Exception Status - Region 4

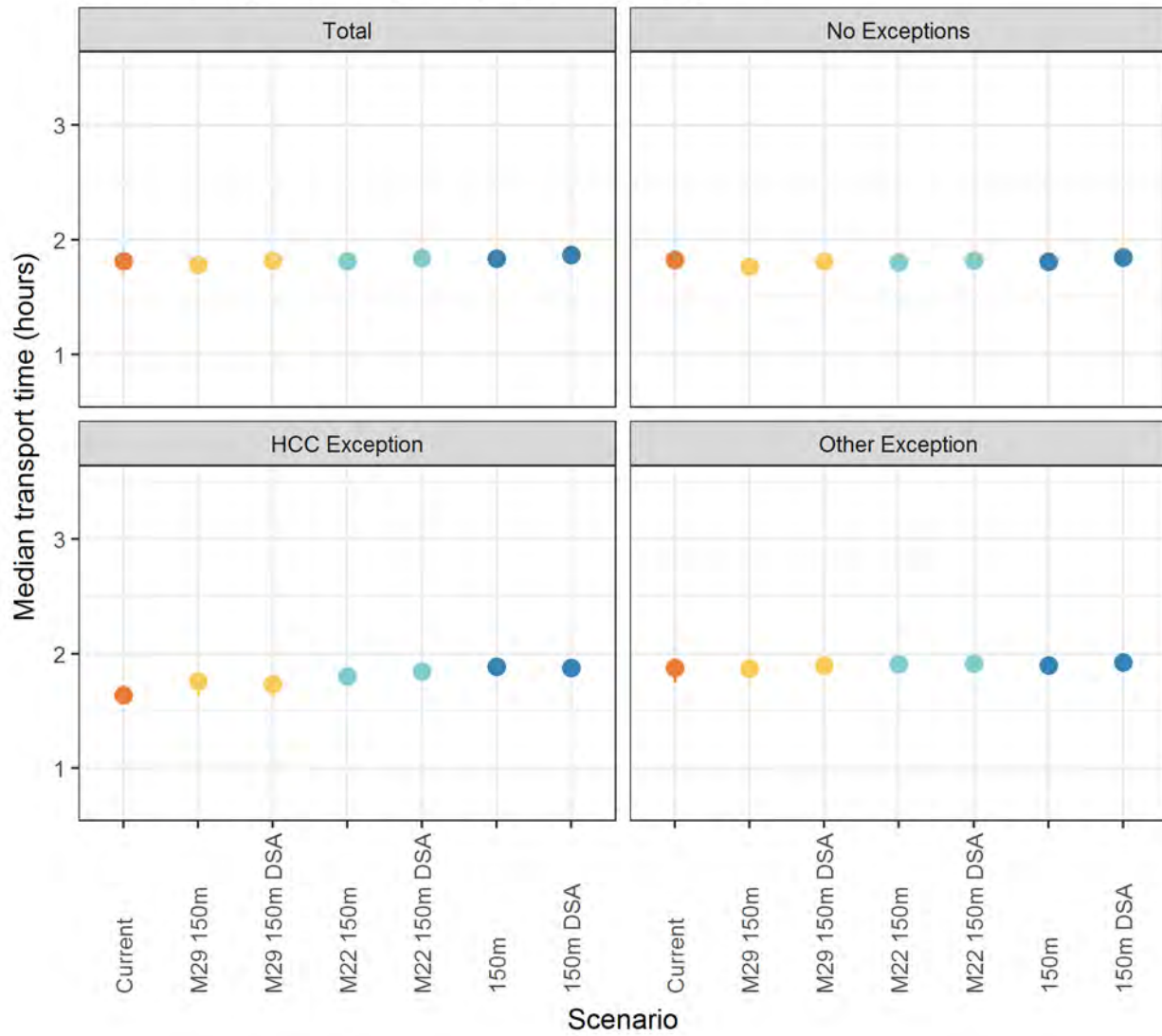


Figure 103 Median Transport Time by exception status - region 4

Median Transport Time by Exception Status - Region 5

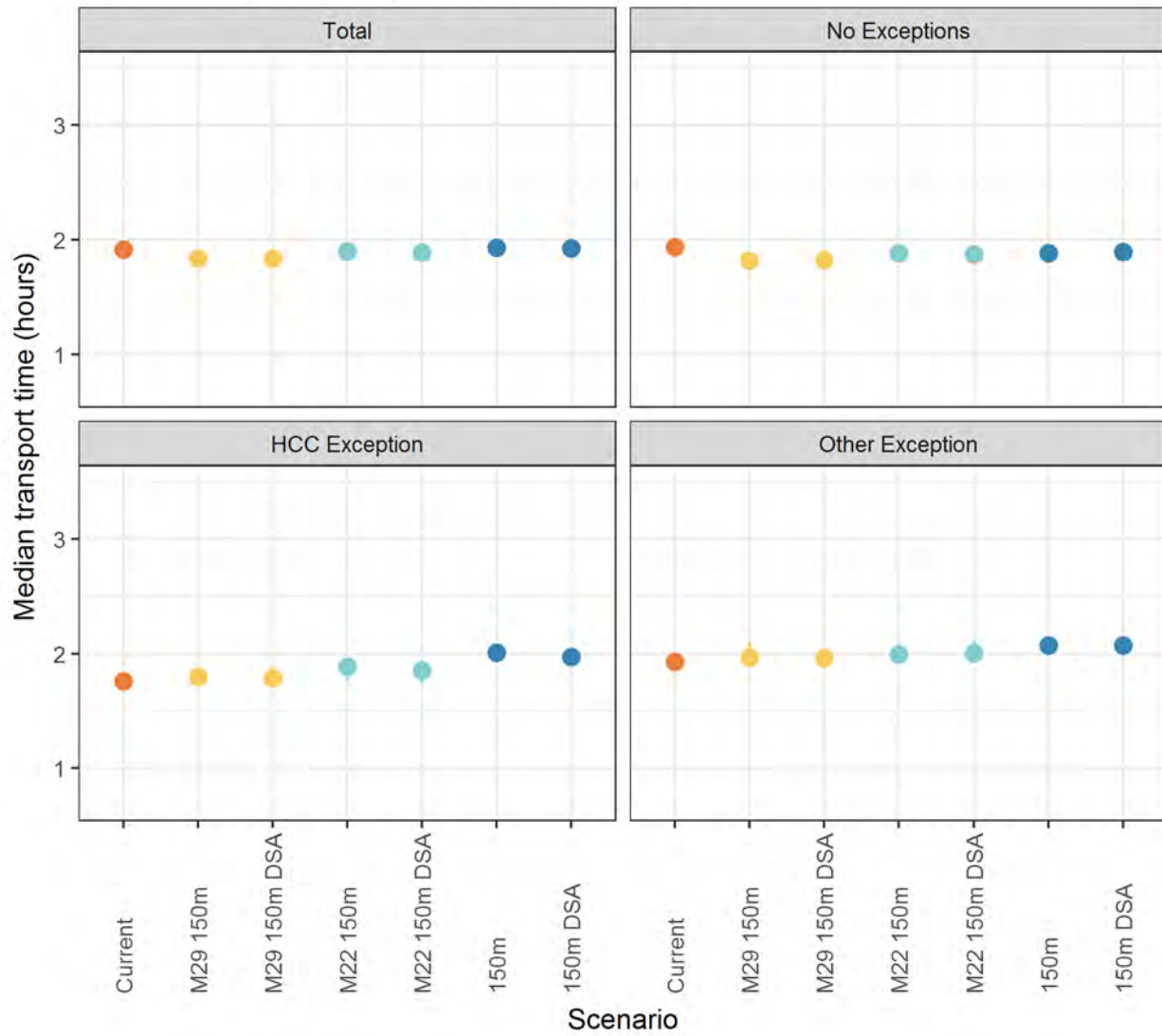


Figure 104 Median Transport Time by exception status - region 5

Median Transport Time by Exception Status - Region 6

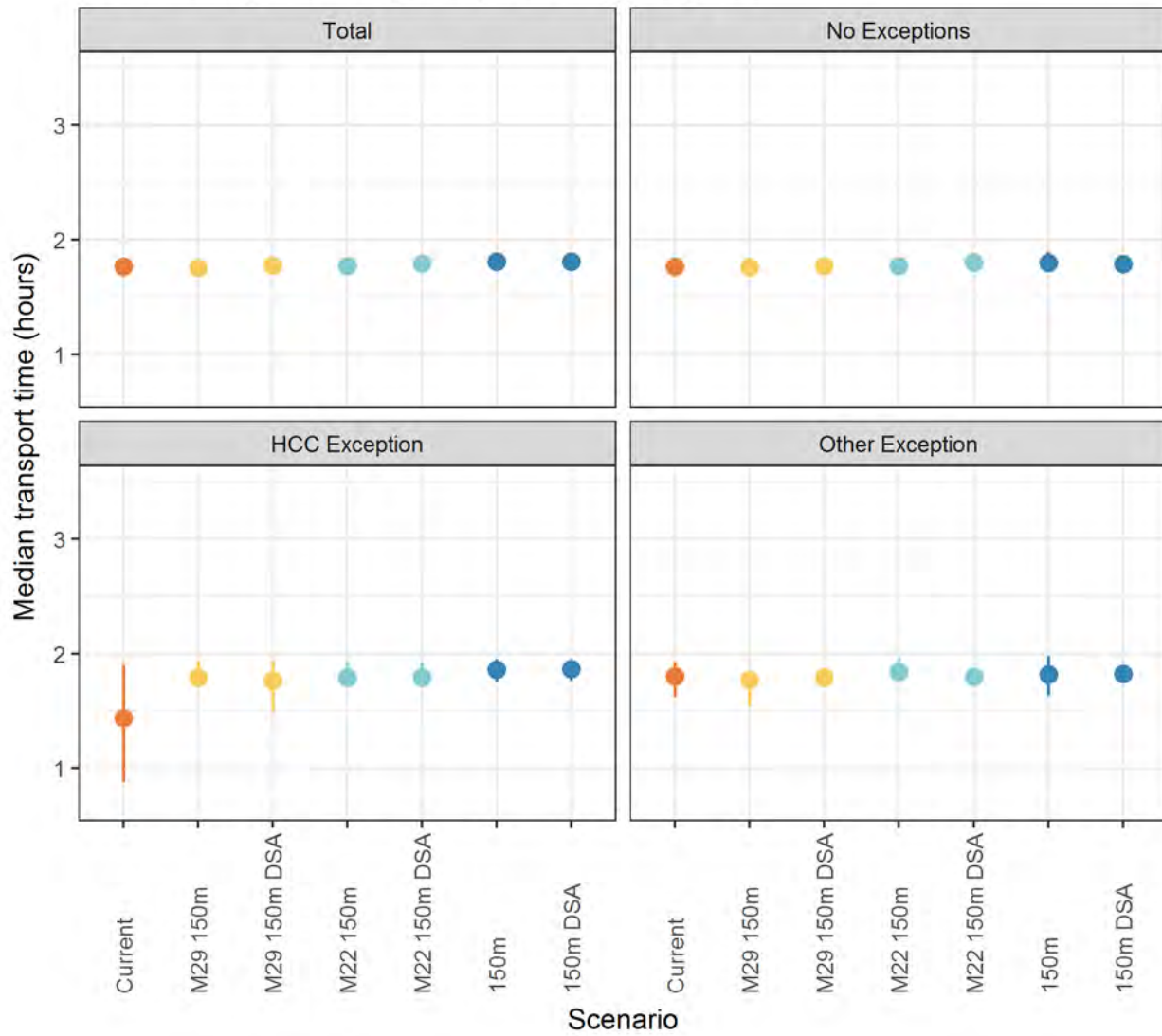


Figure 105 Median Transport Time by exception status - region 6

Median Transport Time by Exception Status - Region 7

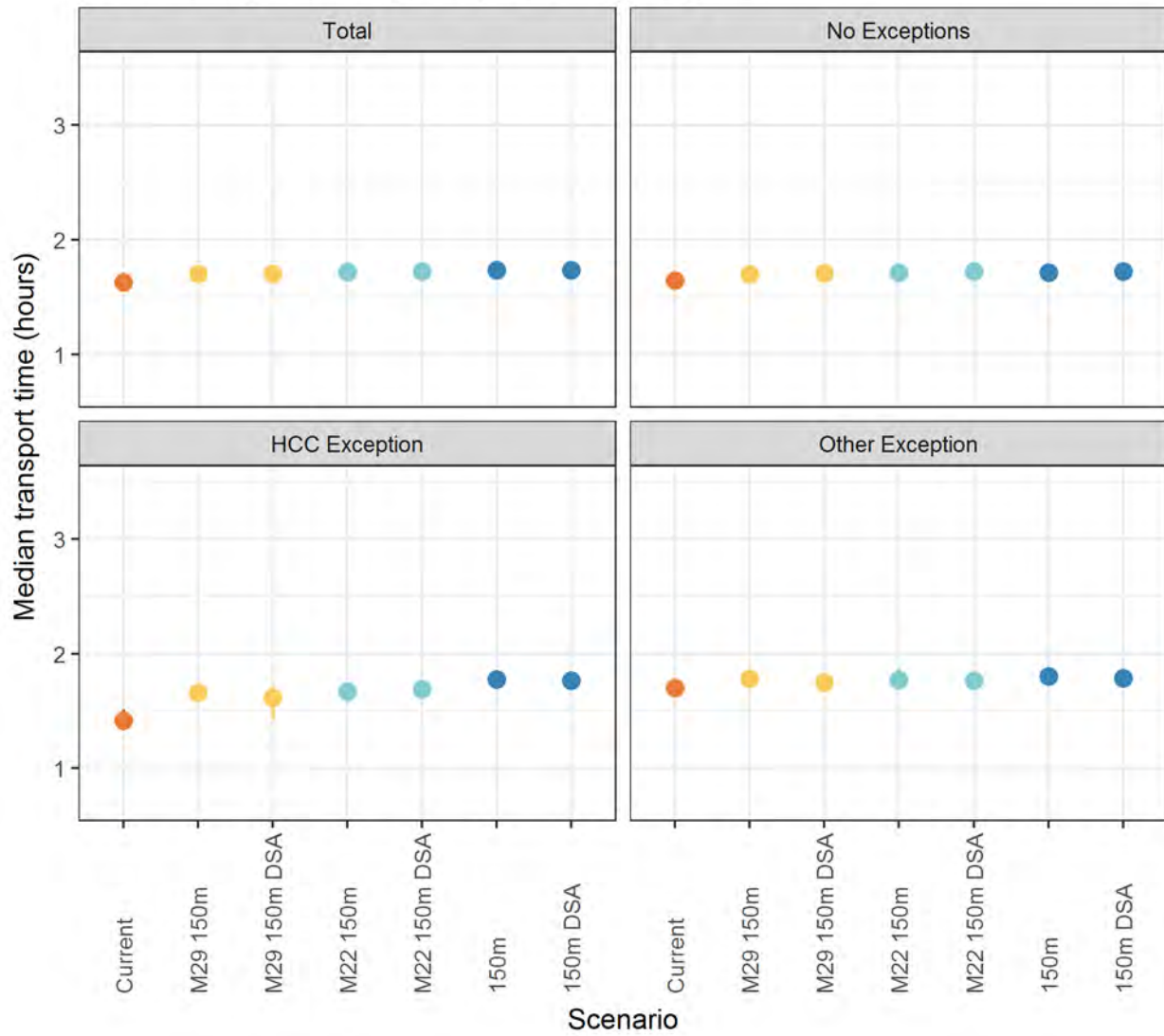


Figure 106 Median Transport Time by exception status - region 7

Median Transport Time by Exception Status - Region 8

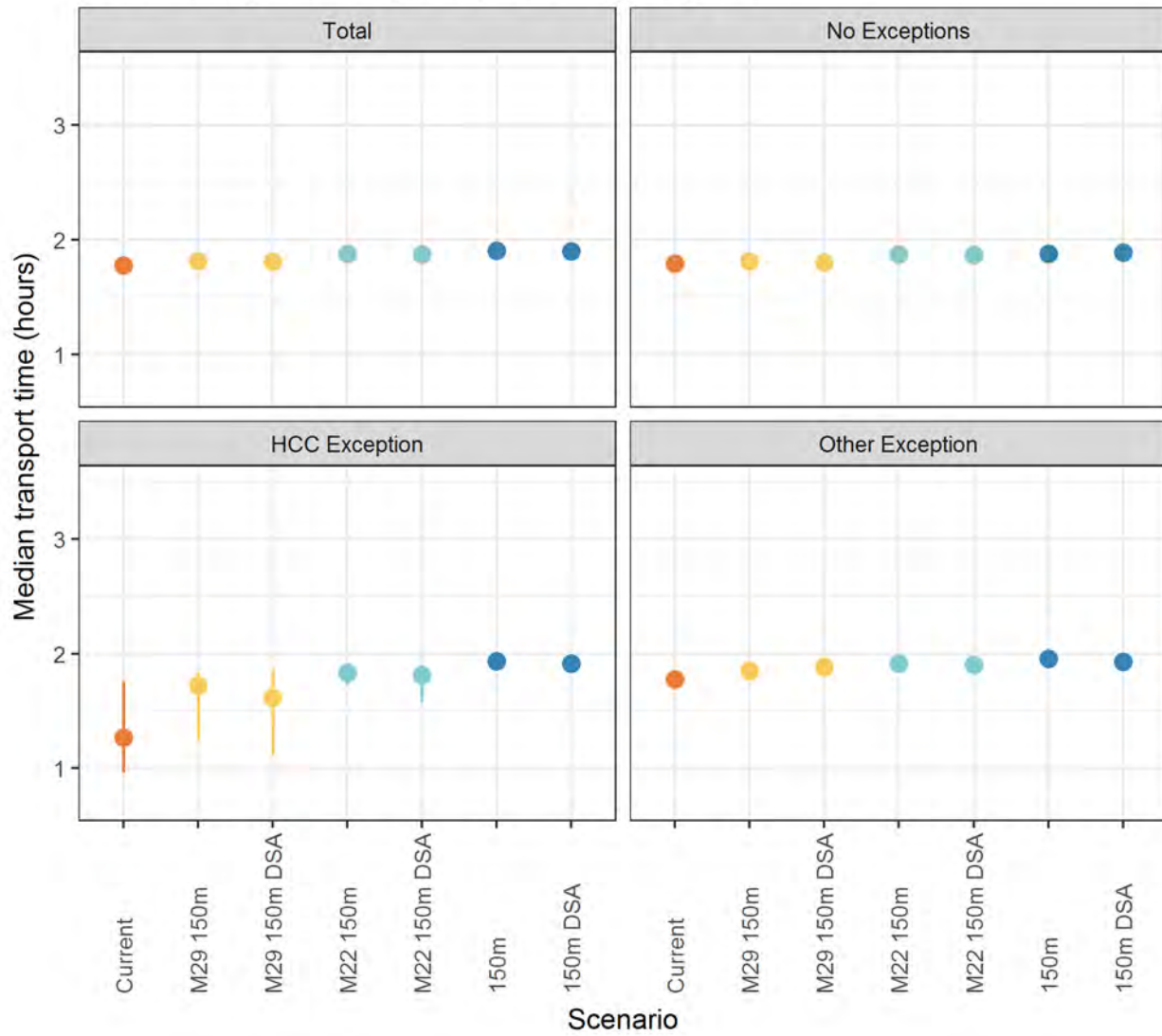


Figure 107 Median Transport Time by exception status - region 8

Median Transport Time by Exception Status - Region 9

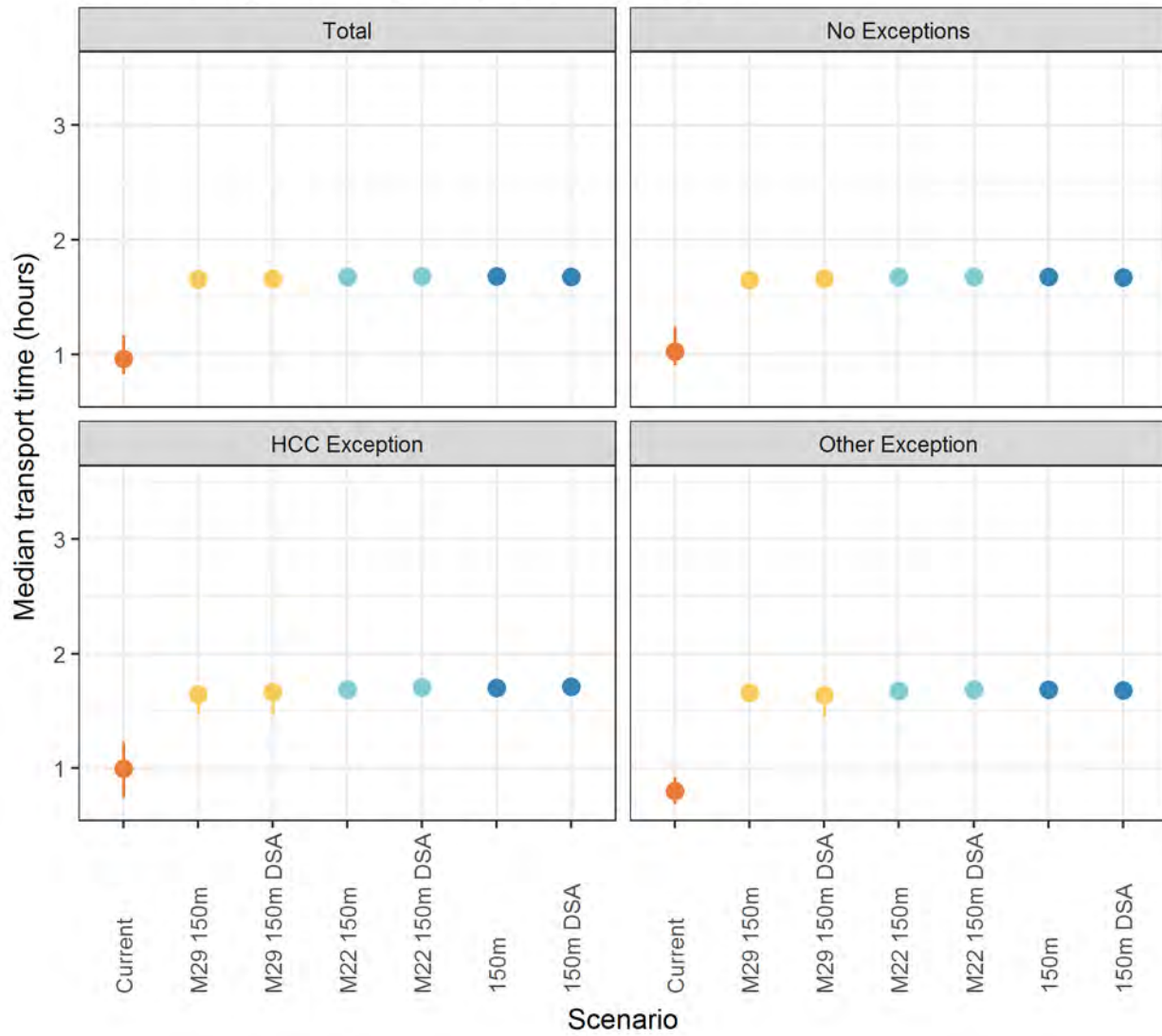


Figure 108 Median Transport Time by exception status - region 9

Median Transport Time by Exception Status - Region 10

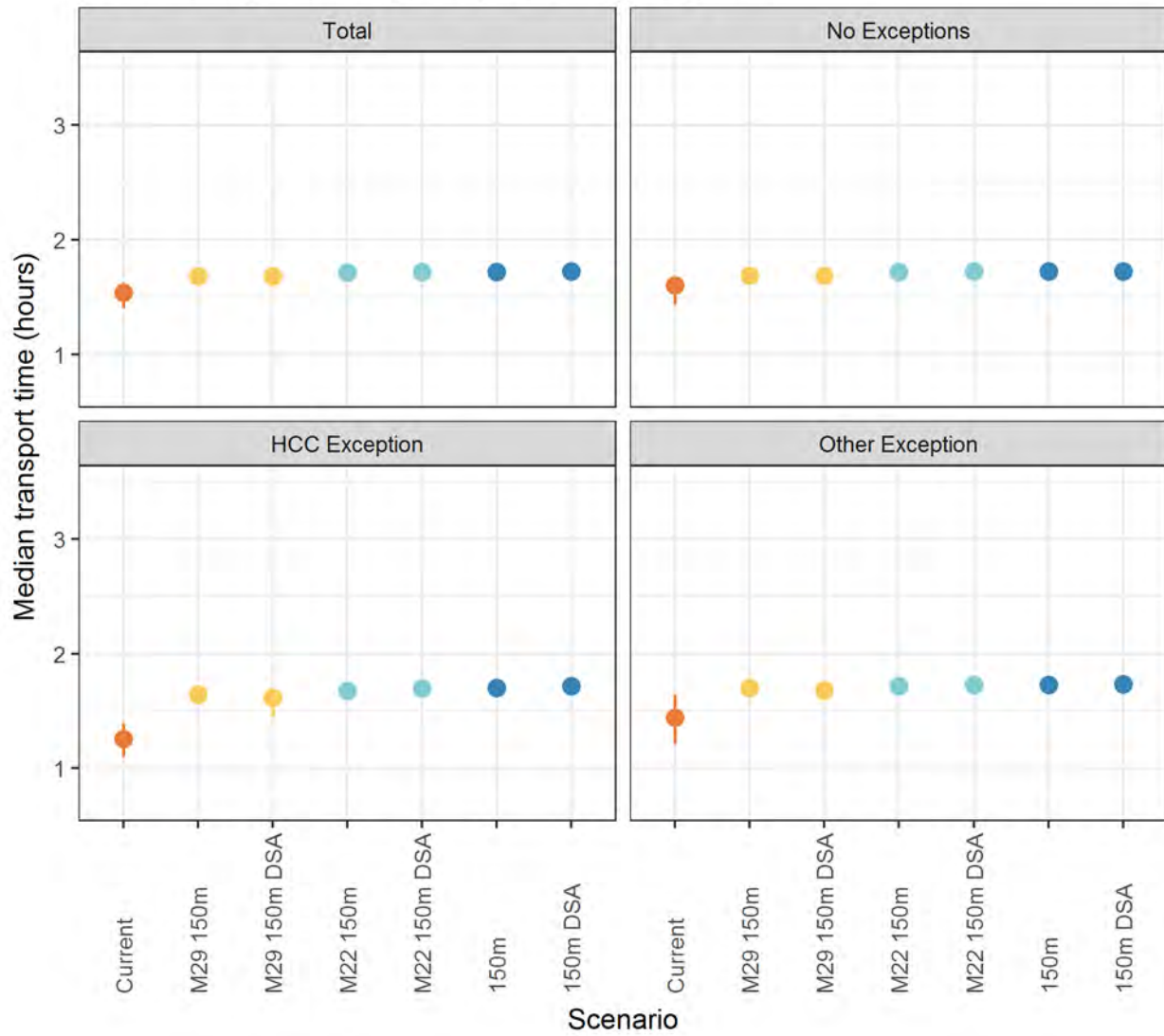


Figure 109 Median Transport Time by exception status - region 10

Median Transport Time by Exception Status - Region 11

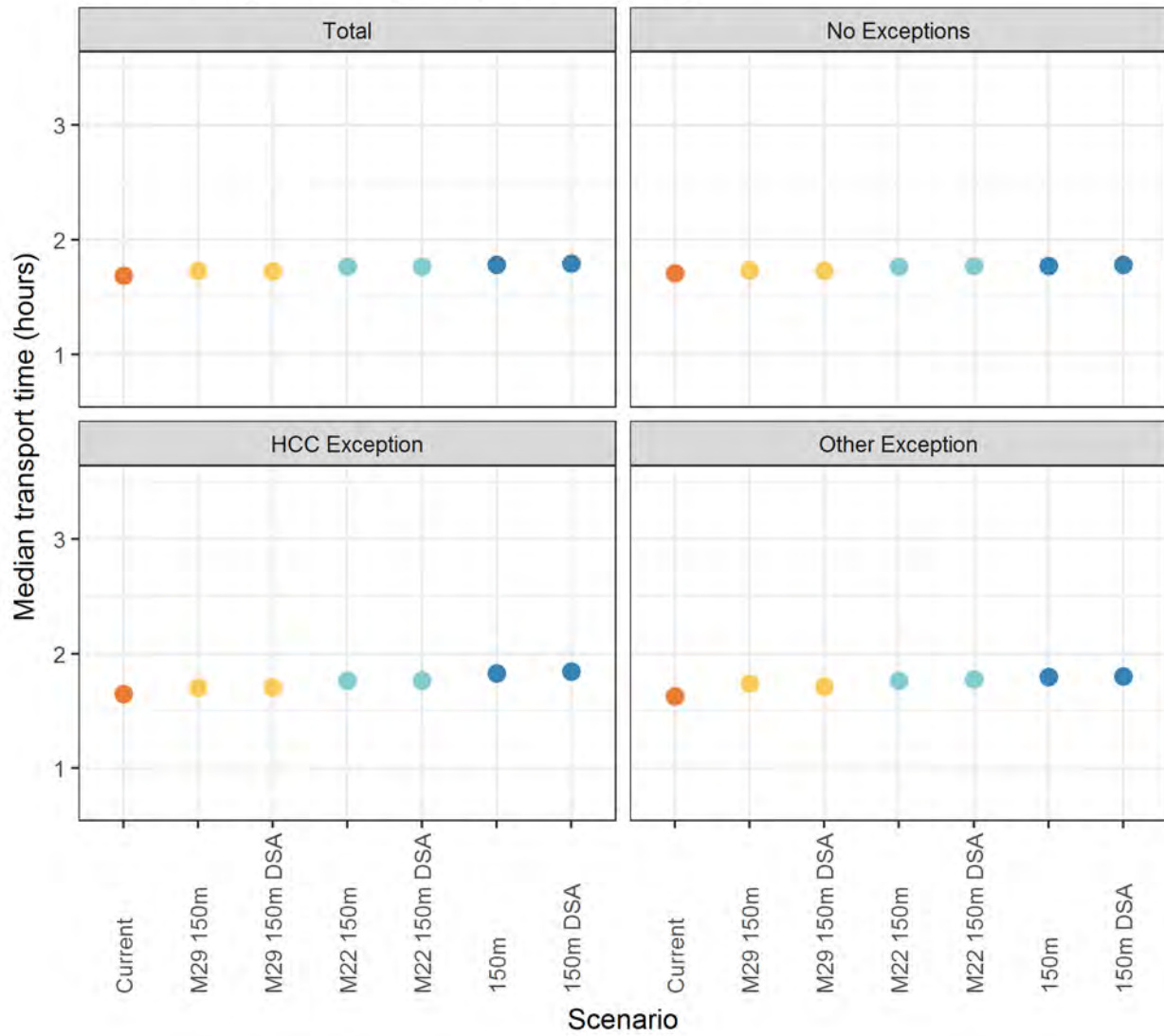


Figure 110 Median Transport Time by exception status - region 11

Median Transport Distance

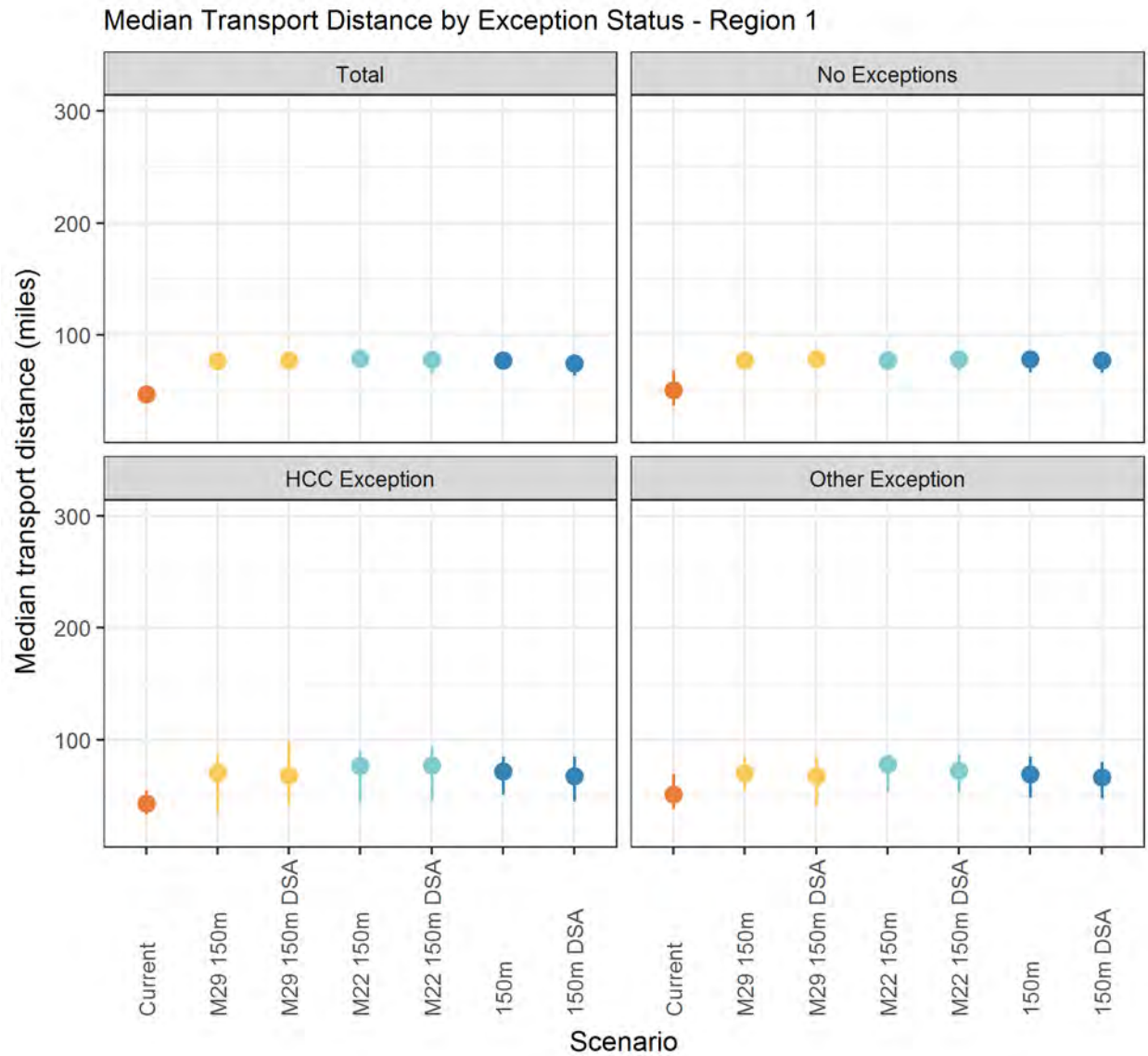


Figure 111 Median Transport Distance by exception status - region 1

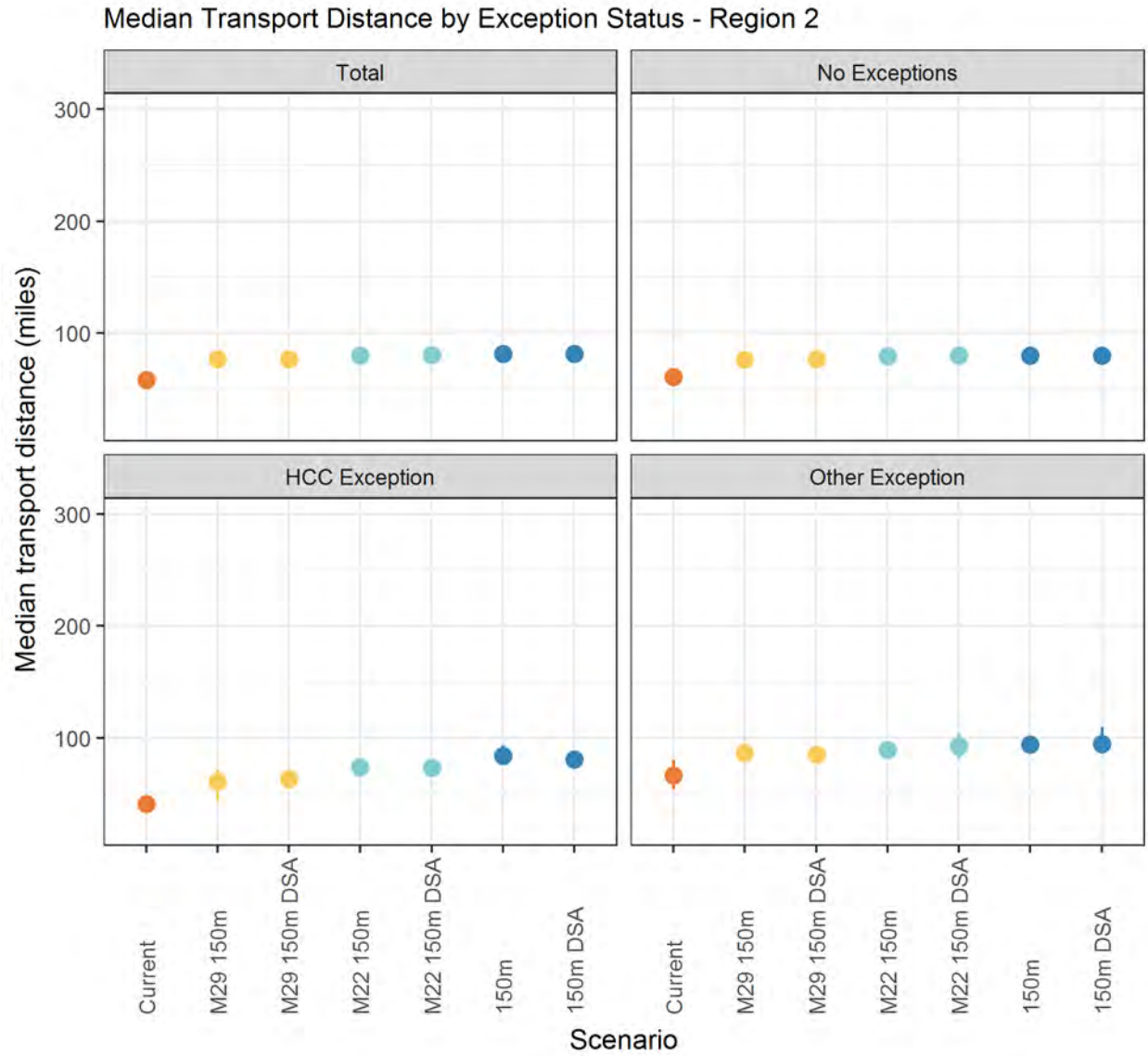


Figure 112 Median Transport Distance by exception status - region 2

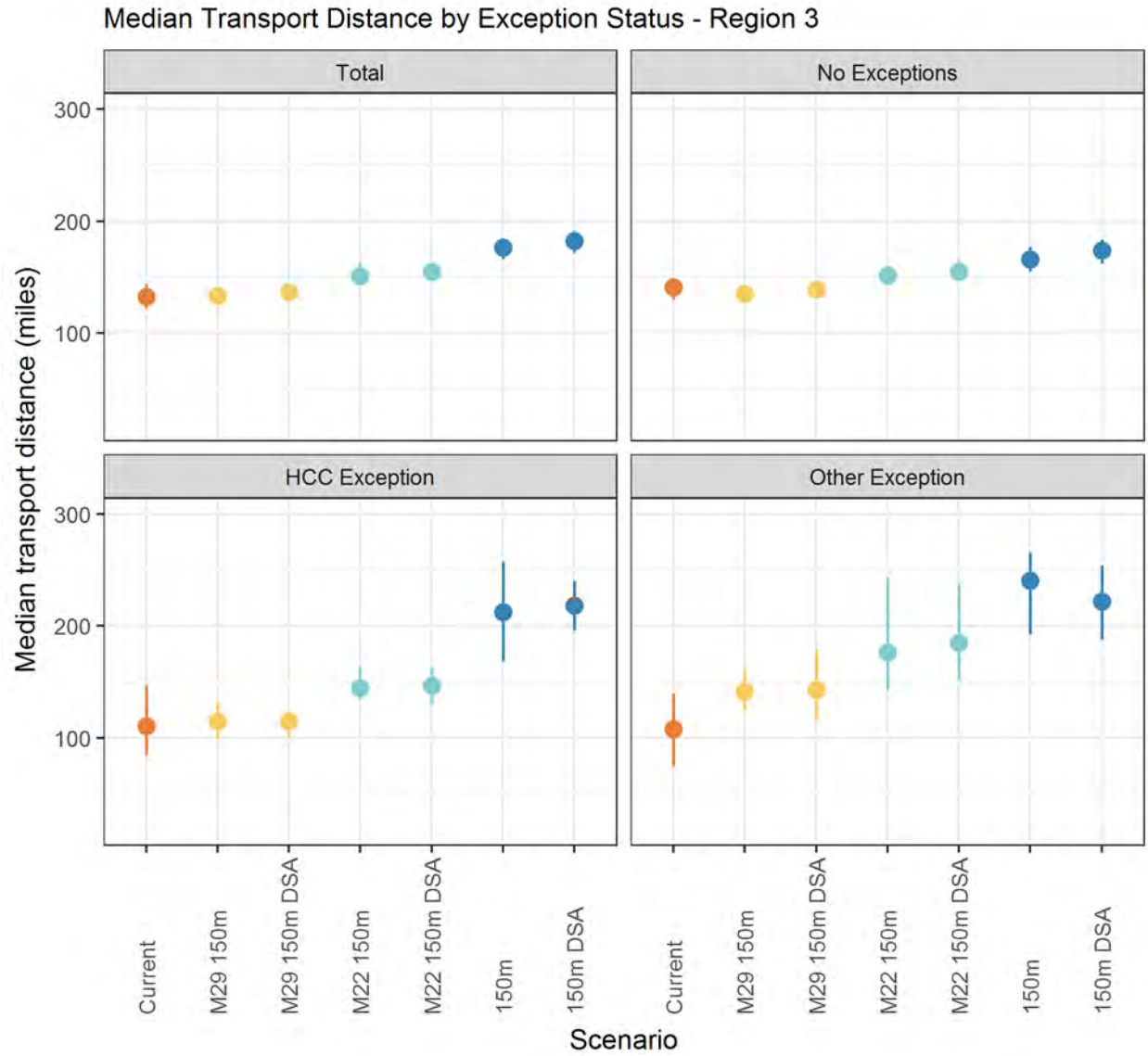


Figure 113 Median Transport Distance by exception status - region 3

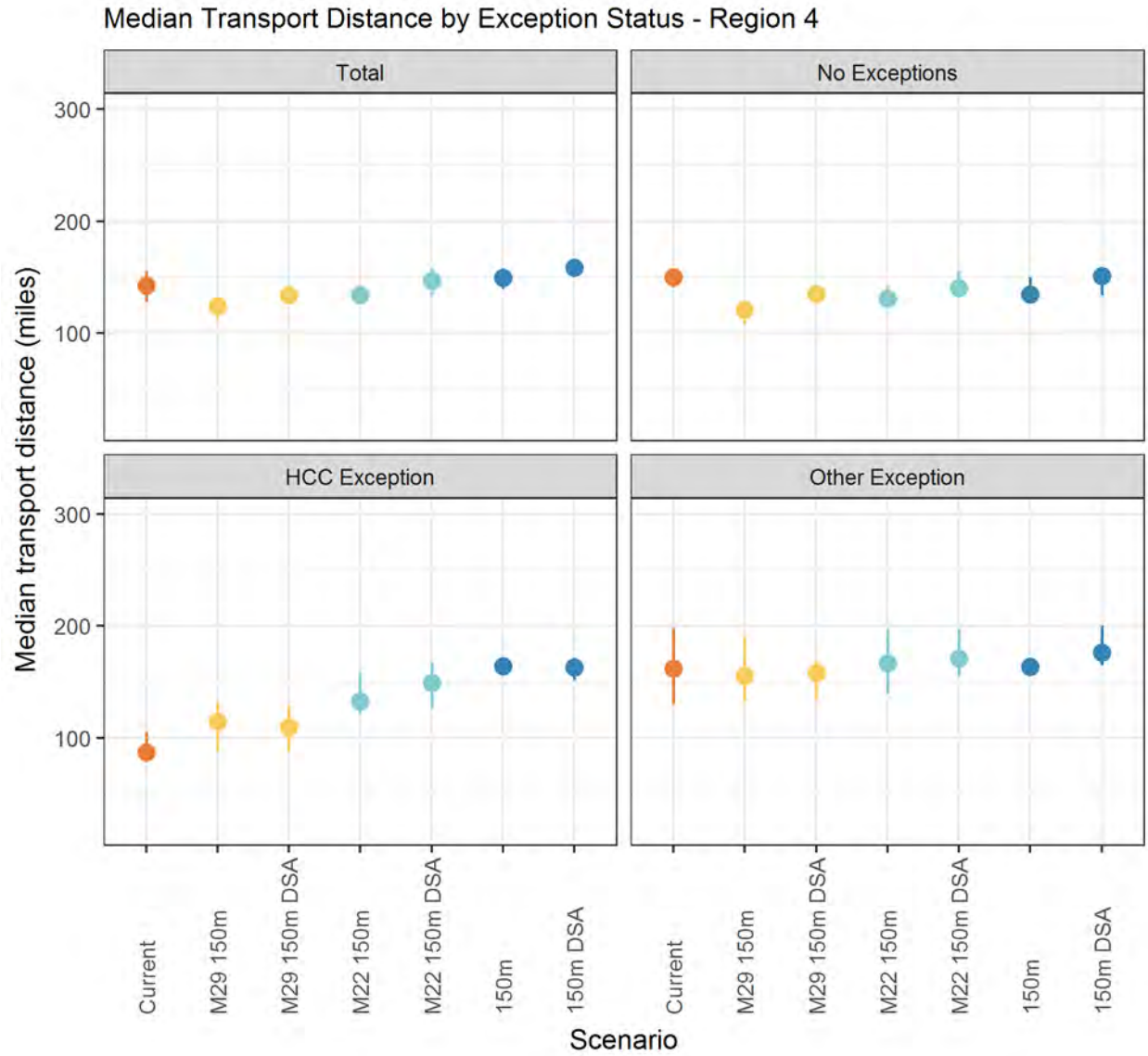


Figure 114 Median Transport Distance by exception status - region 4

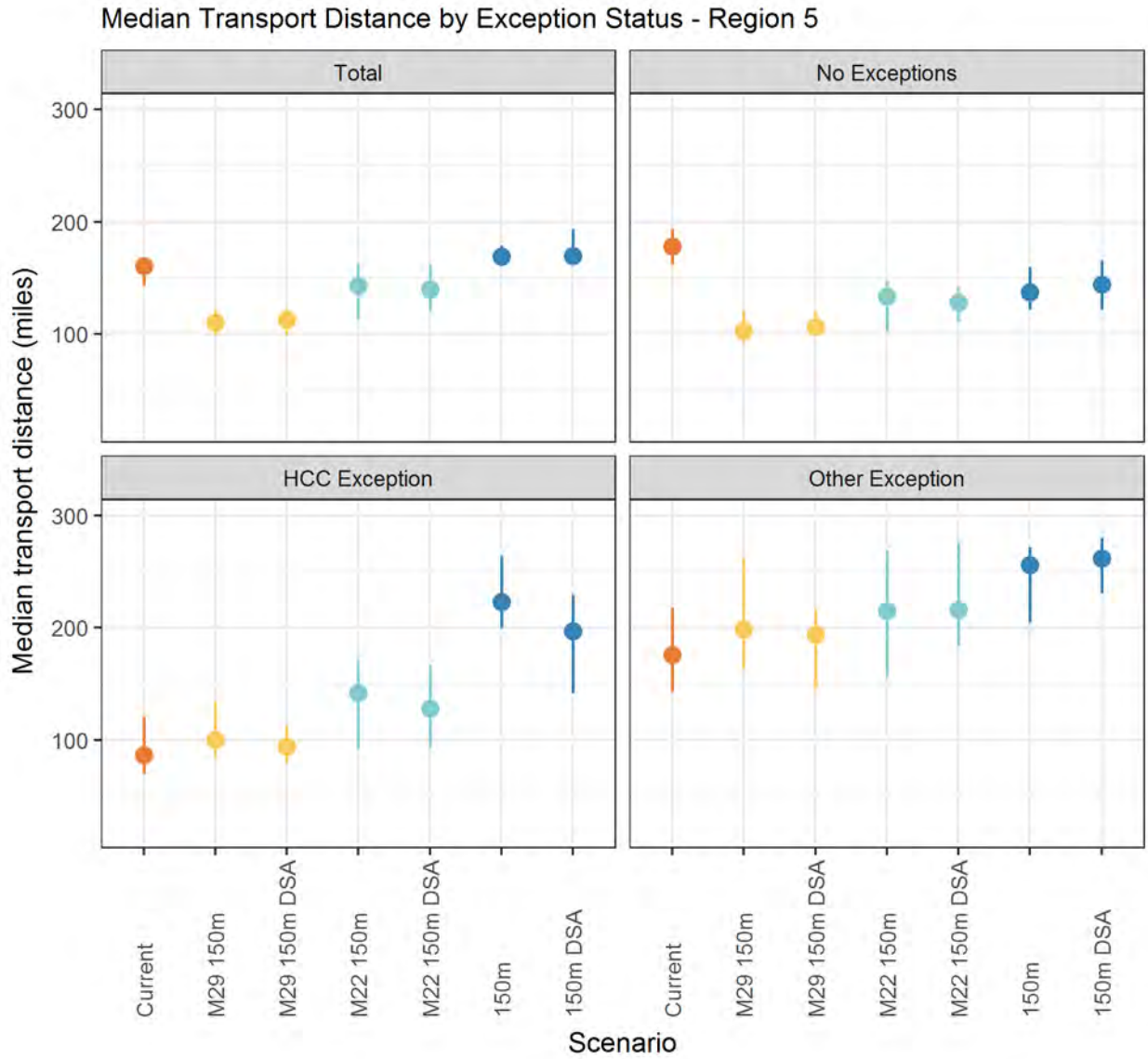


Figure 115 Median Transport Distance by exception status - region 5

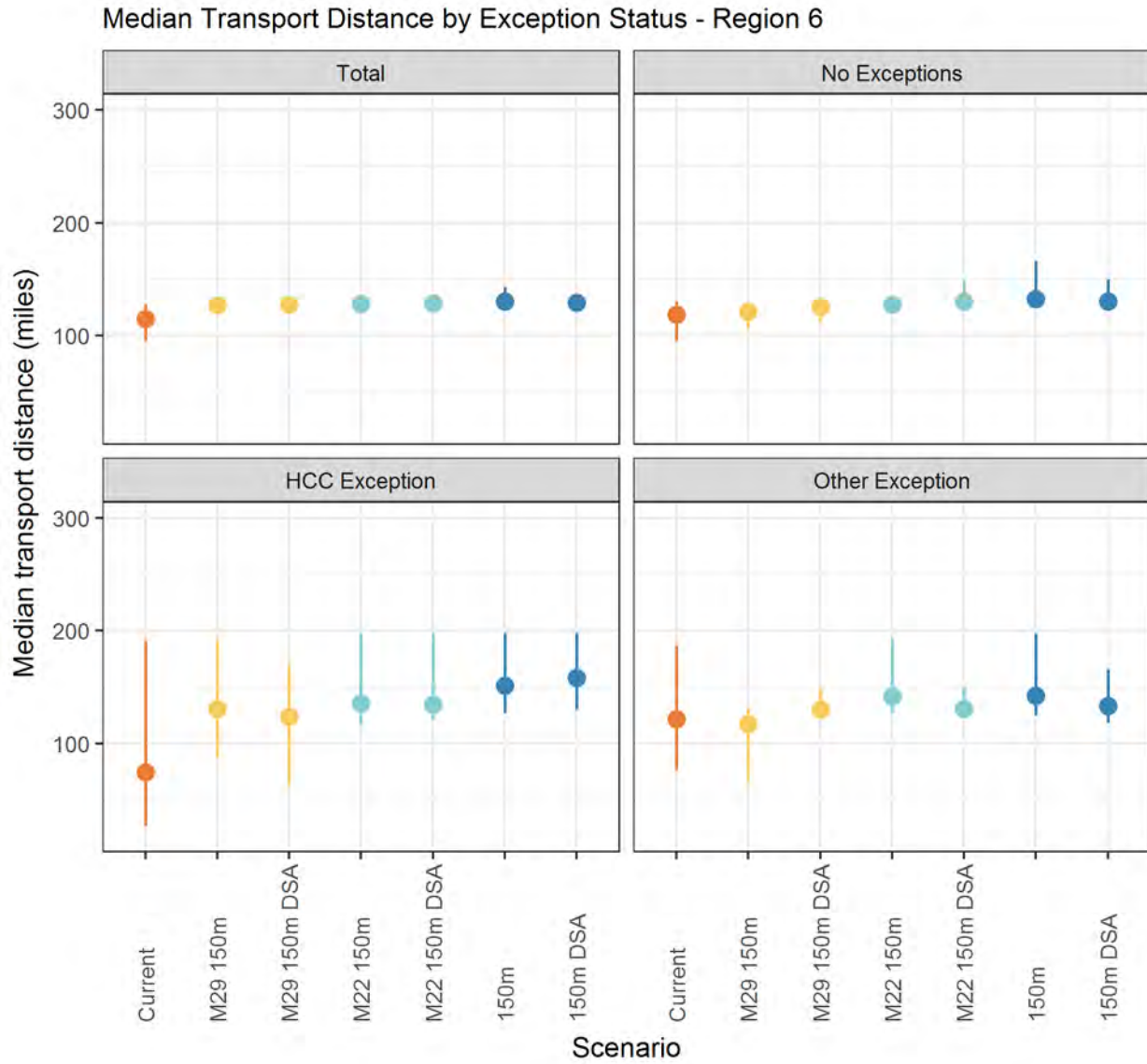


Figure 116 Median Transport Distance by exception status - region 6

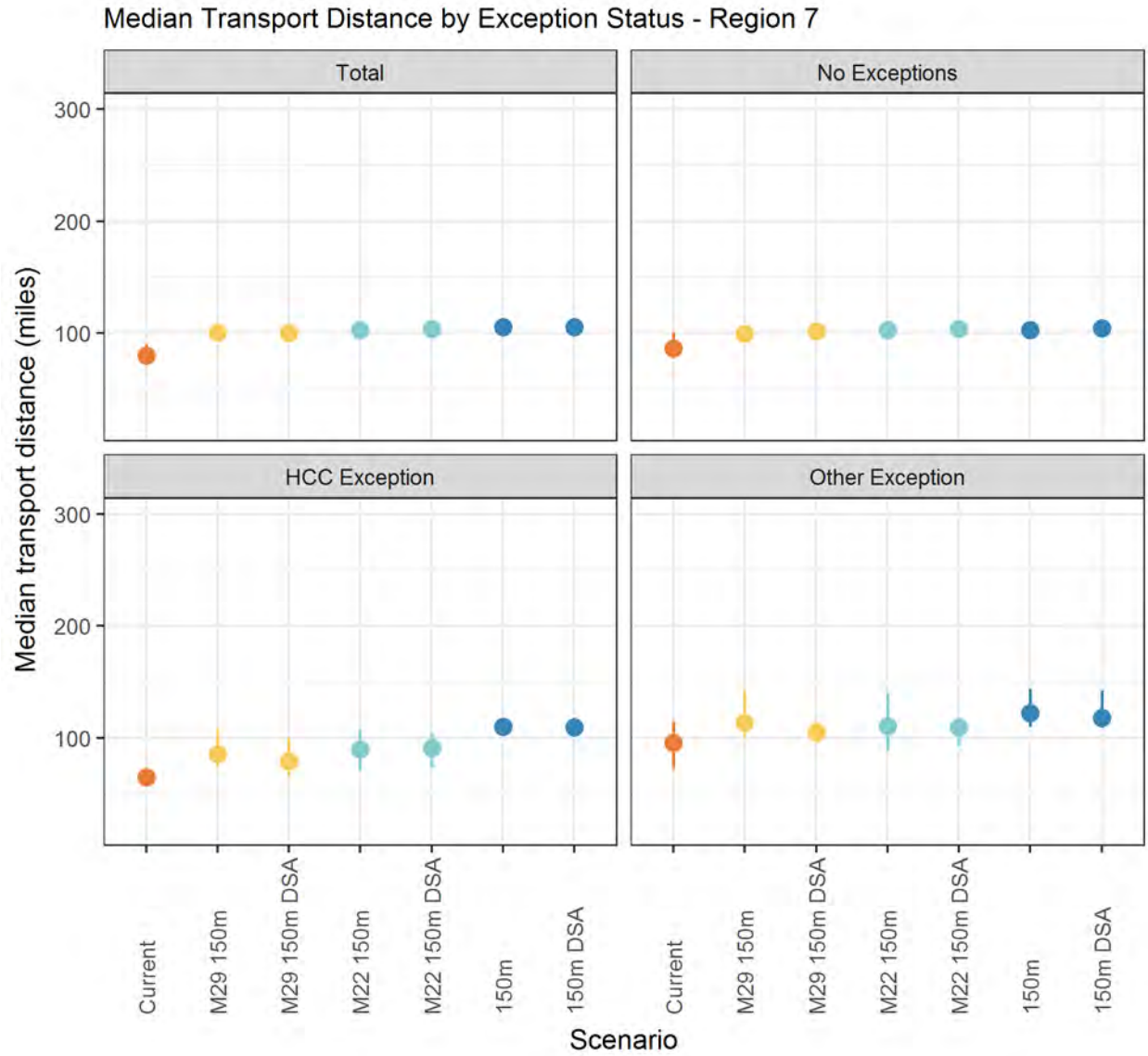


Figure 117 Median Transport Distance by exception status - region 7

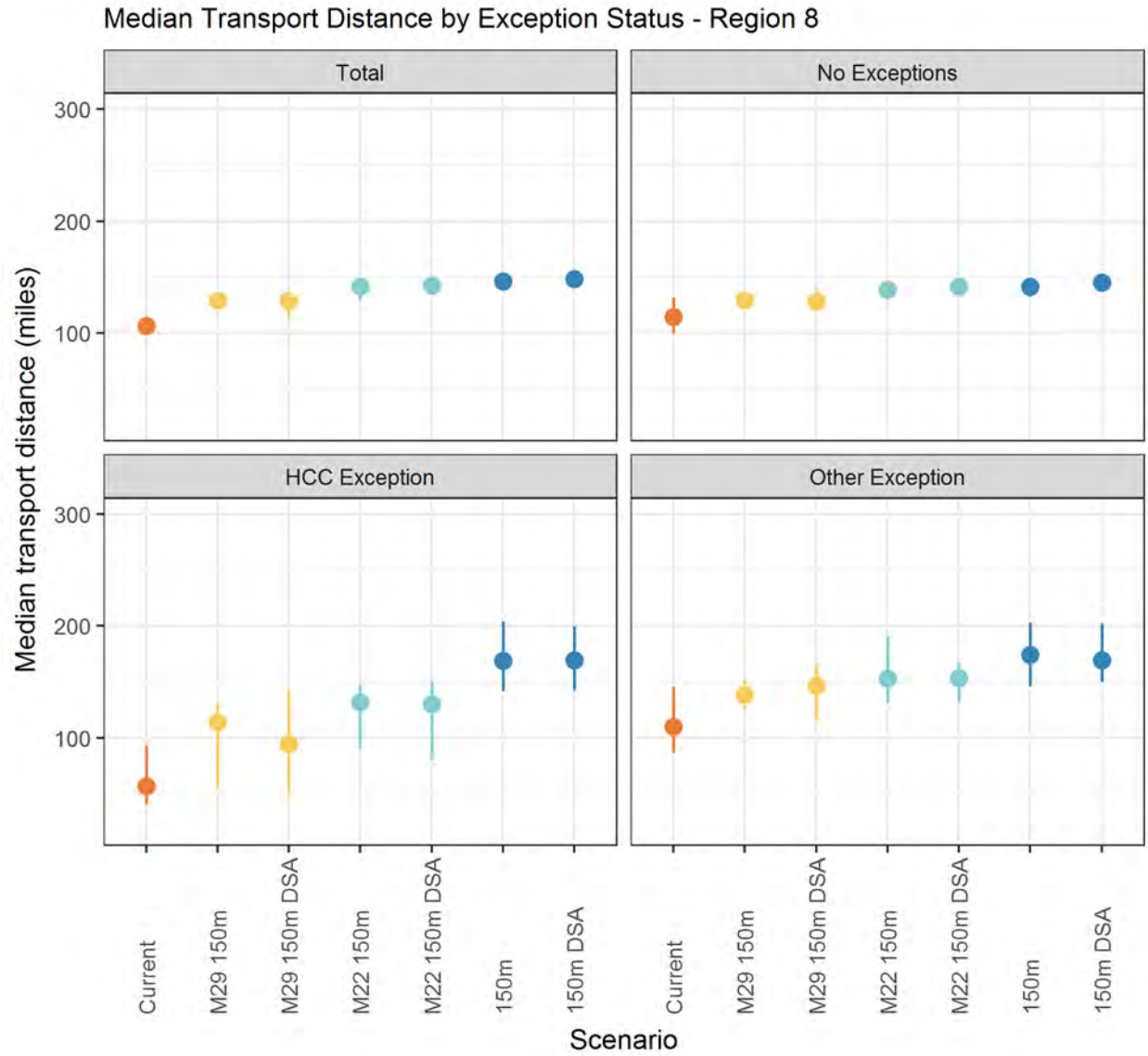


Figure 118 Median Transport Distance by exception status - region 8

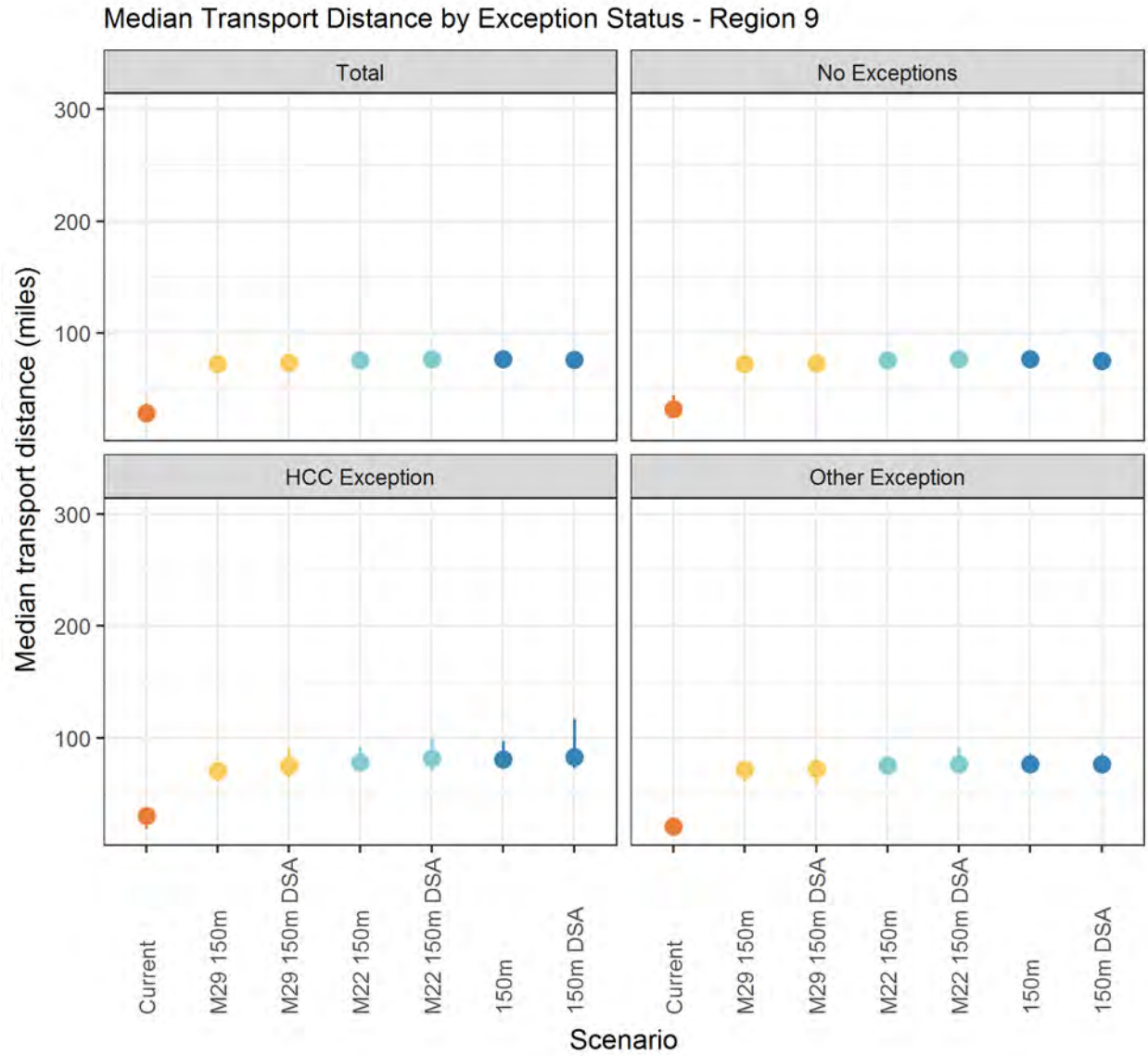


Figure 119 Median Transport Distance by exception status - region 9

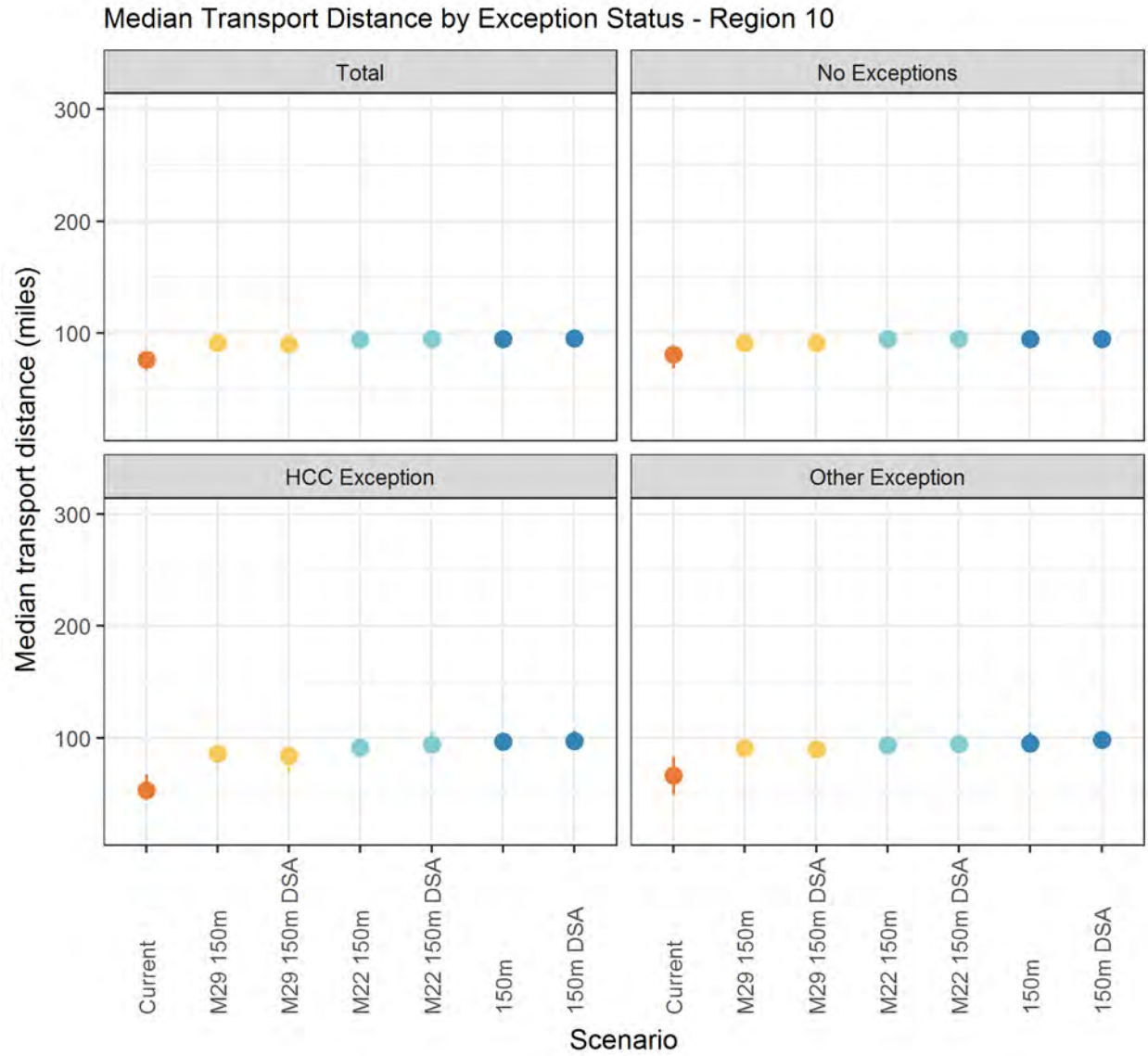


Figure 120 Median Transport Distance by exception status - region 10

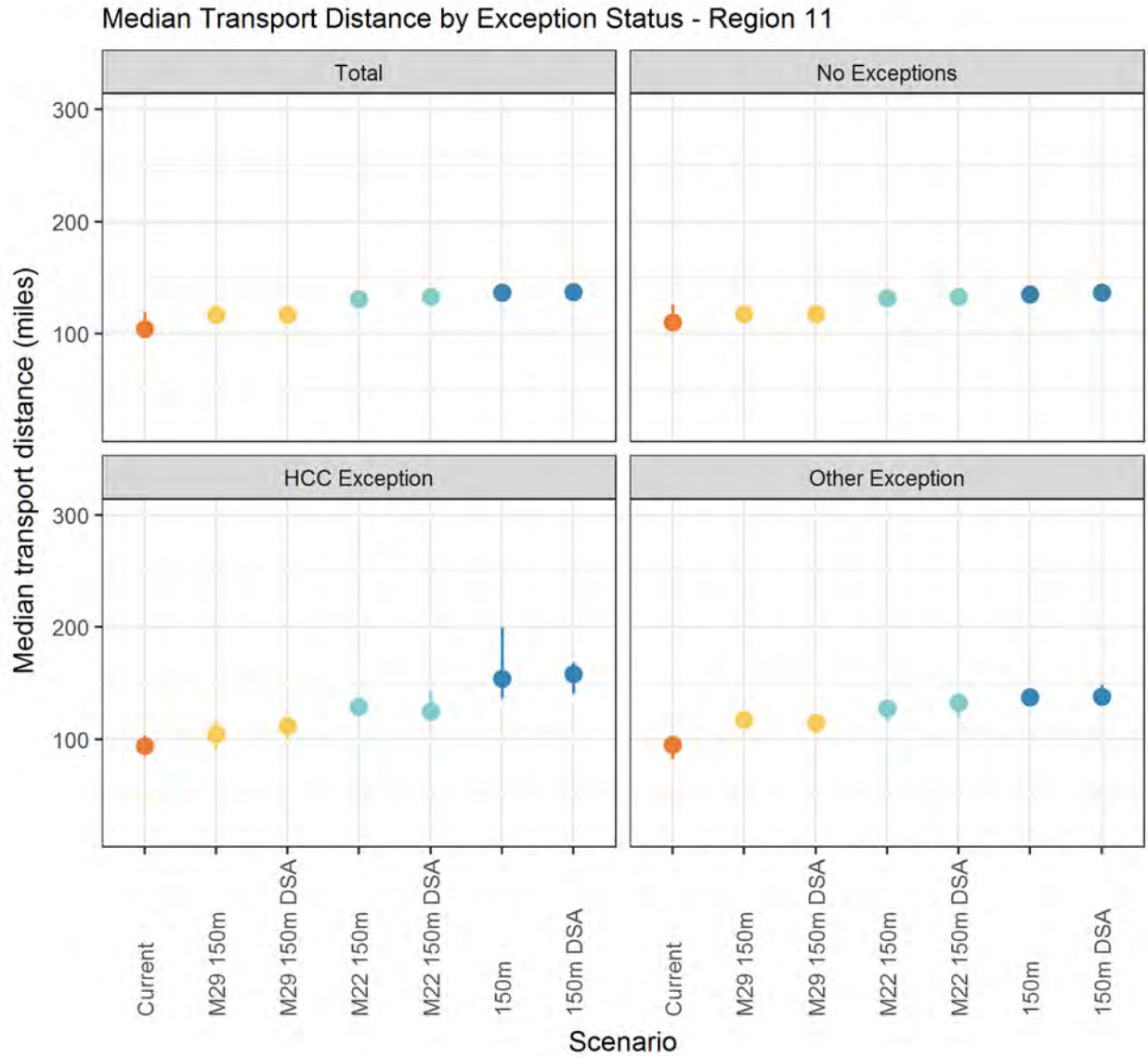


Figure 121 Median Transport Distance by exception status - region 11

Percent of Organs Flown

Percent of Organs Flown by Exception Status - Region 1

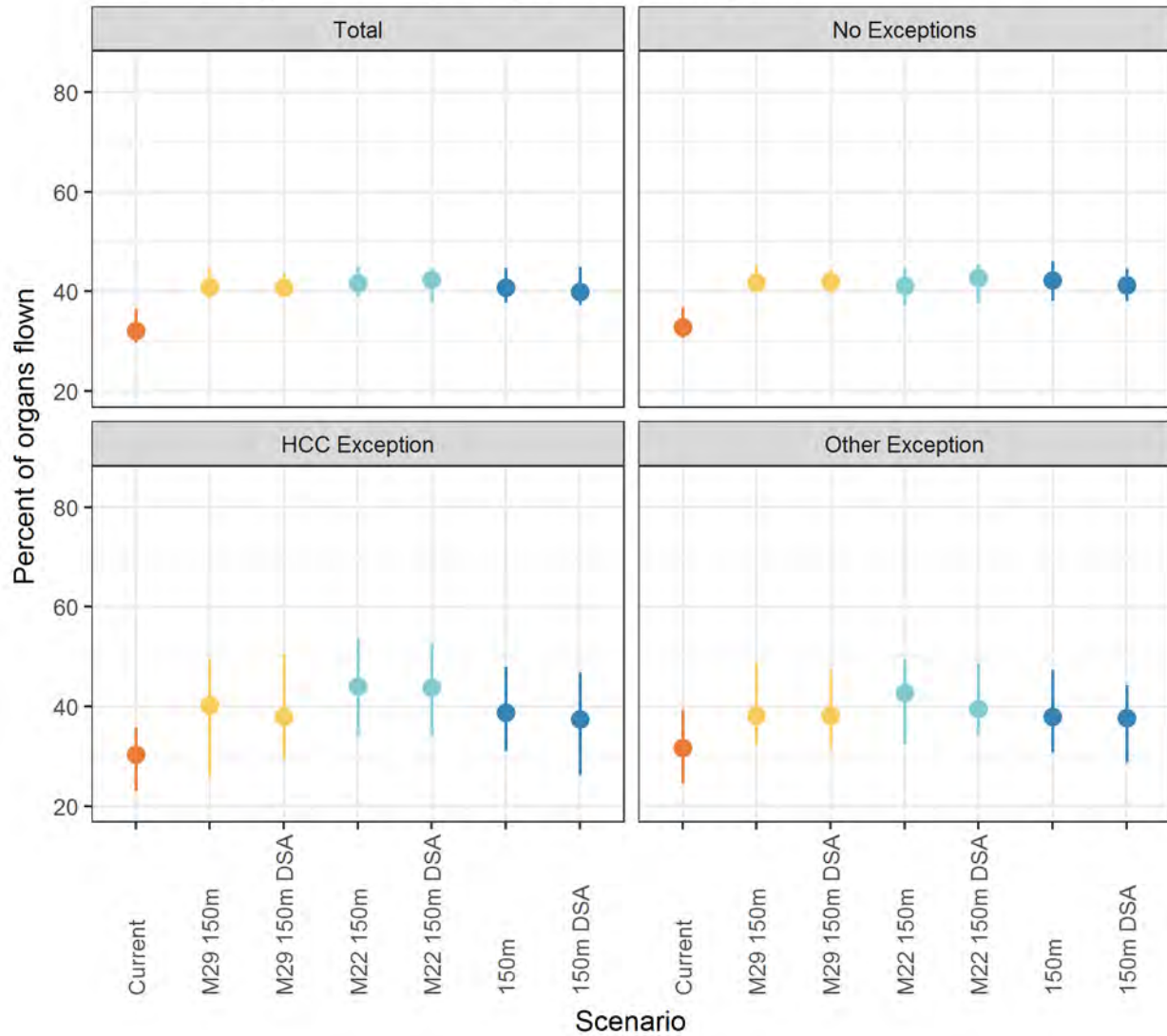


Figure 122 Percent of Organs Flown by exception status - region 1

Percent of Organs Flown by Exception Status - Region 2

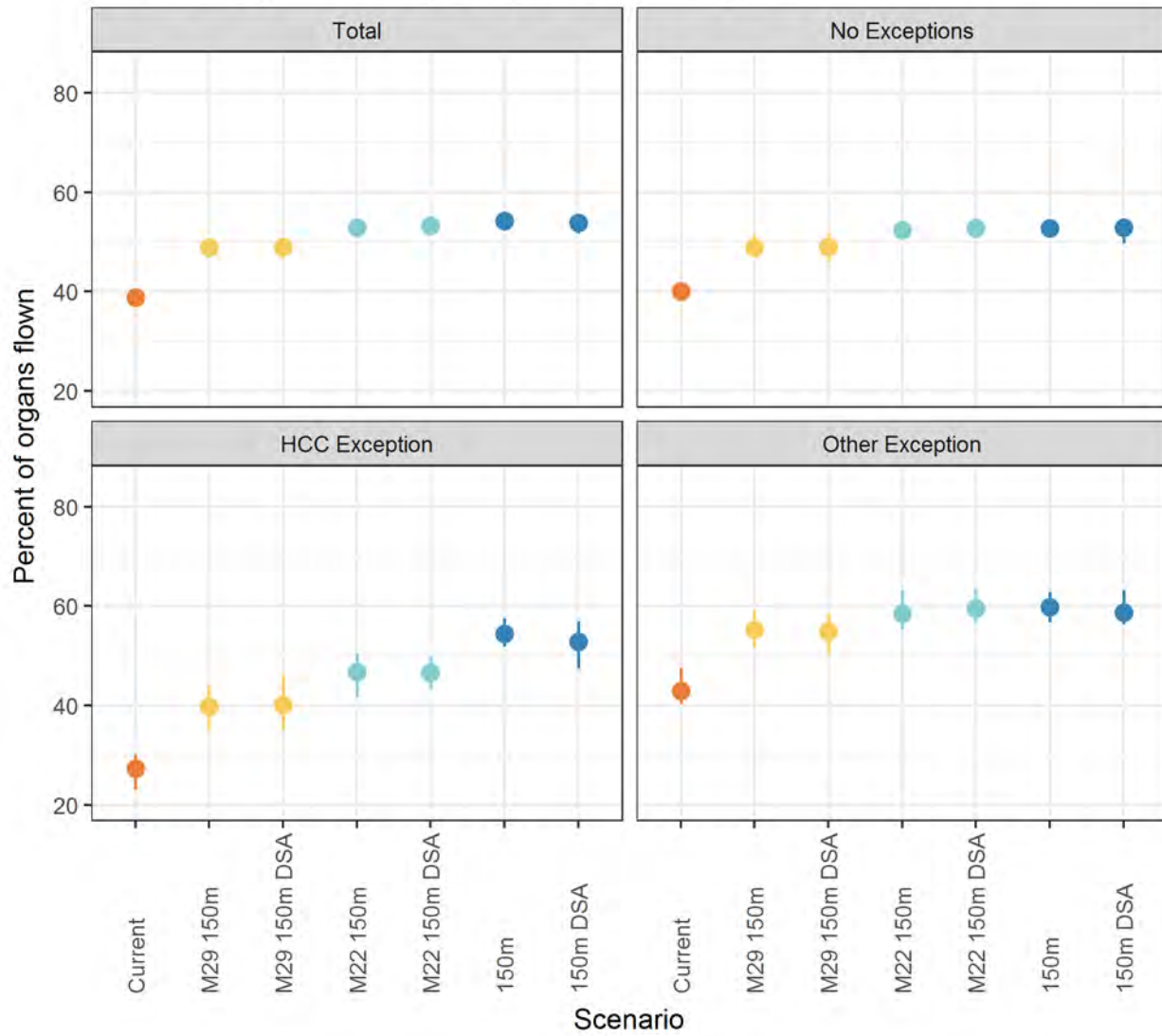


Figure 123 Percent of Organs Flown by exception status - region 2

Percent of Organs Flown by Exception Status - Region 3

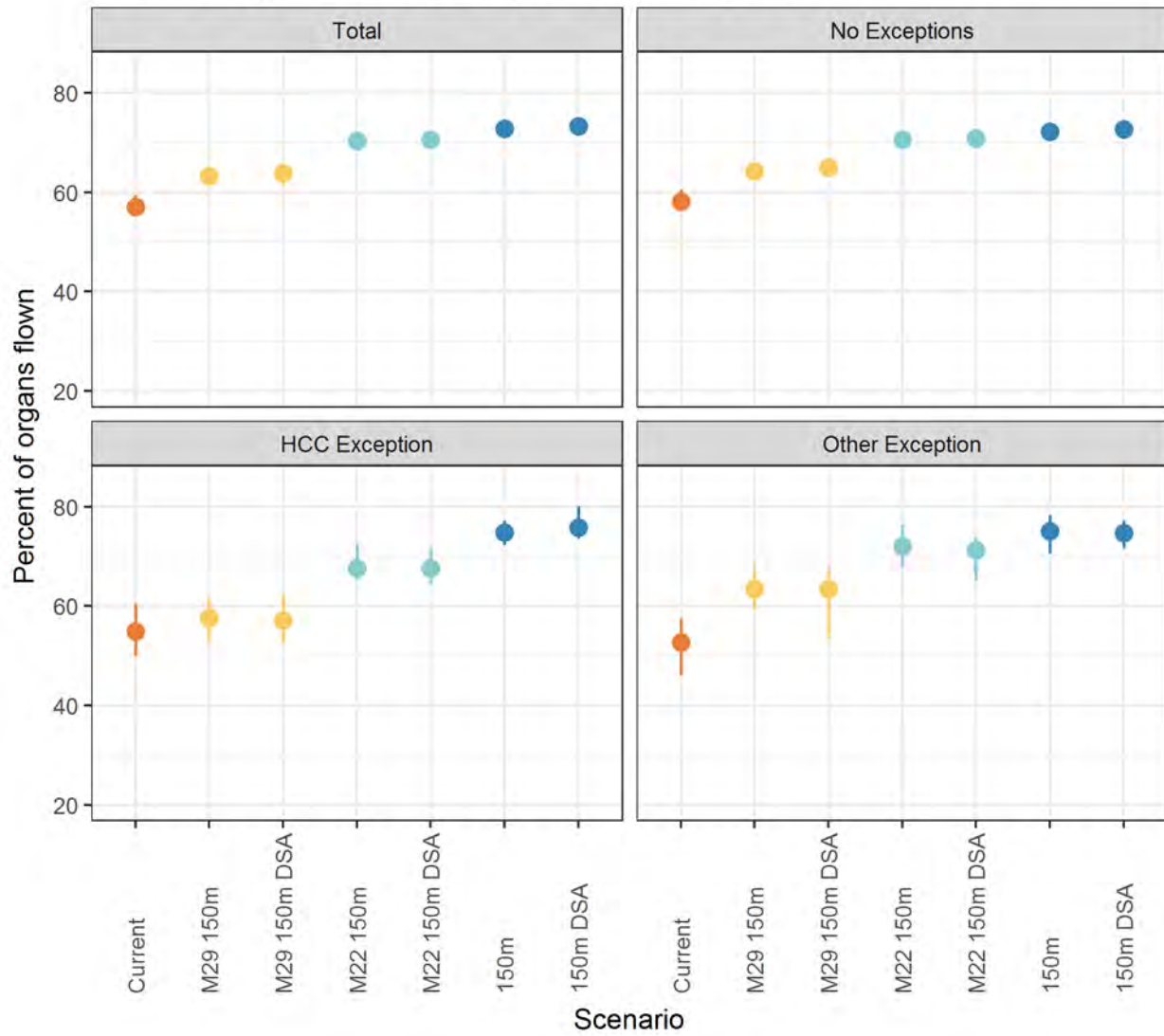


Figure 124 Percent of Organs Flown by exception status - region 3

Percent of Organs Flown by Exception Status - Region 4

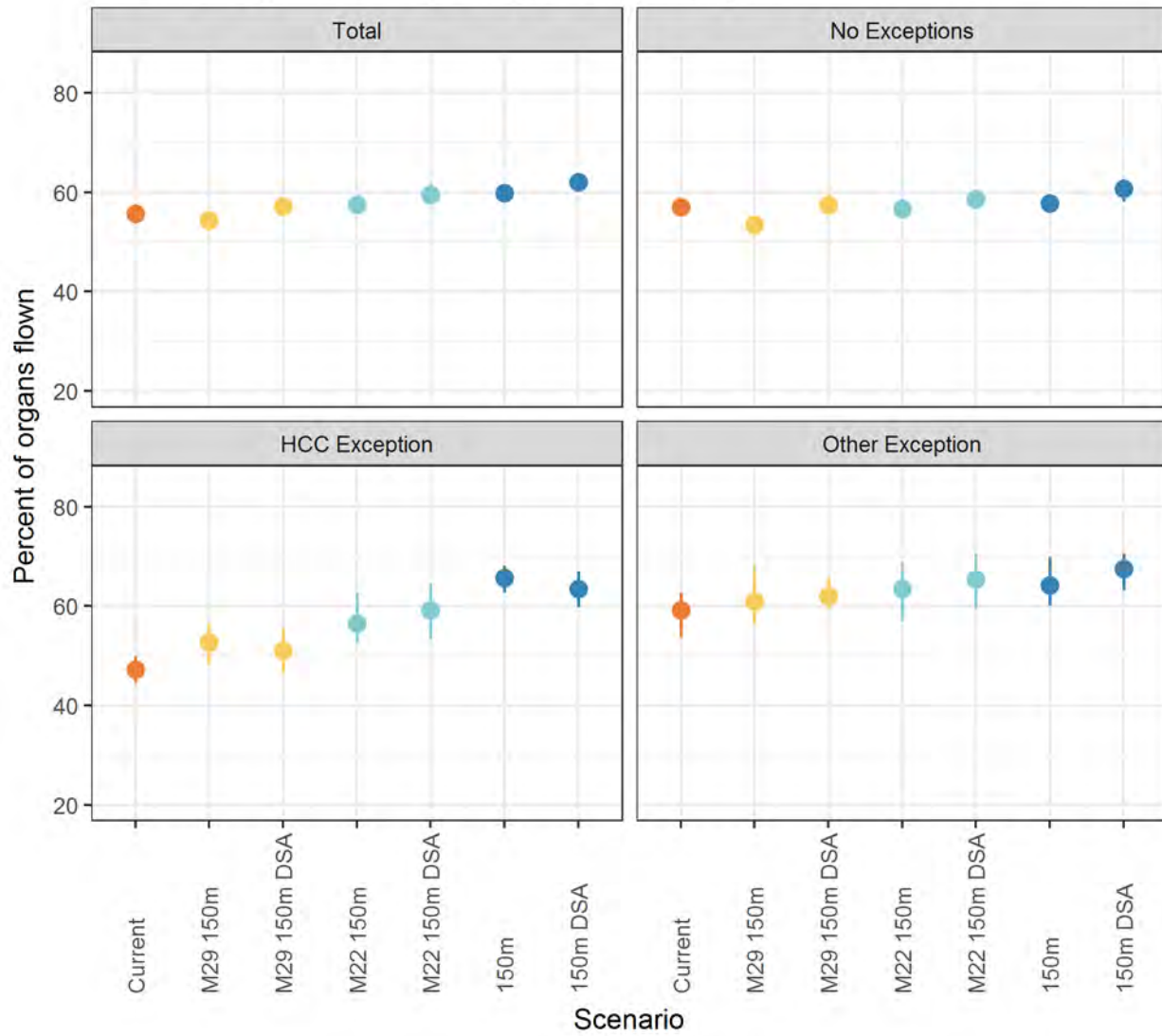


Figure 125 Percent of Organs Flown by exception status - region 4

Percent of Organs Flown by Exception Status - Region 5

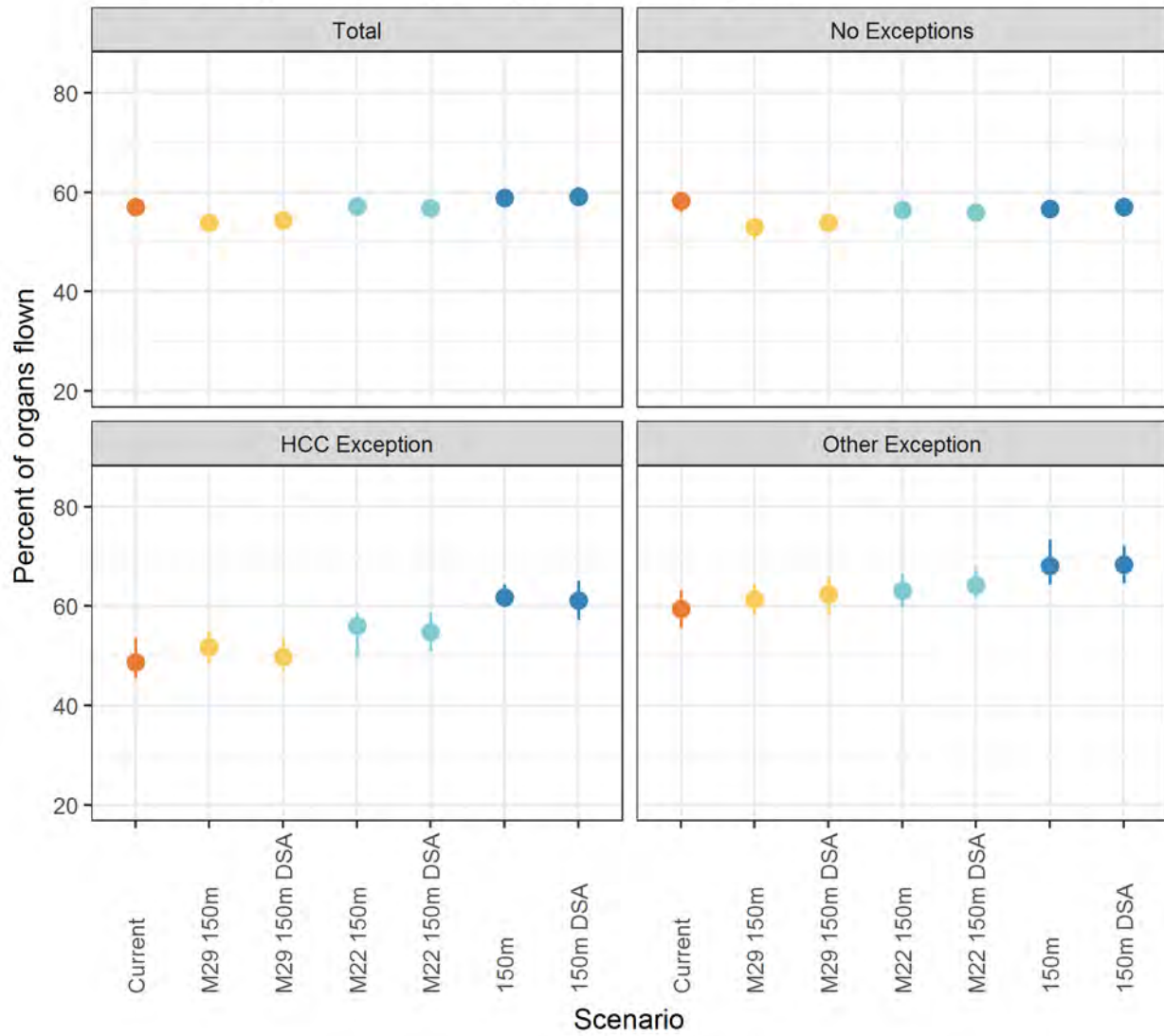


Figure 126 Percent of Organs Flown by exception status - region 5

Percent of Organs Flown by Exception Status - Region 6

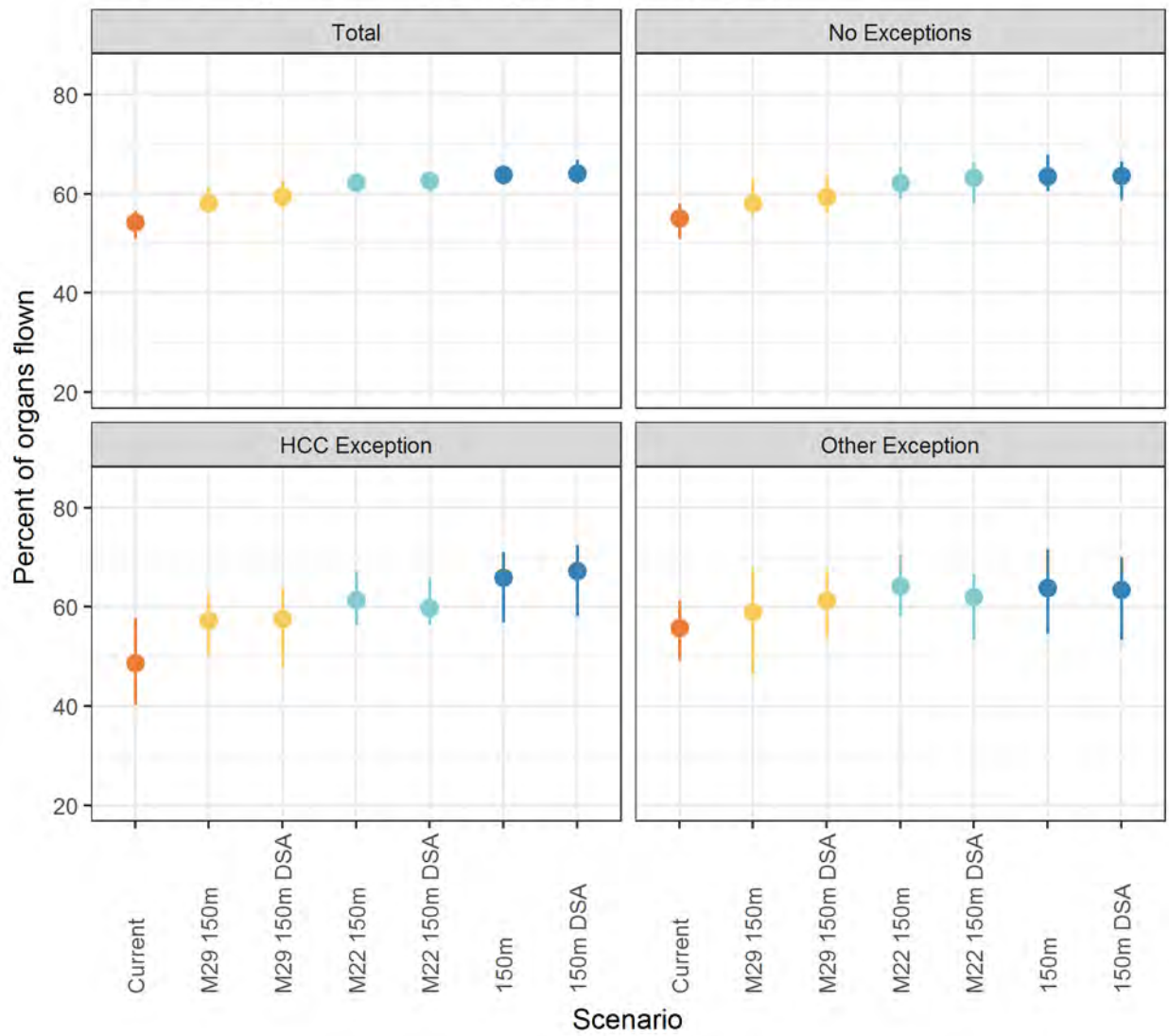


Figure 127 Percent of Organs Flown by exception status - region 6

Percent of Organs Flown by Exception Status - Region 7

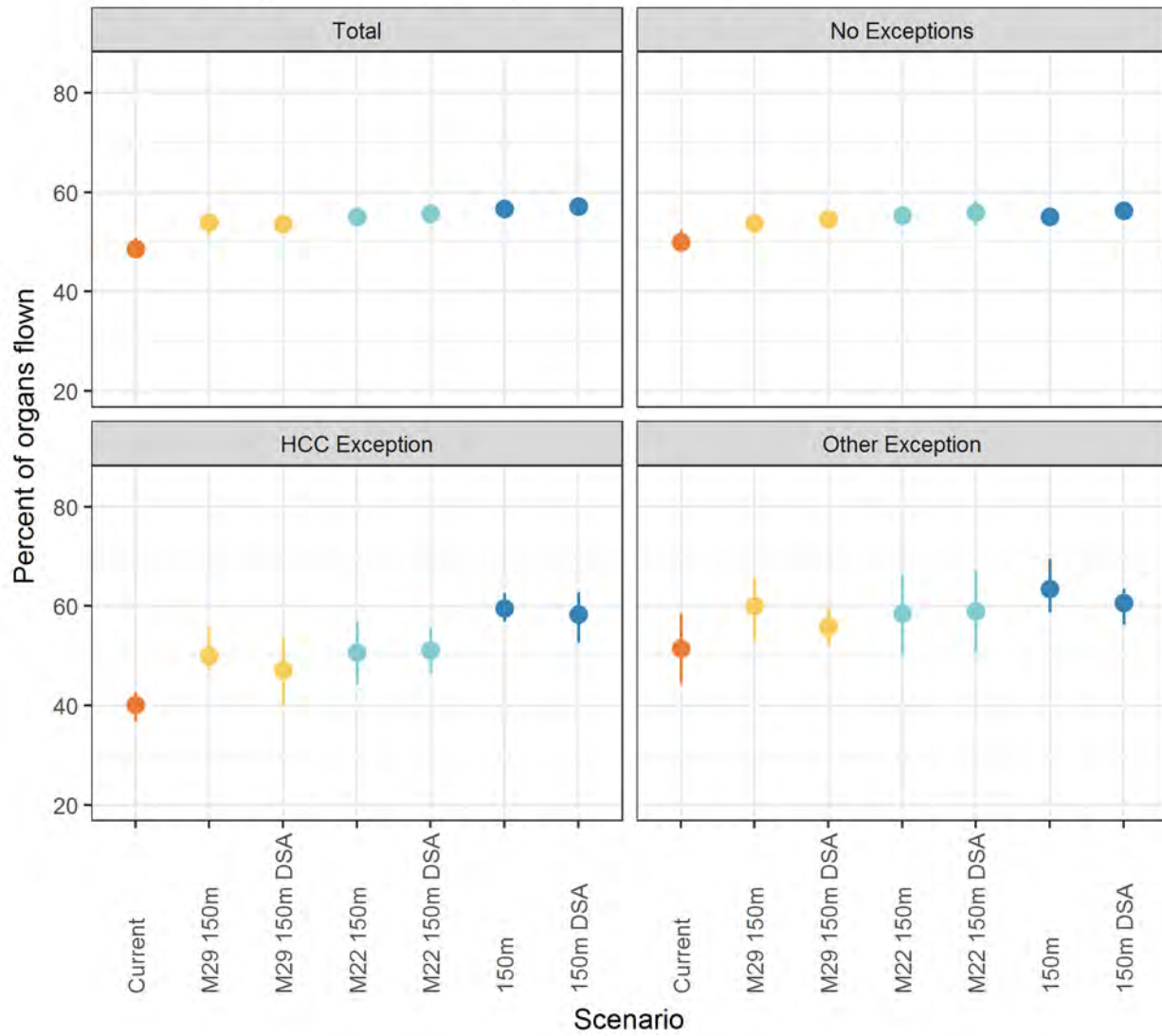


Figure 128 Percent of Organs Flown by exception status - region 7

Percent of Organs Flown by Exception Status - Region 8

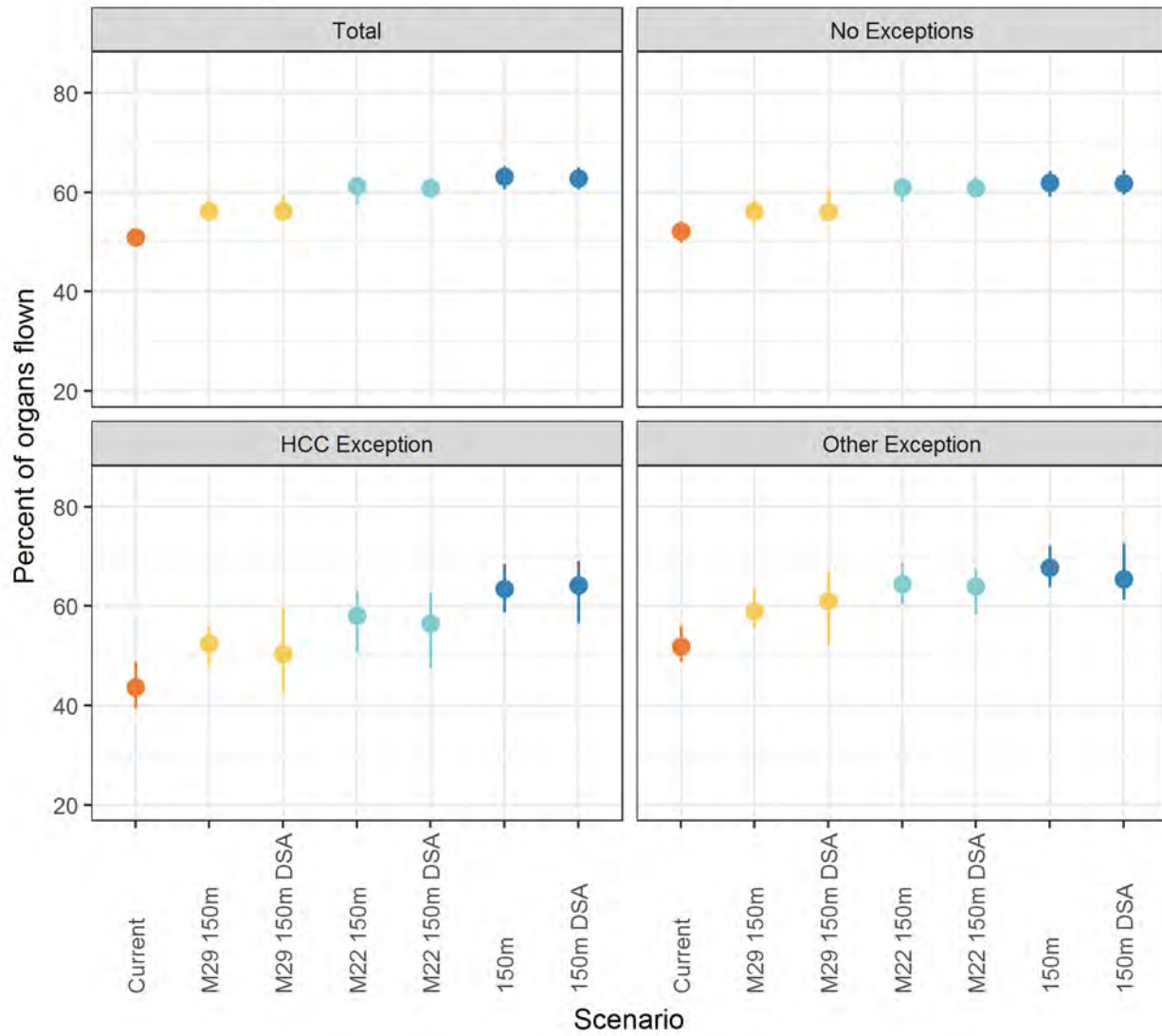


Figure 129 Percent of Organs Flown by exception status - region 8

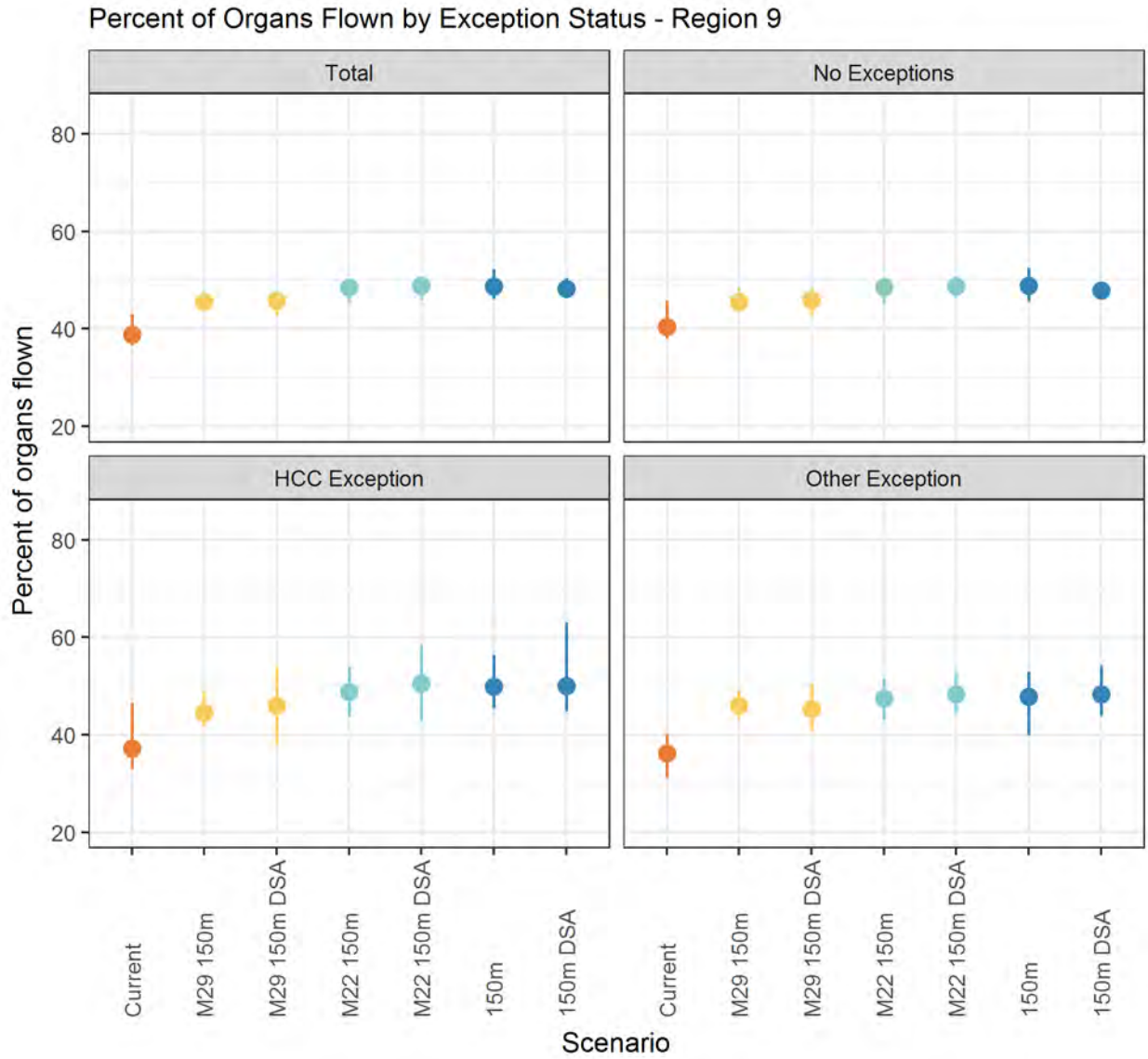


Figure 130 Percent of Organs Flown by exception status - region 9

Percent of Organs Flown by Exception Status - Region 10

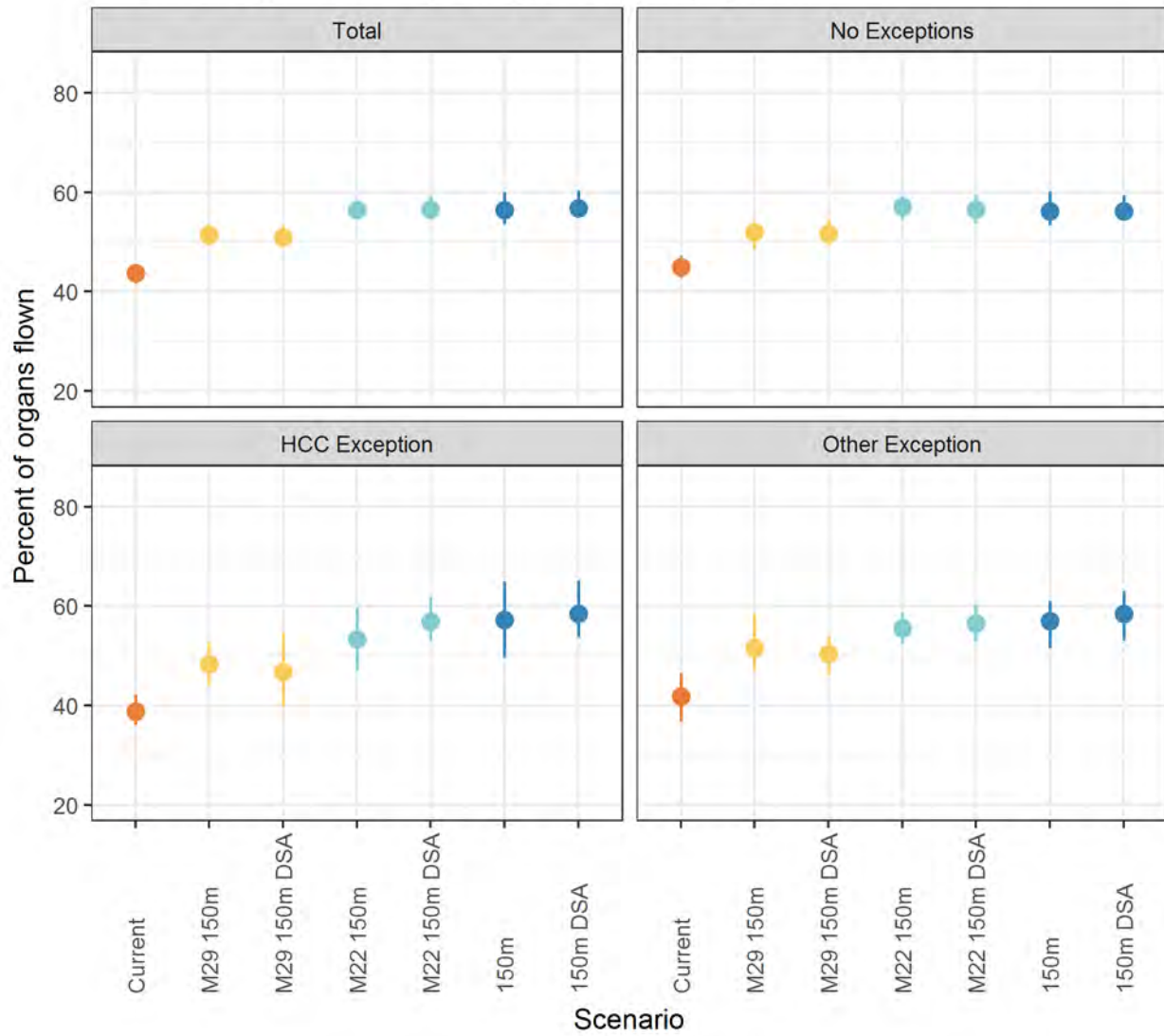


Figure 131 Percent of Organs Flown by exception status - region 10

Percent of Organs Flown by Exception Status - Region 11

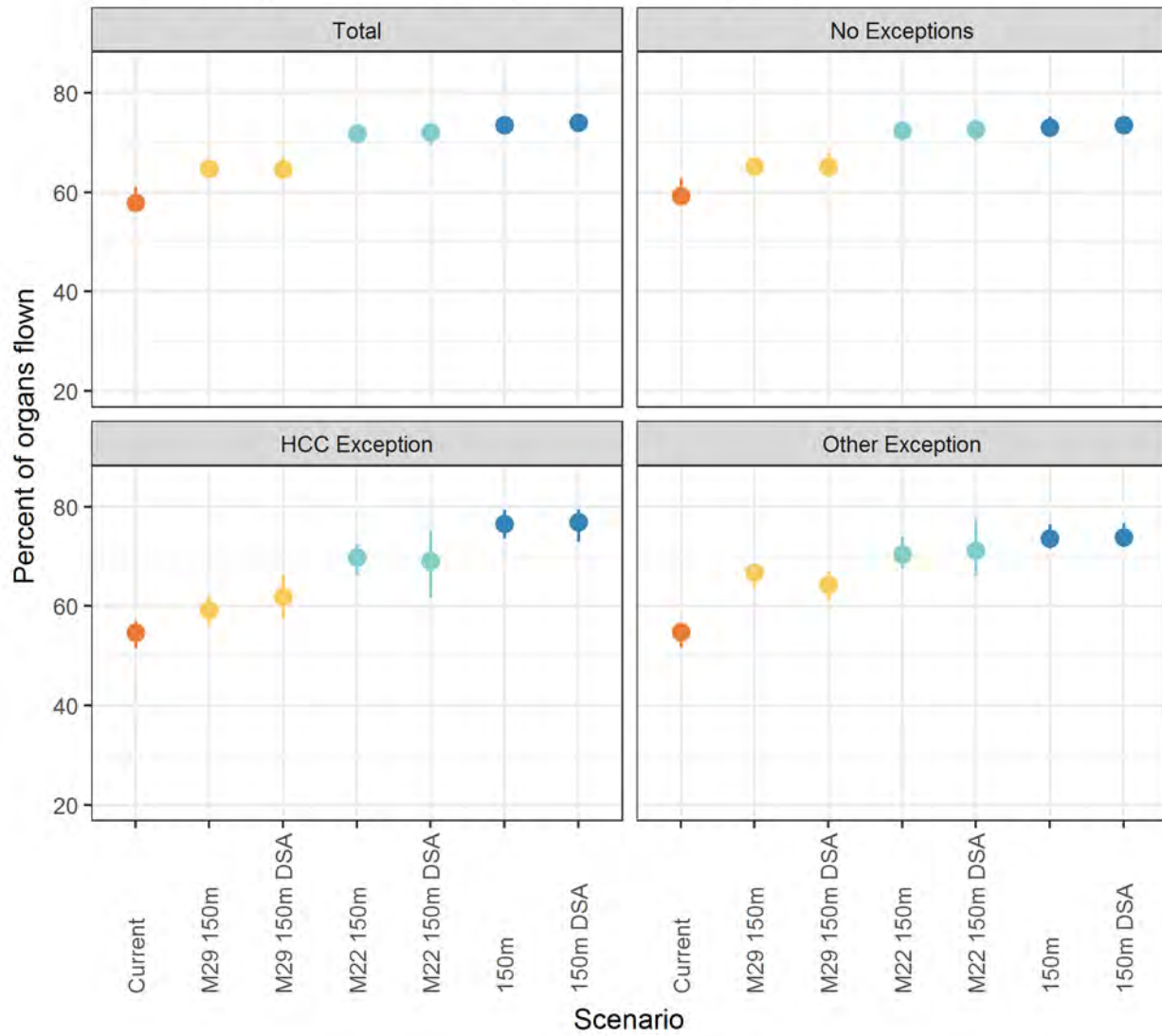


Figure 132 Percent of Organs Flown by exception status - region 11

Percent of Within DSA Transplants

Percent of Transplants Performed Locally by Exception Status - Region 1

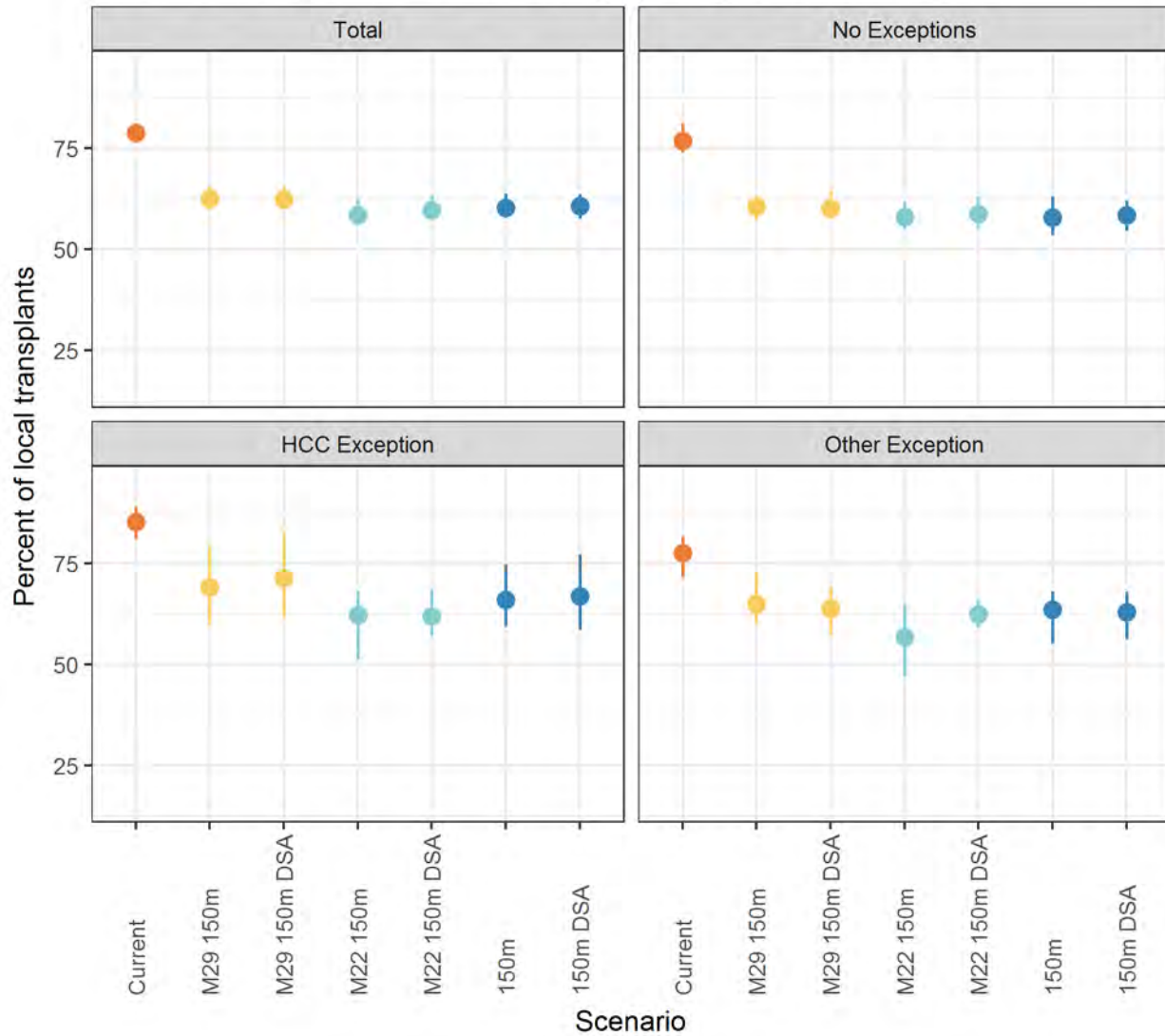


Figure 133 Percent of within DSA transplants by exception status - region 1

Percent of Transplants Performed Locally by Exception Status - Region 2

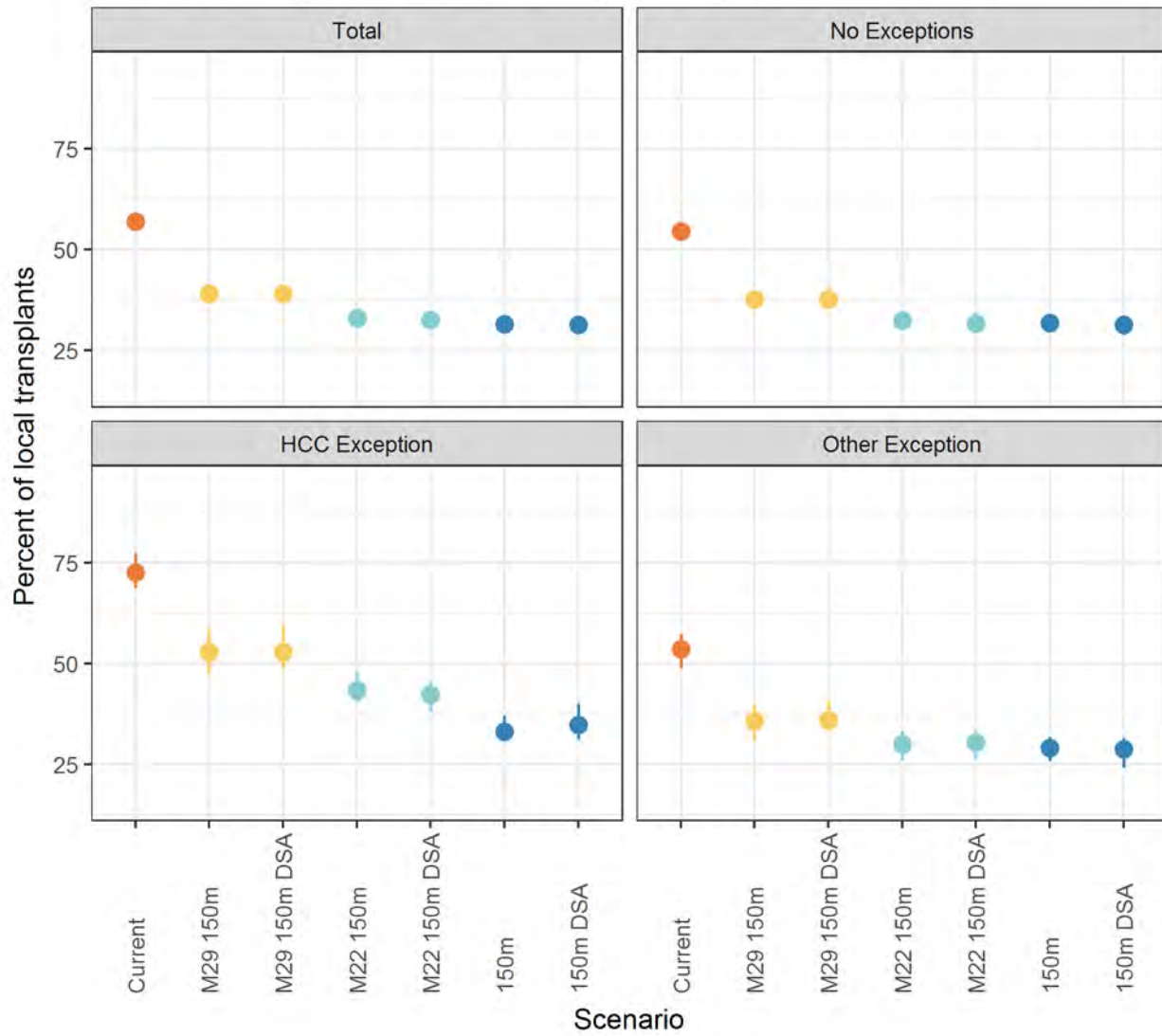


Figure 134 Percent of within DSA transplants by exception status - region 2

Percent of Transplants Performed Locally by Exception Status - Region 3

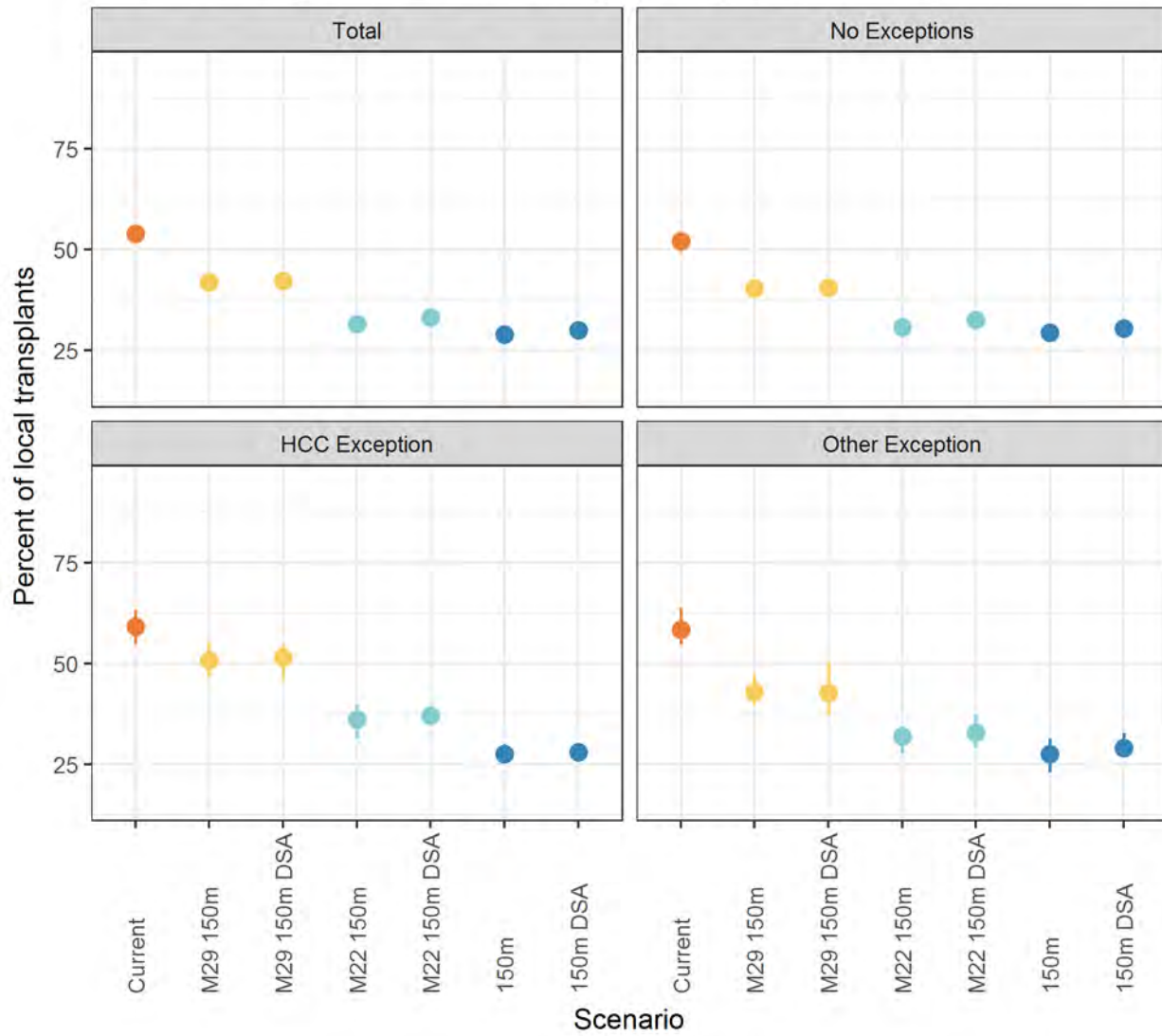


Figure 135 Percent of within DSA transplants by exception status - region 3

Percent of Transplants Performed Locally by Exception Status - Region 4

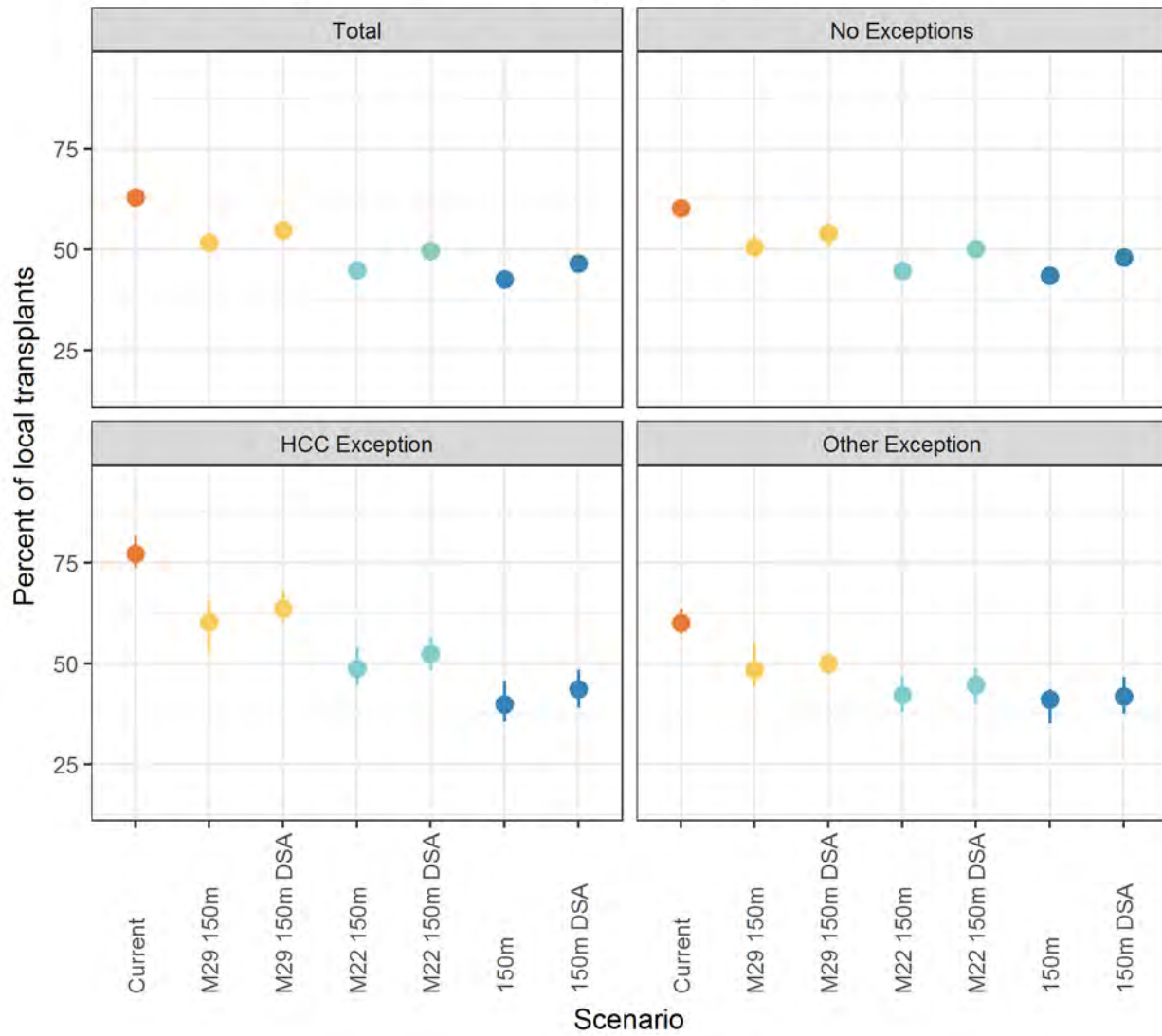


Figure 136 Percent of within DSA transplants by exception status - region 4

Percent of Transplants Performed Locally by Exception Status - Region 5

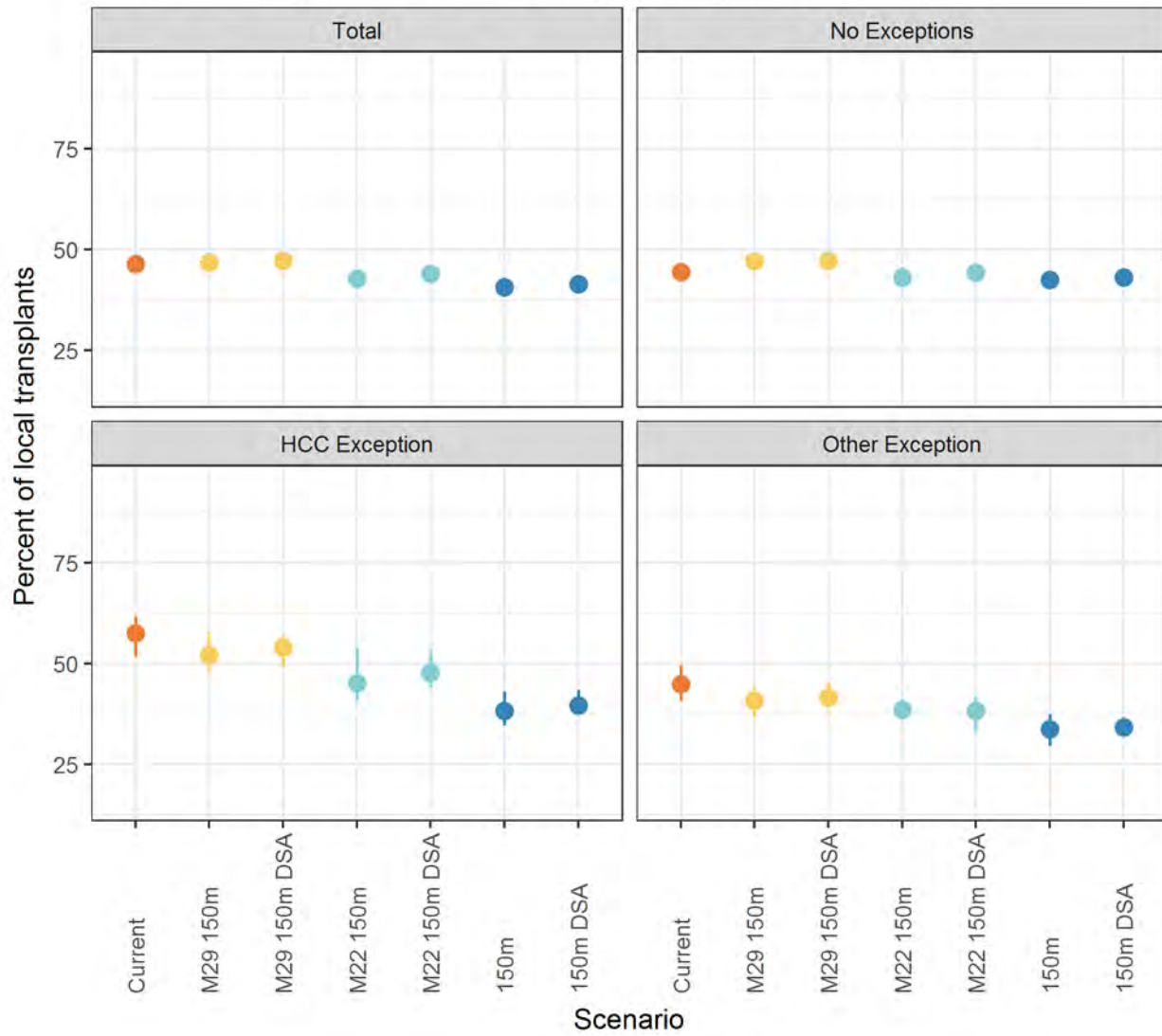


Figure 137 Percent of within DSA transplants by exception status - region 5

Percent of Transplants Performed Locally by Exception Status - Region 6

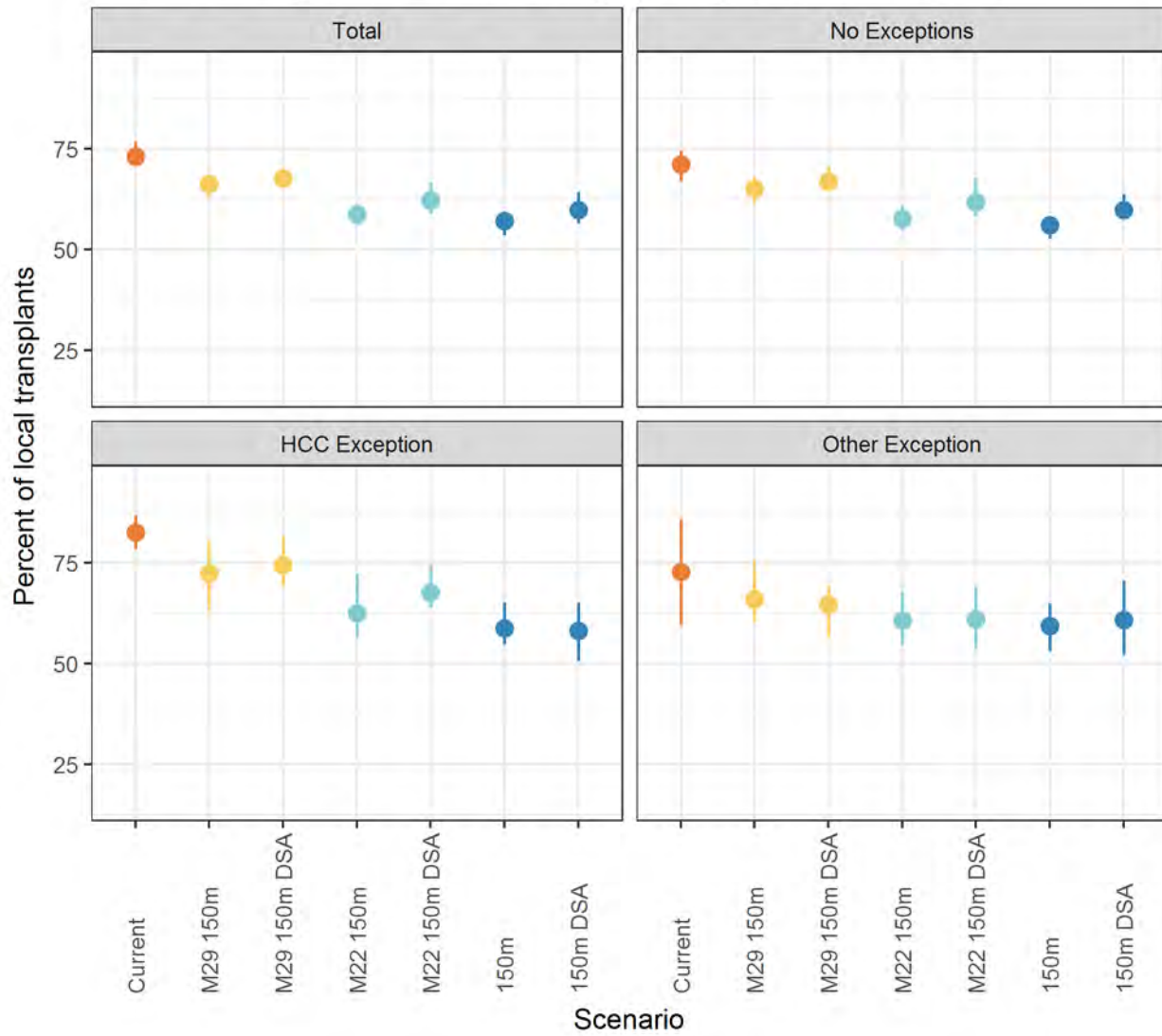


Figure 138 Percent of within DSA transplants by exception status - region 6

Percent of Transplants Performed Locally by Exception Status - Region 7

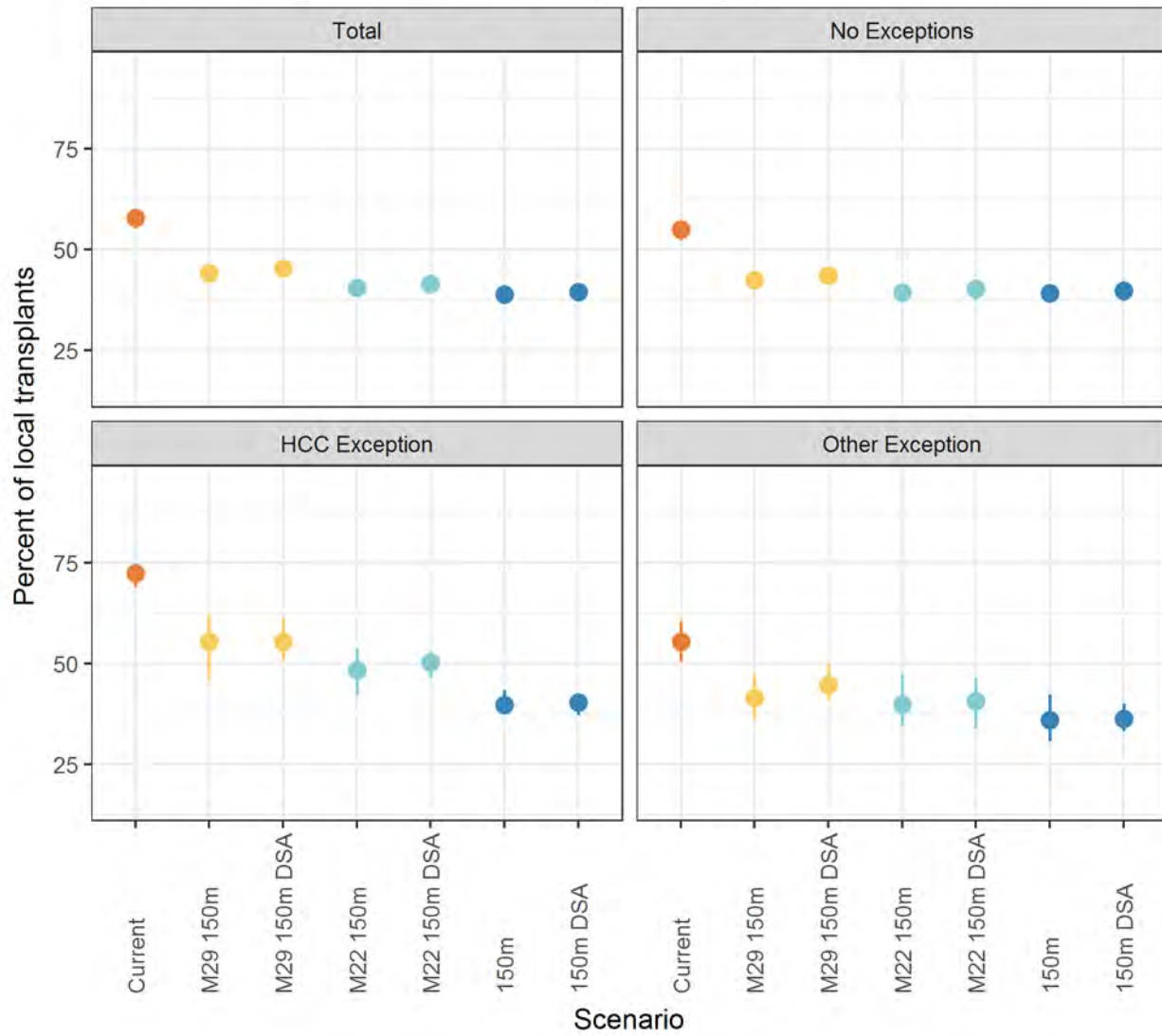


Figure 139 Percent of within DSA transplants by exception status - region 7

Percent of Transplants Performed Locally by Exception Status - Region 8

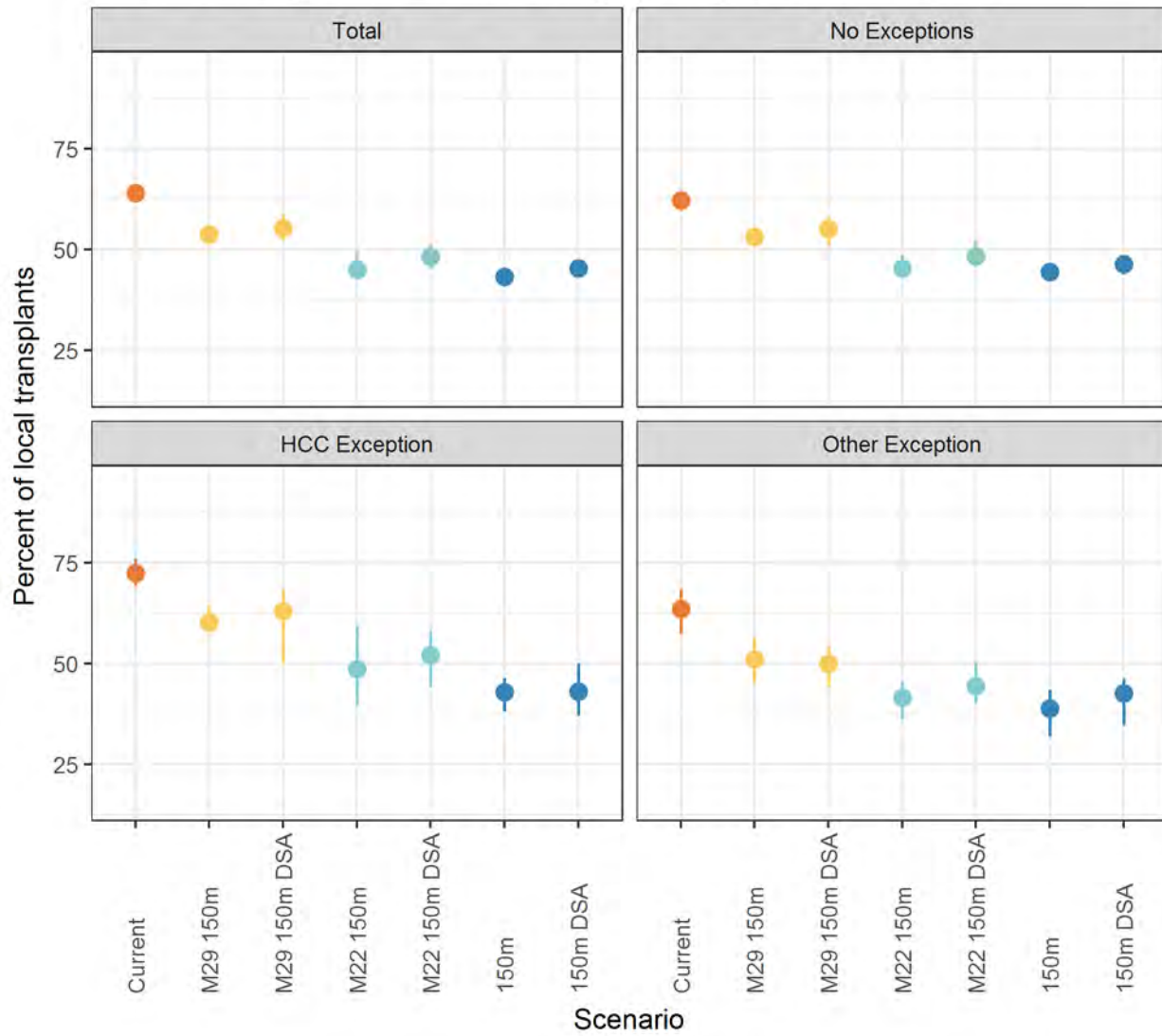


Figure 140 Percent of within DSA transplants by exception status - region 8

Percent of Transplants Performed Locally by Exception Status - Region 9

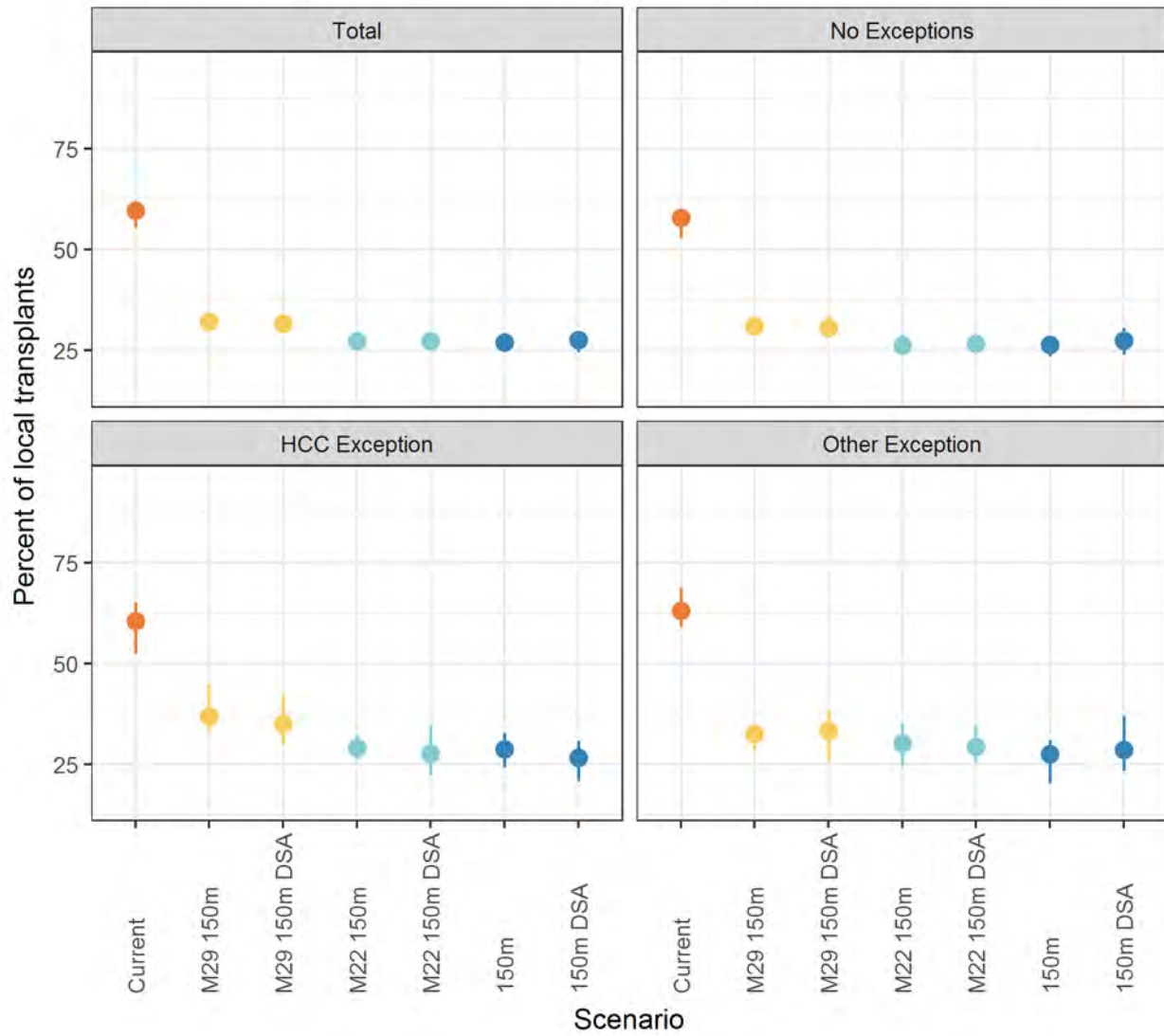


Figure 141 Percent of within DSA transplants by exception status - region 9

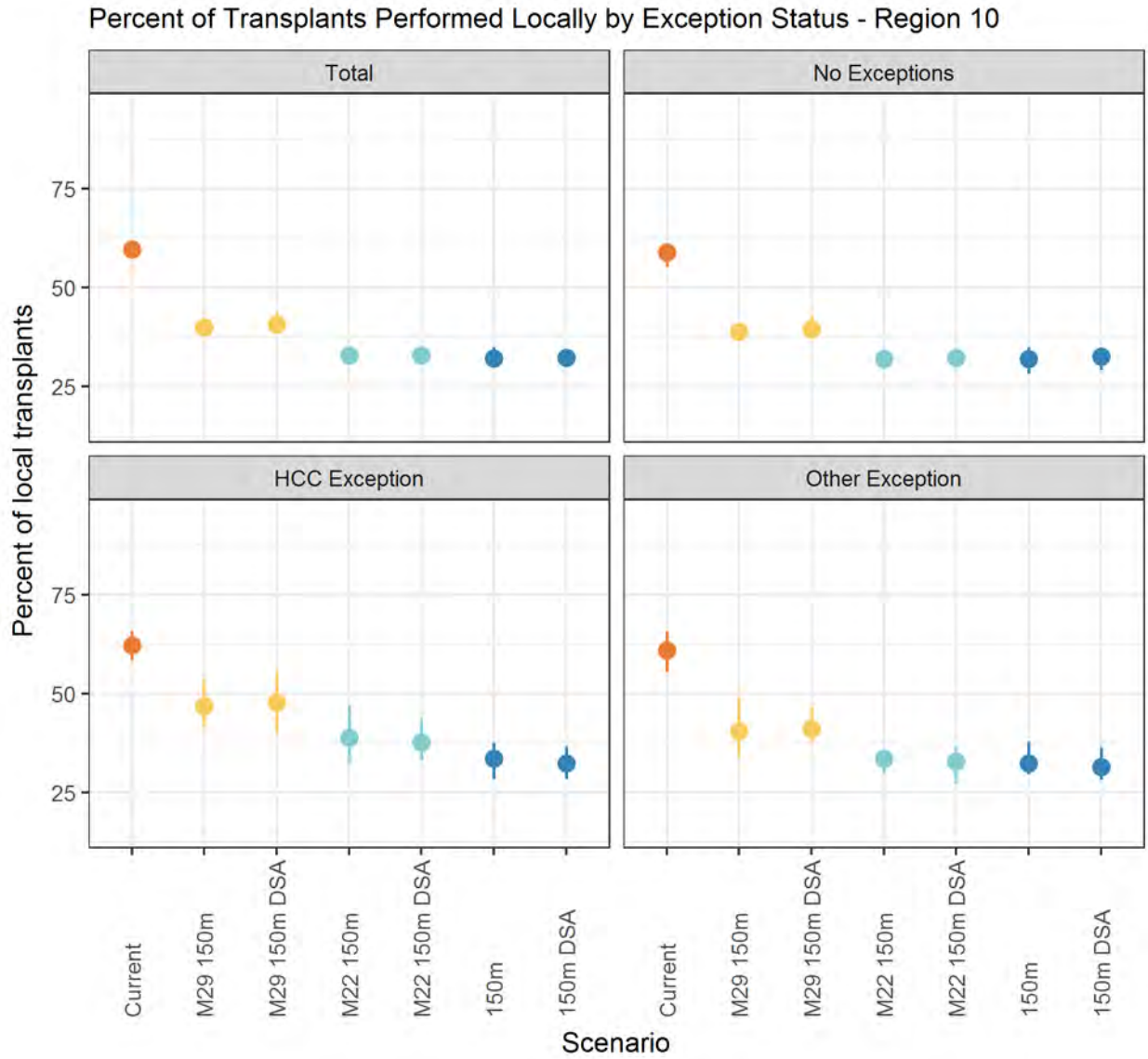


Figure 142 Percent of within DSA transplants by exception status - region 10

Percent of Transplants Performed Locally by Exception Status - Region 11

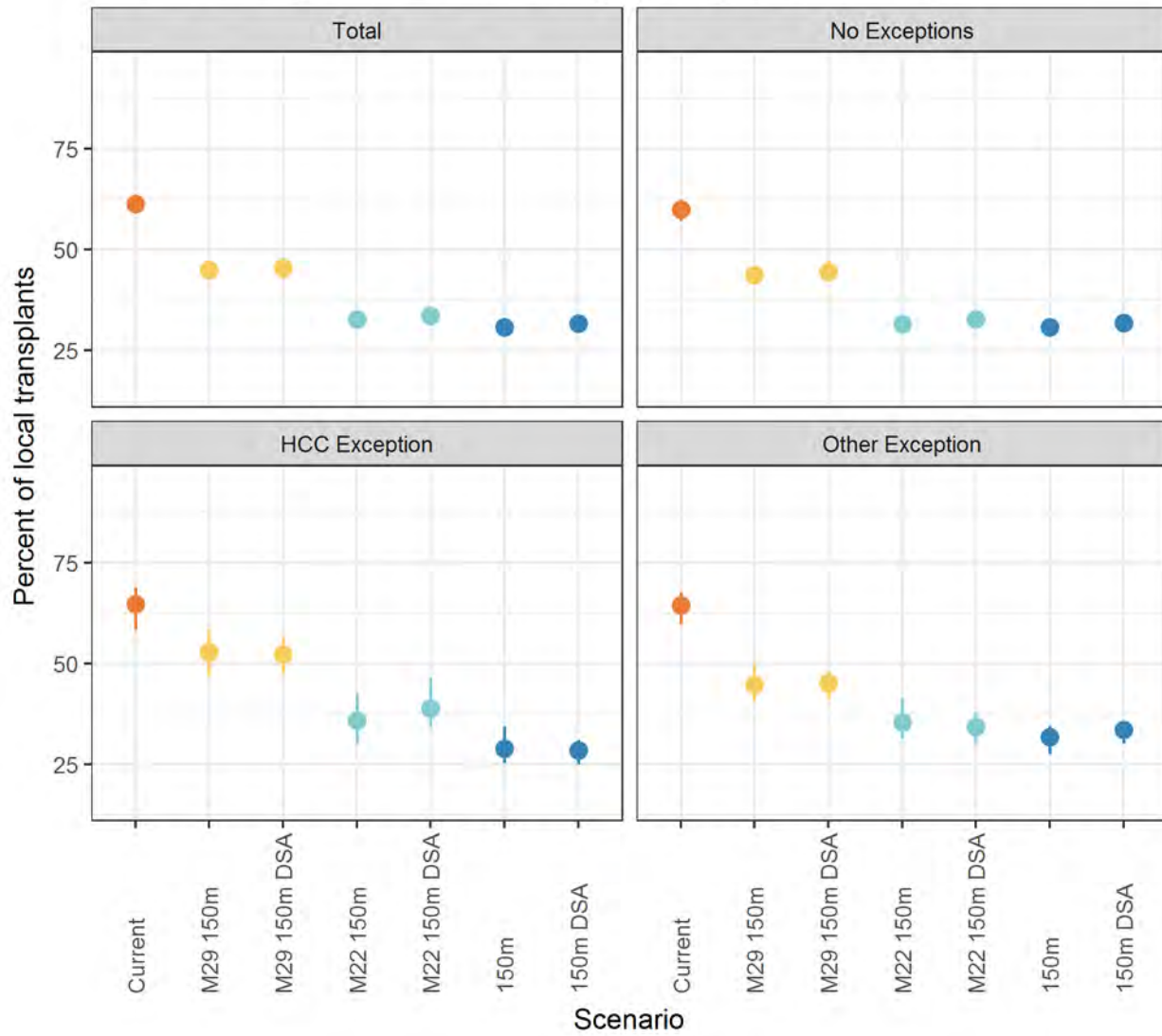


Figure 143 Percent of within DSA transplants by exception status - region 11

Appendix B: Results by age, sex, and race/ethnicity

Allocation MELD/PELD at Transplant

Variance in Median Allocation MELD/PELD at Transplant by DSA

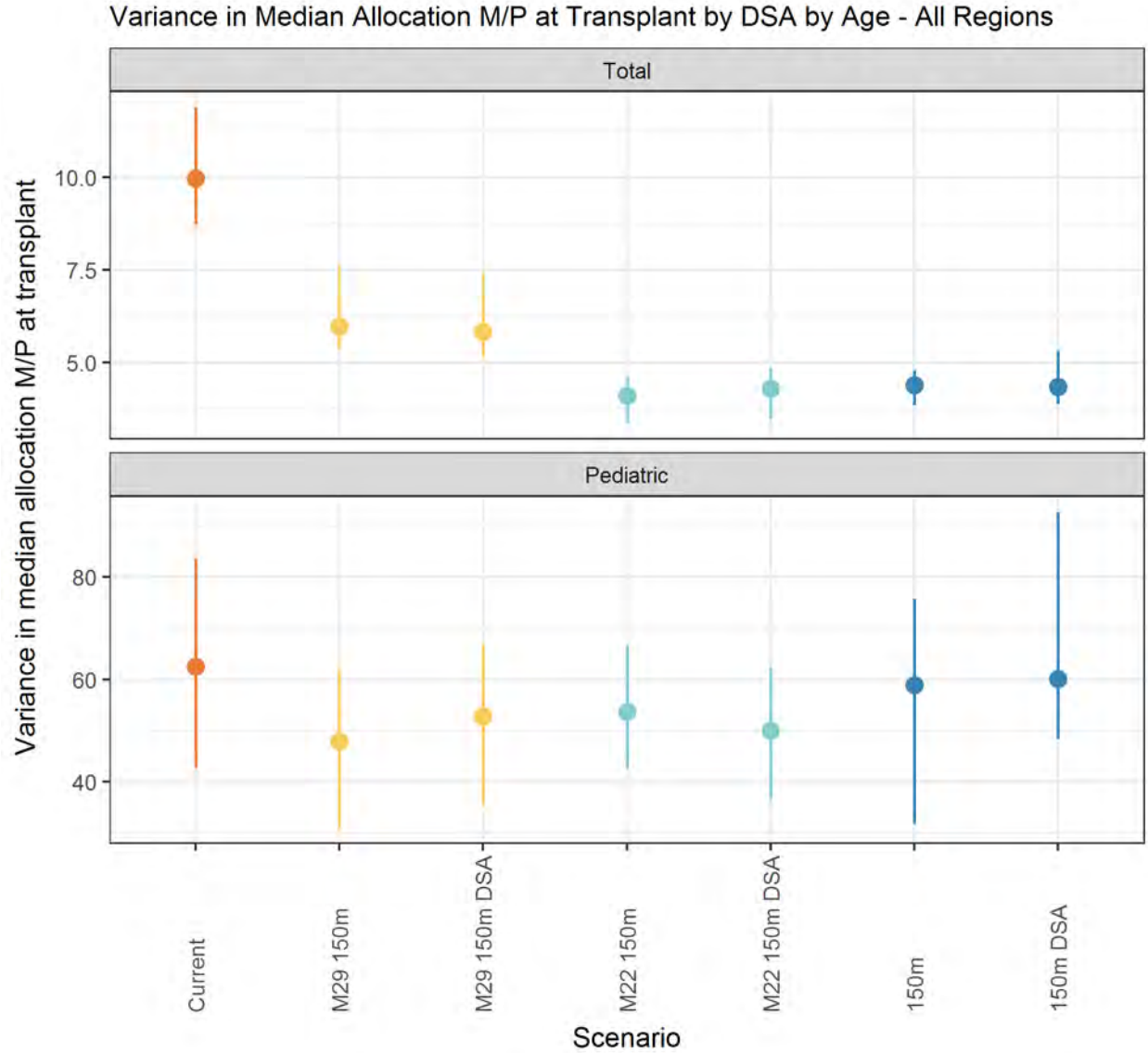


Figure 144 Variance in median allocation M/P at transplant by DSA by age - all regions

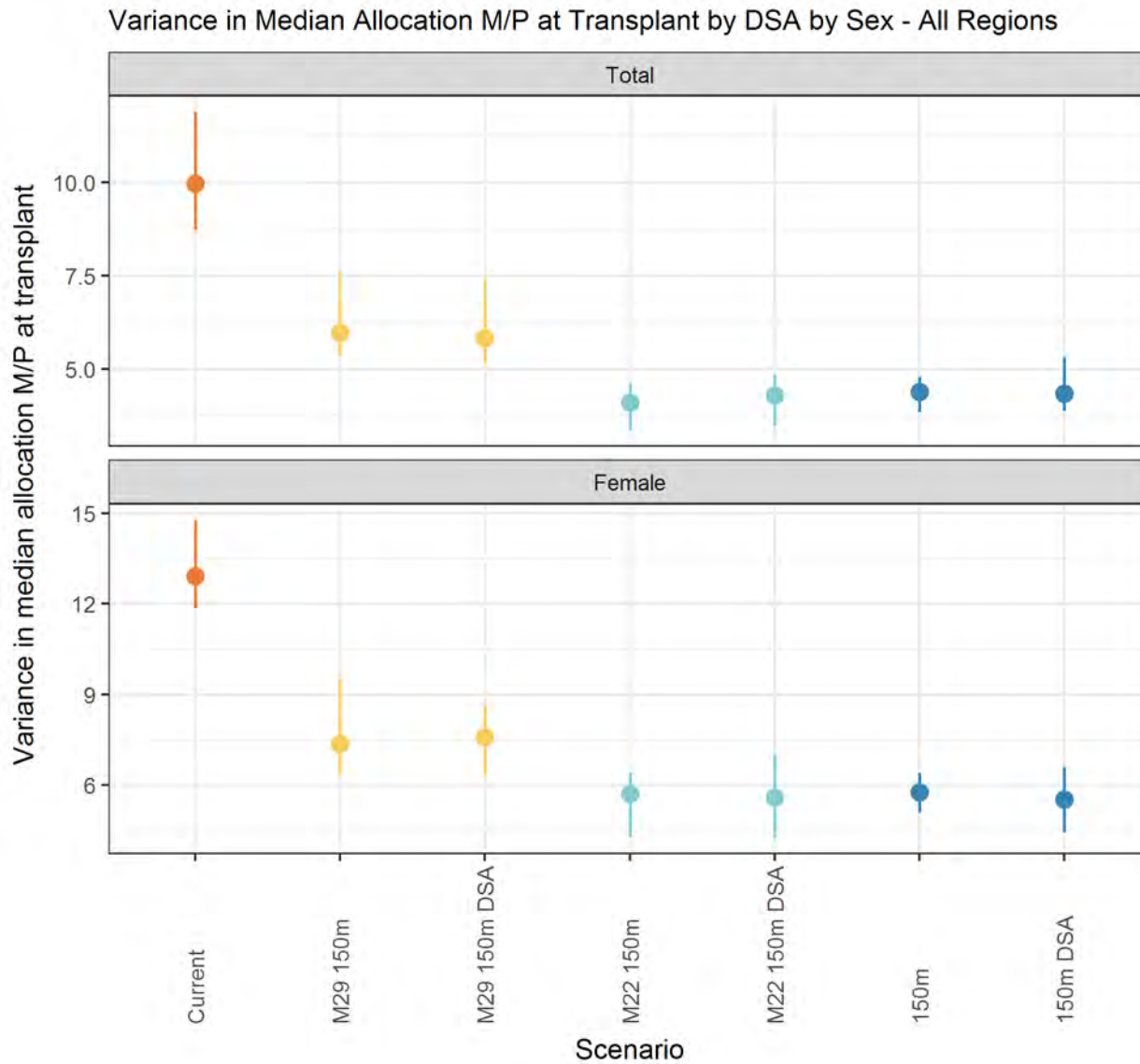


Figure 145 Variance in median allocation M/P at transplant by DSA by sex - all regions

Variance in Median Allocation M/P at Transplant by DSA by Race/Ethnicity - All Region

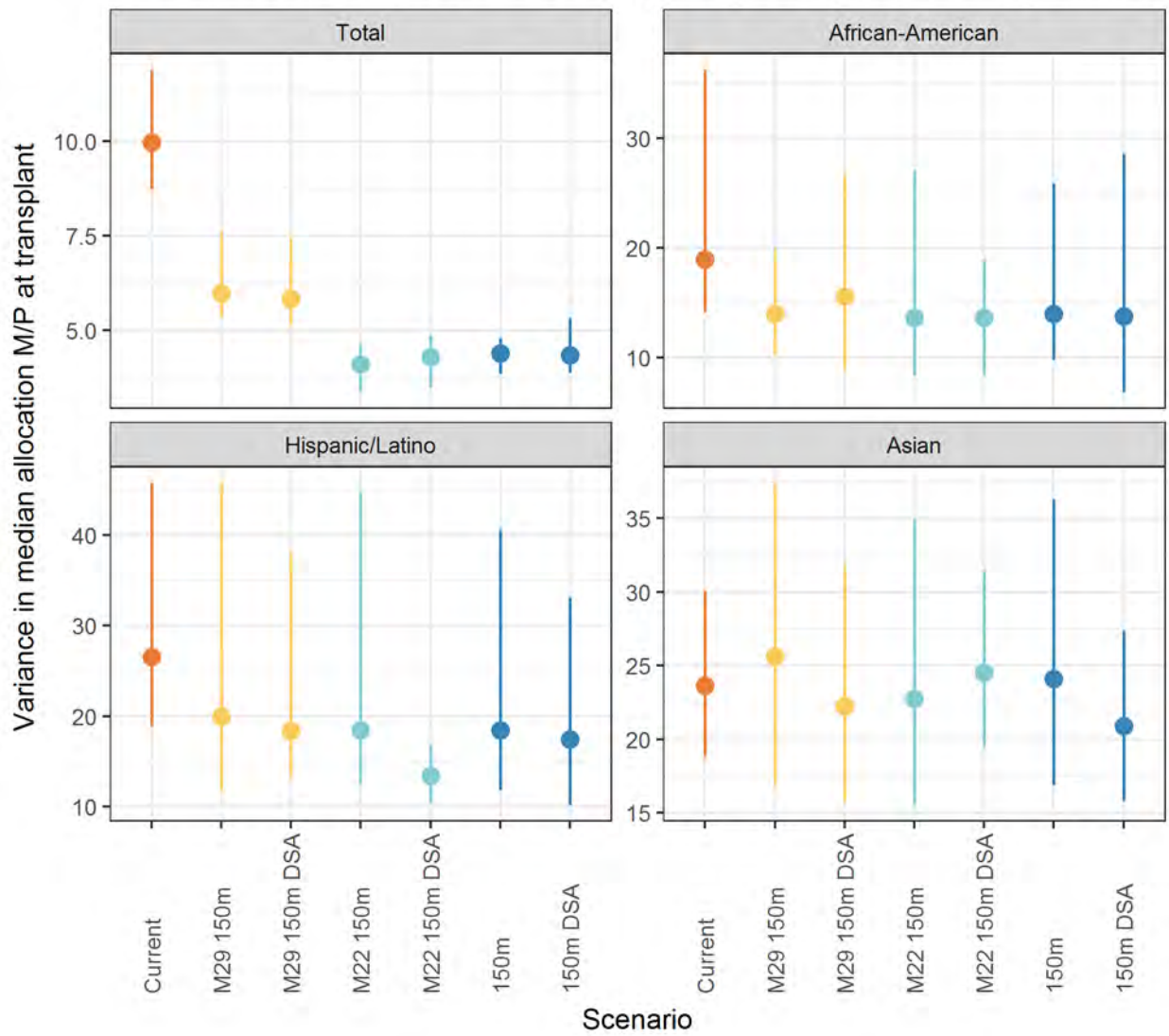


Figure 146 Variance in median allocation M/P at transplant by DSA by race/ethnicity - all regions

Median Allocation MELD/PELD at Transplant

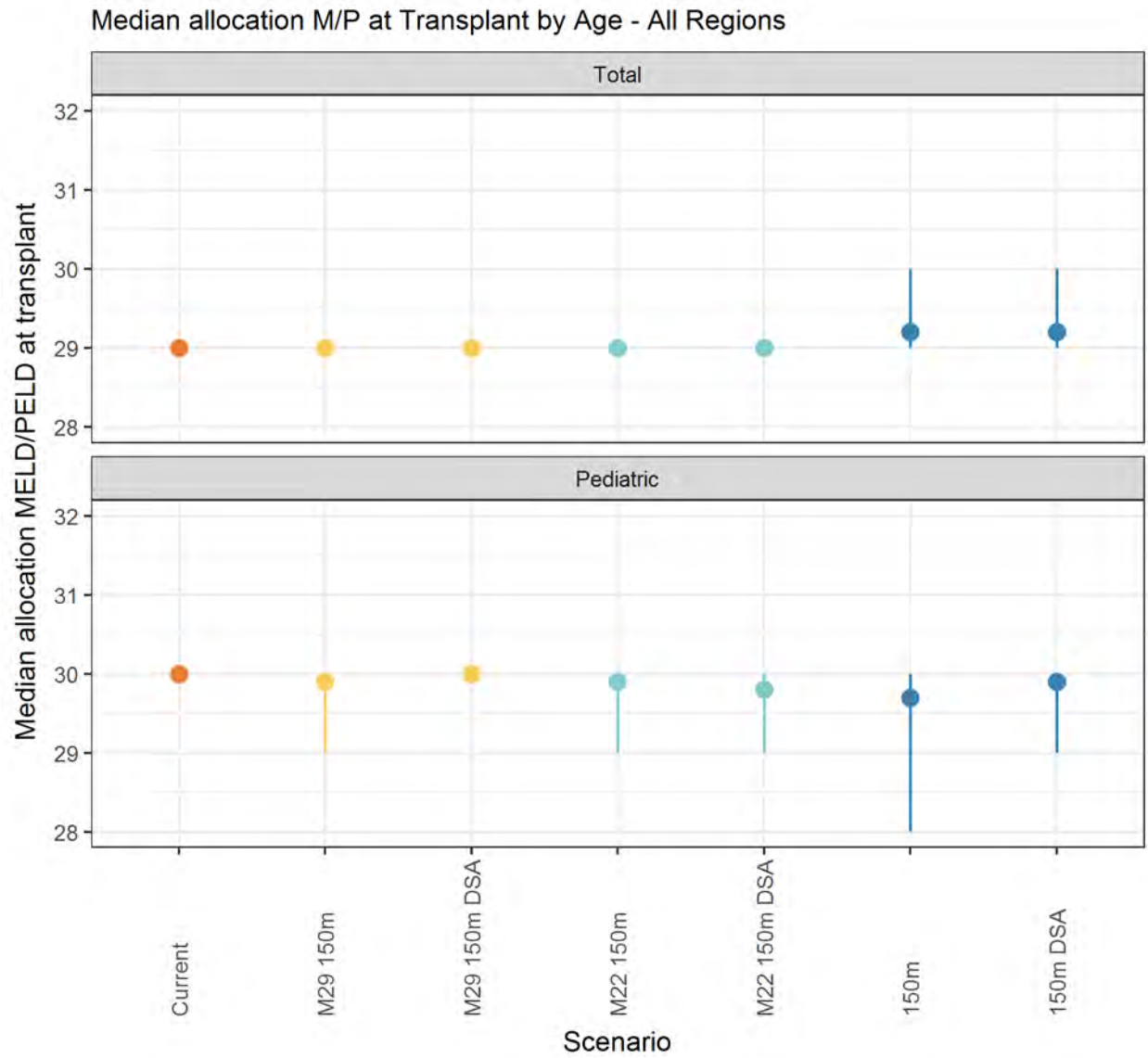


Figure 147 Median allocation MELD/PELD at transplant by age - all regions

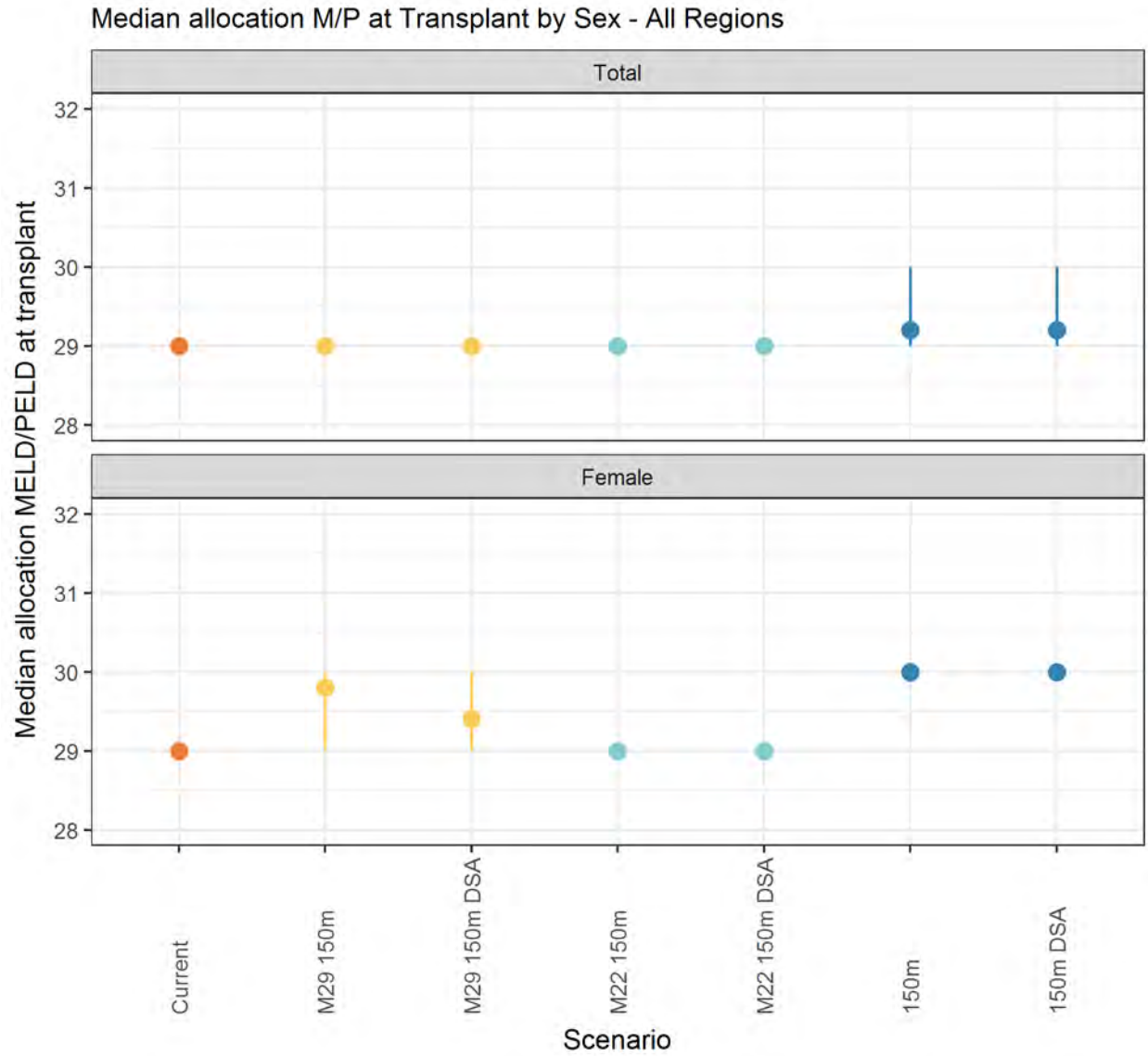


Figure 148 Median allocation MELD/PELD at transplant by sex - all regions

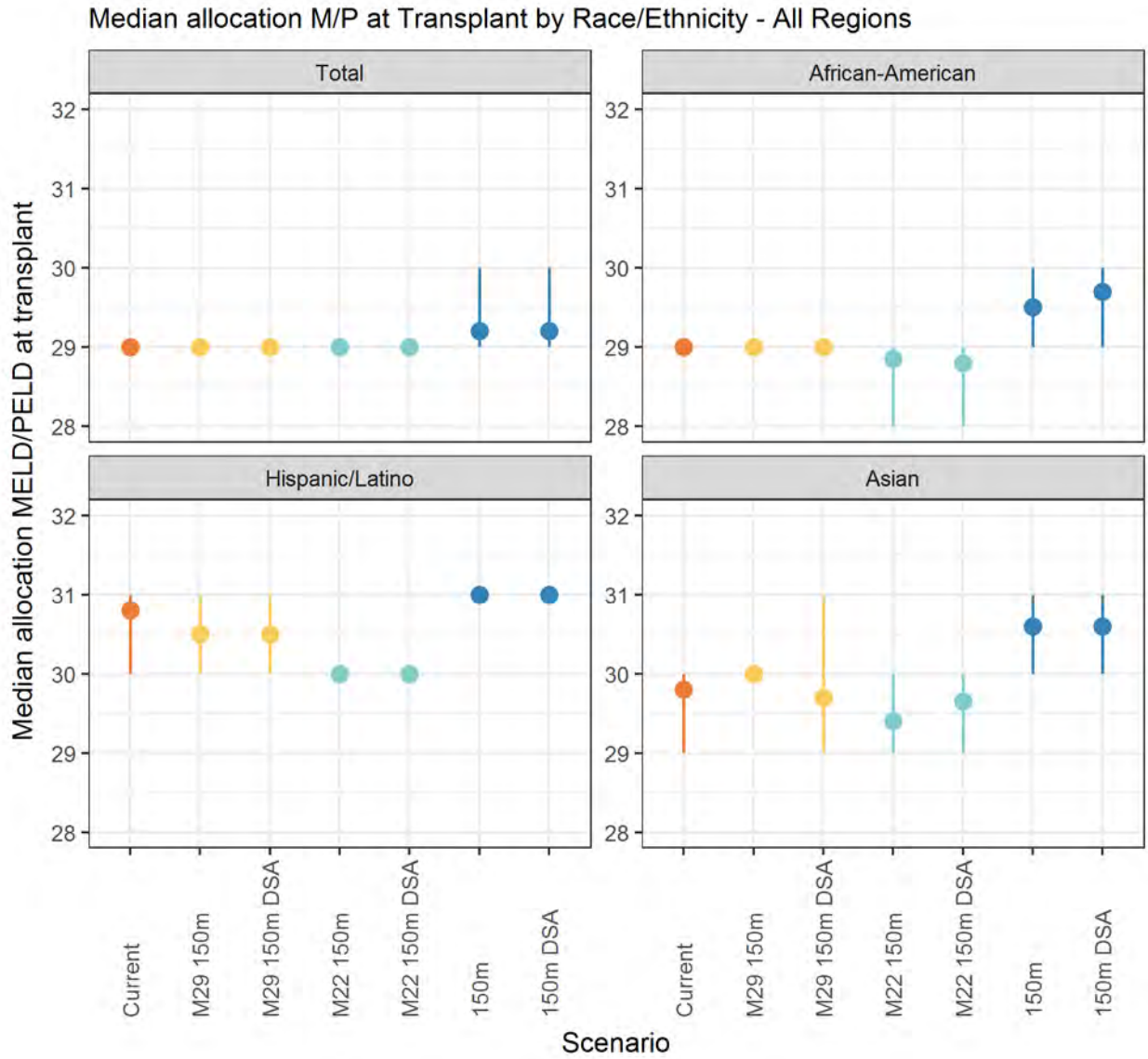


Figure 149 Median allocation MELD/PELD at transplant by race/ethnicity - all regions

Transplant

Transplant Rates

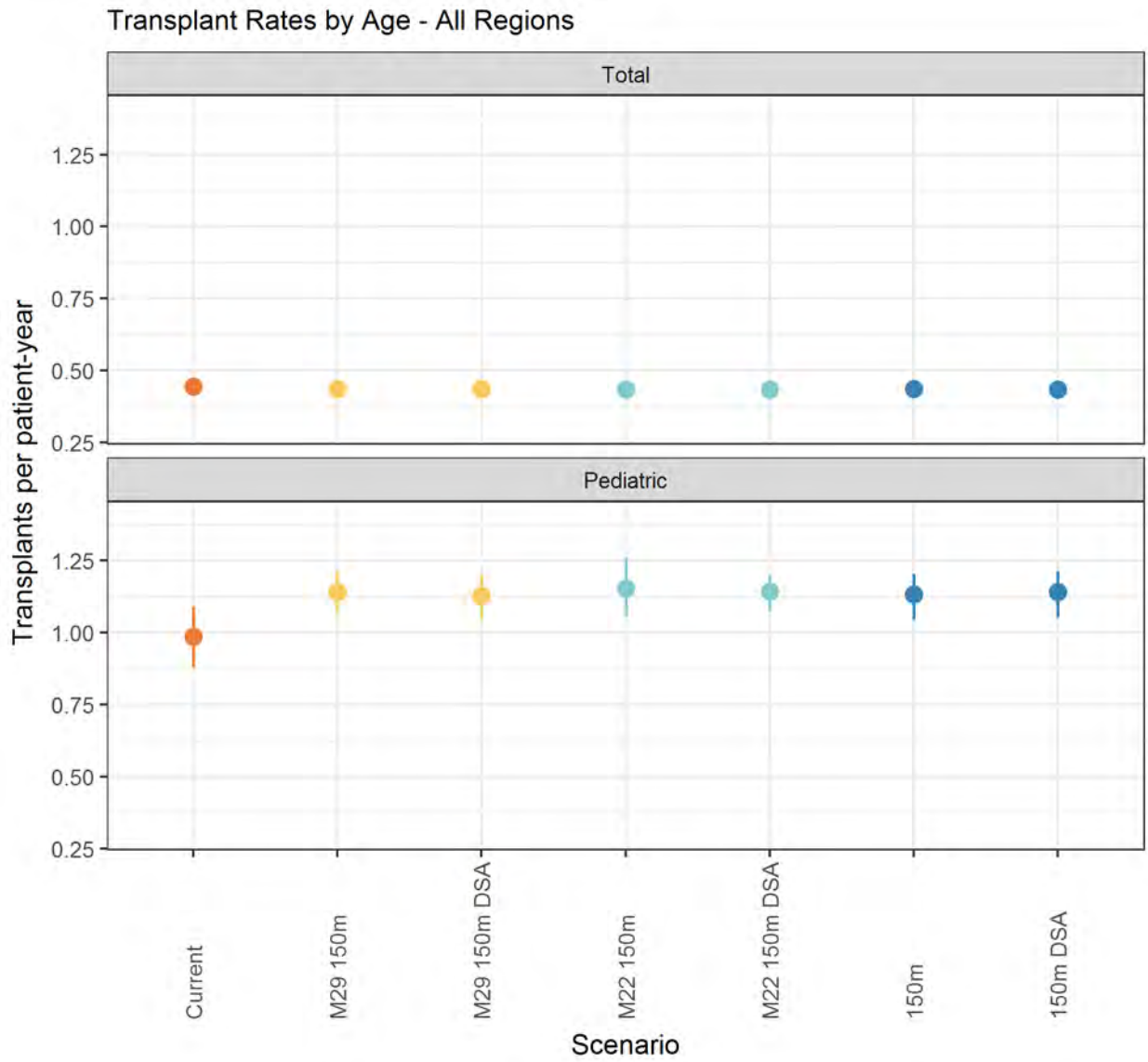


Figure 150 Transplant rates by age - all regions

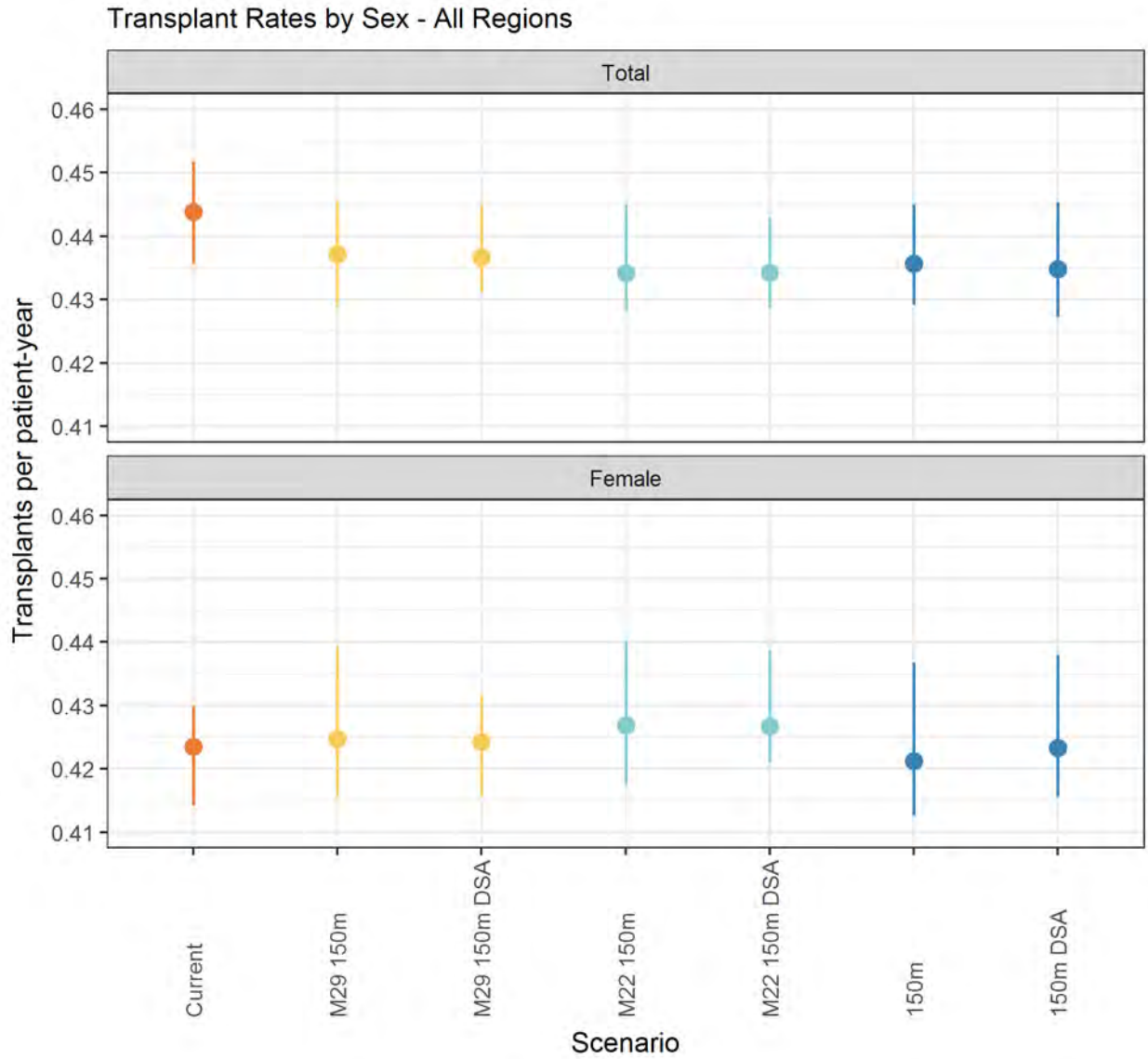


Figure 151 Transplant rates by sex - all regions

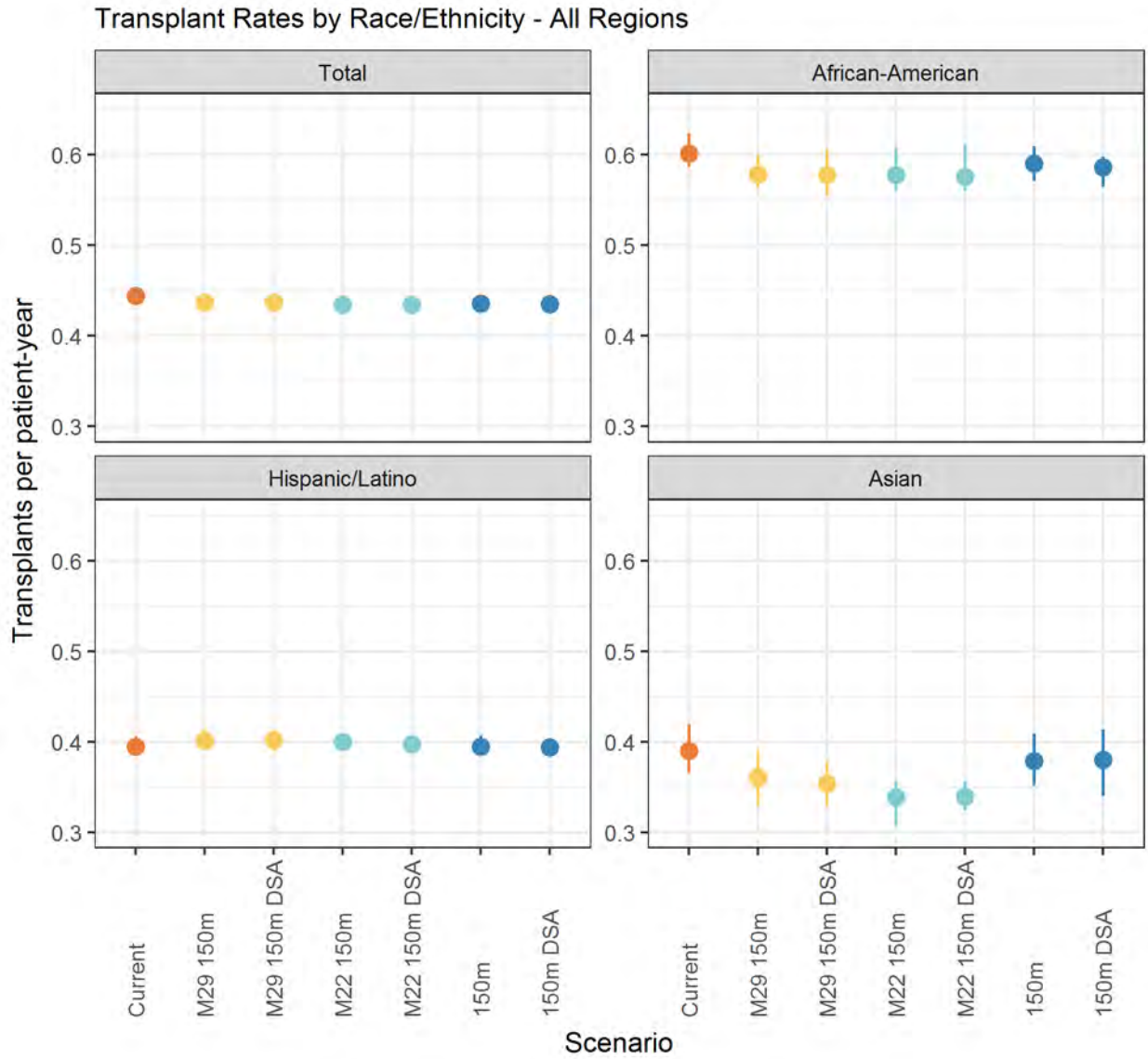


Figure 152 Transplant rates by race/ethnicity - all regions

Transplant Counts

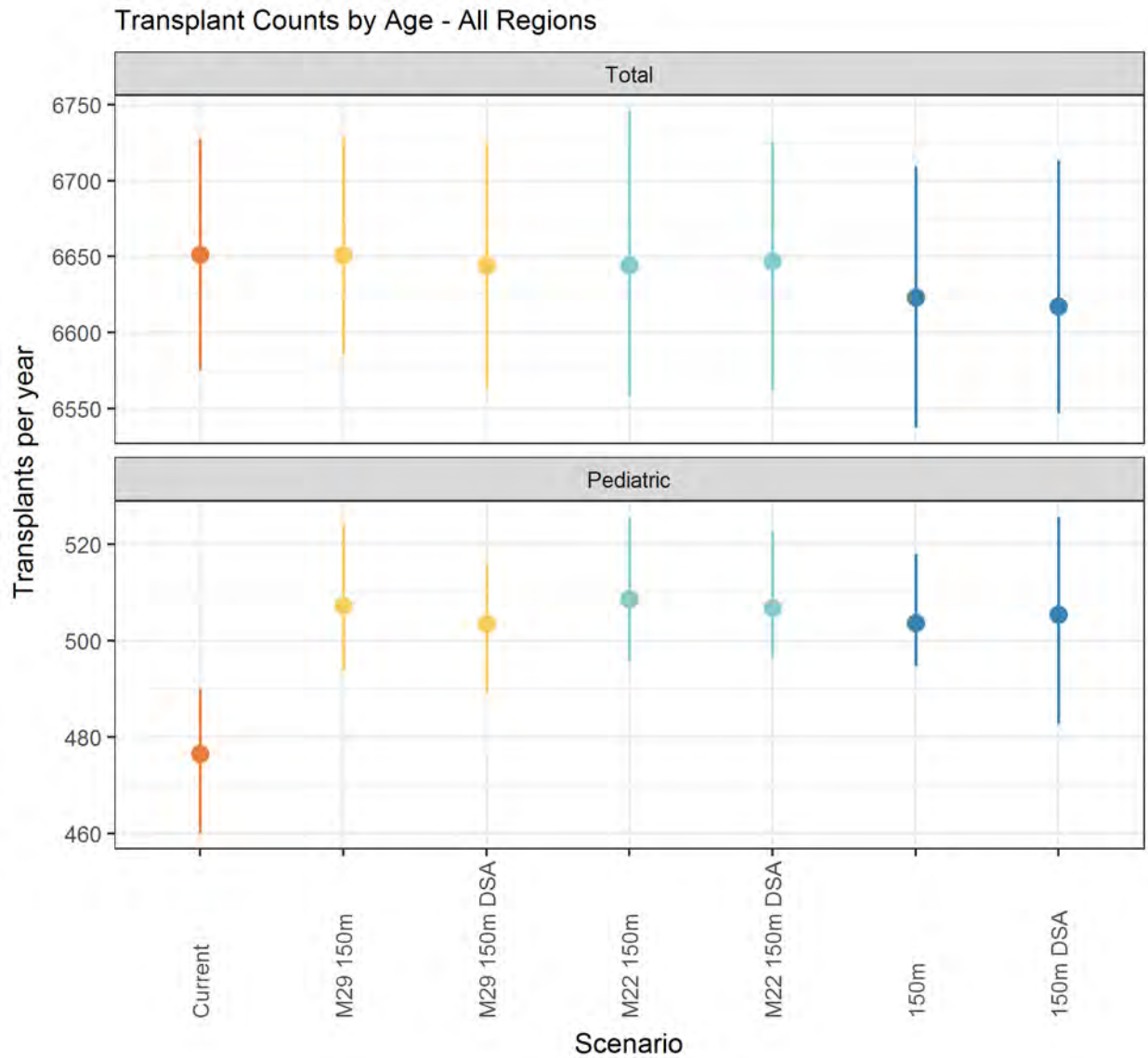


Figure 153 Transplant counts by age - all regions

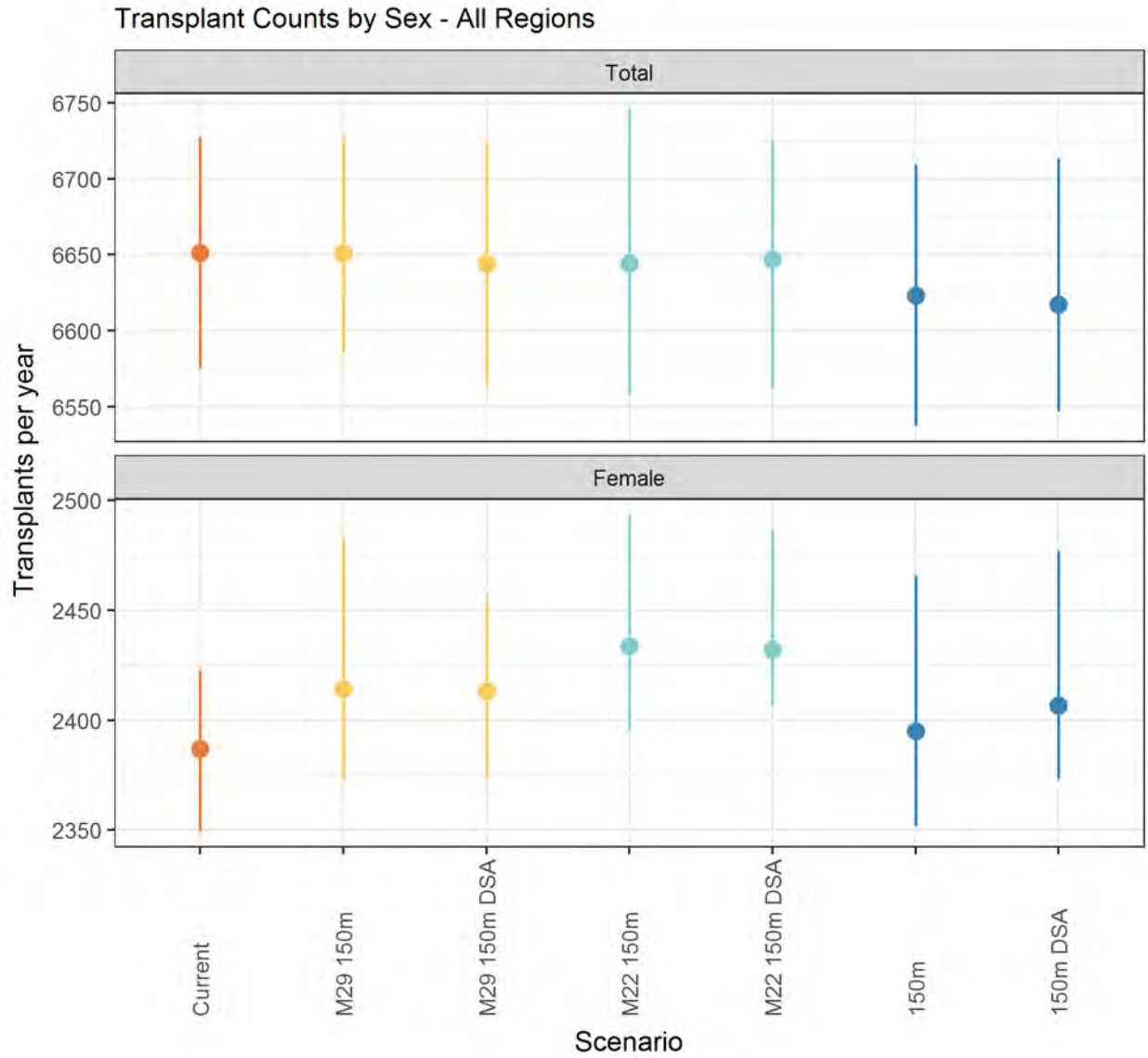


Figure 154 Transplant counts by sex - all regions

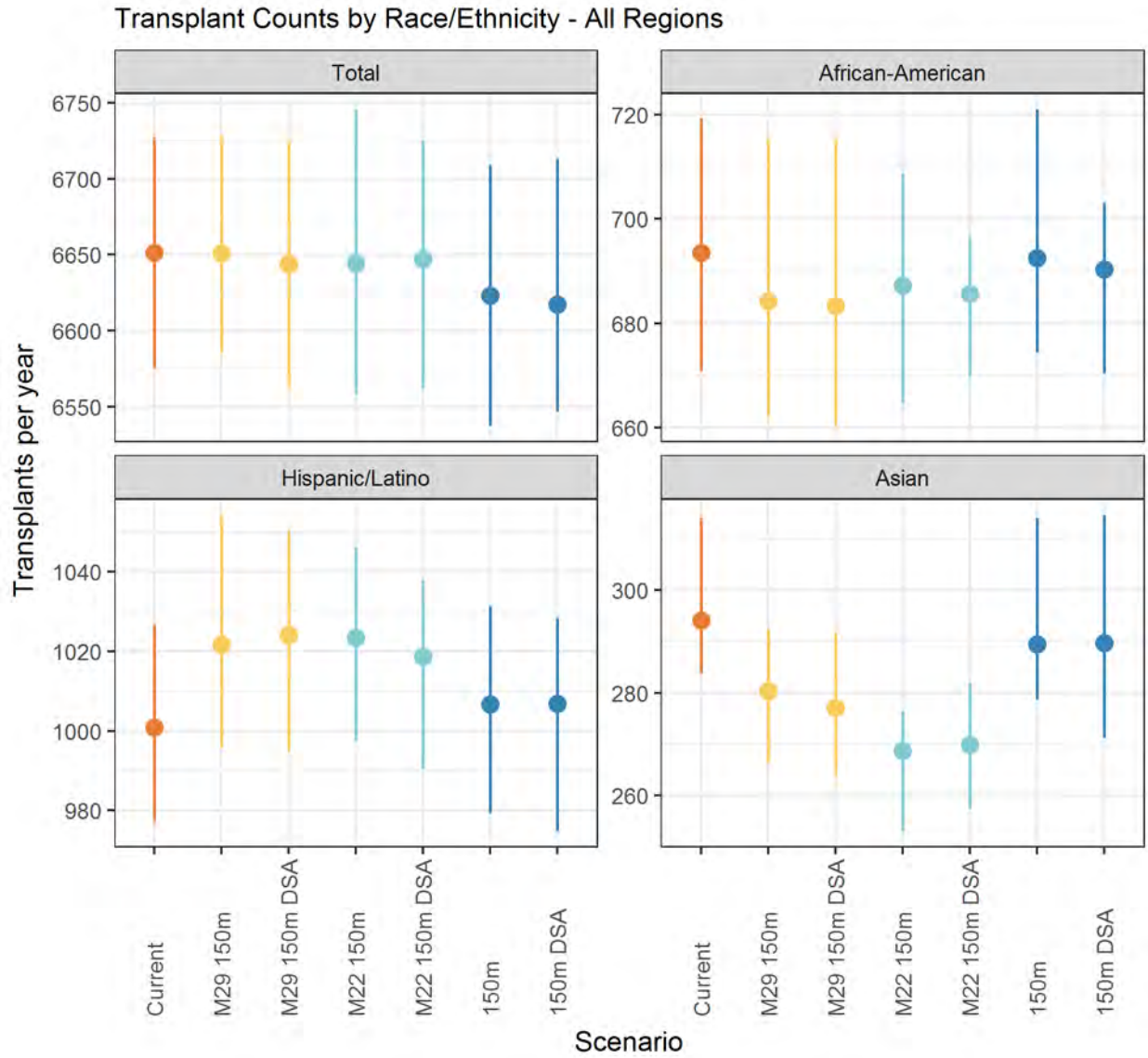


Figure 155 Transplant counts by race/ethnicity - all regions

Variance in Transplant Rates by DSA

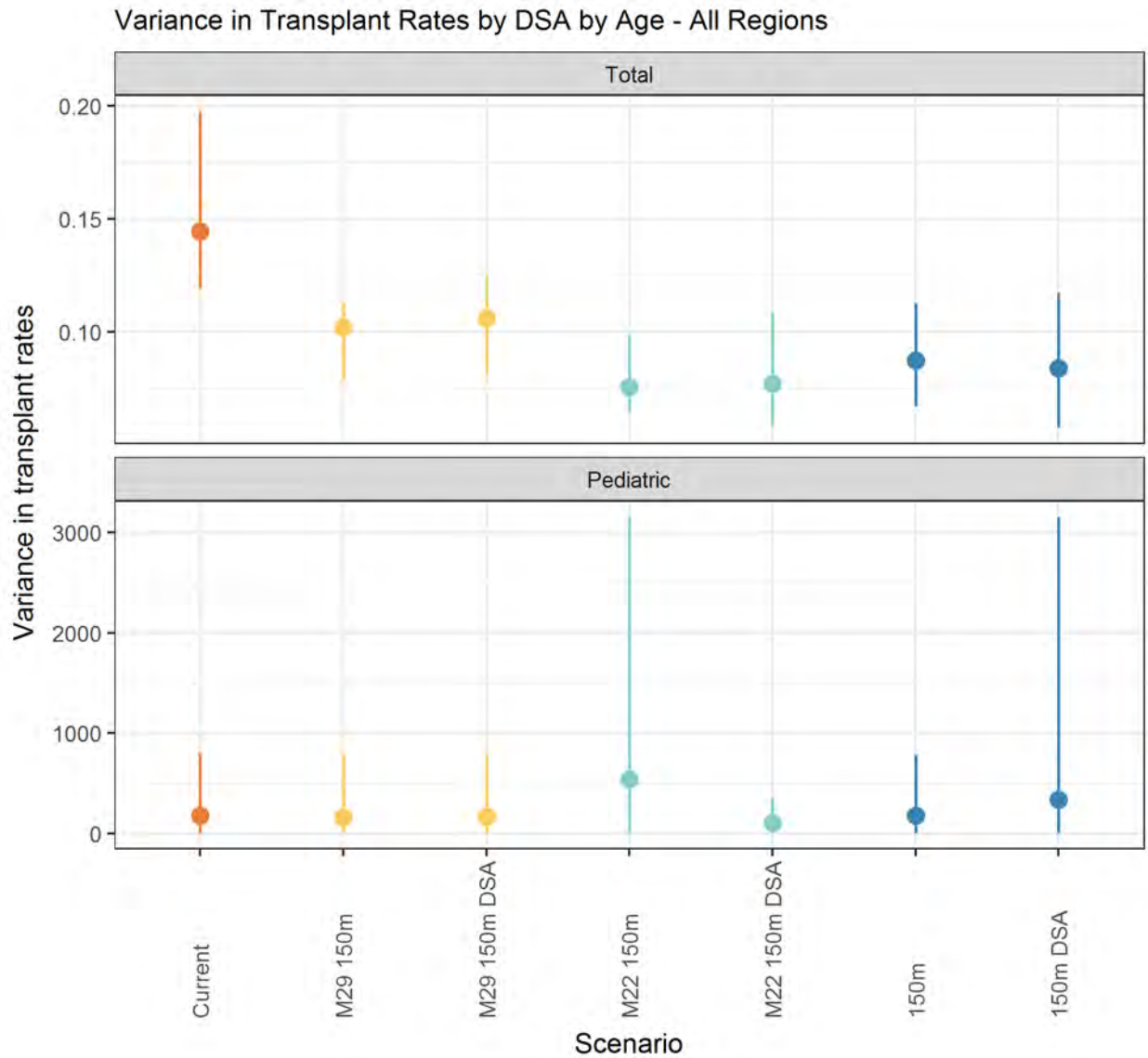


Figure 156 Variance in transplant rates by DSA by age - all regions

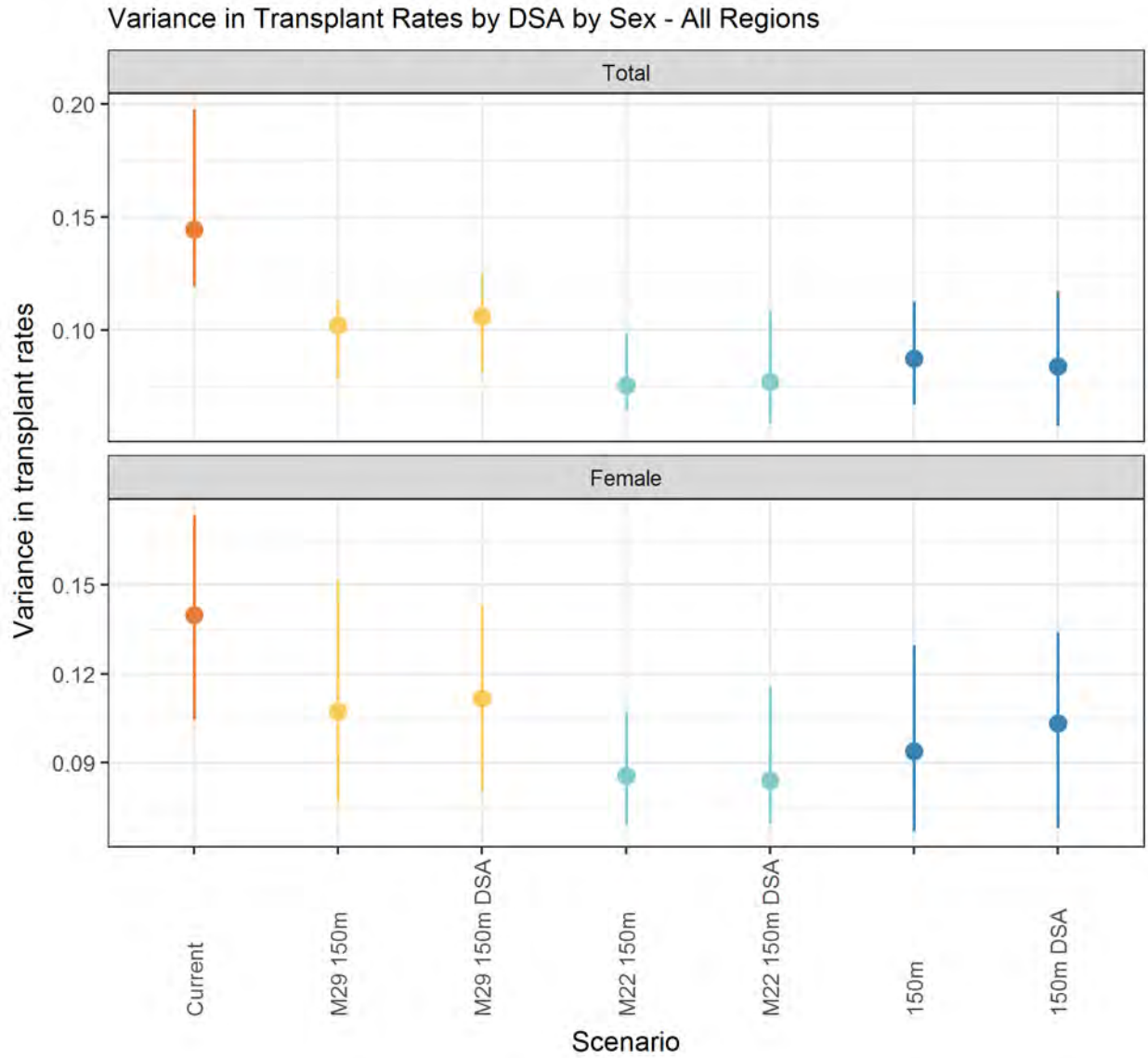


Figure 157 Variance in transplant rates by DSA by sex - all regions

Variance in Transplant Rates by DSA by Race/Ethnicity - All Regions

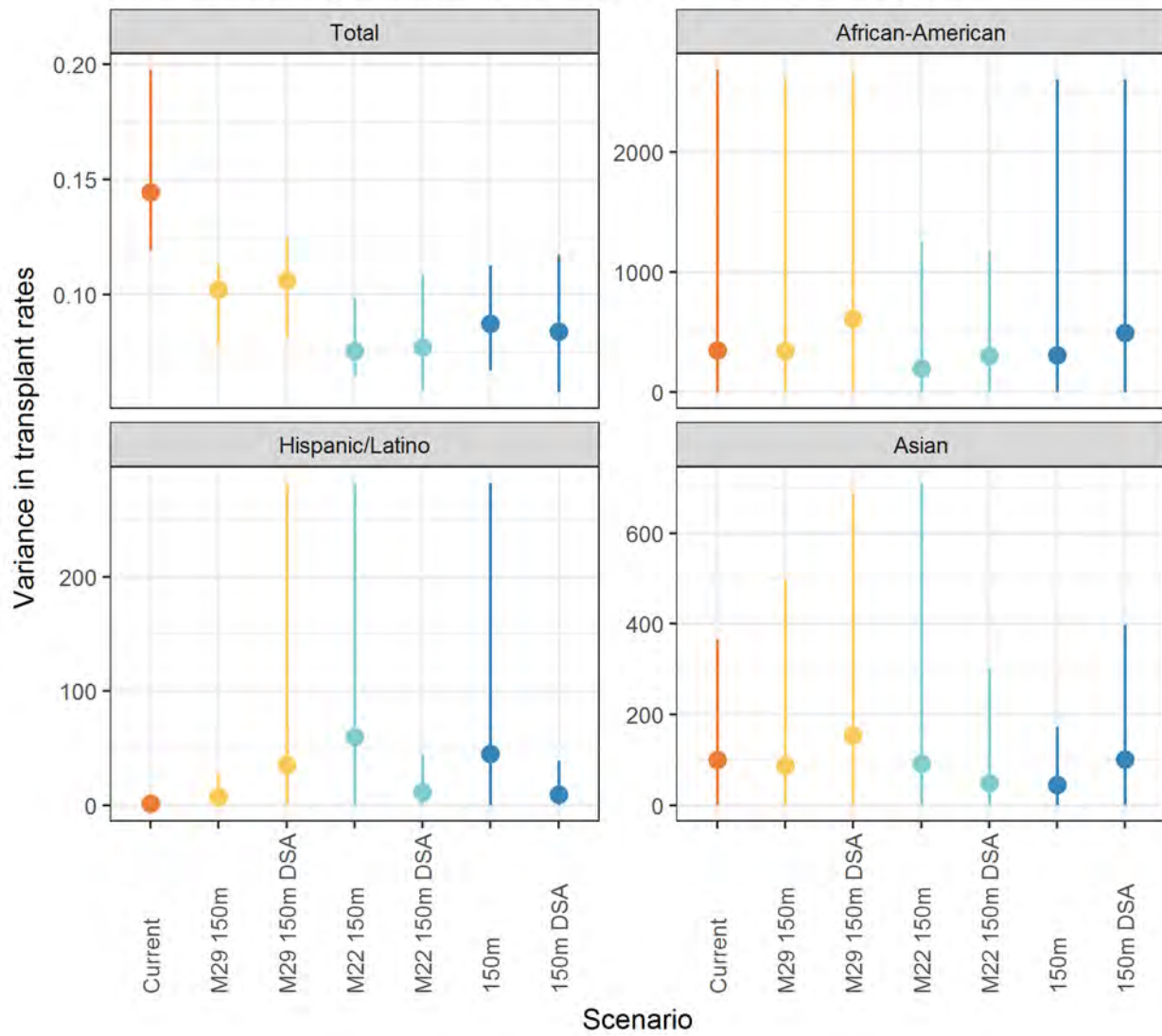


Figure 158 Variance in transplant rates by DSA by race/ethnicity - all regions

Waitlist Mortality

Waitlist Mortality Rates

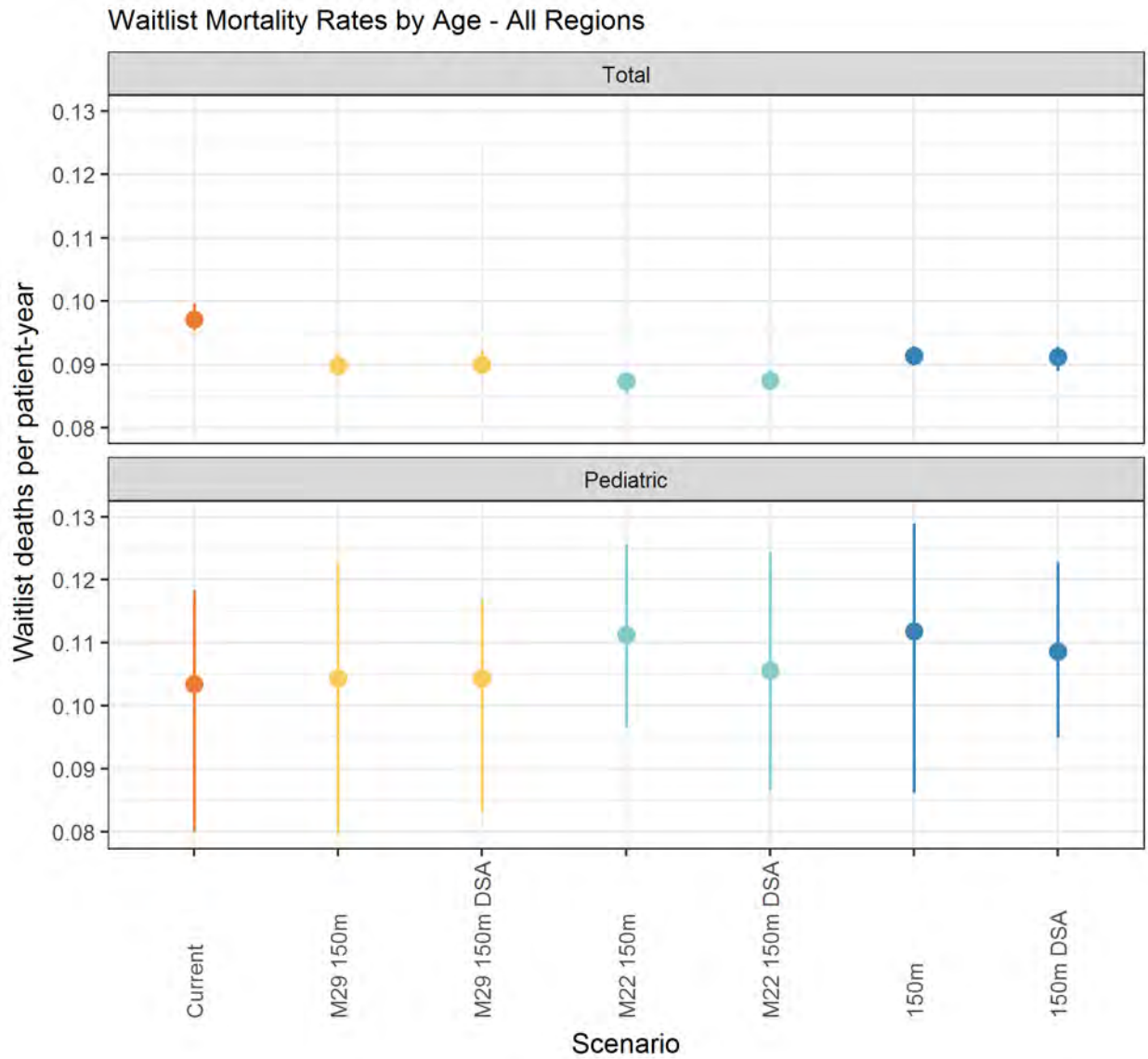


Figure 159 Waitlist mortality rates by age - all regions

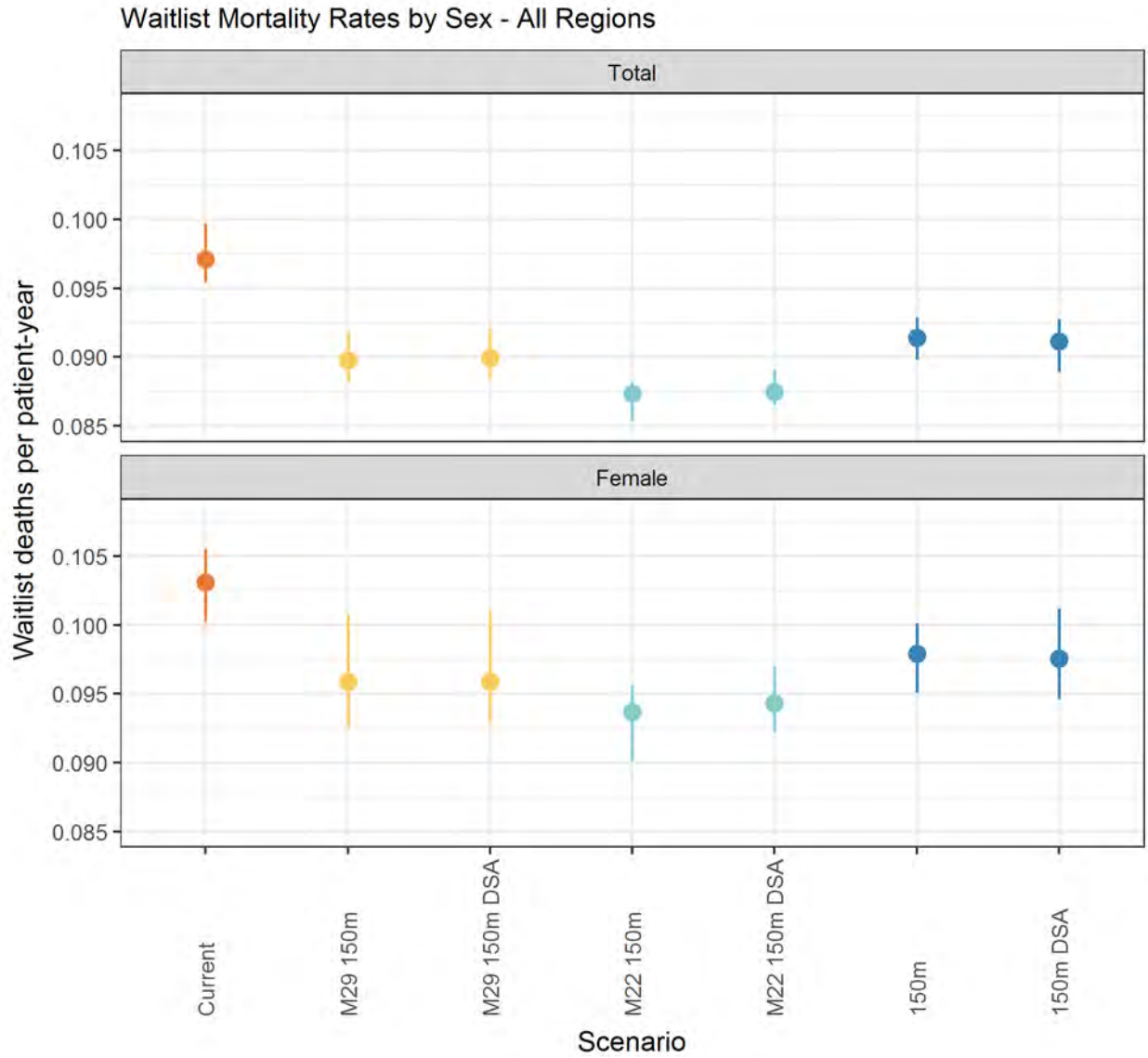


Figure 160 Waitlist mortality rates by sex - all regions

Waitlist Mortality Rates by Race/Ethnicity - All Regions

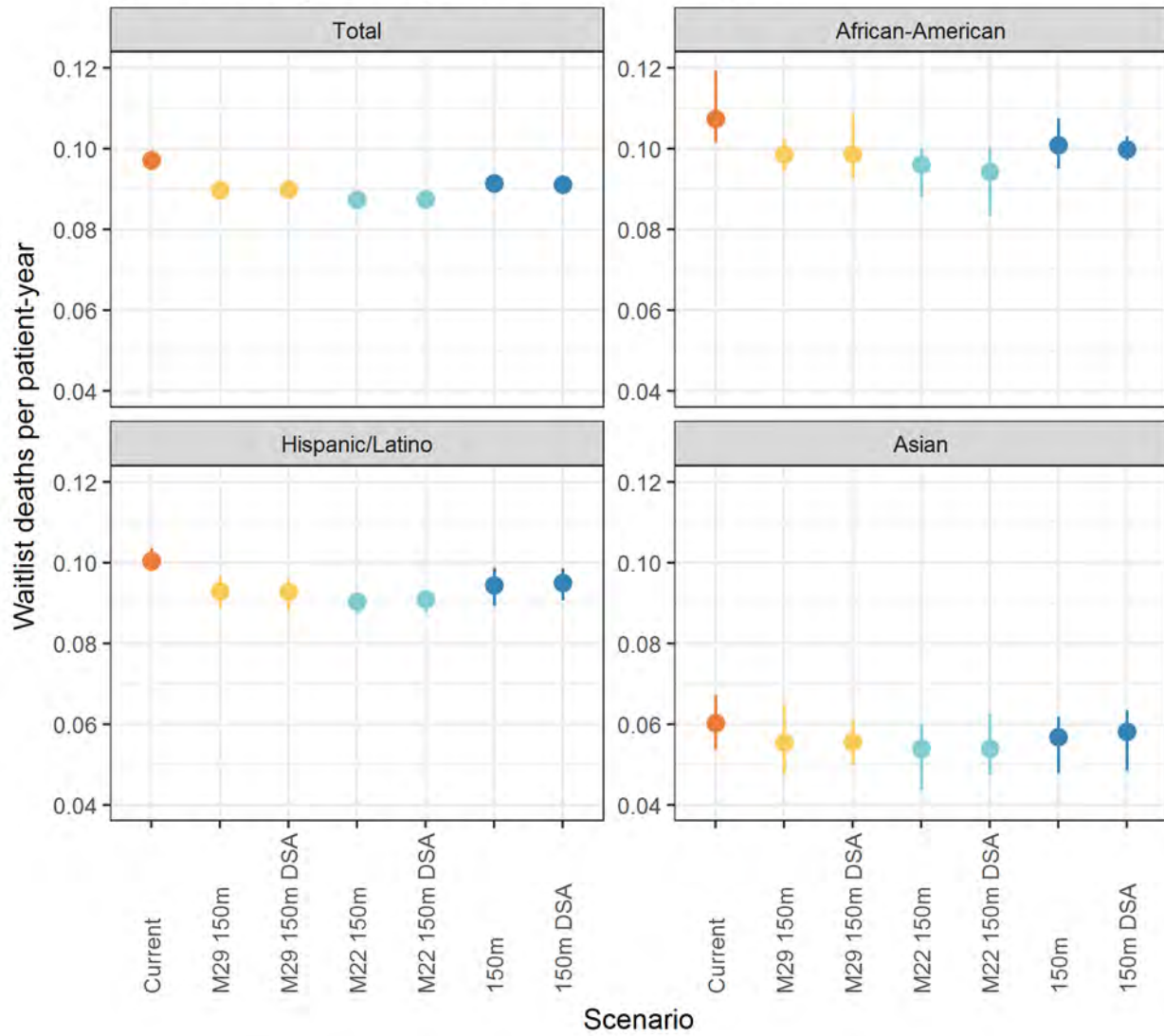


Figure 161 Waitlist mortality rates by race/ethnicity - all regions

Waitlist Mortality Counts

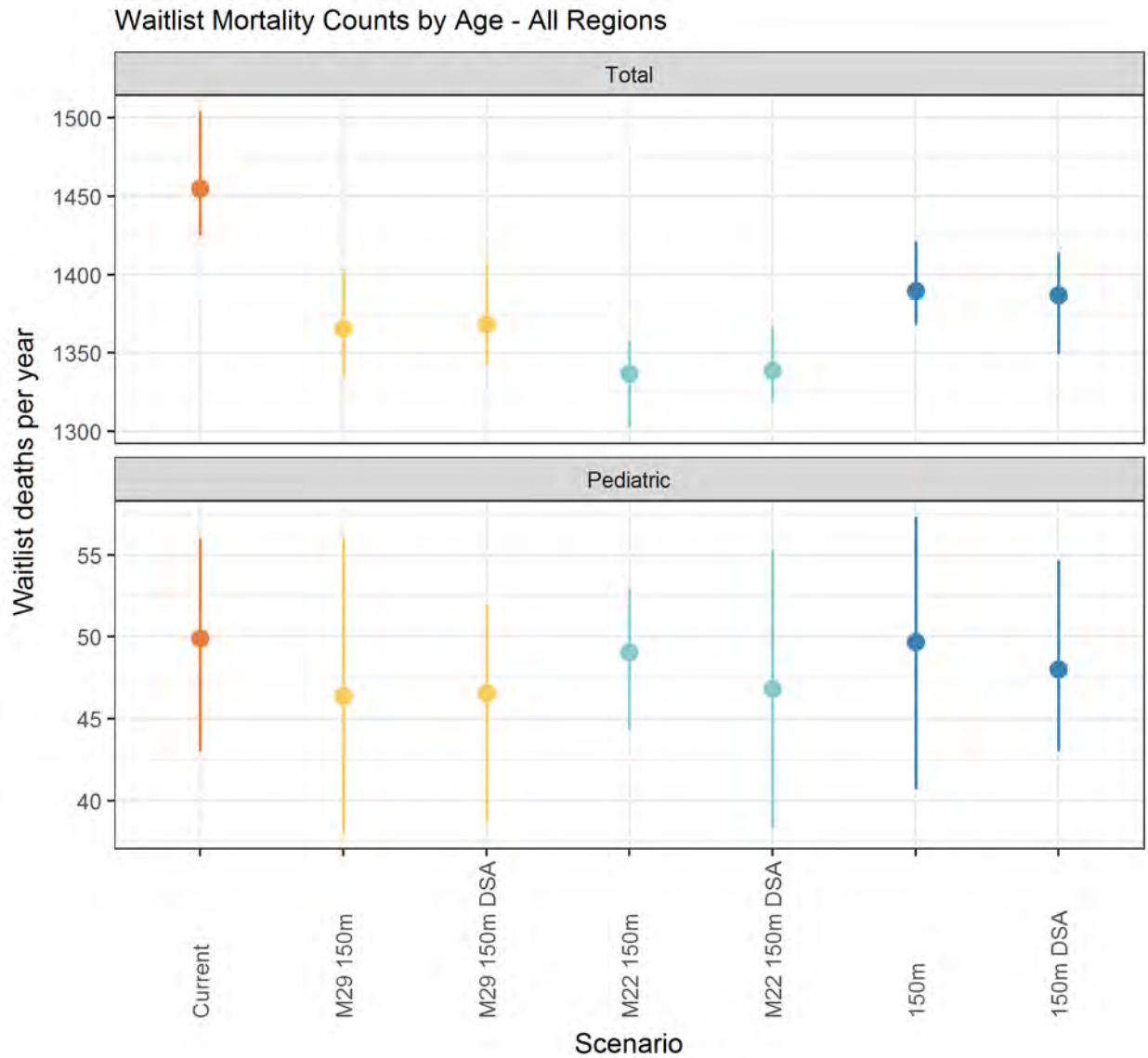


Figure 162 Waitlist mortality counts by age - all regions

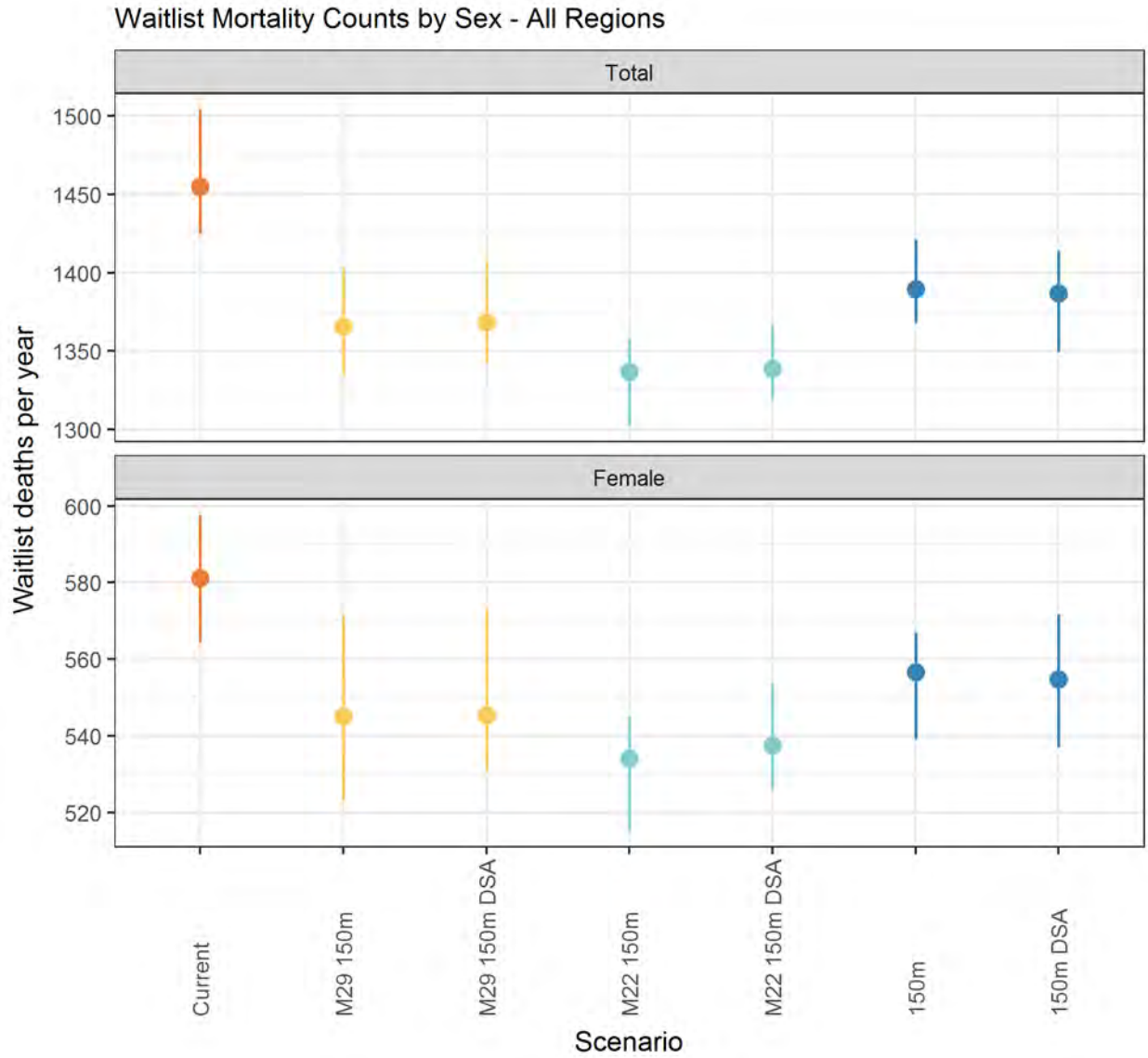


Figure 163 Waitlist mortality counts by sex - all regions

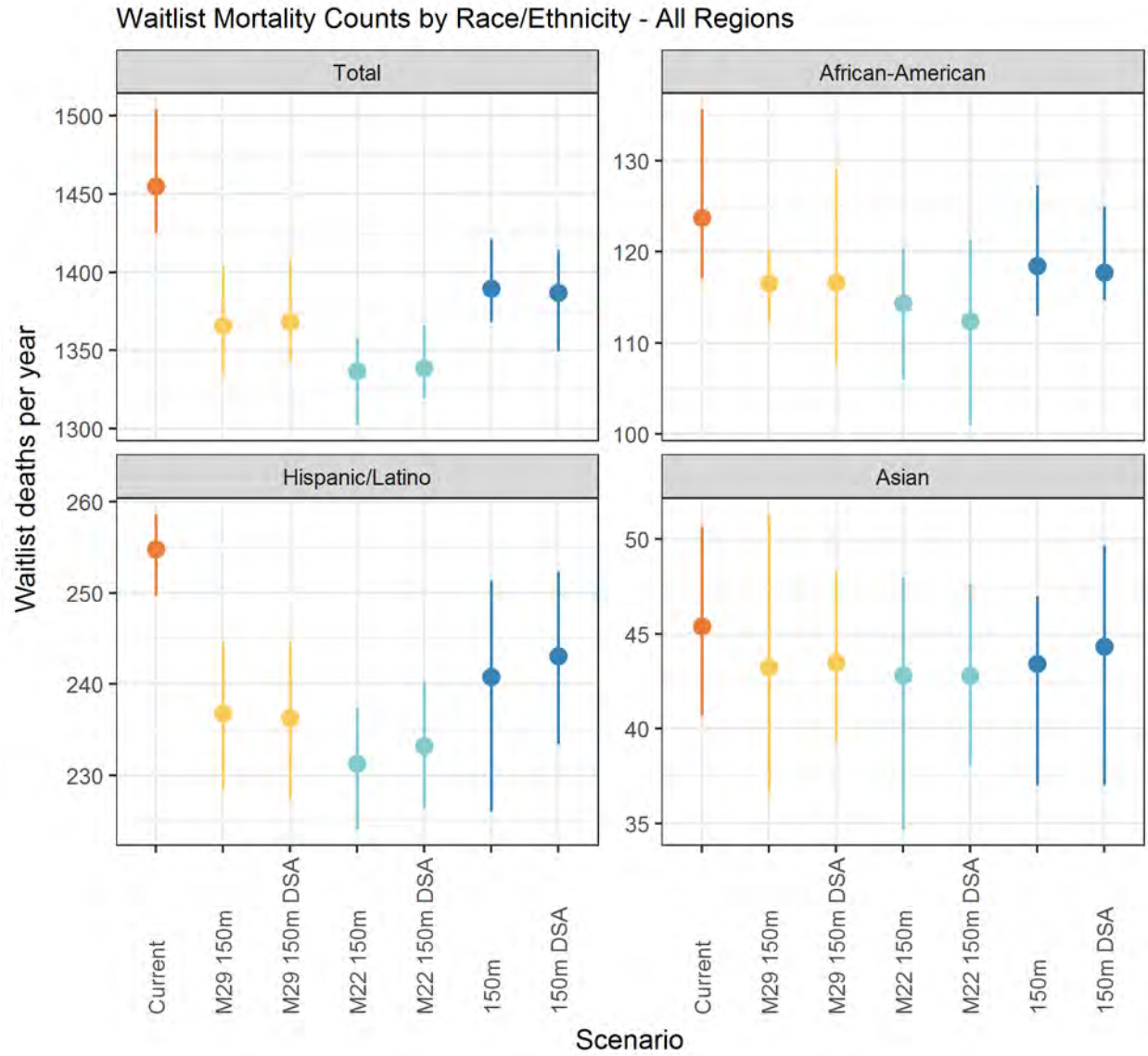


Figure 164 Waitlist mortality counts by race/ethnicity - all regions

Variance in Waitlist Mortality Rates by DSA

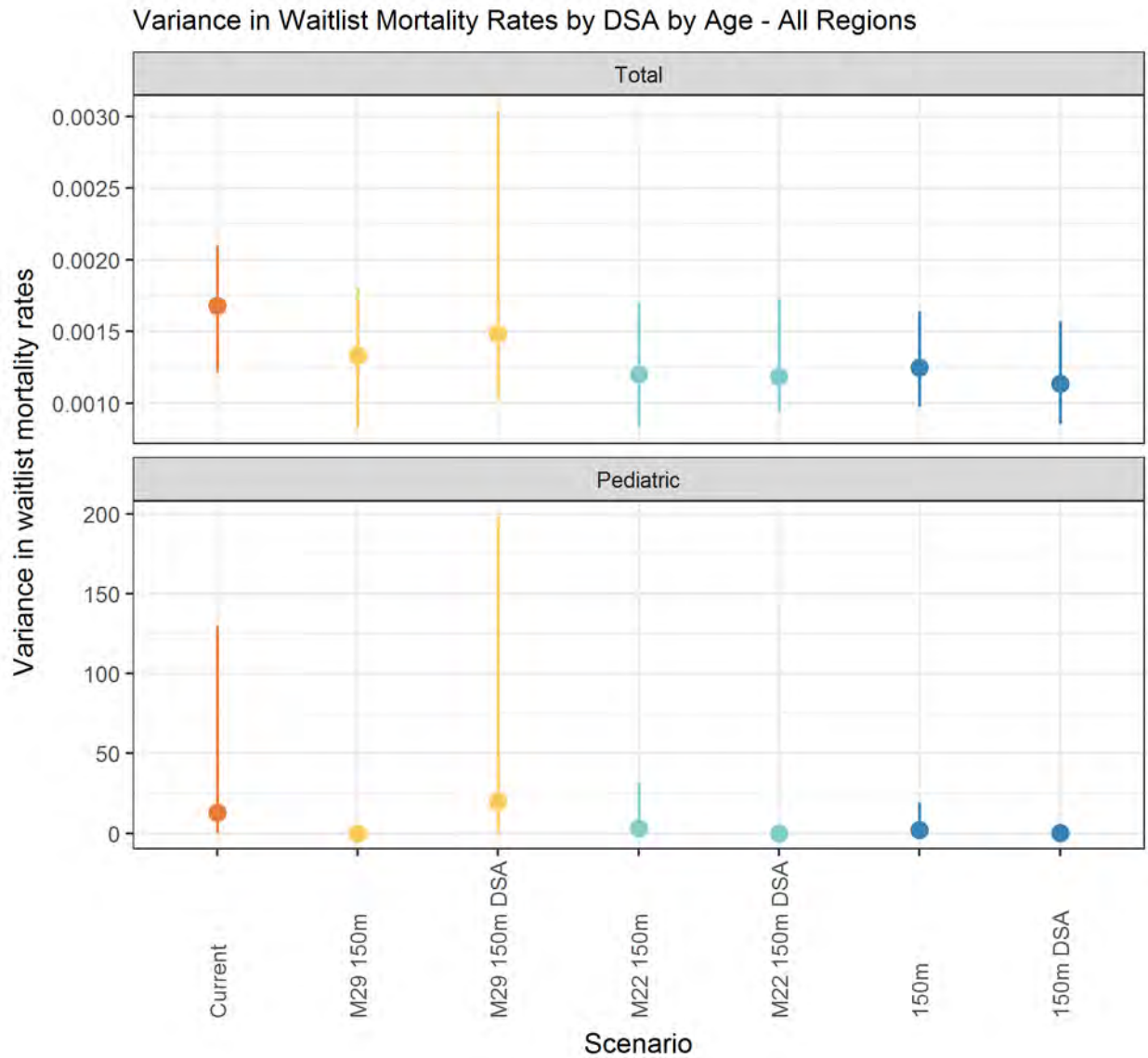


Figure 165 Variance in waitlist mortality rates by DSA by age - all regions

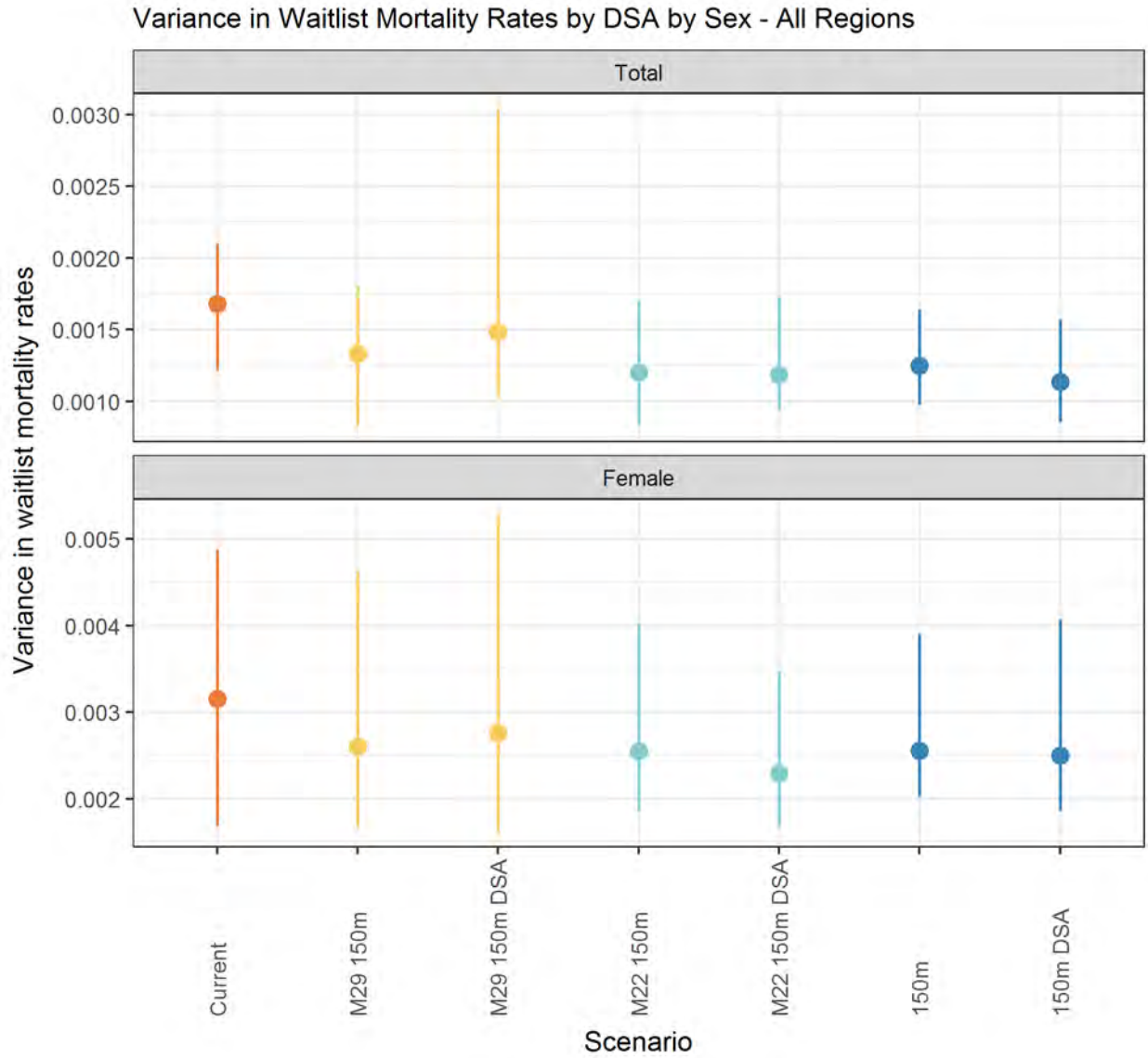


Figure 166 Variance in waitlist mortality rates by DSA by sex - all regions

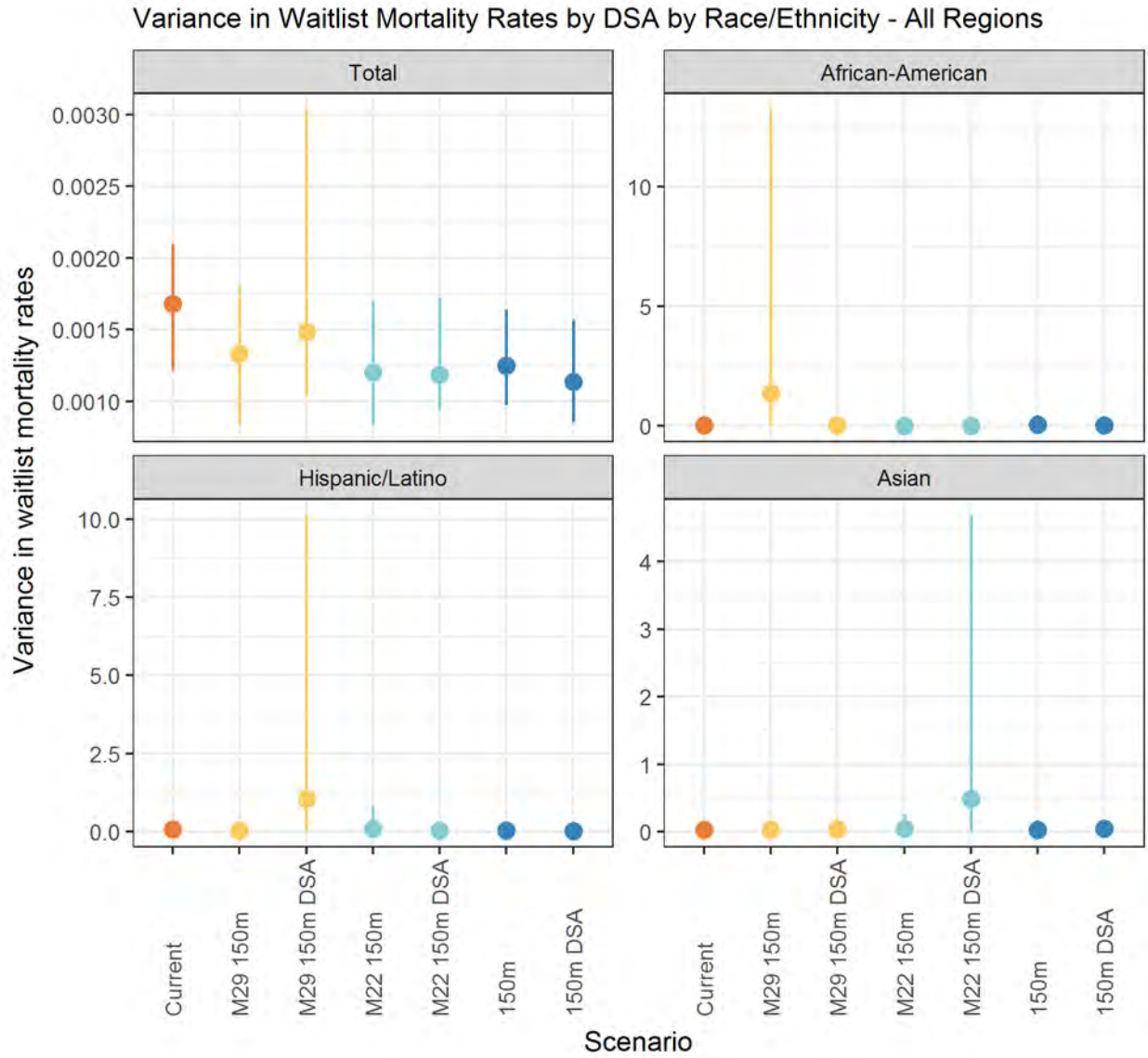


Figure 167 Variance in waitlist mortality rates by DSA by race/ethnicity - all regions

Posttransplant Mortality

Posttransplant Mortality Rates

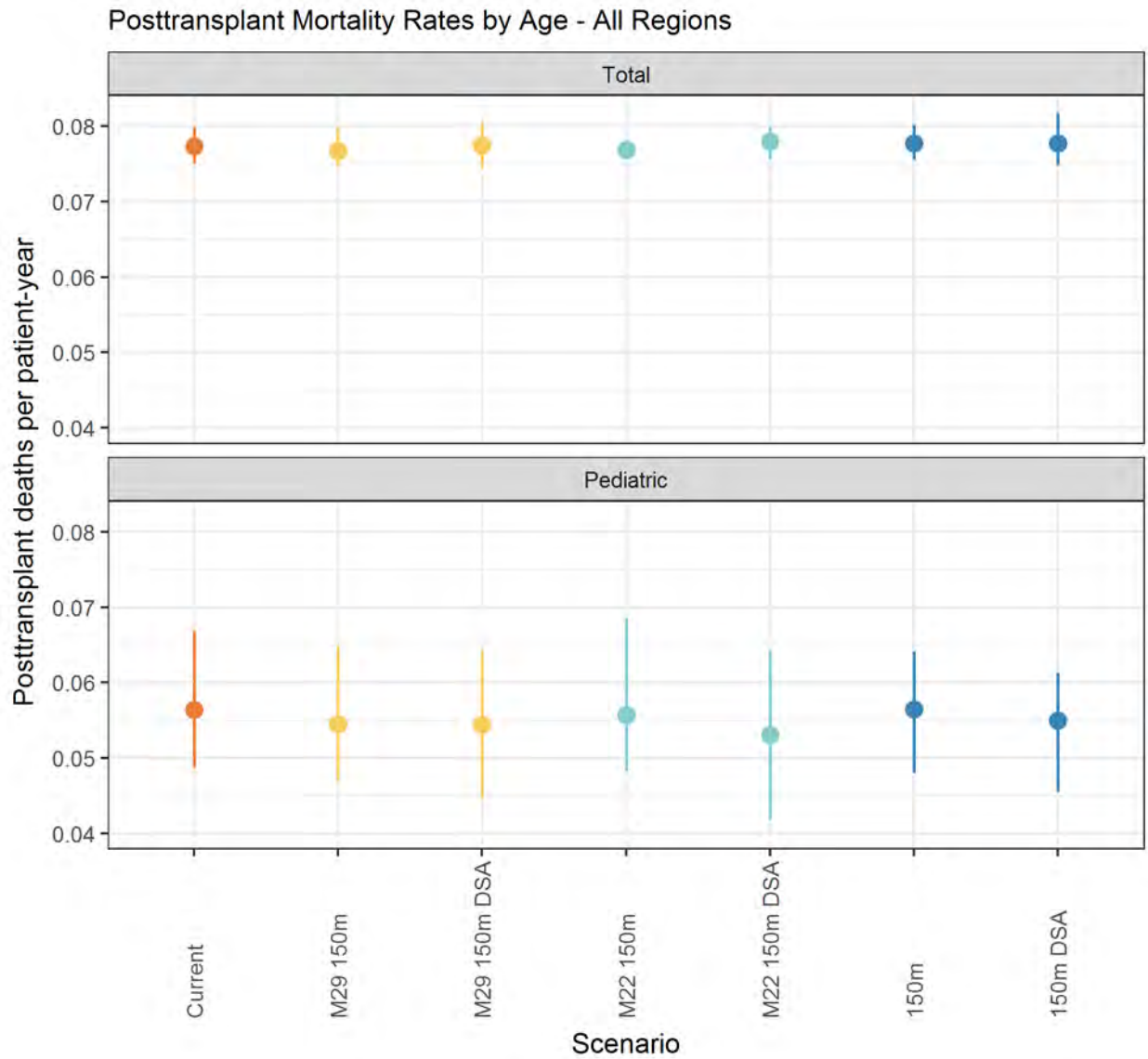


Figure 168 Posttransplant mortality rates by age - all regions

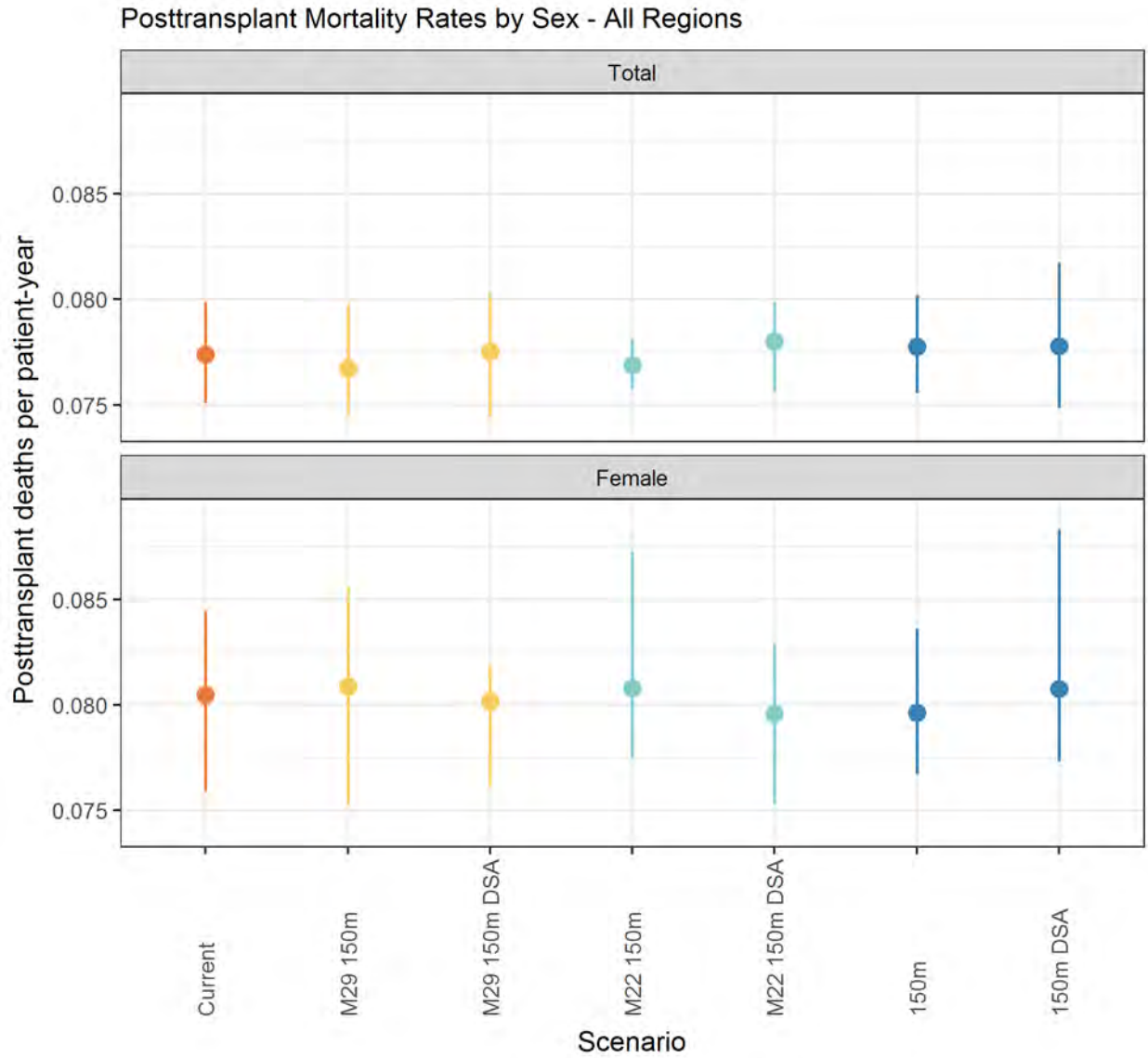


Figure 169 Posttransplant mortality rates by sex - all regions

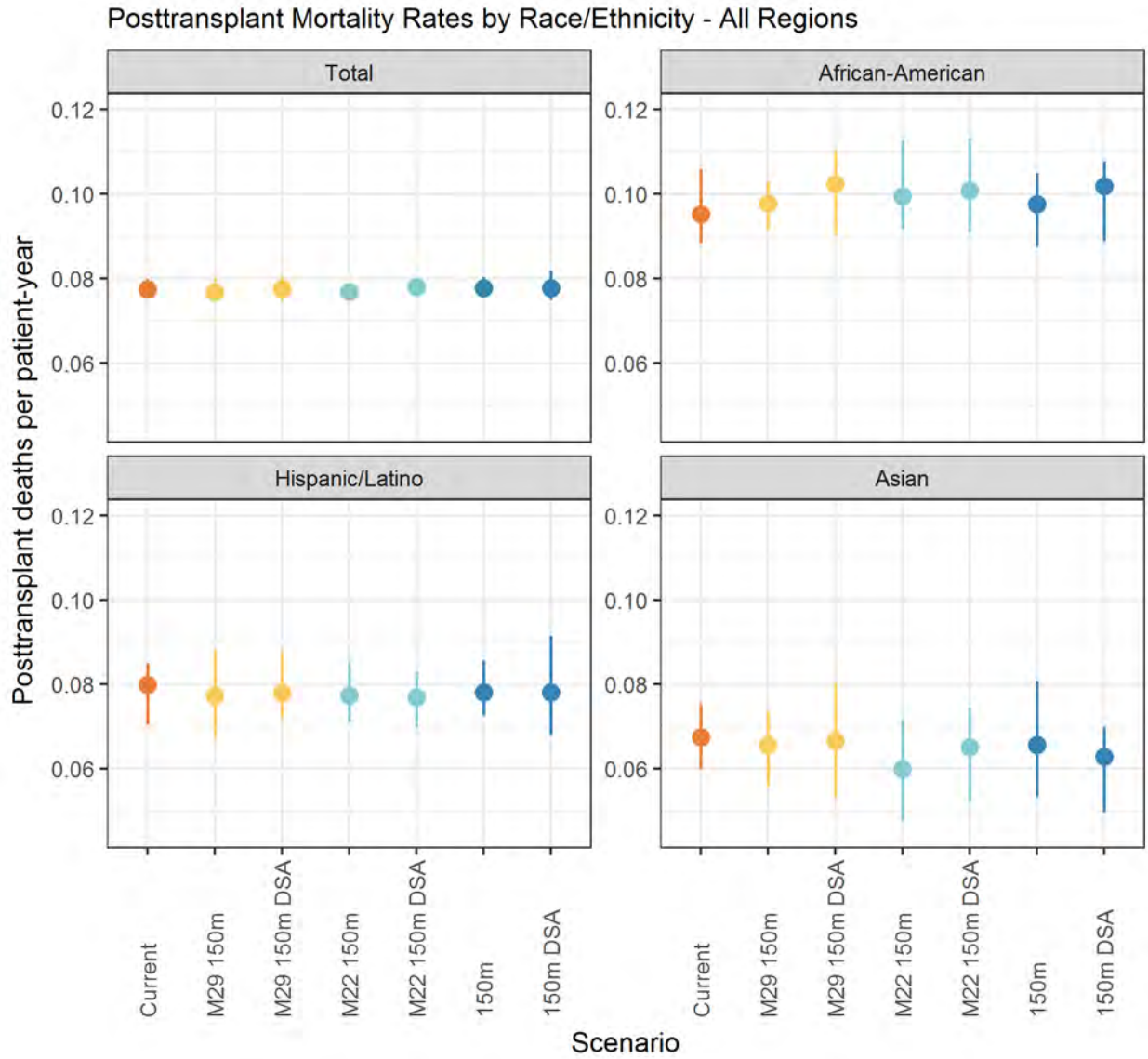


Figure 170 Posttransplant mortality rates by race/ethnicity - all regions

Posttransplant Mortality Counts

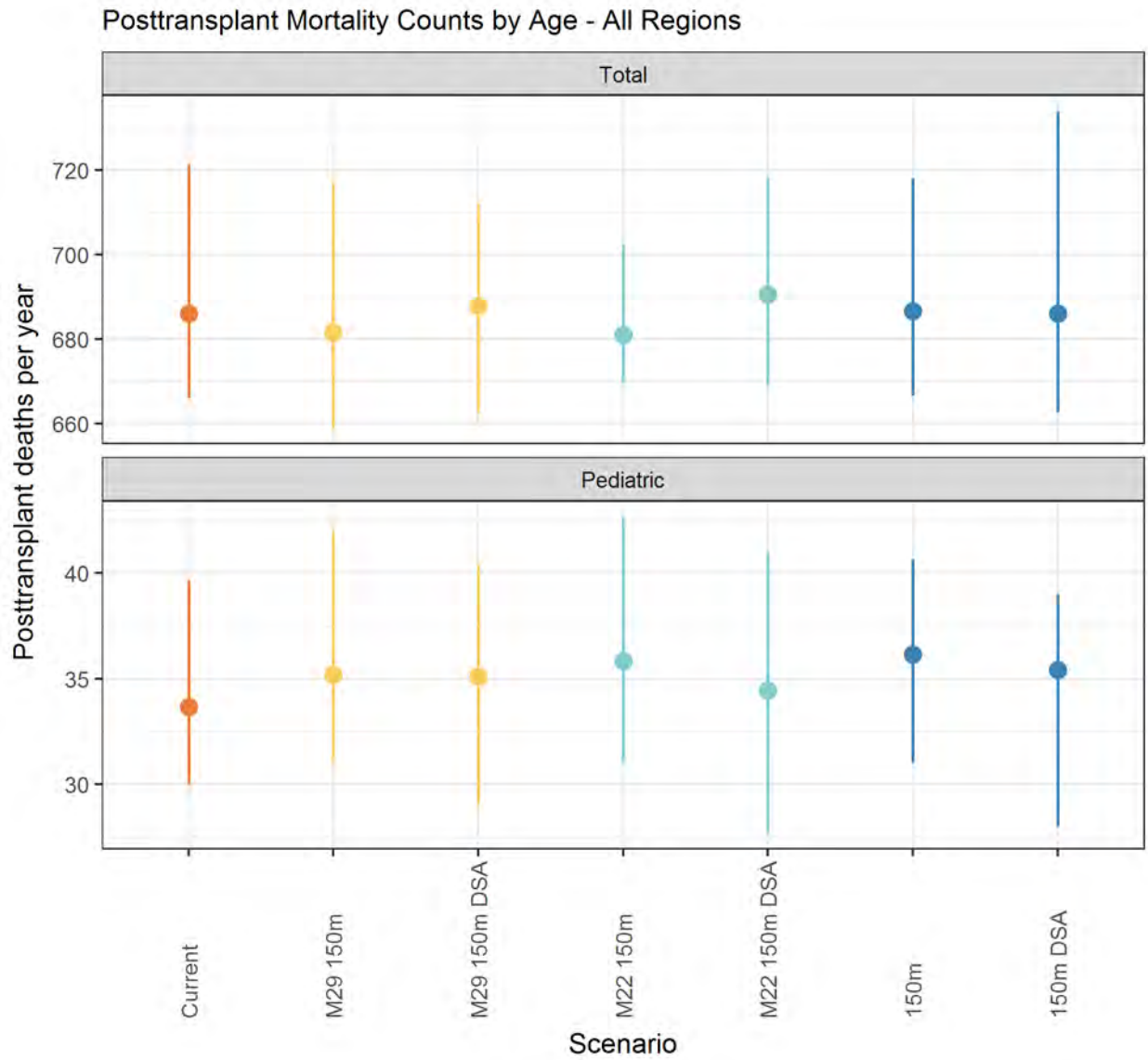


Figure 171 Posttransplant mortality counts by age - all regions

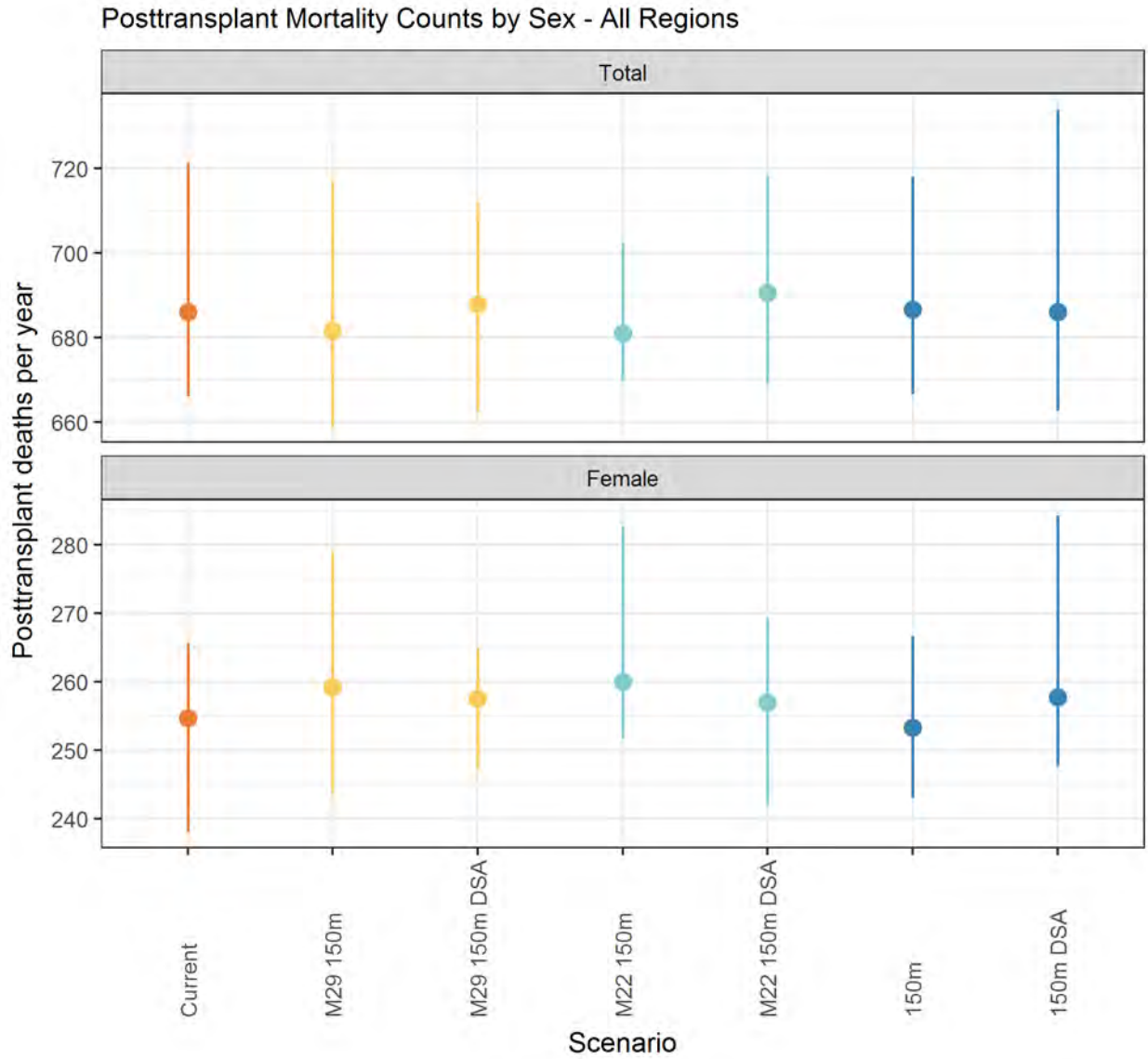


Figure 172 Posttransplant mortality counts by sex - all regions

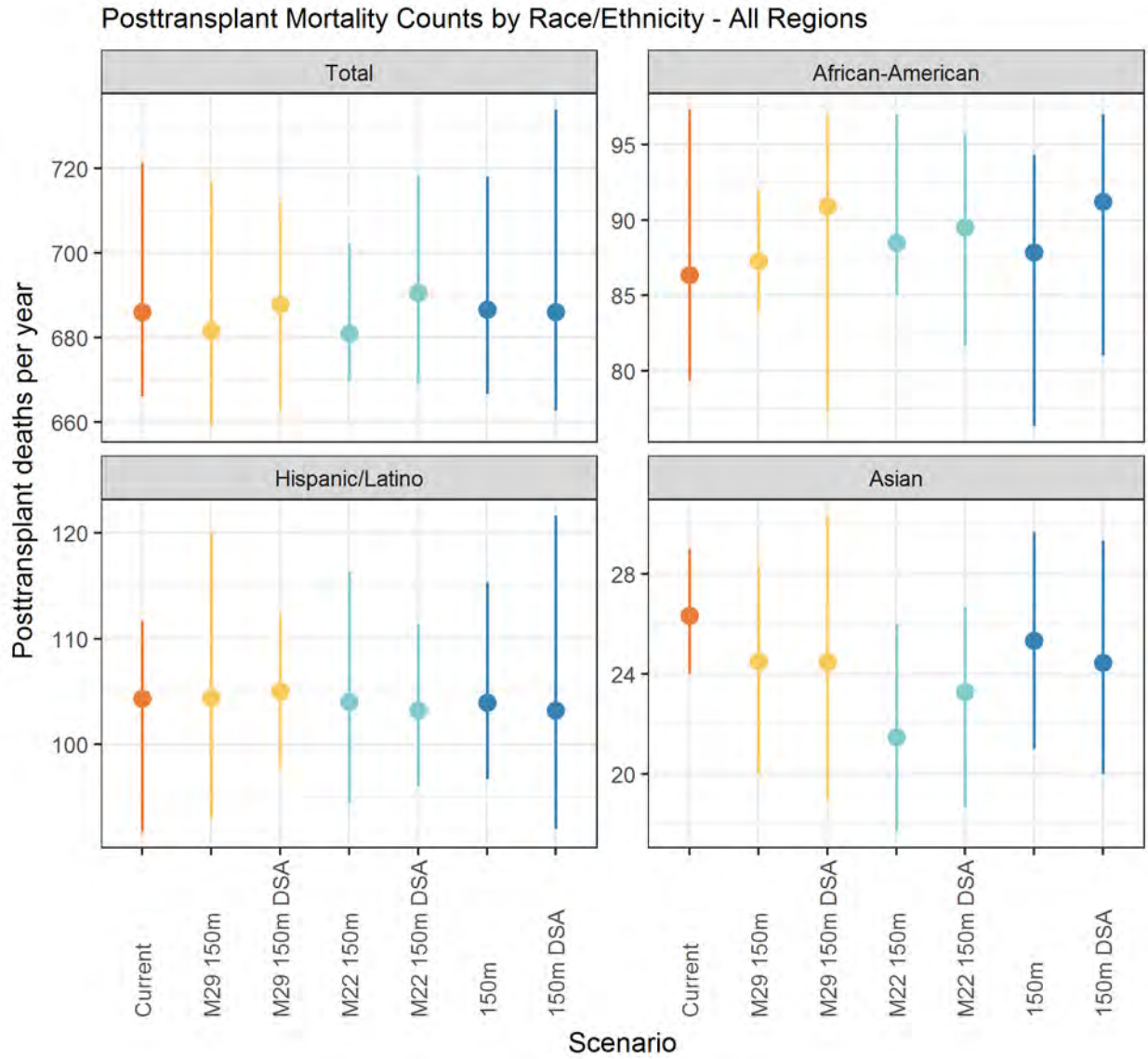


Figure 173 Posttransplant mortality counts by race/ethnicity - all regions

Transport

Median Transport Time

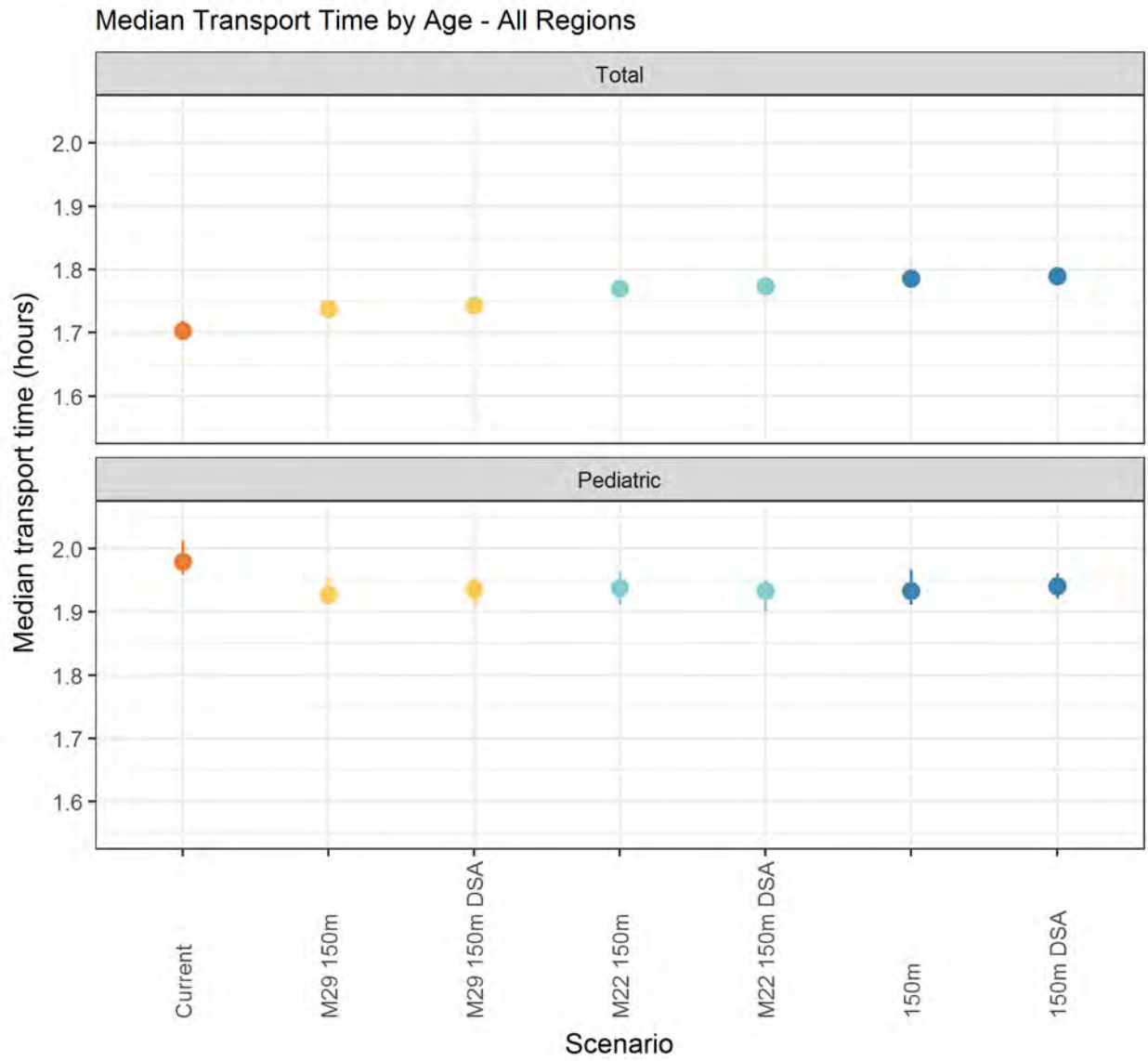


Figure 174 Median Transport Time by age - all regions

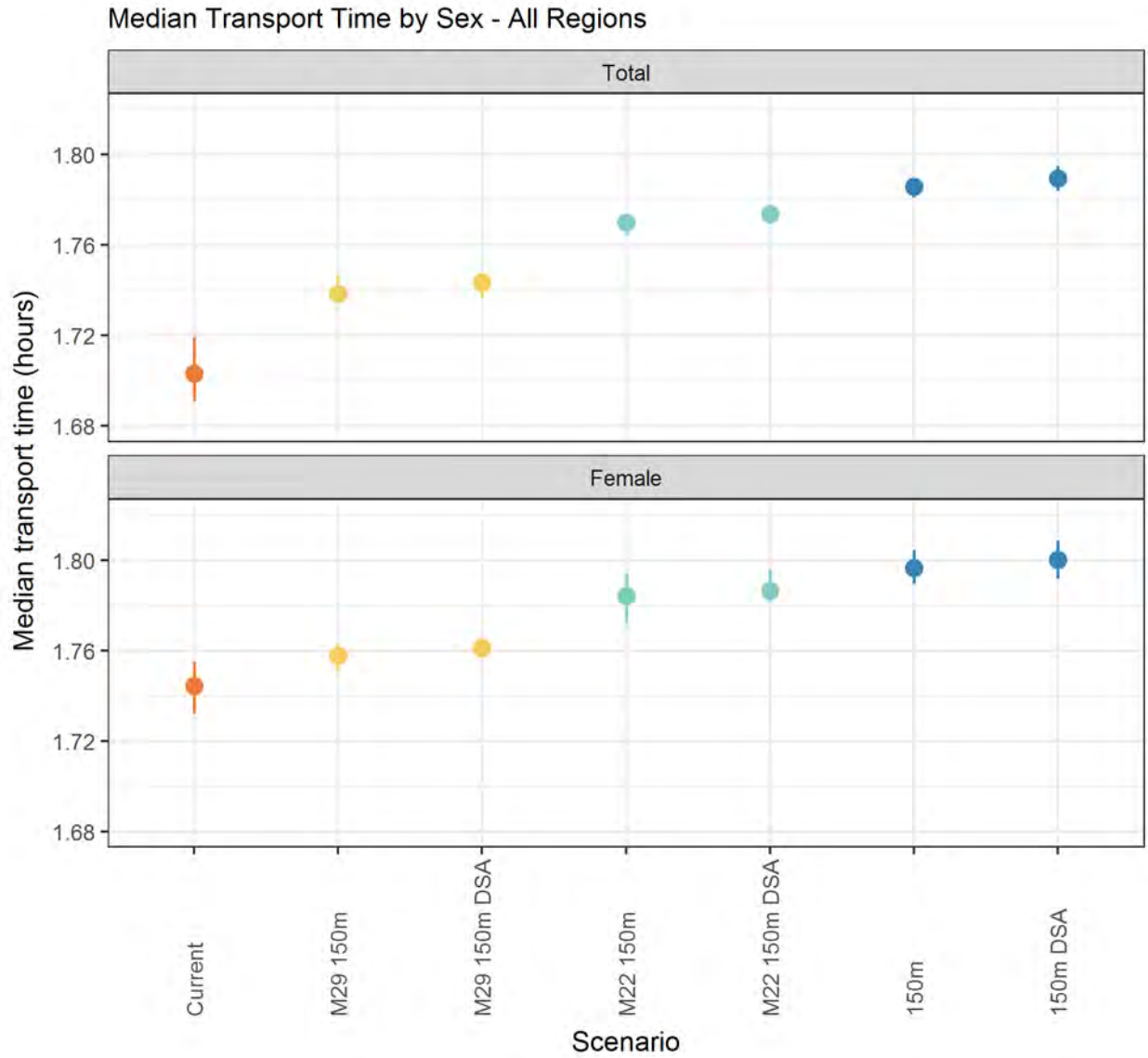


Figure 175 Median Transport Time by sex - all regions

Median Transport Time by Race/Ethnicity - All Regions

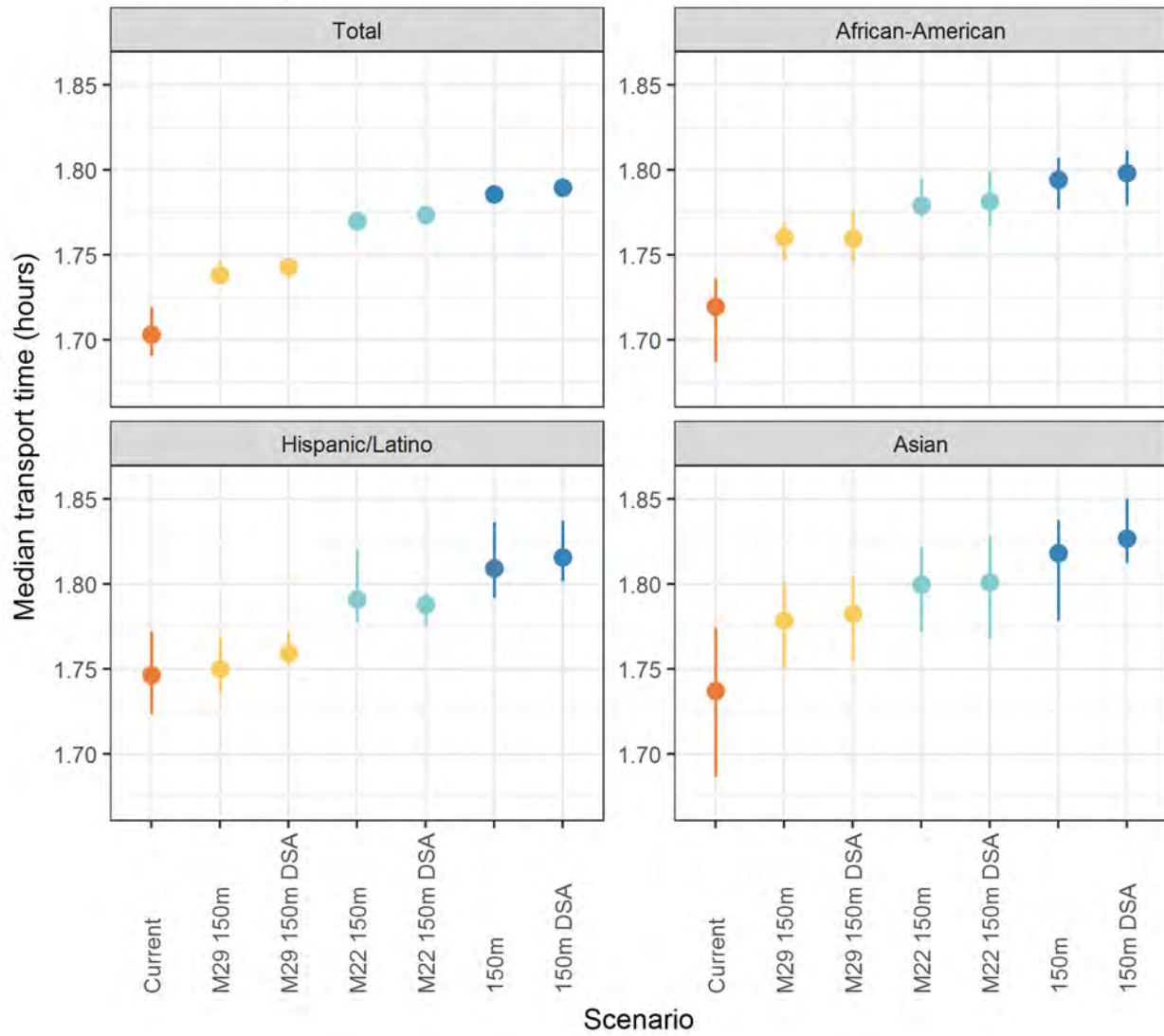


Figure 176 Median Transport Time by race/ethnicity - all regions

Median Transport Distance

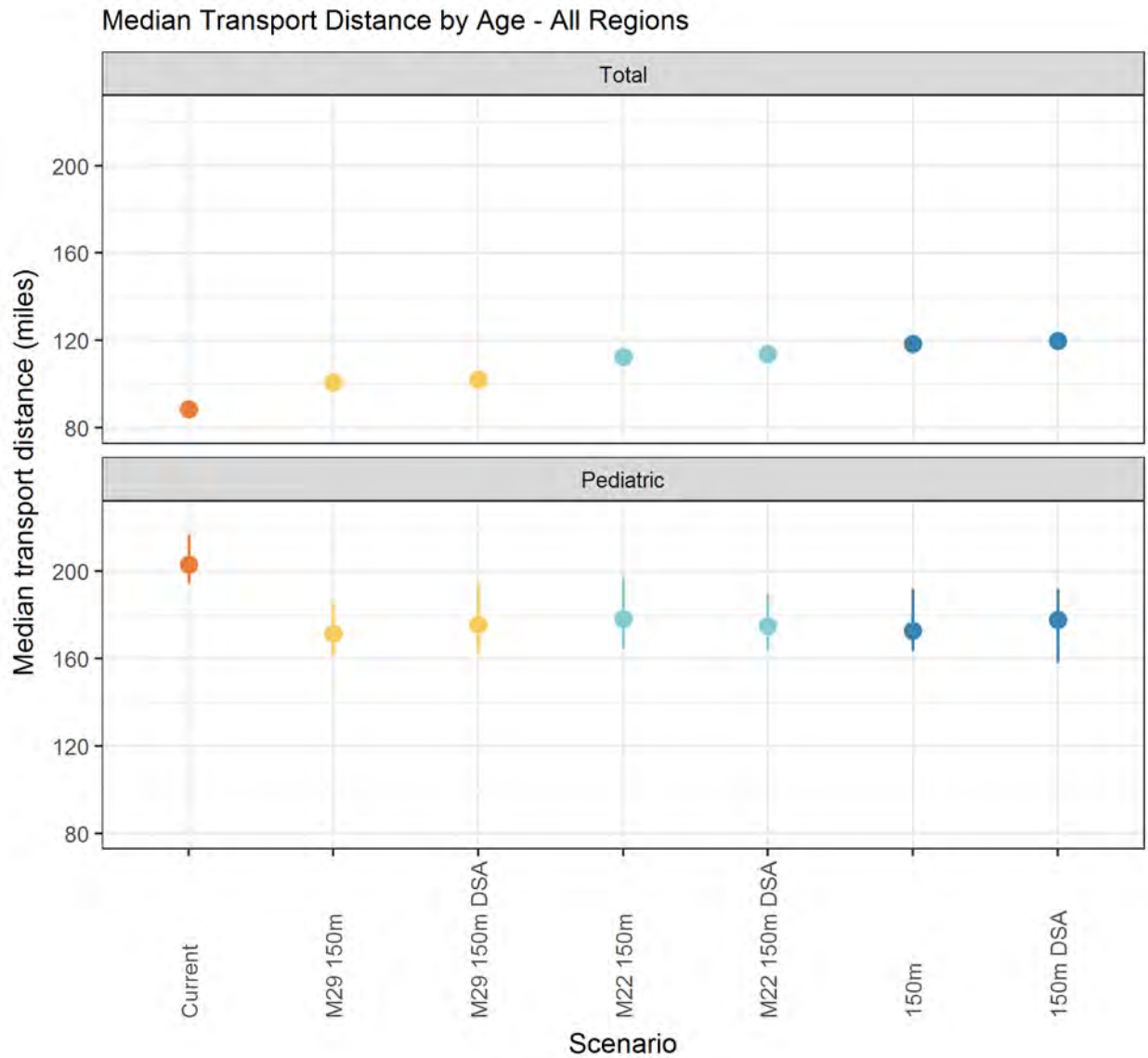


Figure 177 Median Transport Distance by age - all regions

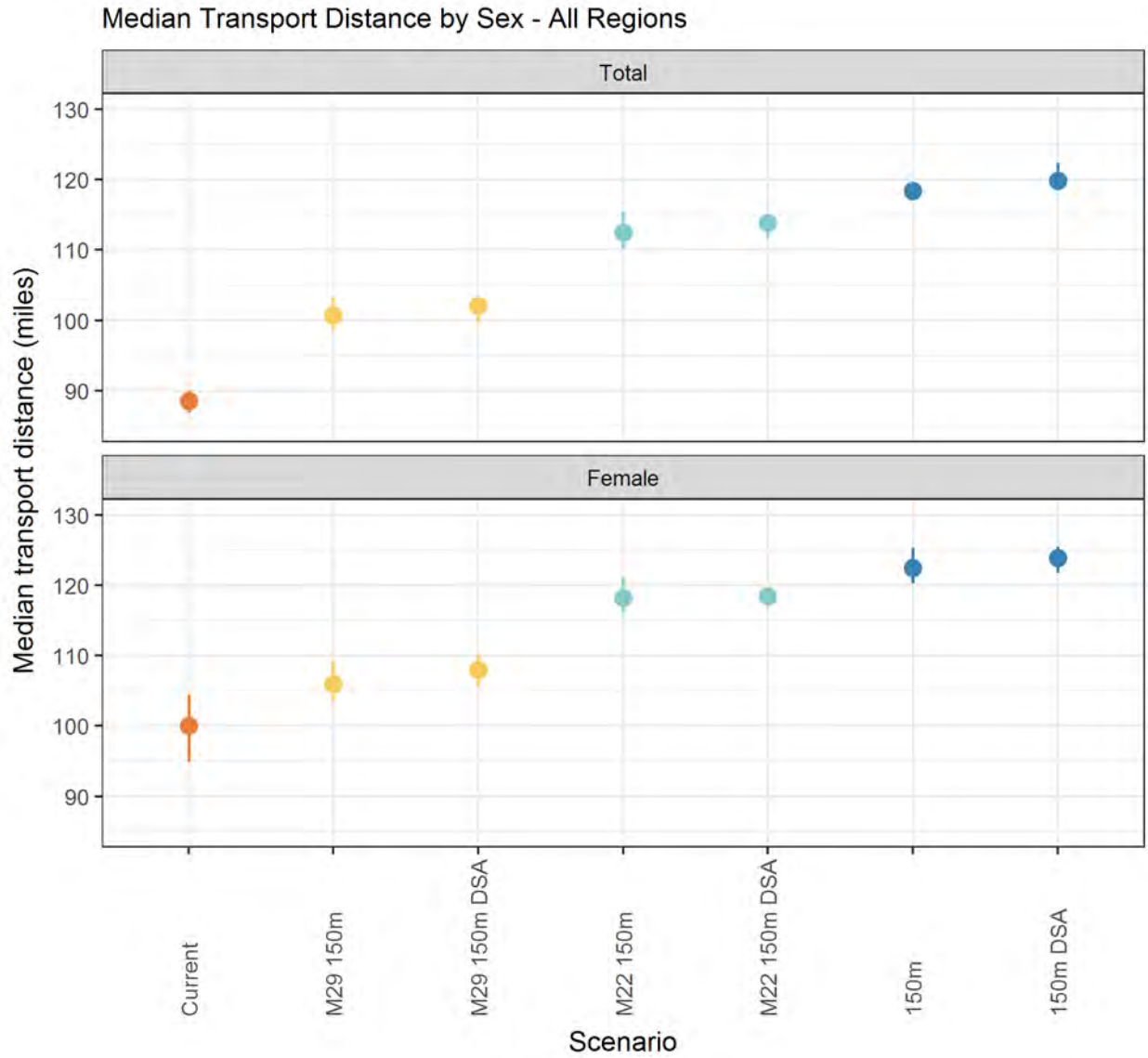


Figure 178 Median Transport Distance by sex - all regions

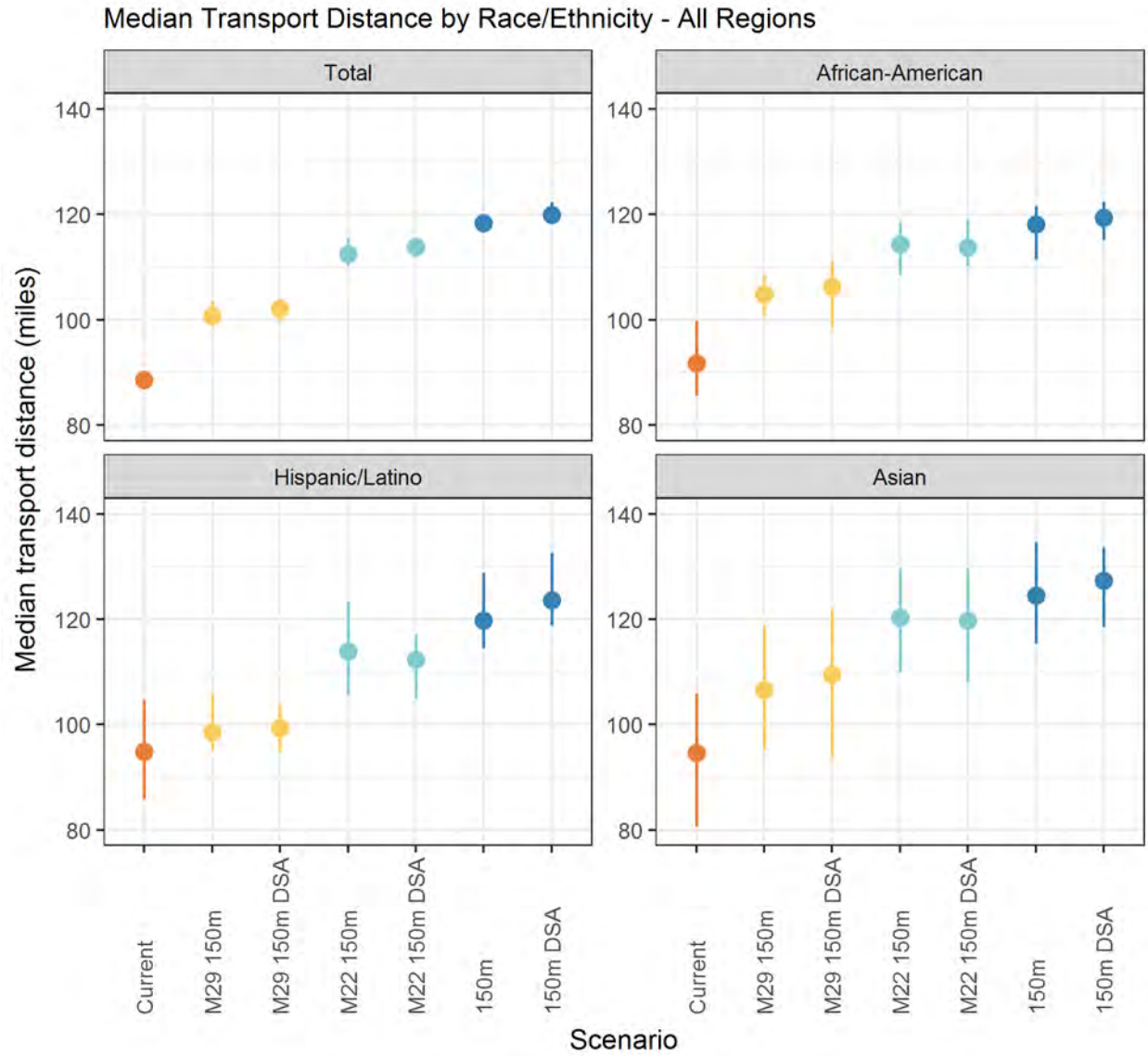


Figure 179 Median Transport Distance by race/ethnicity - all regions

Percent of Organs Flown

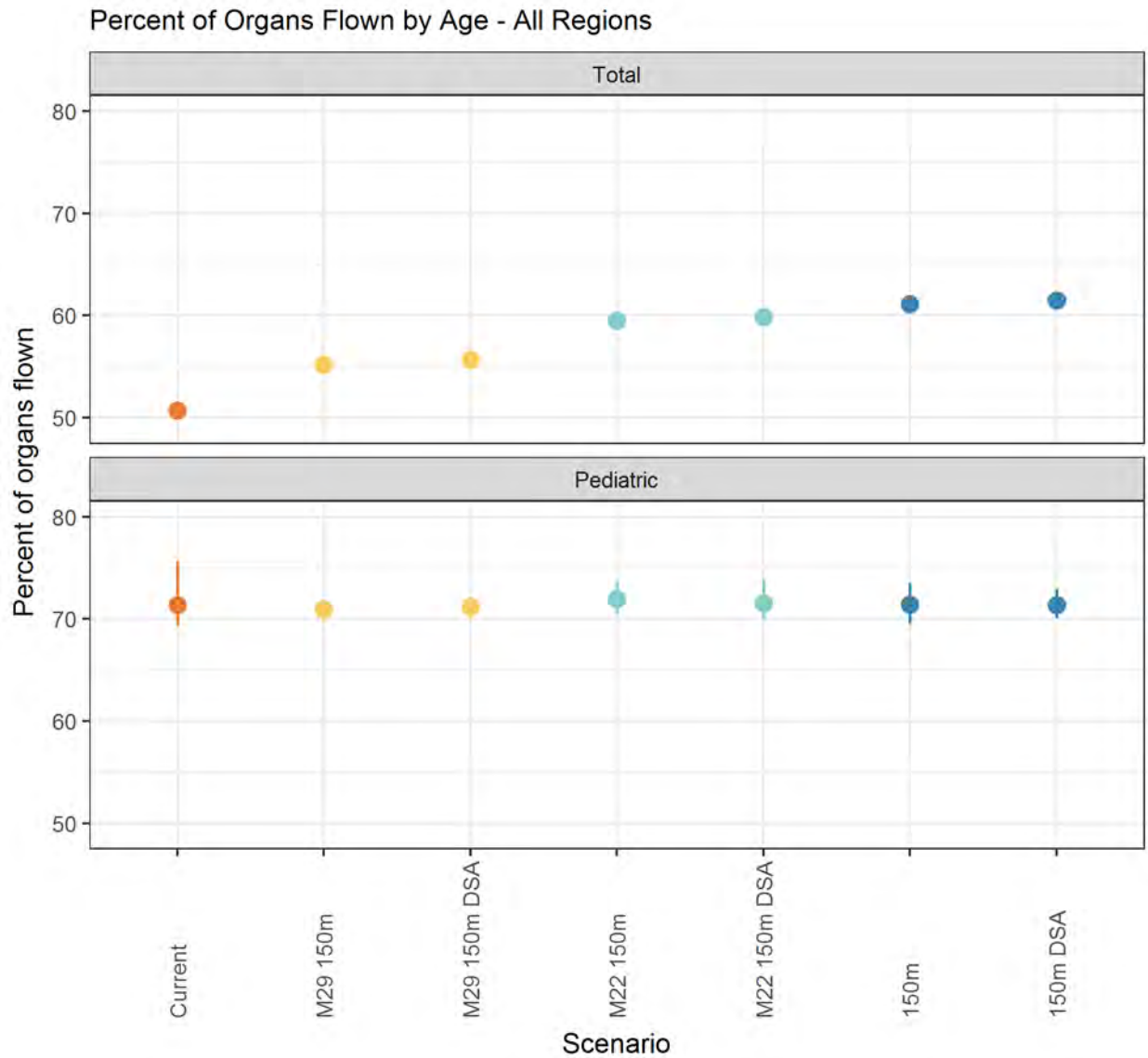


Figure 180 Percent of Organs Flown by age - all regions

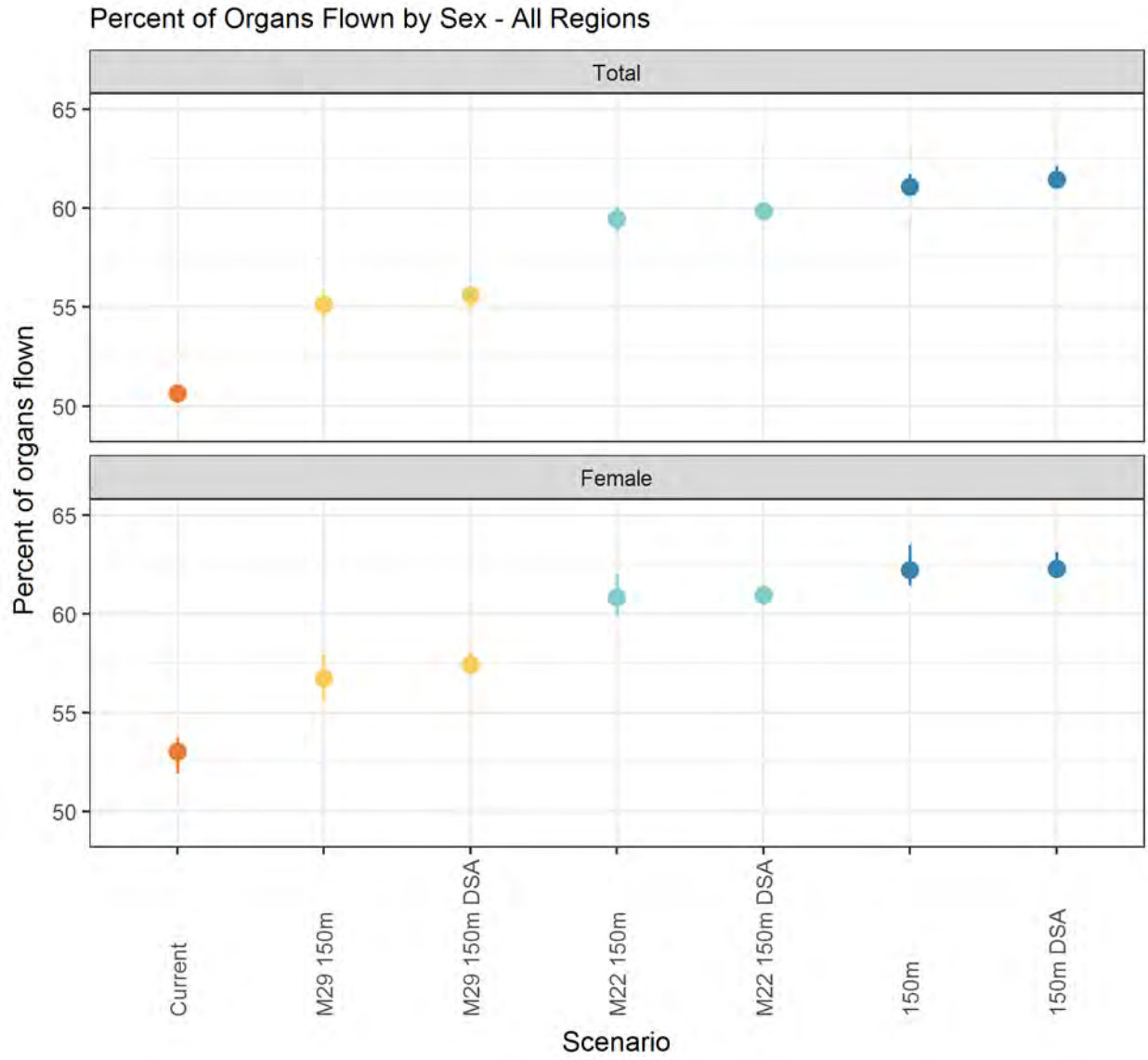


Figure 181 Percent of Organs Flown by sex - all regions

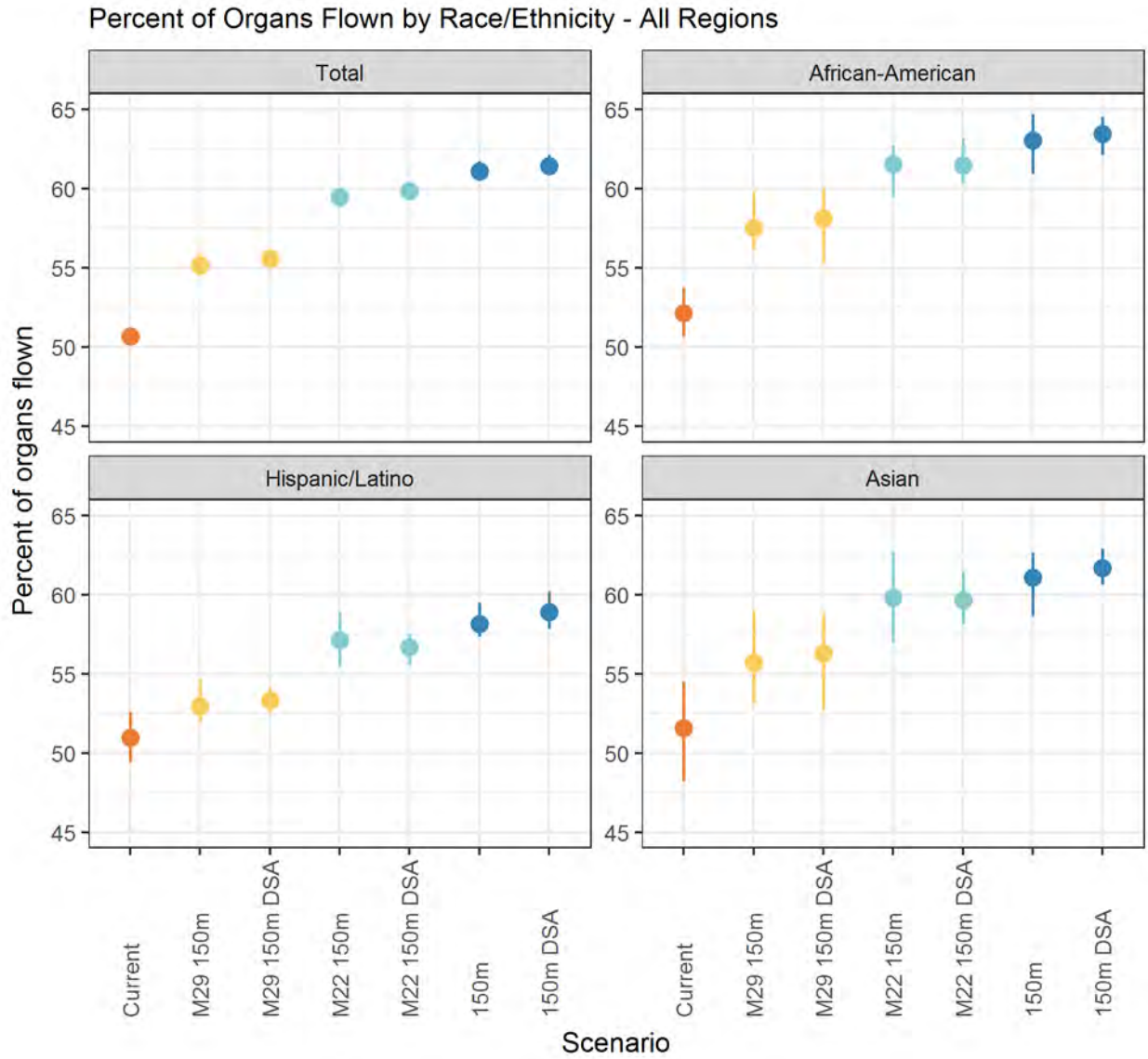


Figure 182 Percent of Organs Flown by race/ethnicity - all regions

Percent of Within DSA Transplants

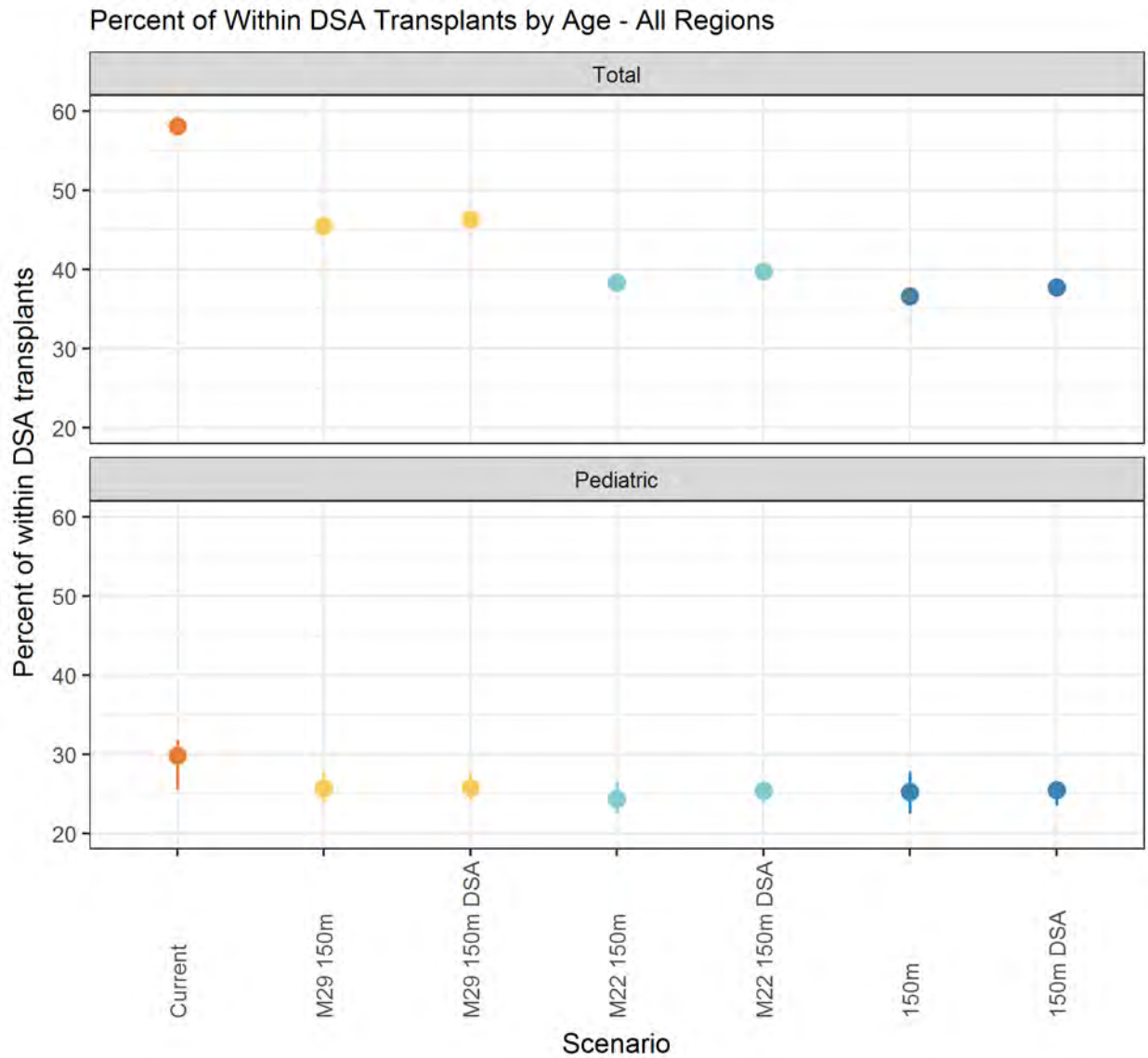


Figure 183 Percent of within DSA transplants by age - all regions

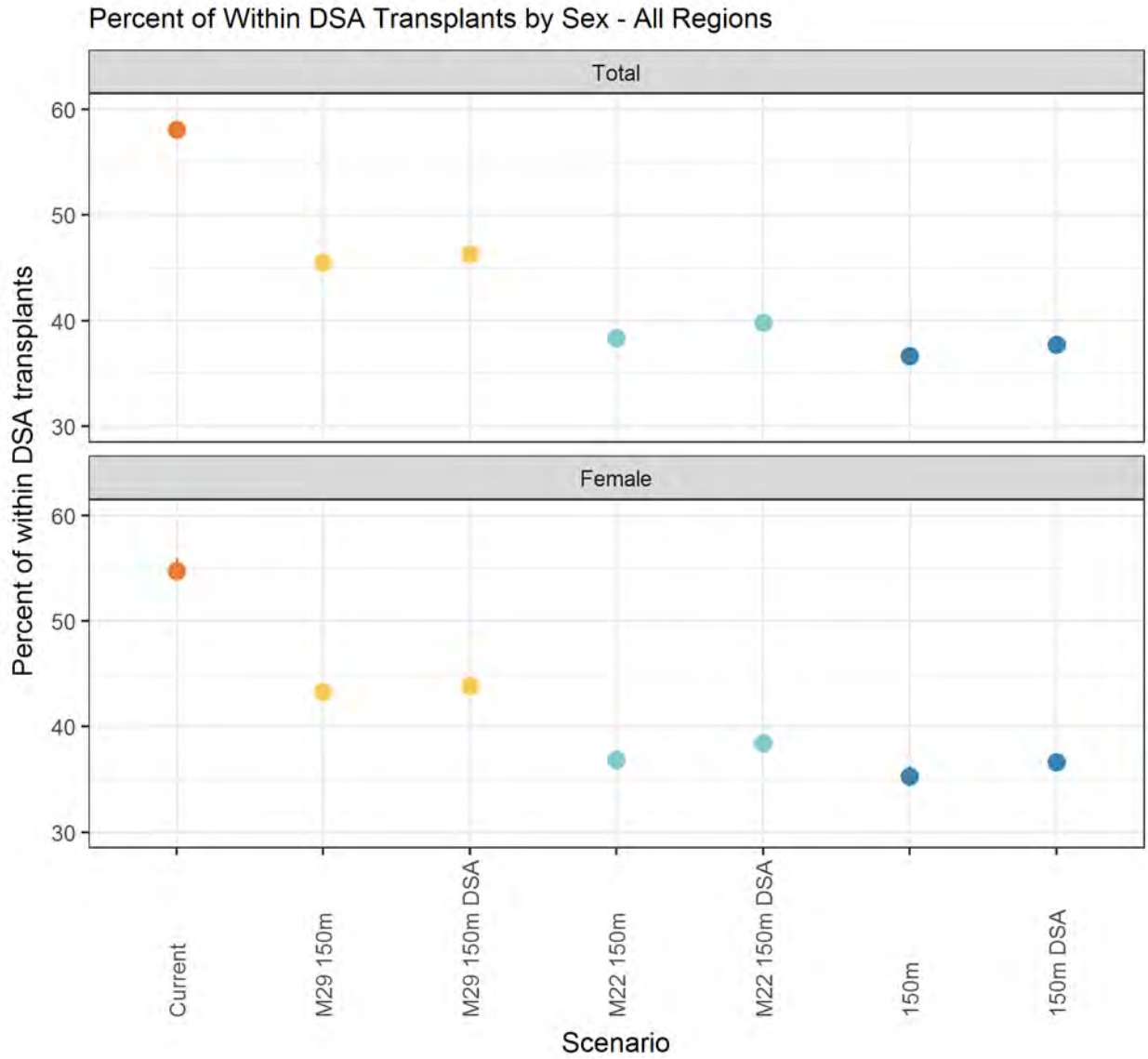


Figure 184 Percent of within DSA transplants by sex - all regions

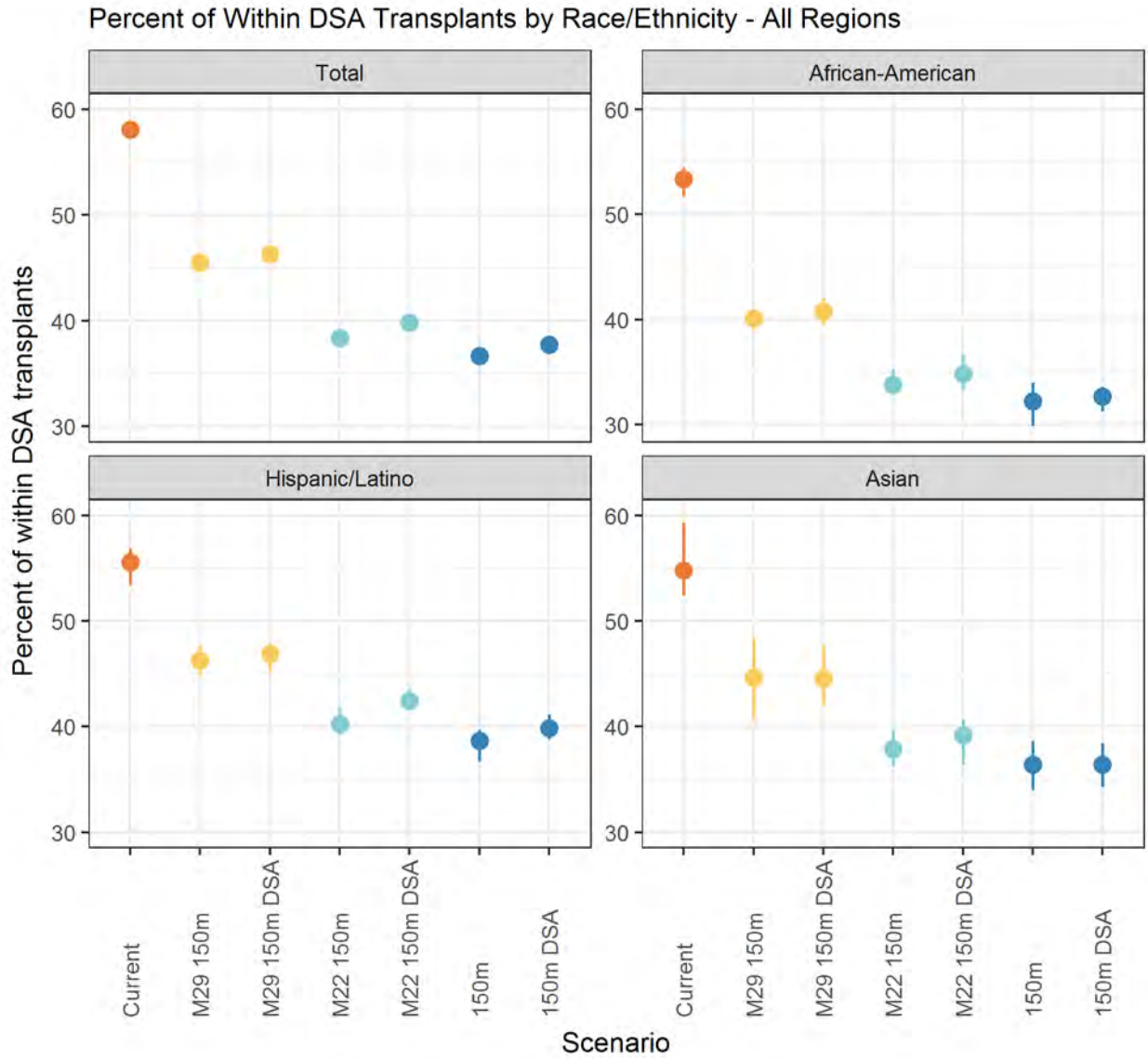


Figure 185 Percent of within DSA transplants by race/ethnicity - all regions

Appendix C: Results by education, insurance, and urban/rural

MELD/PELD at Transplant

Variance in Median Allocation MELD/PELD at Transplant by DSA

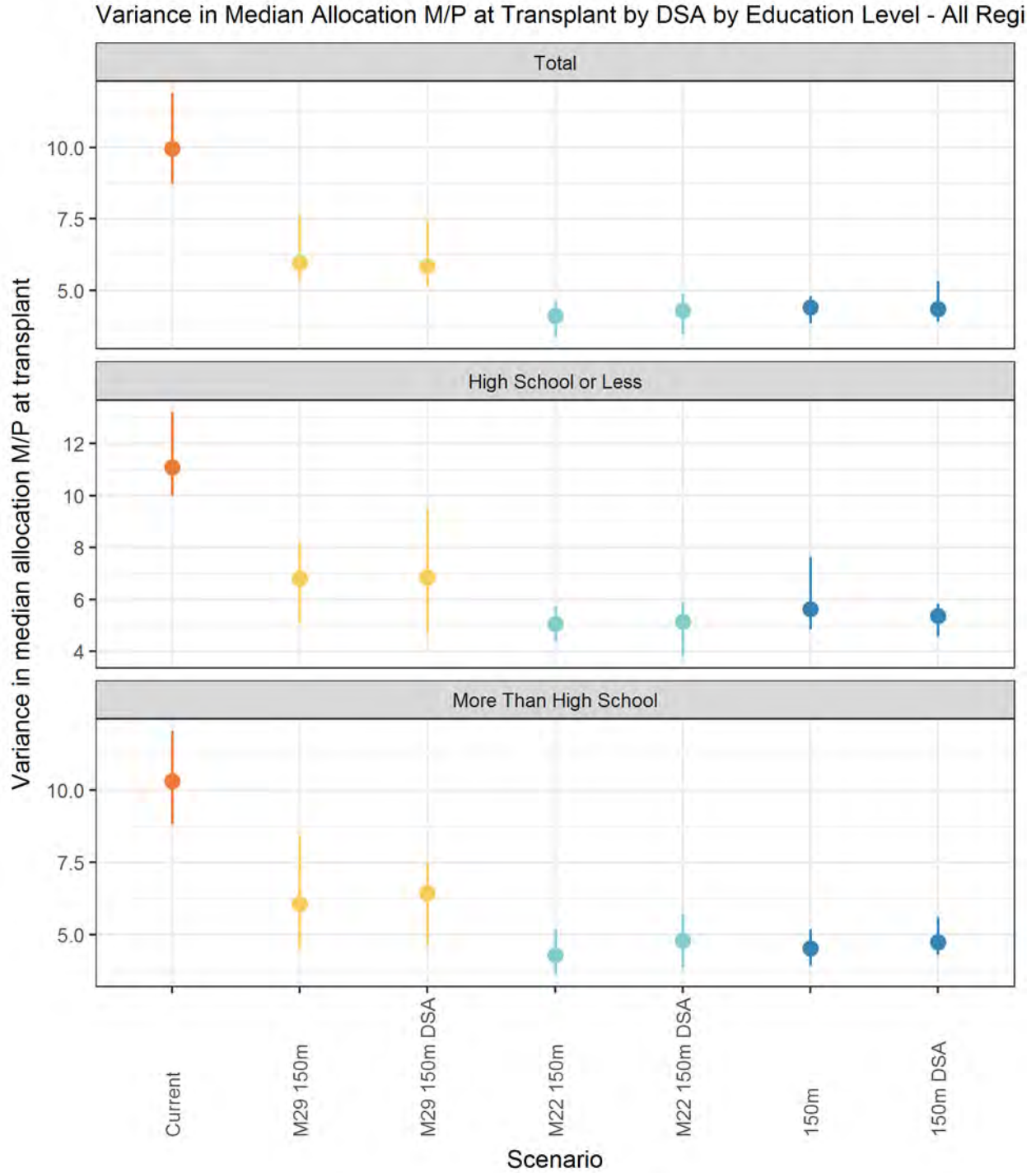


Figure 186 Variance in median allocation M/P at transplant by DSA by education level - all regions

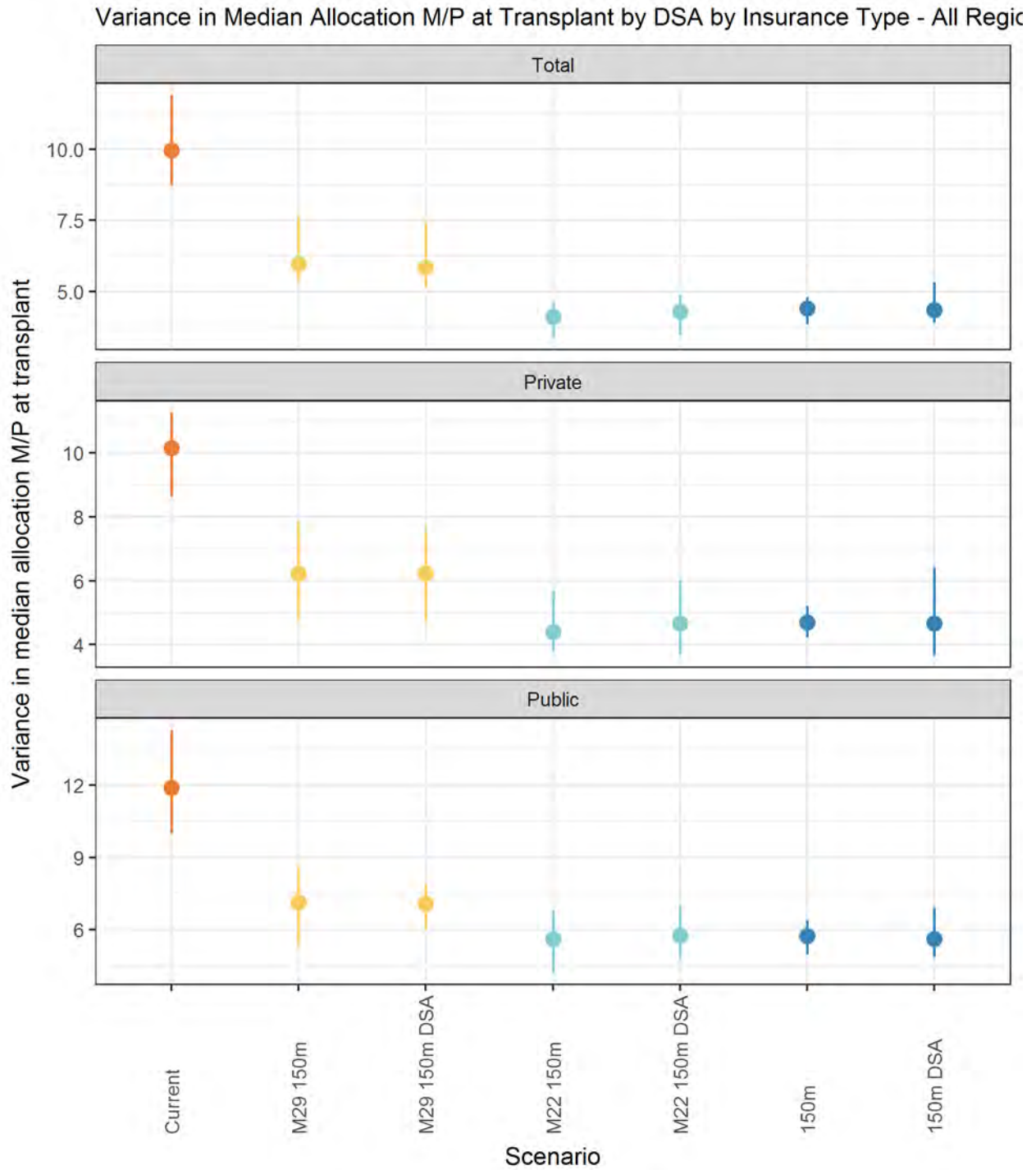


Figure 187 Variance in median allocation M/P at transplant by DSA by insurance type - all regions

Variance in Median Allocation M/P at Transplant by DSA by Urban/Rural - All Regions

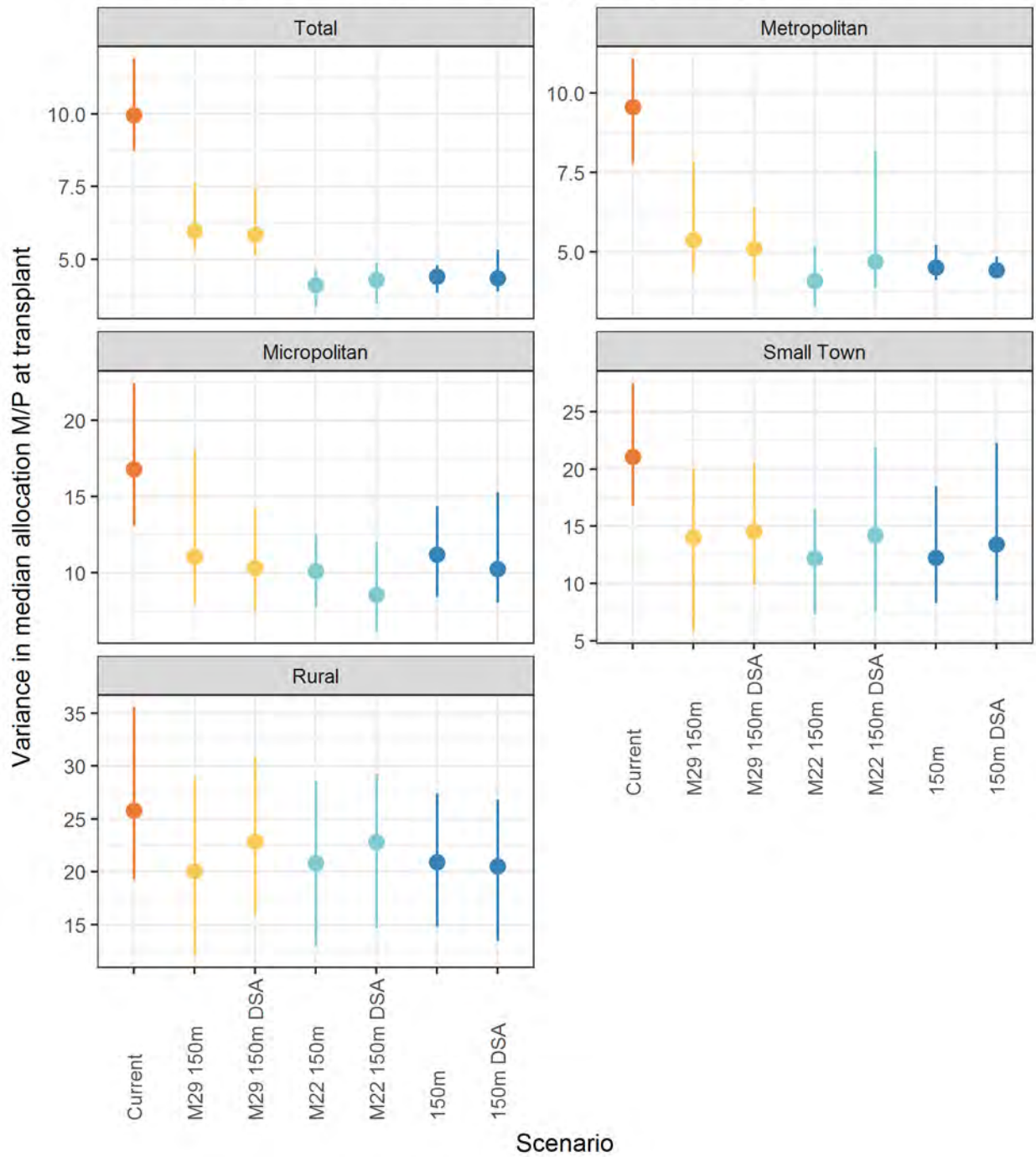


Figure 188 Variance in median allocation M/P at transplant by DSA by urban/rural - all regions

Median Allocation MELD/PELD at Transplant

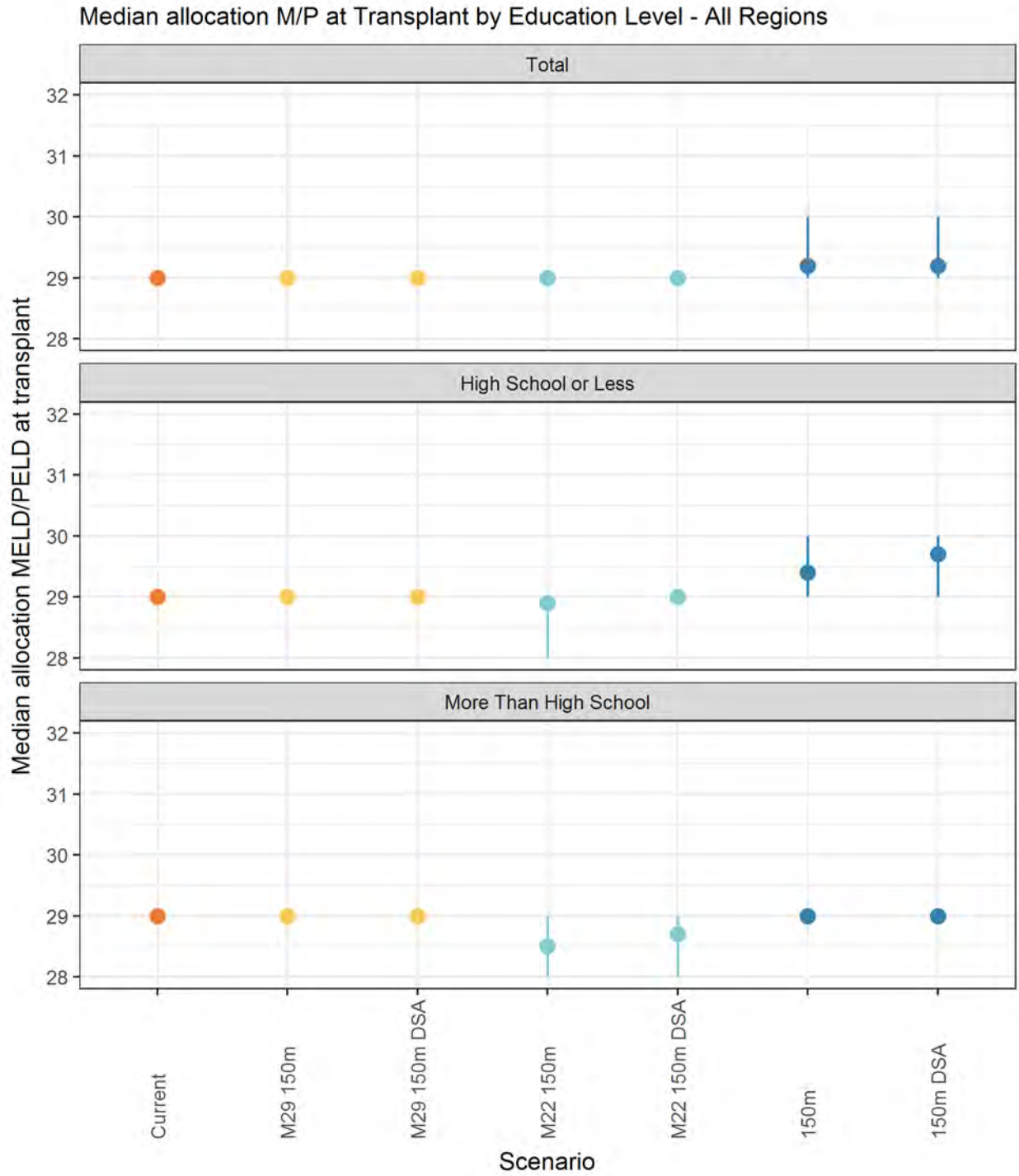


Figure 189 Median allocation MELD/PELD at transplant by education level - all regions

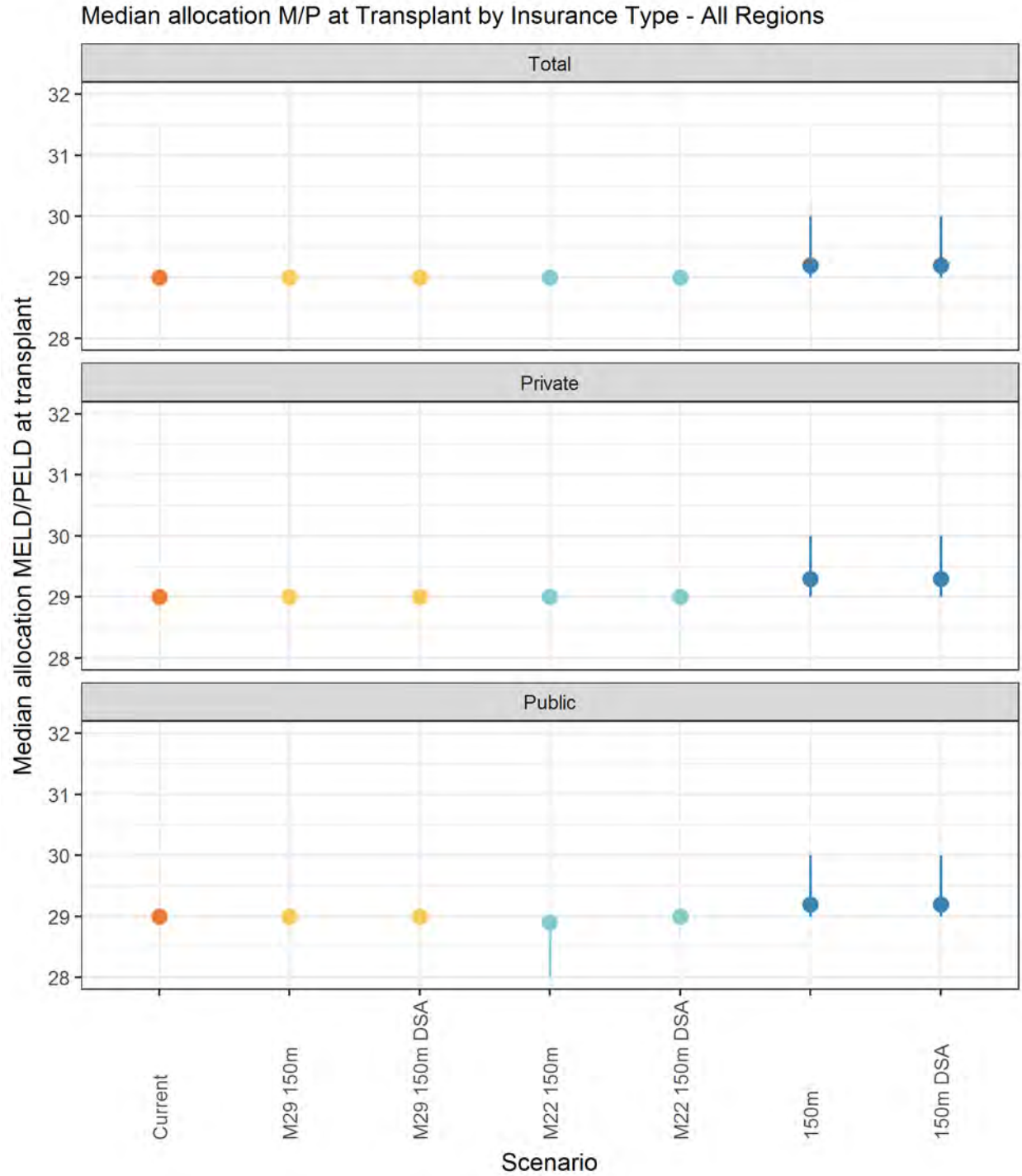


Figure 190 Median allocation MELD/PELD at transplant by insurance type - all regions

Median allocation M/P at Transplant by Urban/Rural - All Regions

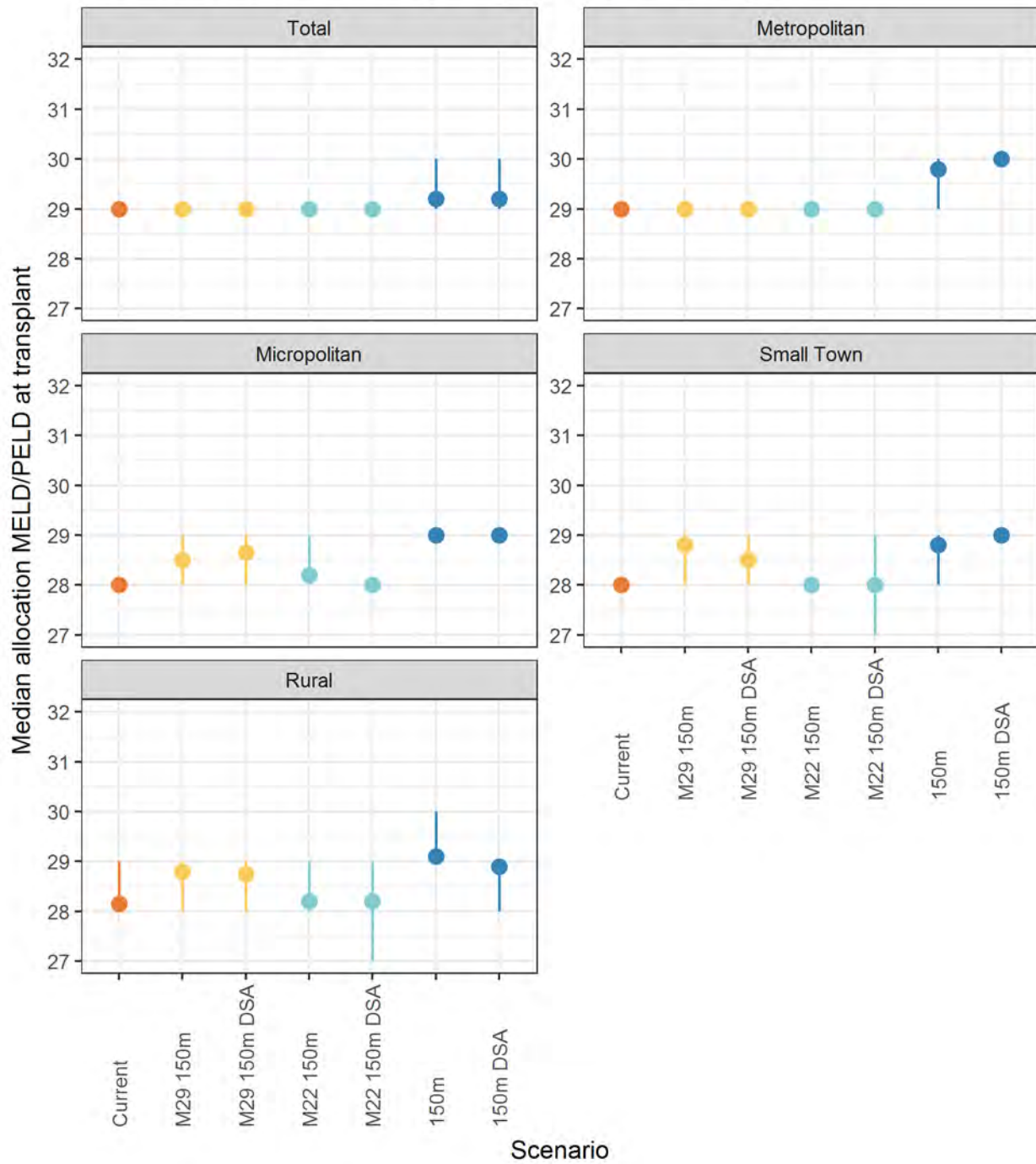


Figure 191 Median allocation MELD/PELD at transplant by urban/rural - all regions

Transplant

Transplant Rates

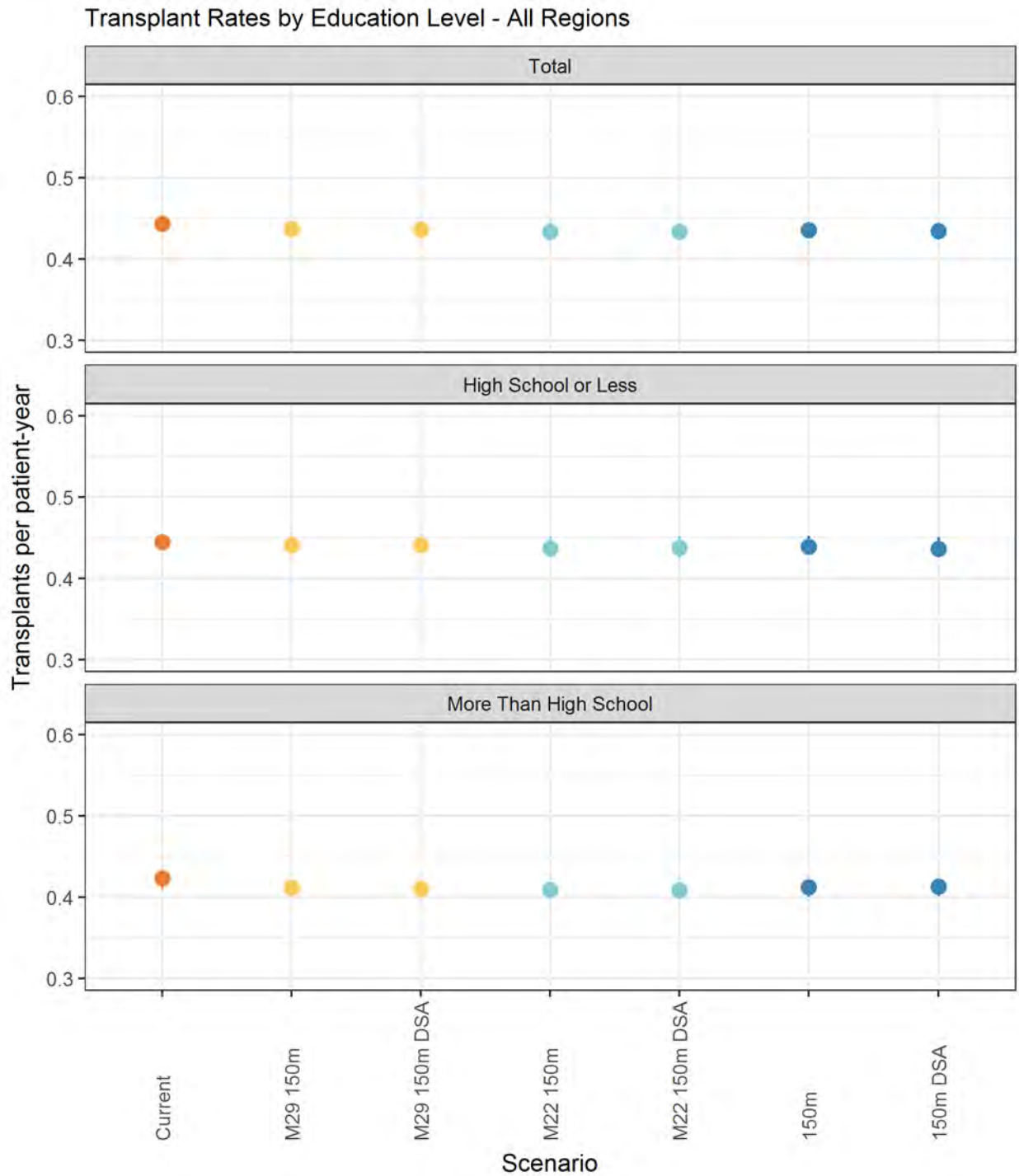


Figure 192 Transplant rates by education level - all regions

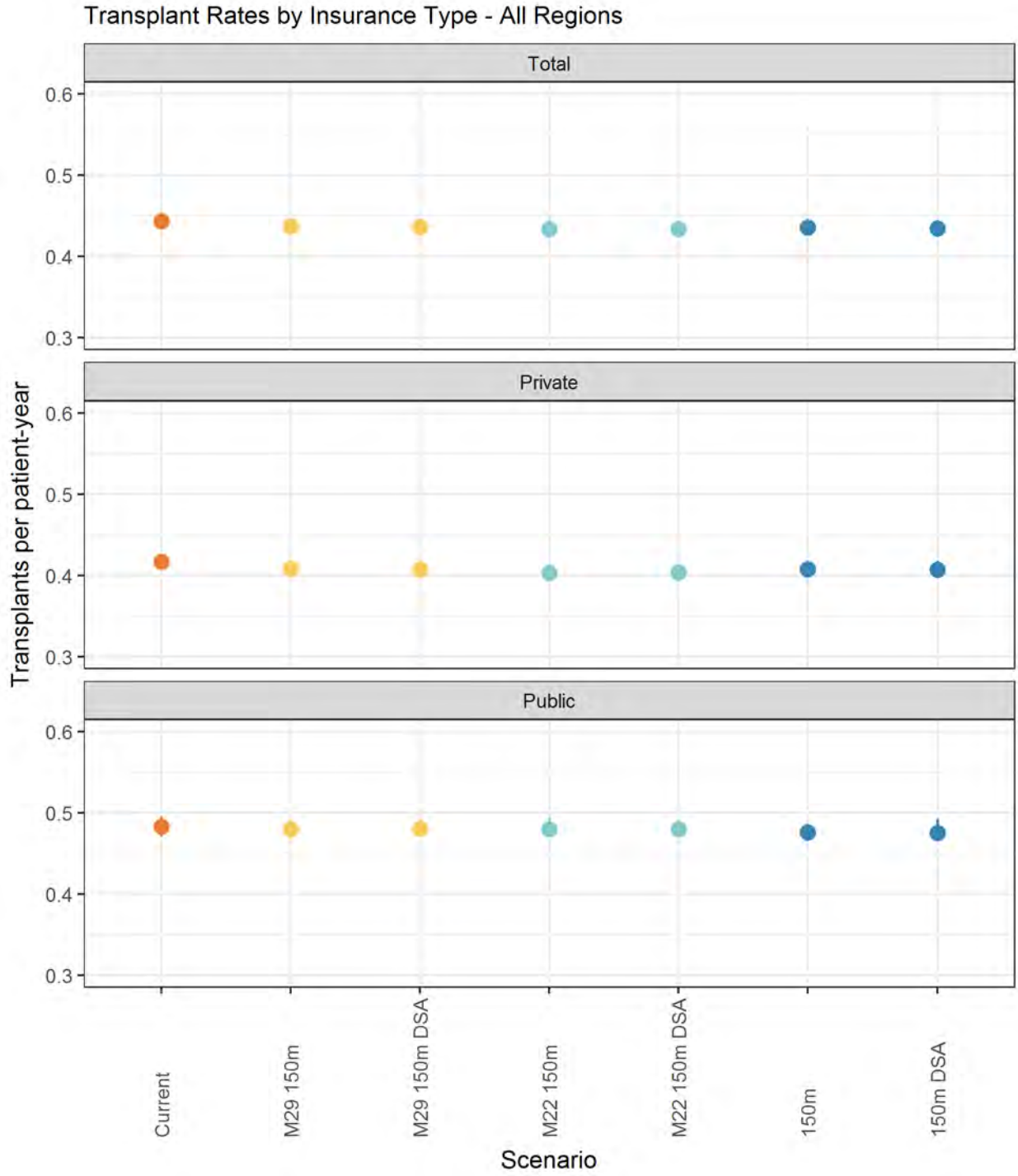


Figure 193 Transplant rates by insurance type - all regions

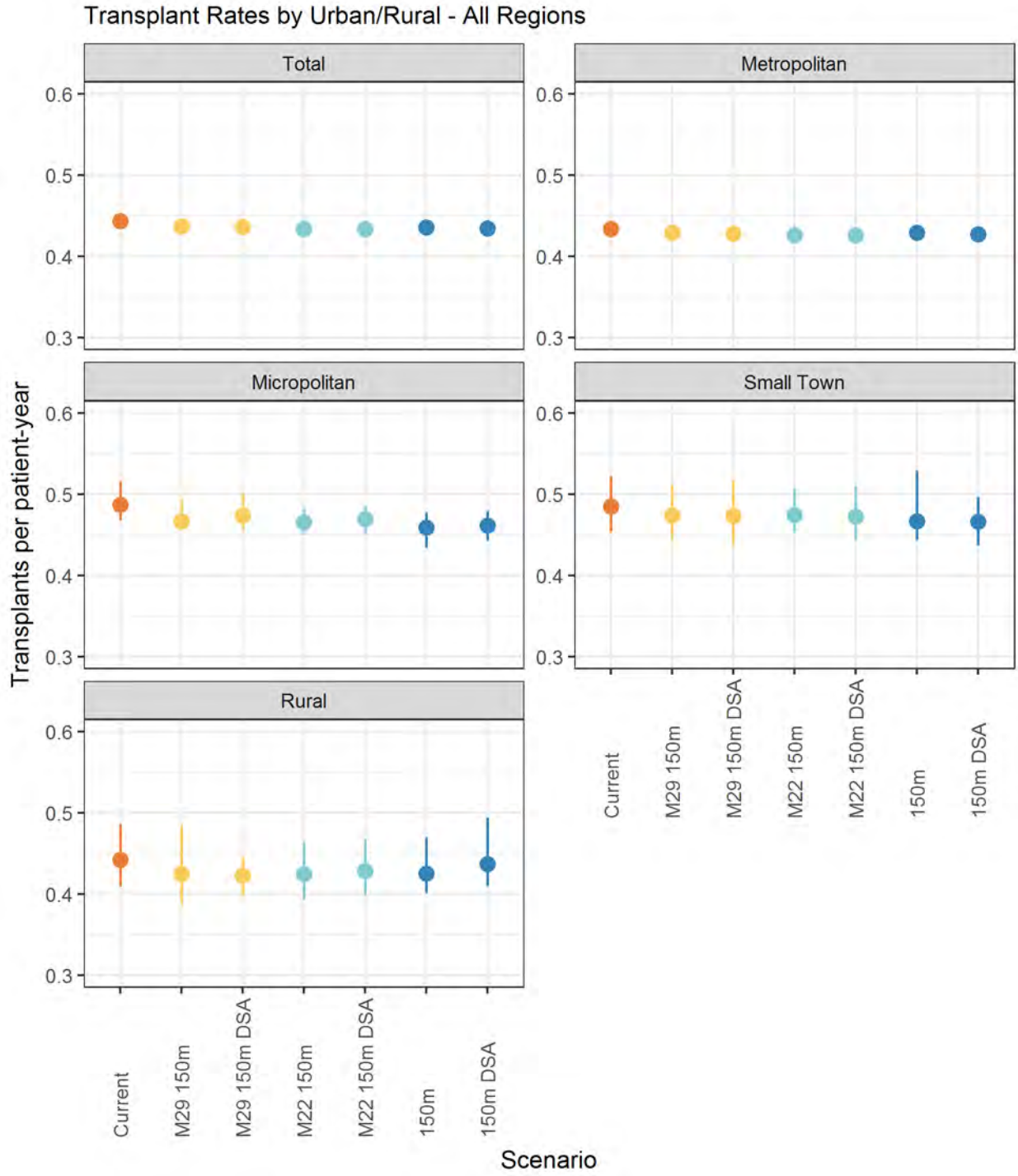


Figure 194 Transplant rates by urban/rural - all regions

Transplant Counts

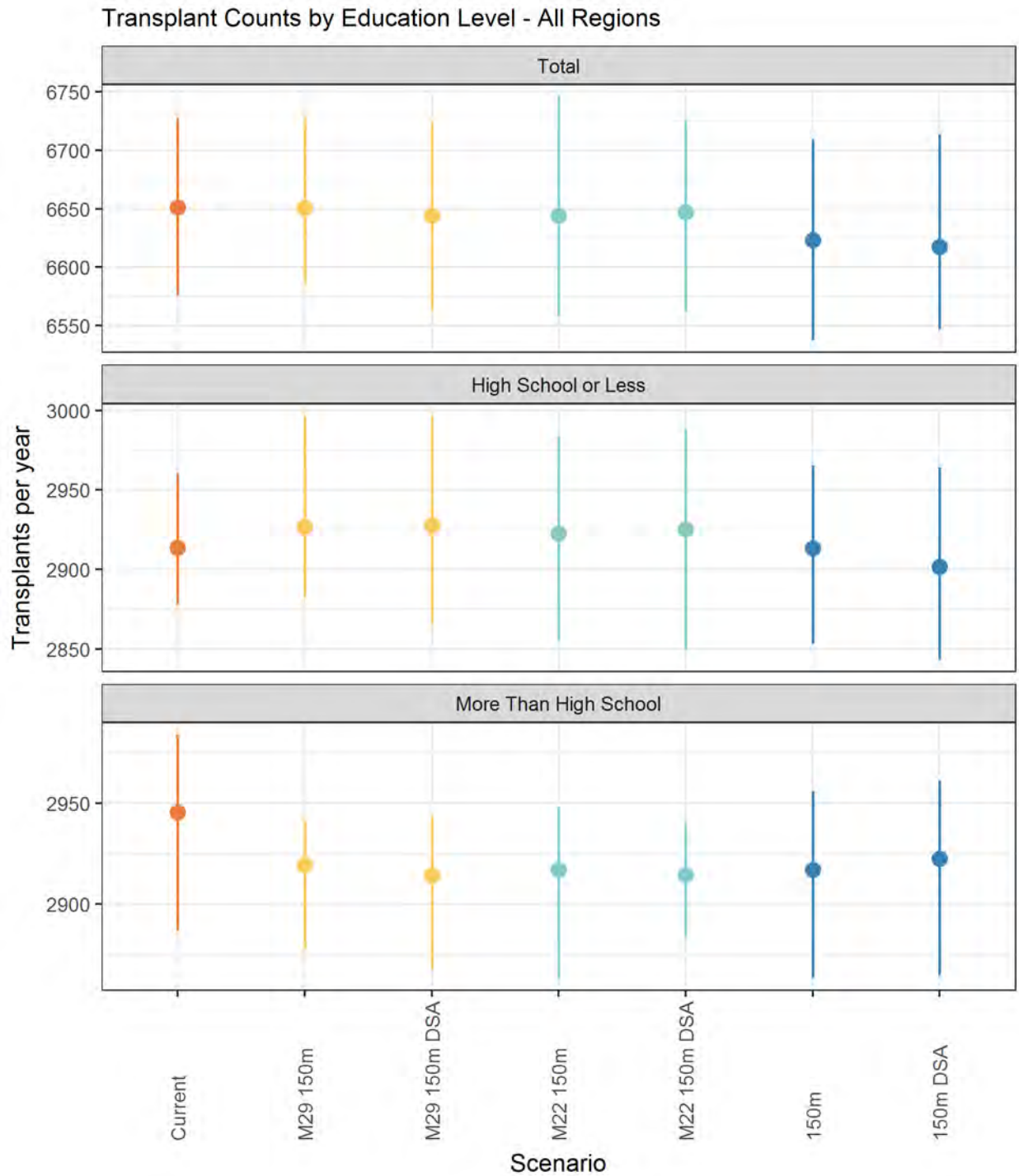


Figure 195 Transplant counts by education level - all regions

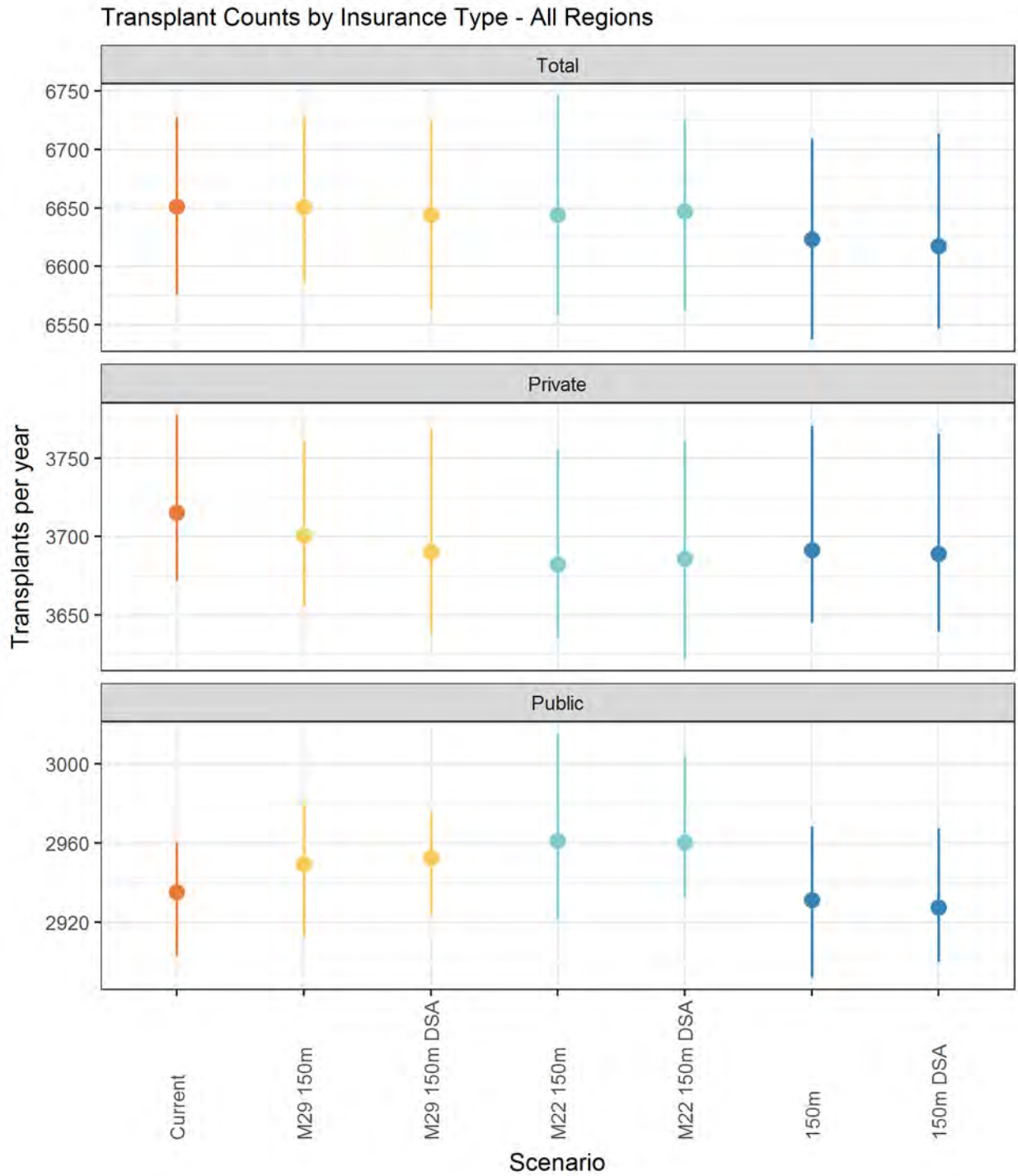


Figure 196 Transplant counts by insurance type - all regions

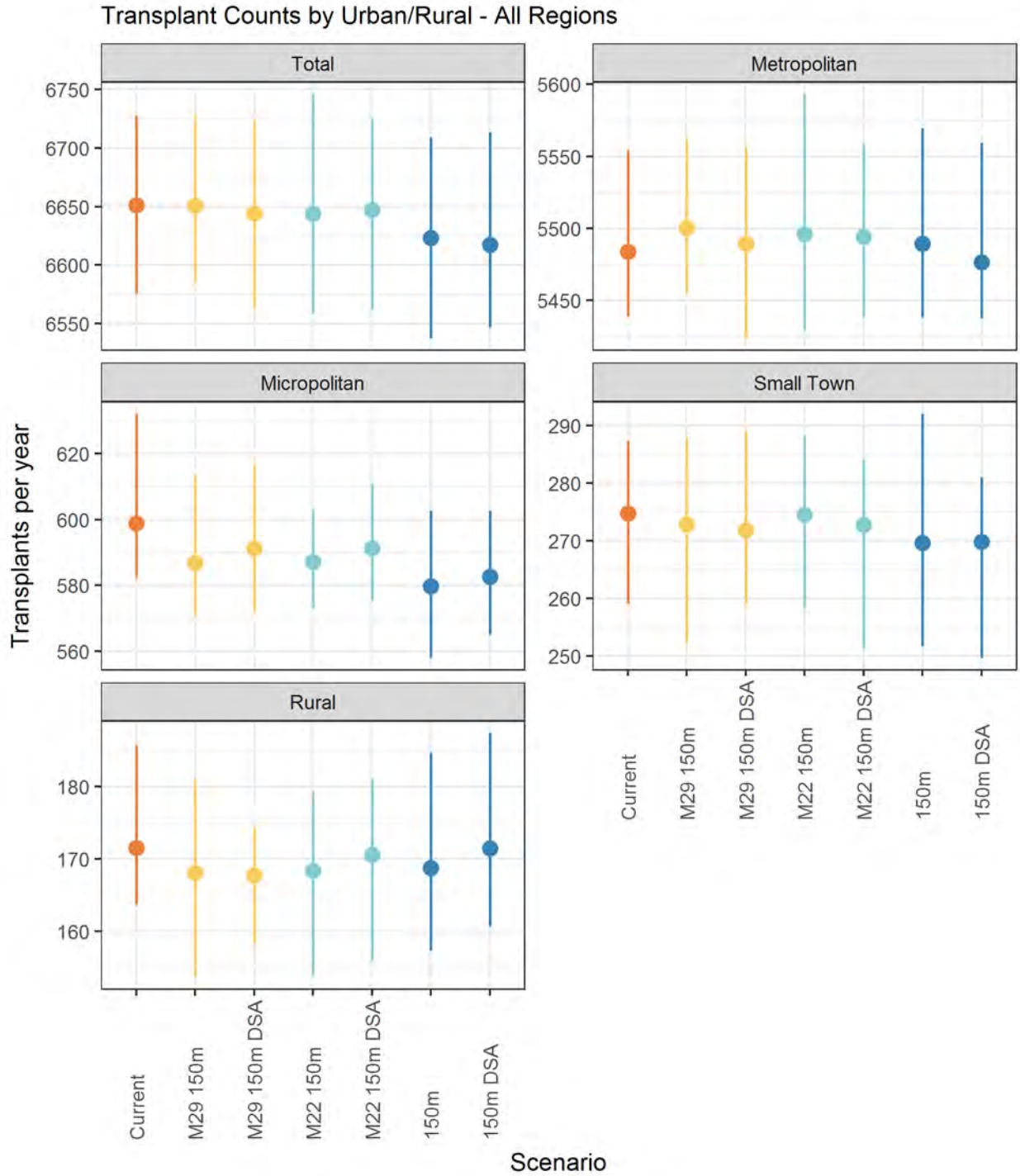


Figure 197 Transplant counts by urban/rural - all regions

Variance in Transplant Rates by DSA

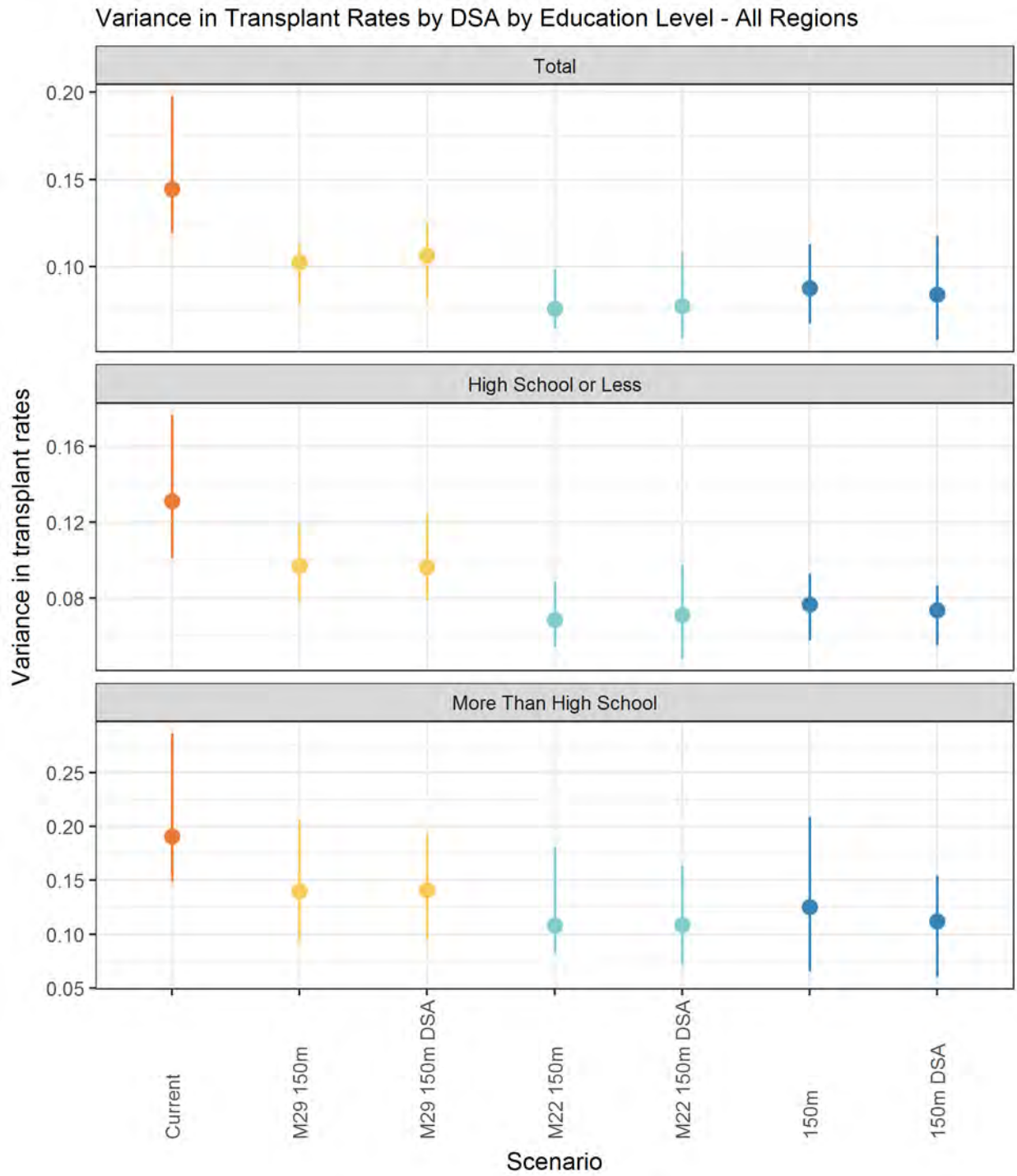


Figure 198 Variance in transplant rates by DSA by education level - all regions

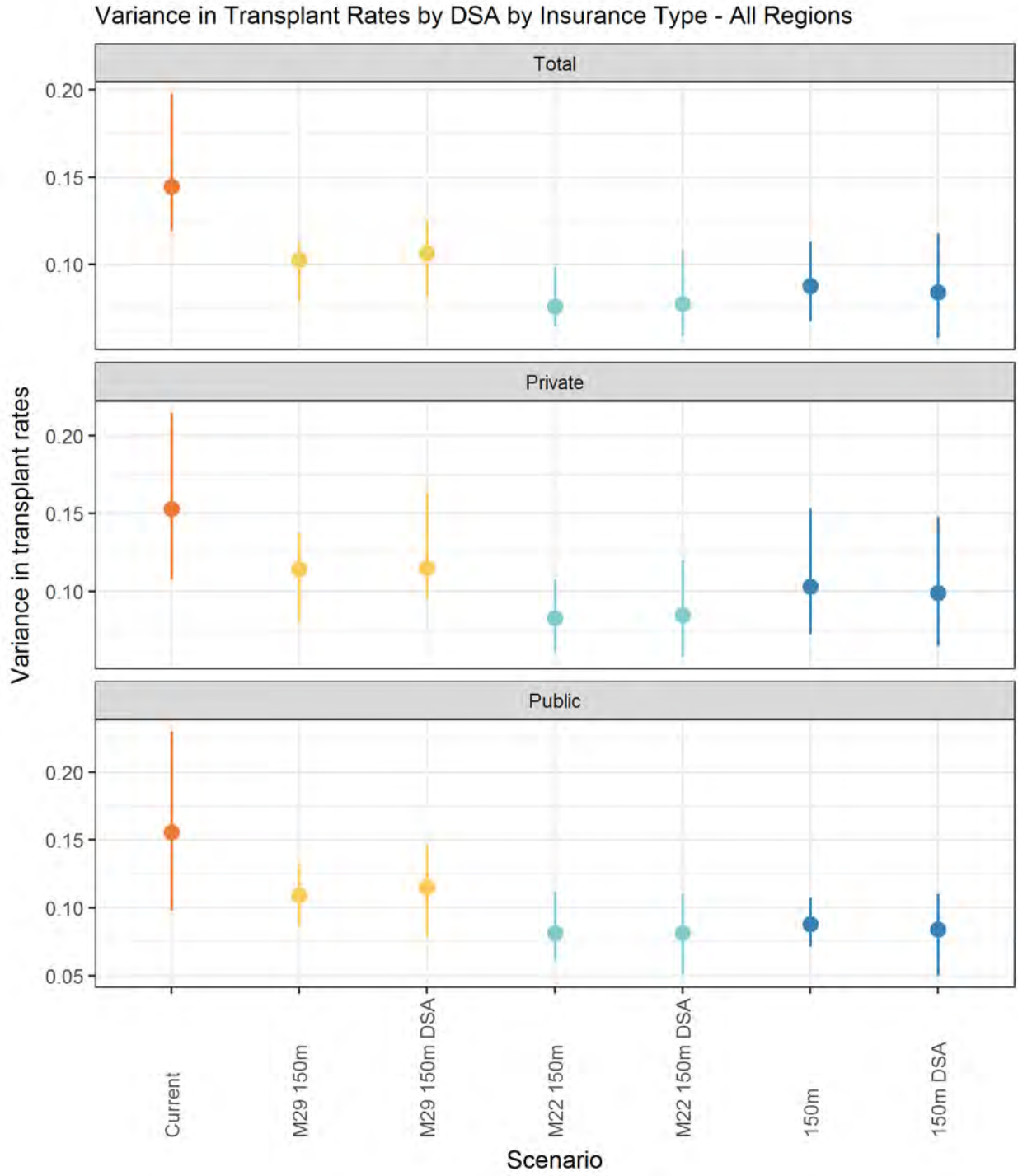


Figure 199 Variance in transplant rates by DSA by insurance type - all regions

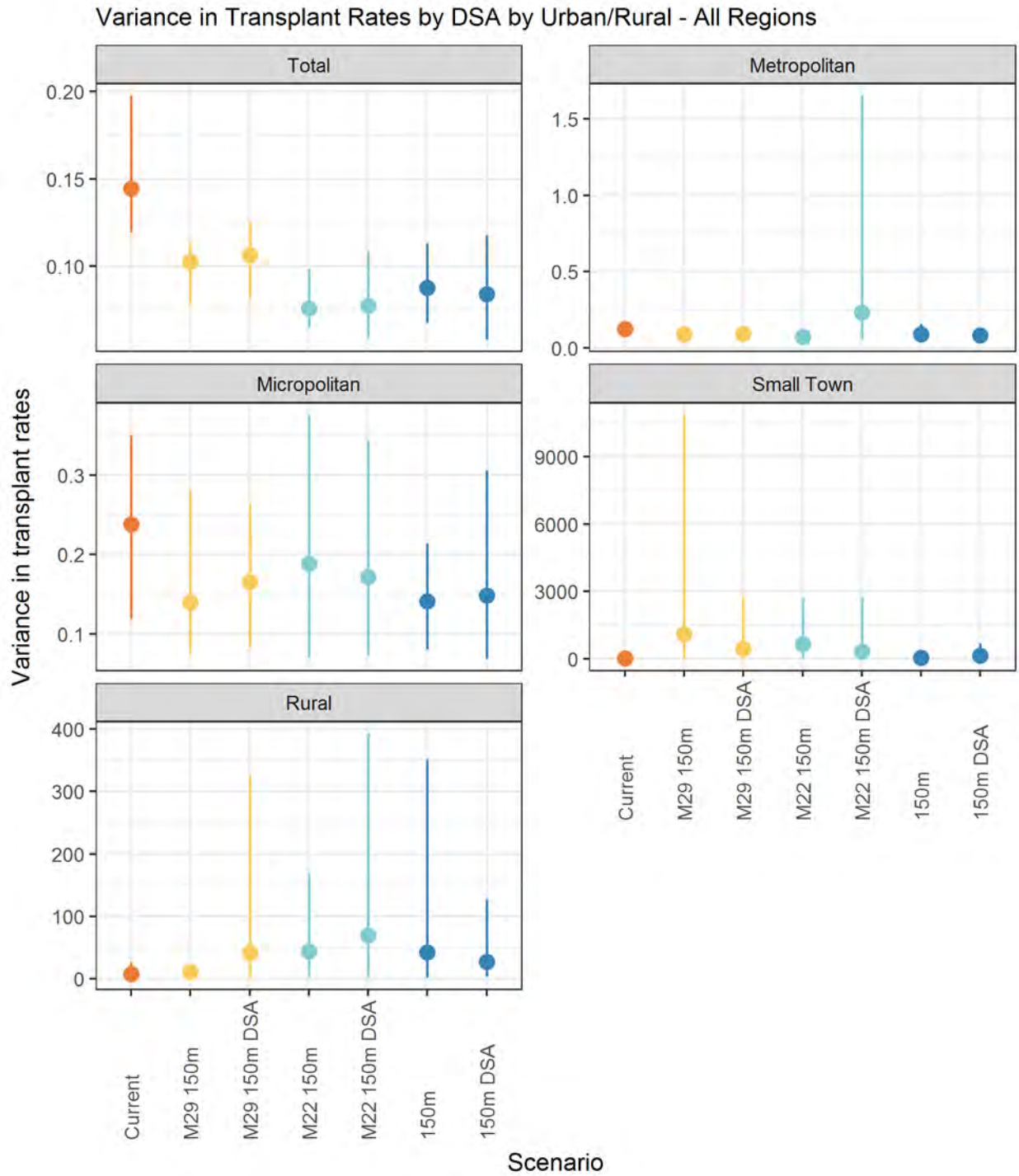


Figure 200 Variance in transplant rates by DSA by urban/rural - all regions

Waitlist Mortality

Waitlist Mortality Rates

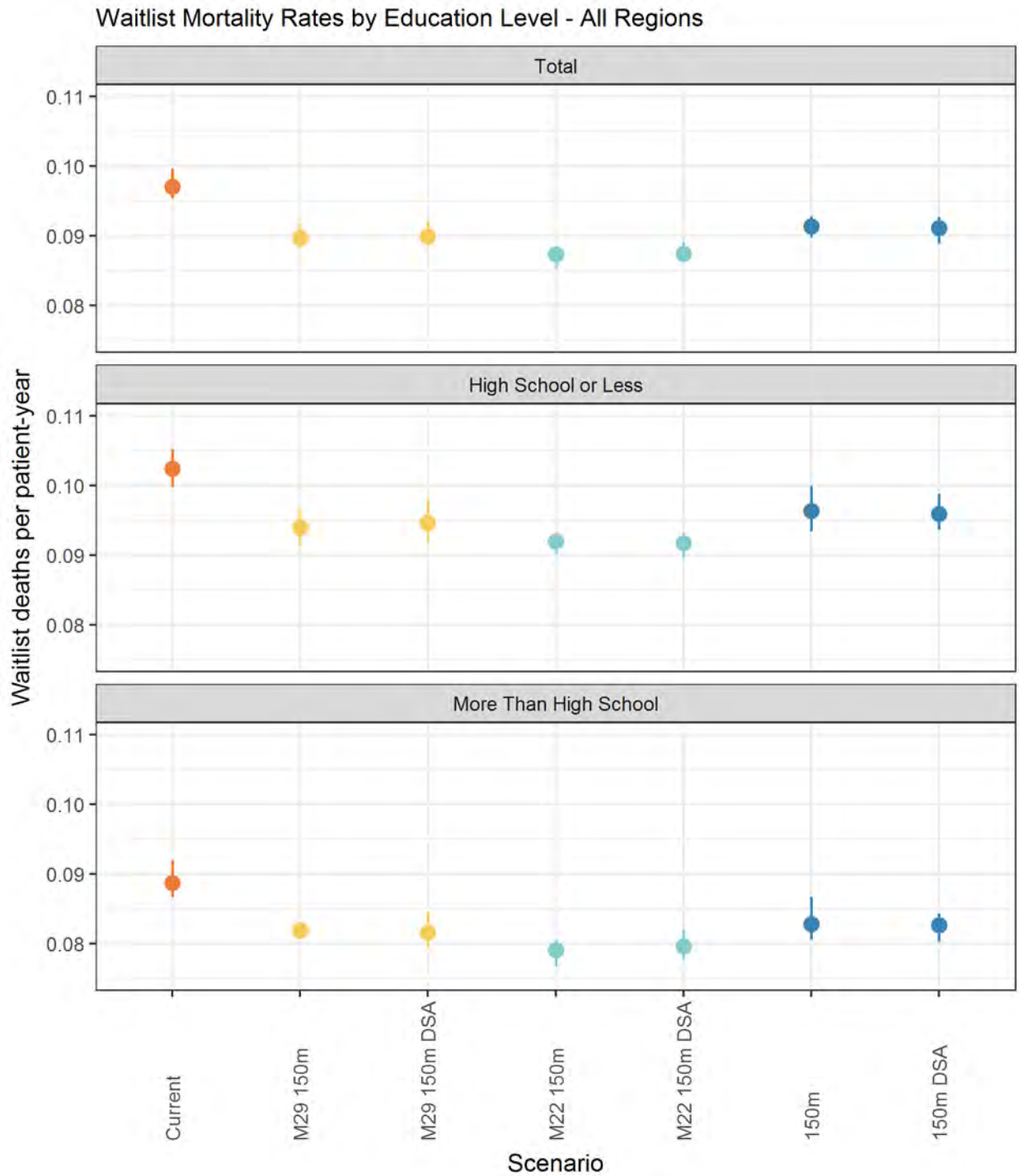


Figure 201 Waitlist mortality rates by education level - all regions

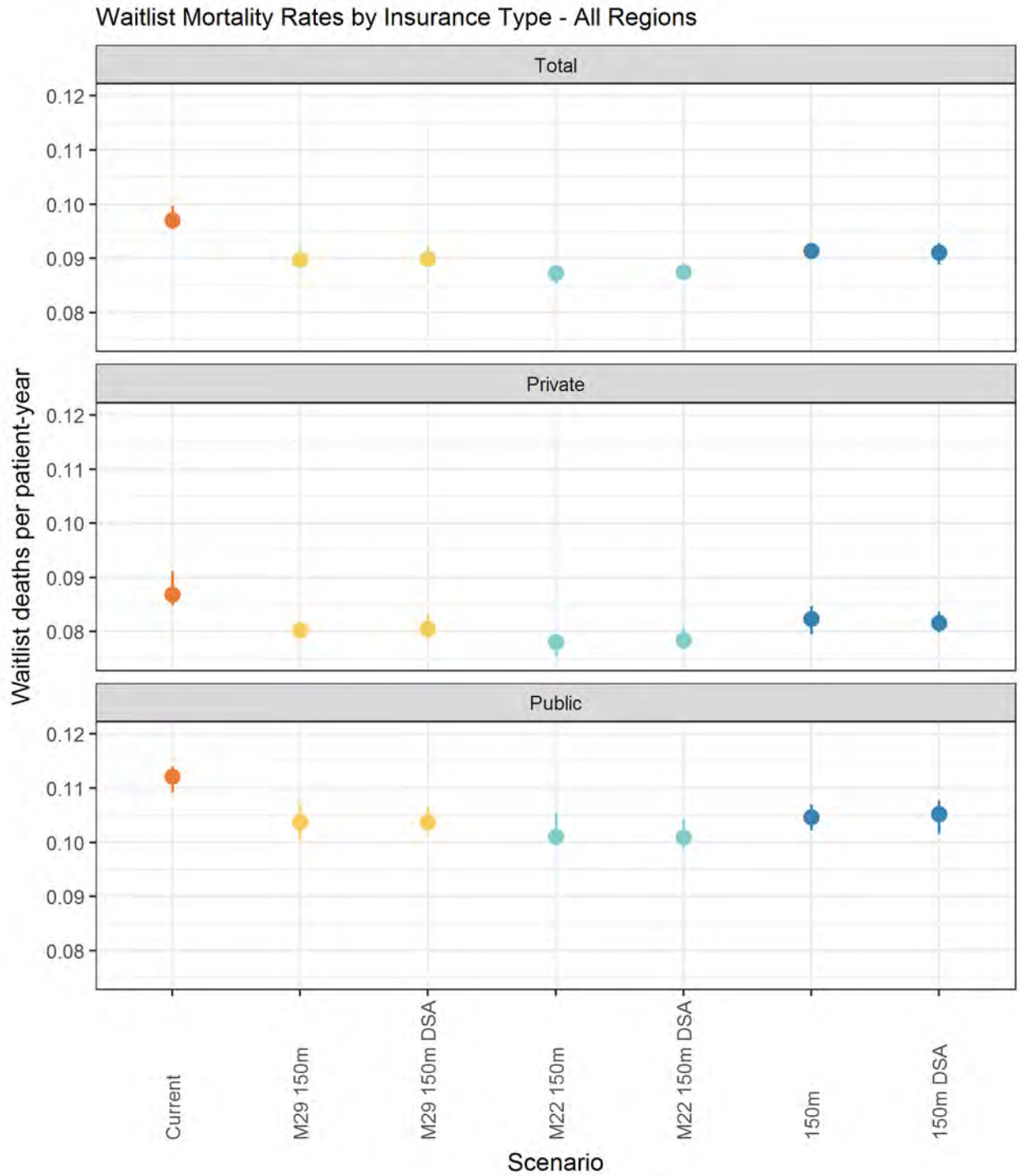


Figure 202 Waitlist mortality rates by insurance type - all regions

Waitlist Mortality Rates by Urban/Rural - All Regions

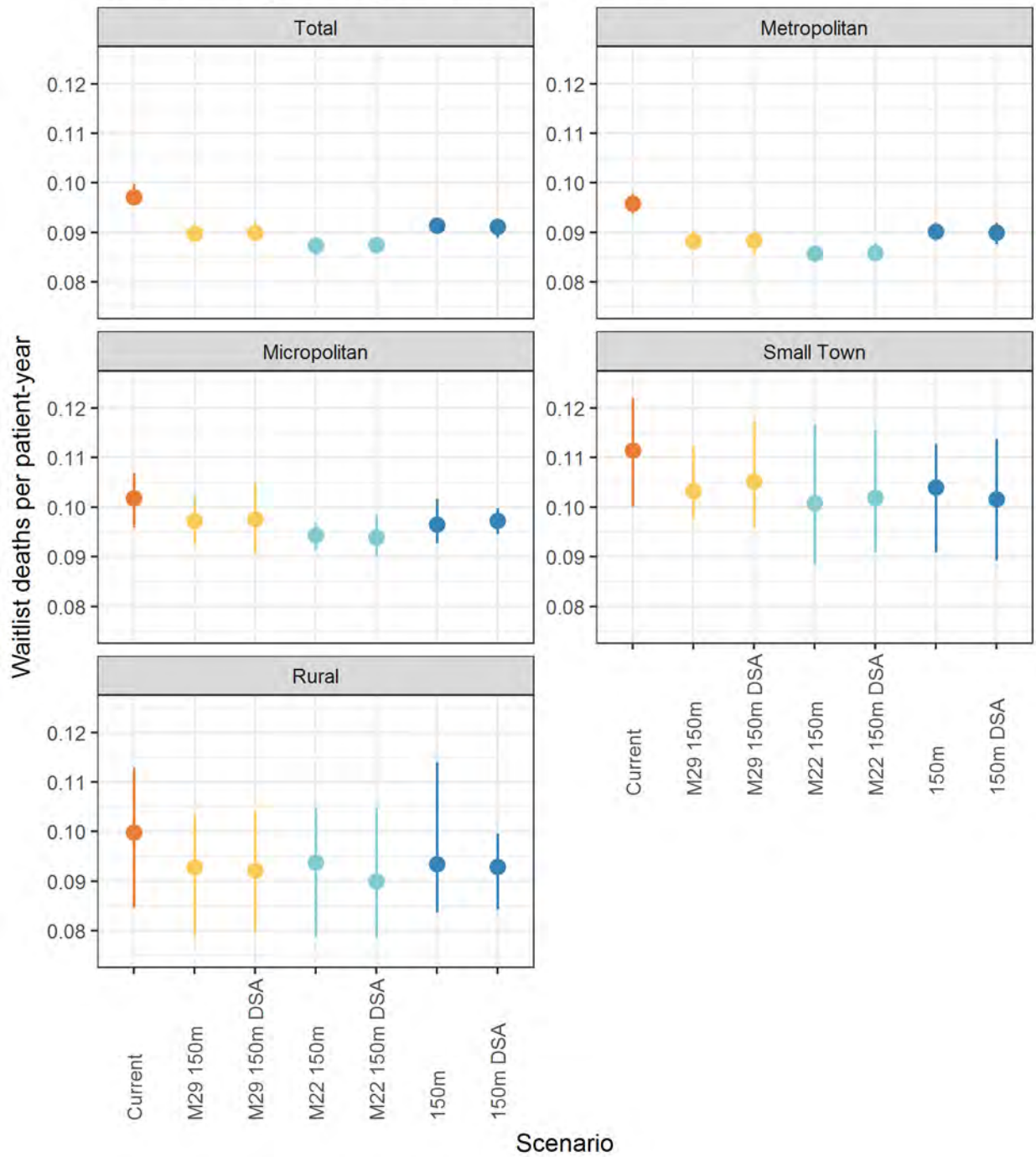


Figure 203 Waitlist mortality rates by urban/rural - all regions

Waitlist Mortality Counts

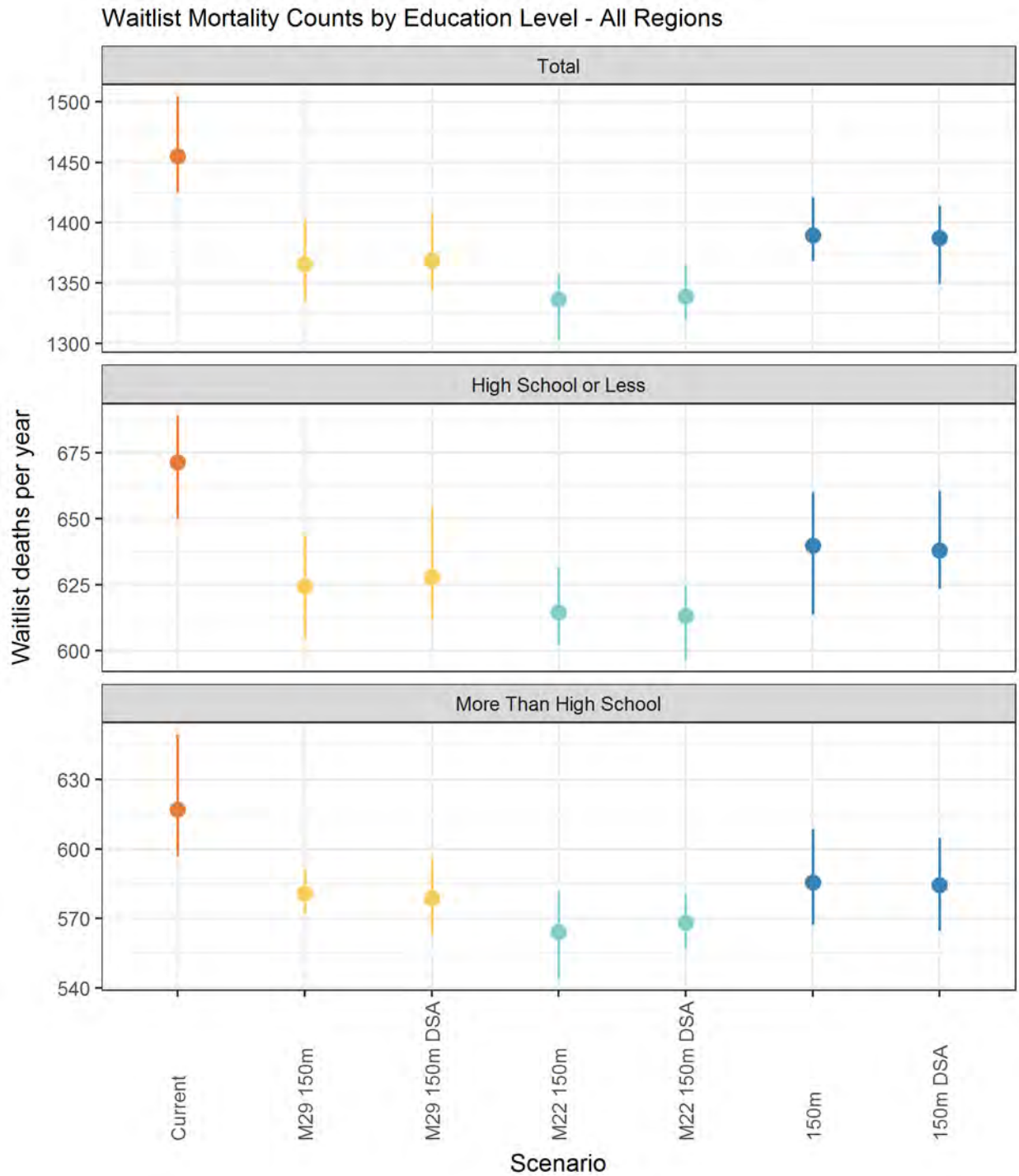


Figure 204 Waitlist mortality counts by education level - all regions

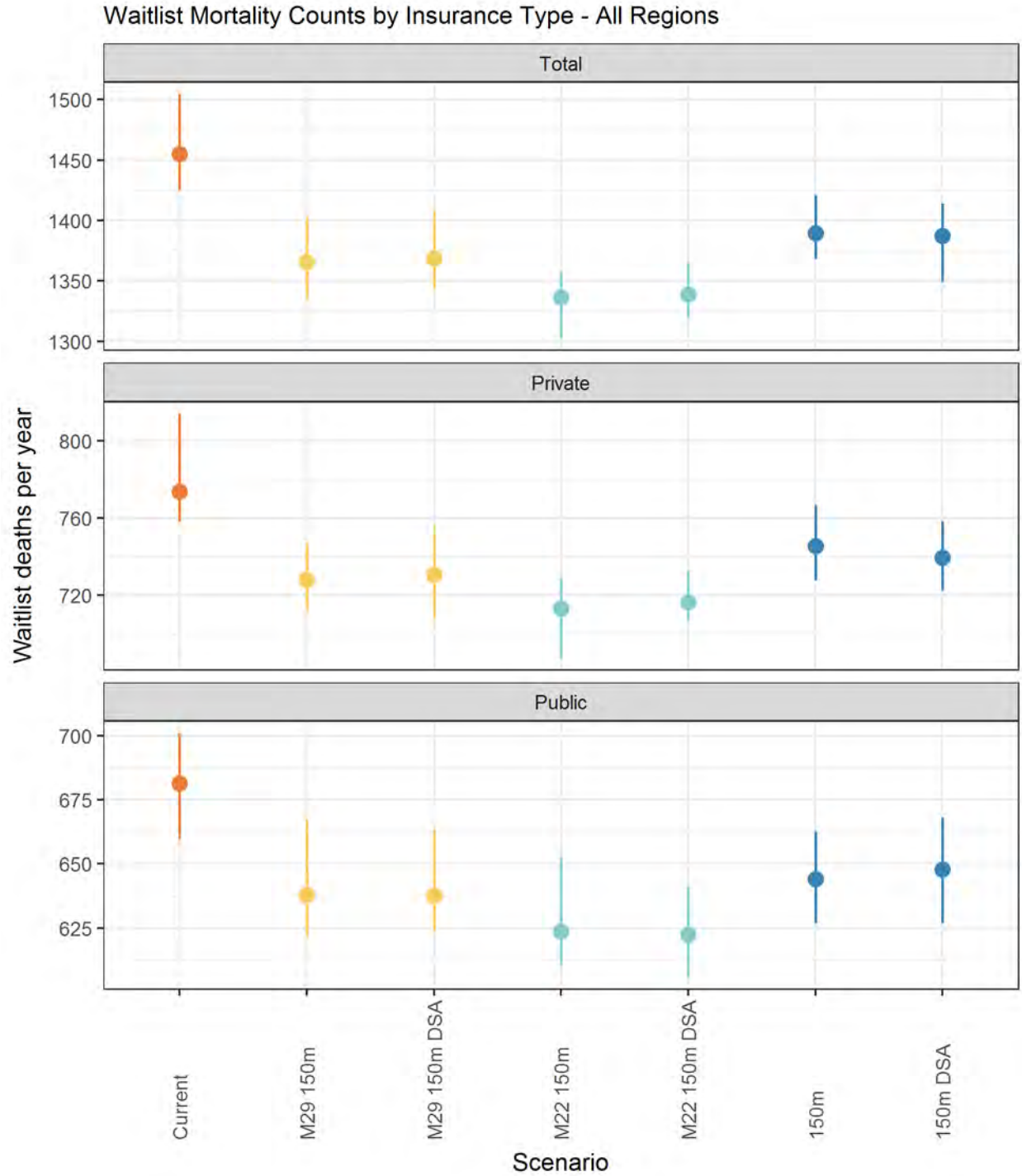


Figure 205 Waitlist mortality counts by insurance type - all regions

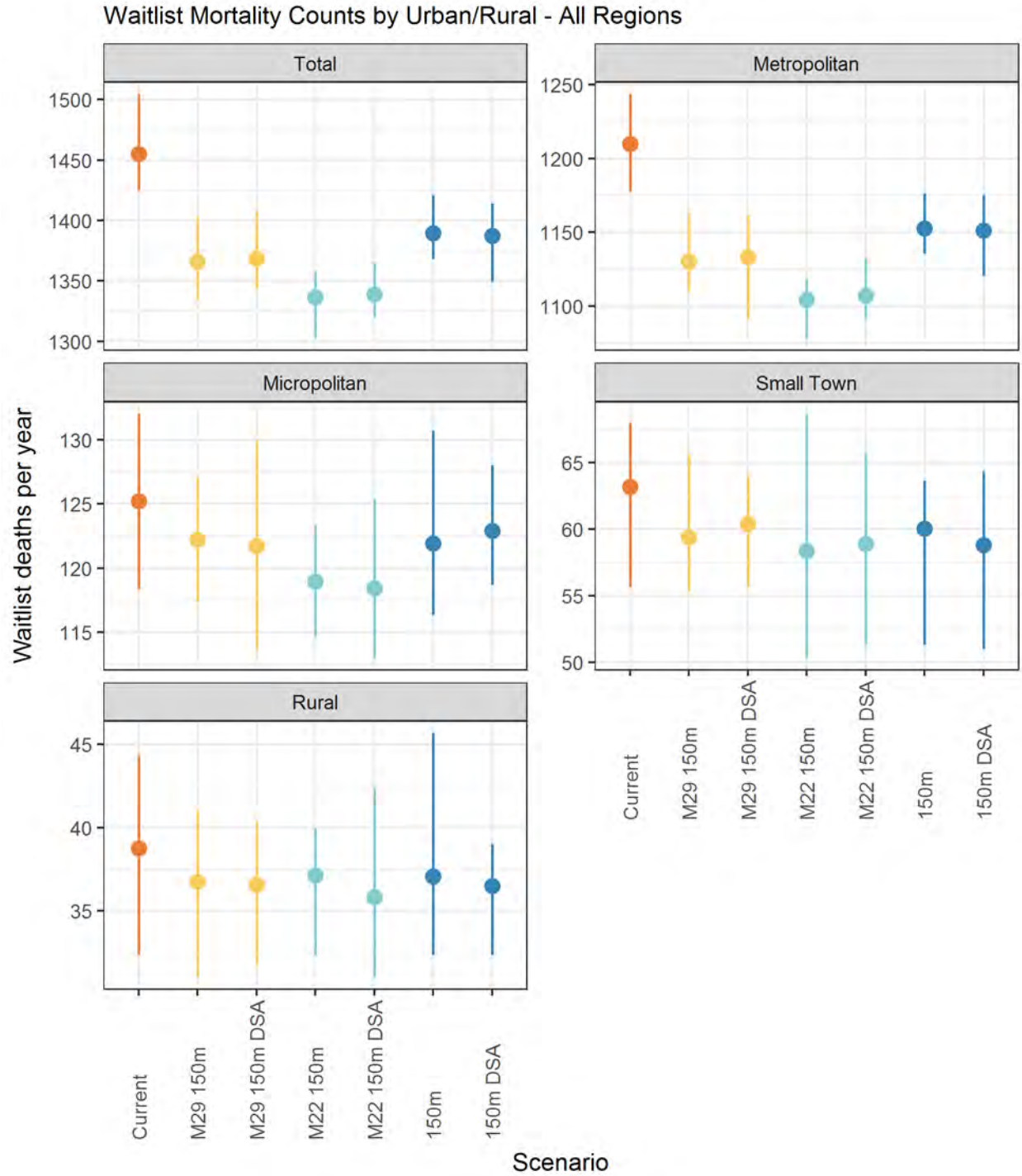


Figure 206 Waitlist mortality counts by urban/rural - all regions

Variance in Waitlist Mortality Rates by DSA

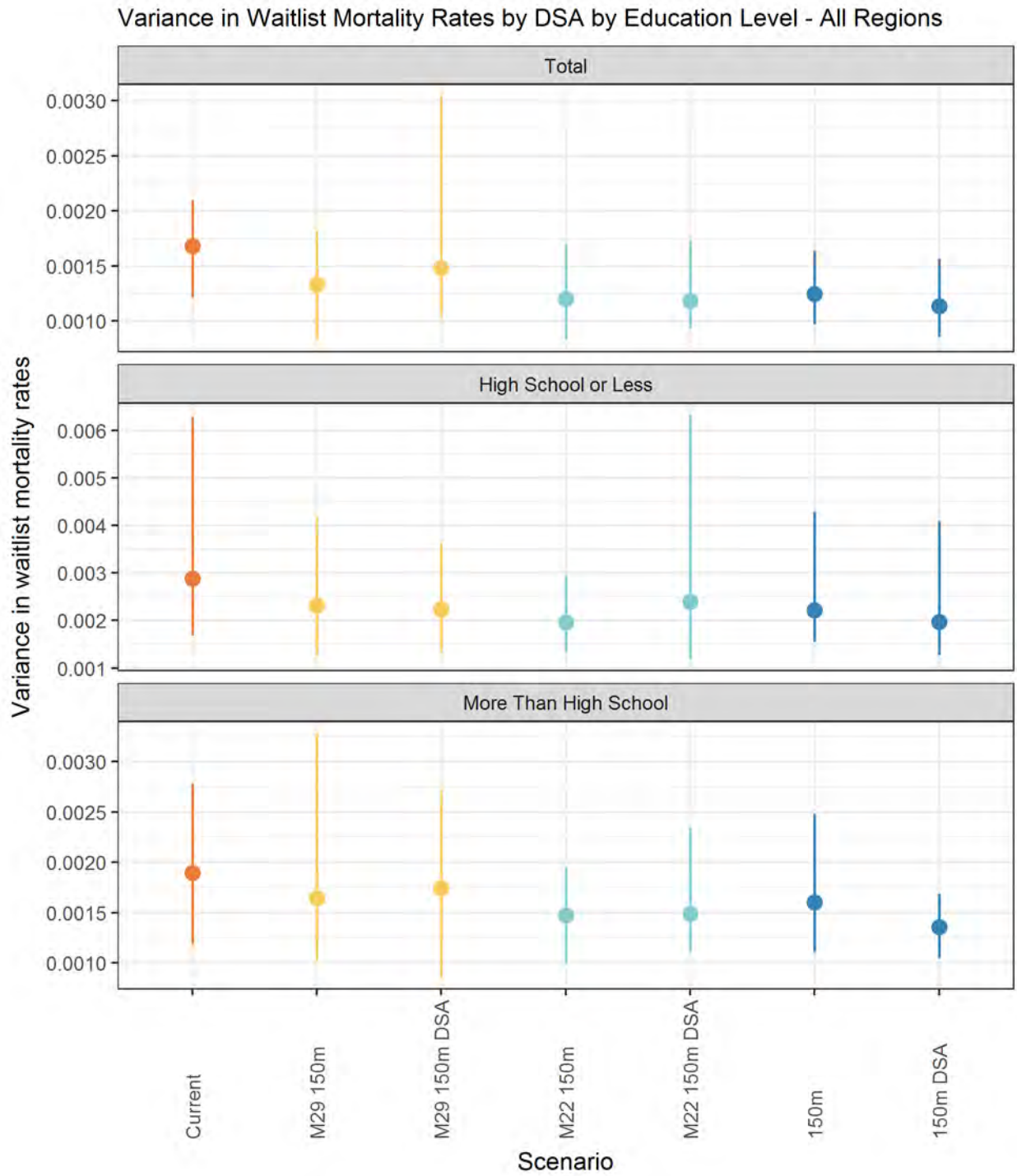


Figure 207 Variance in waitlist mortality rates by DSA by education level - all regions

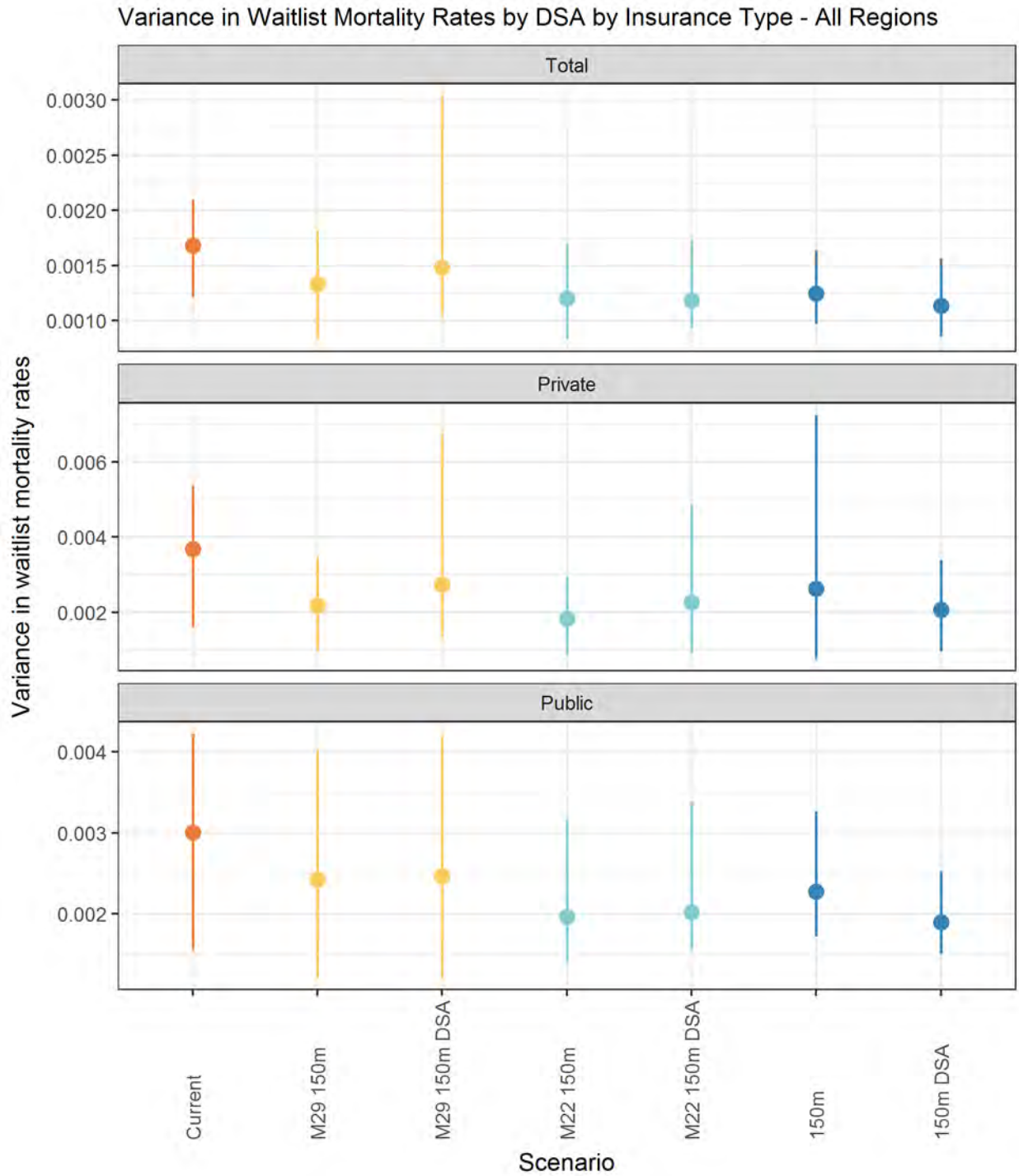


Figure 208 Variance in waitlist mortality rates by DSA by insurance type - all regions

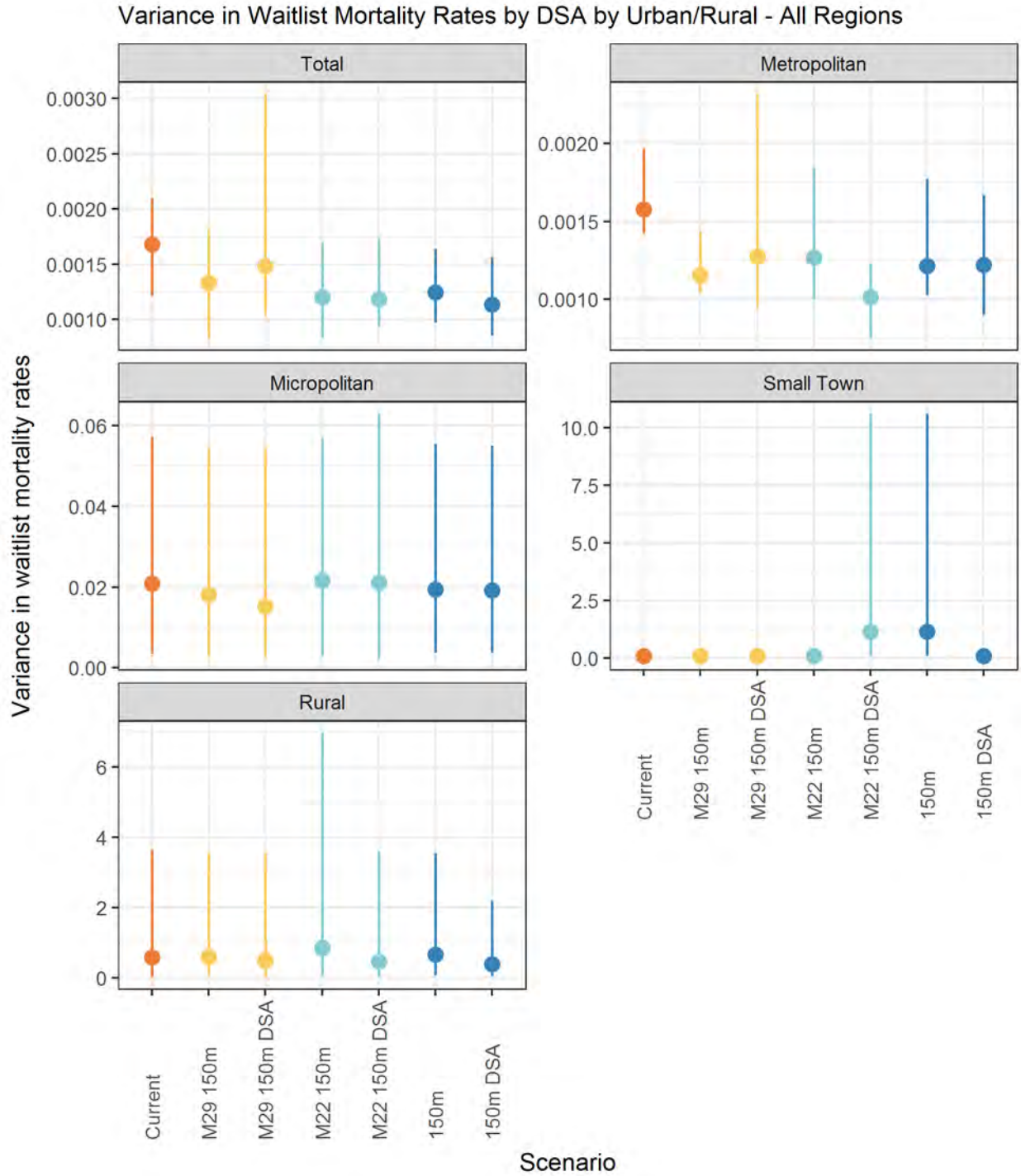


Figure 209 Variance in waitlist mortality rates by DSA by urban/rural - all regions

Posttransplant Mortality

Posttransplant Mortality Rates

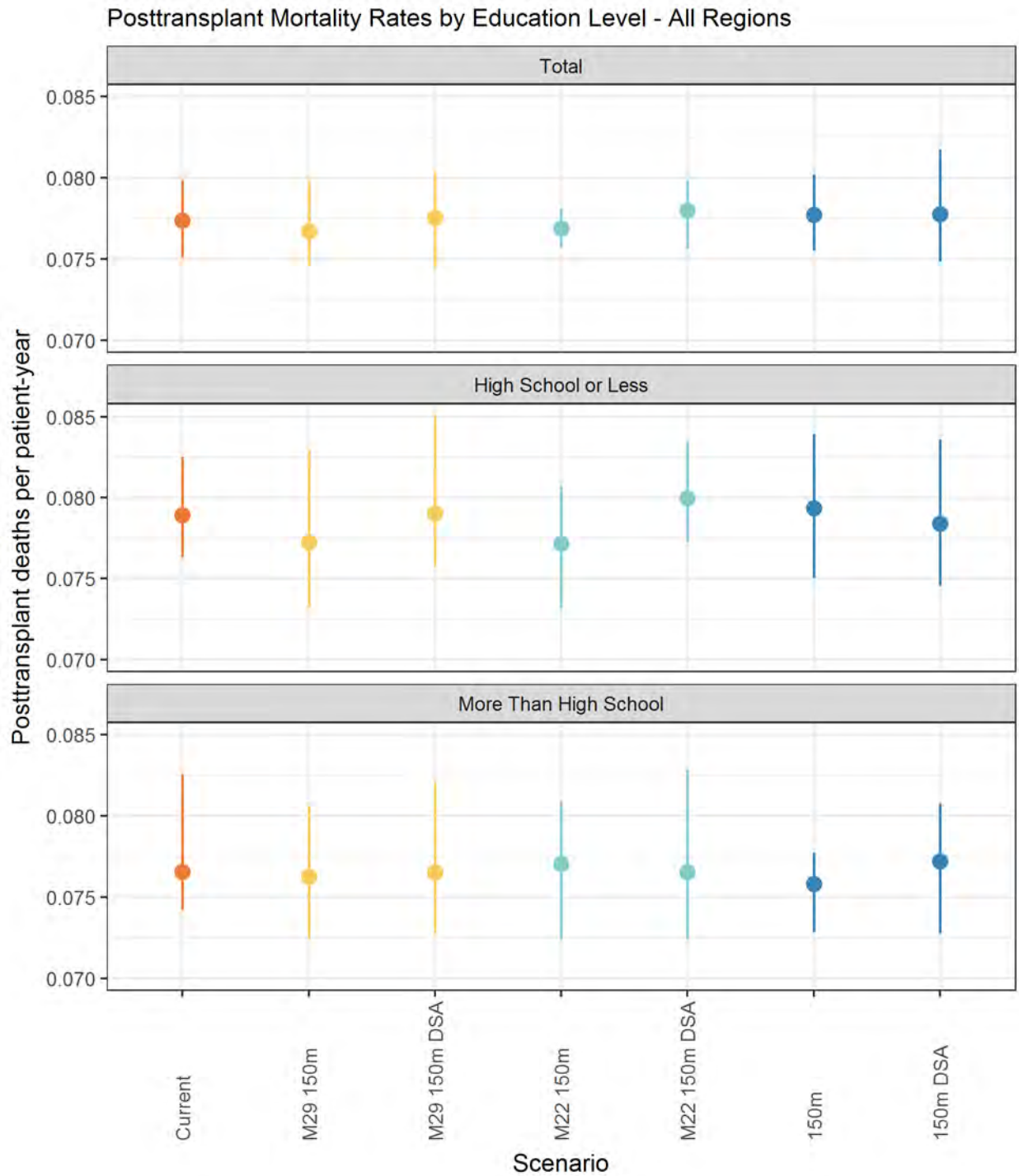


Figure 210 Posttransplant mortality rates by education level - all regions

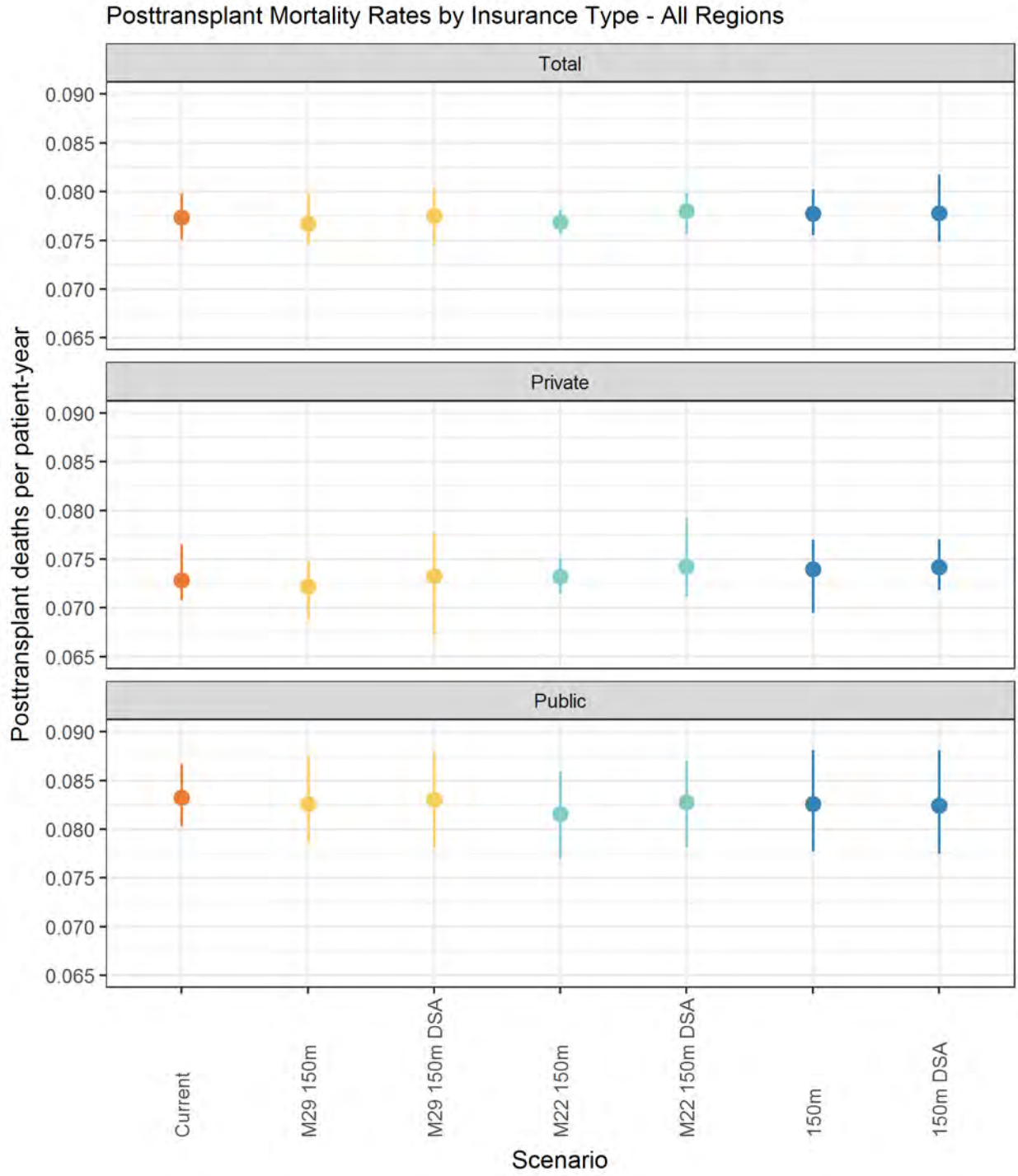


Figure 211 Posttransplant mortality rates by insurance type - all regions

Posttransplant Mortality Rates by Urban/Rural - All Regions

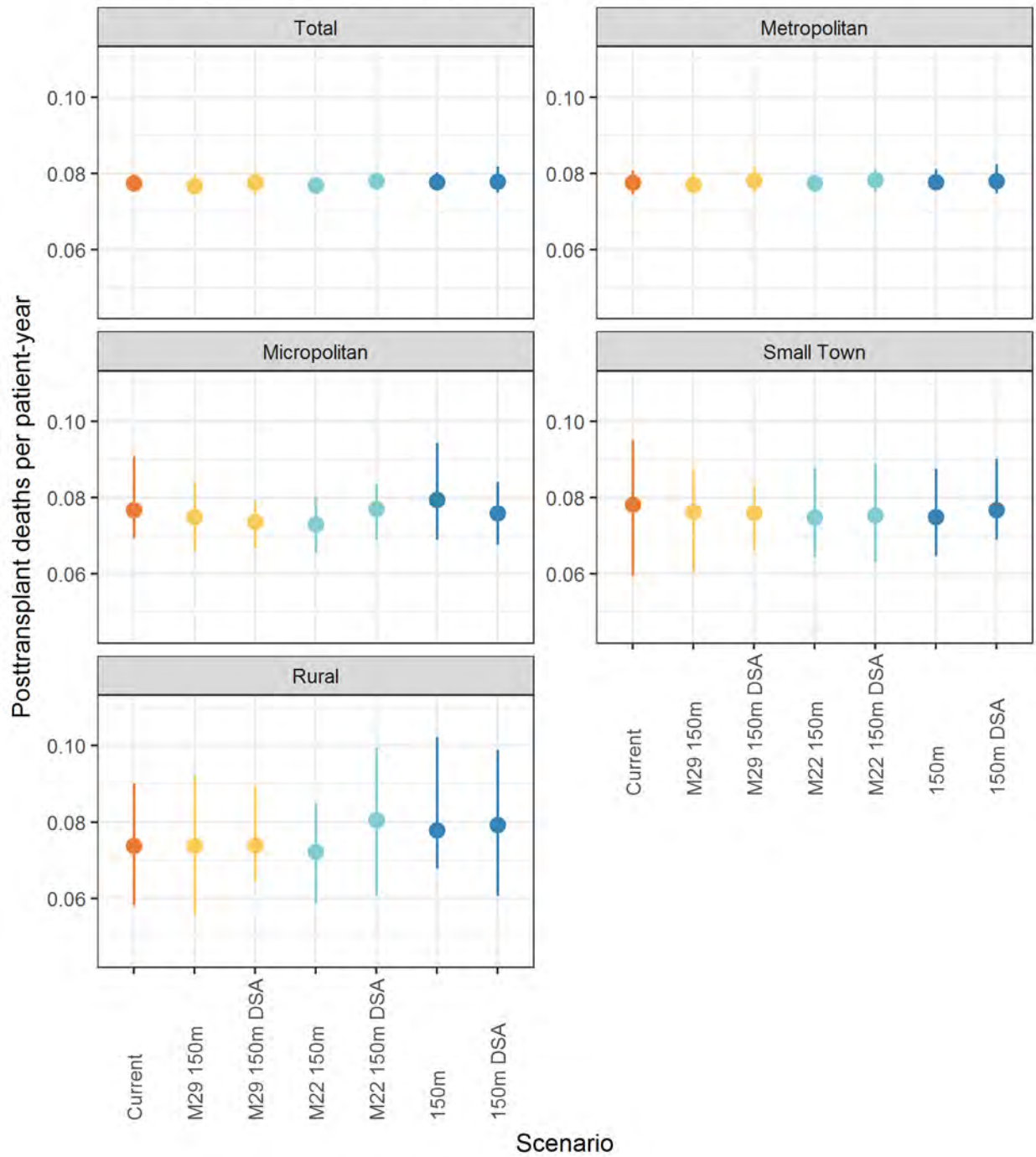


Figure 212 Posttransplant mortality rates by urban/rural - all regions

Posttransplant Mortality Counts

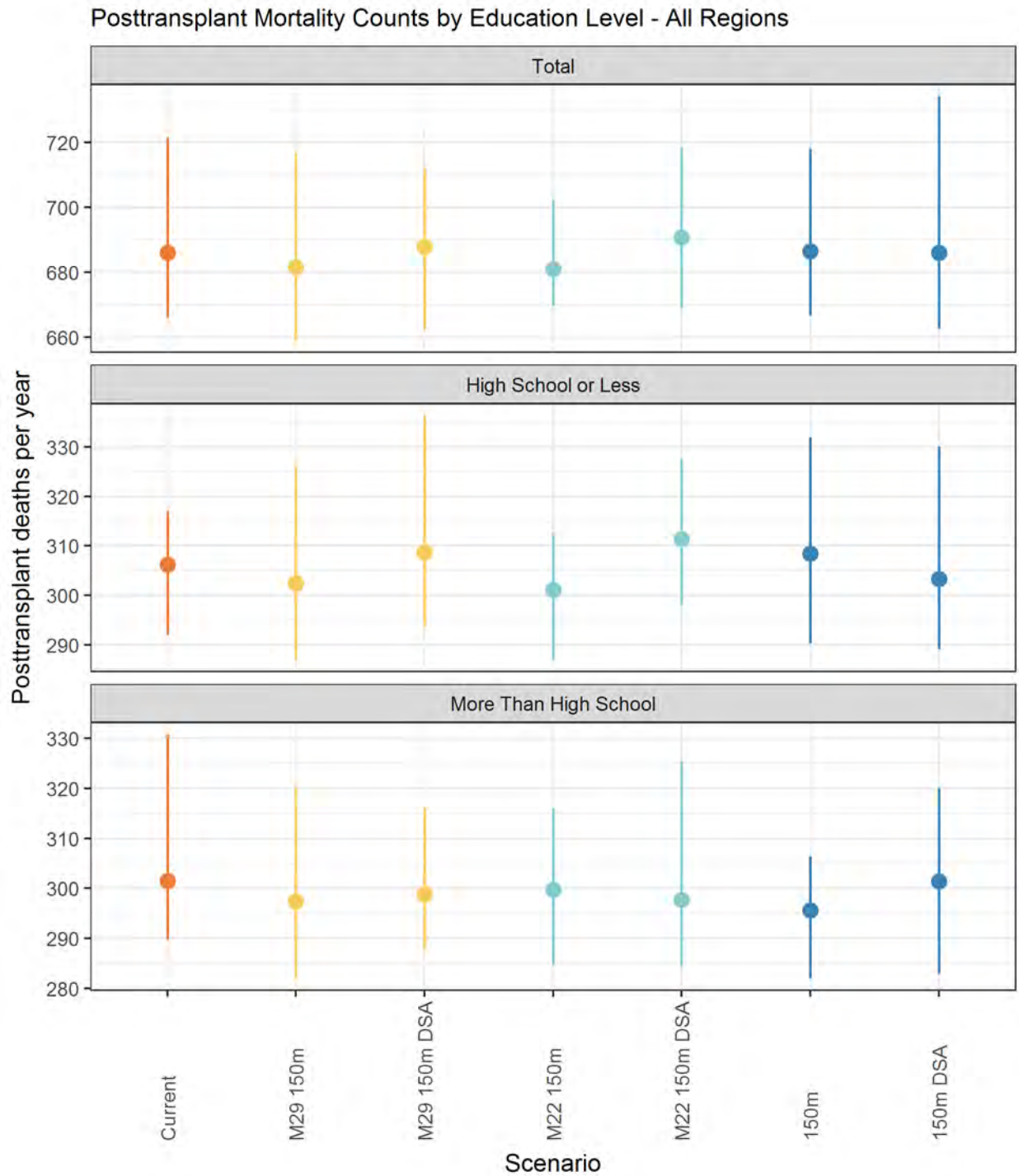


Figure 213 Posttransplant mortality counts by education level - all regions

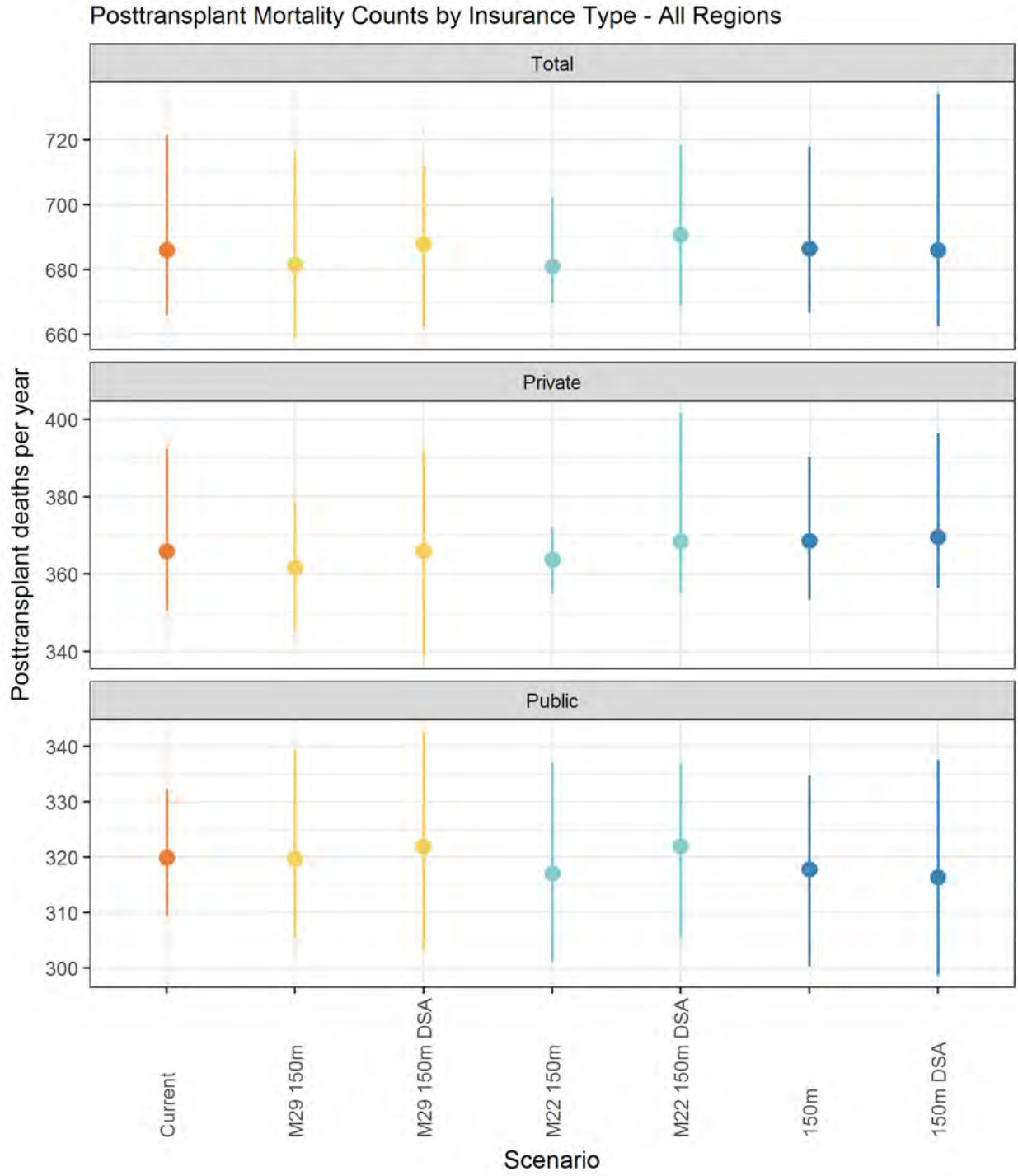


Figure 214 Posttransplant mortality counts by insurance type - all regions

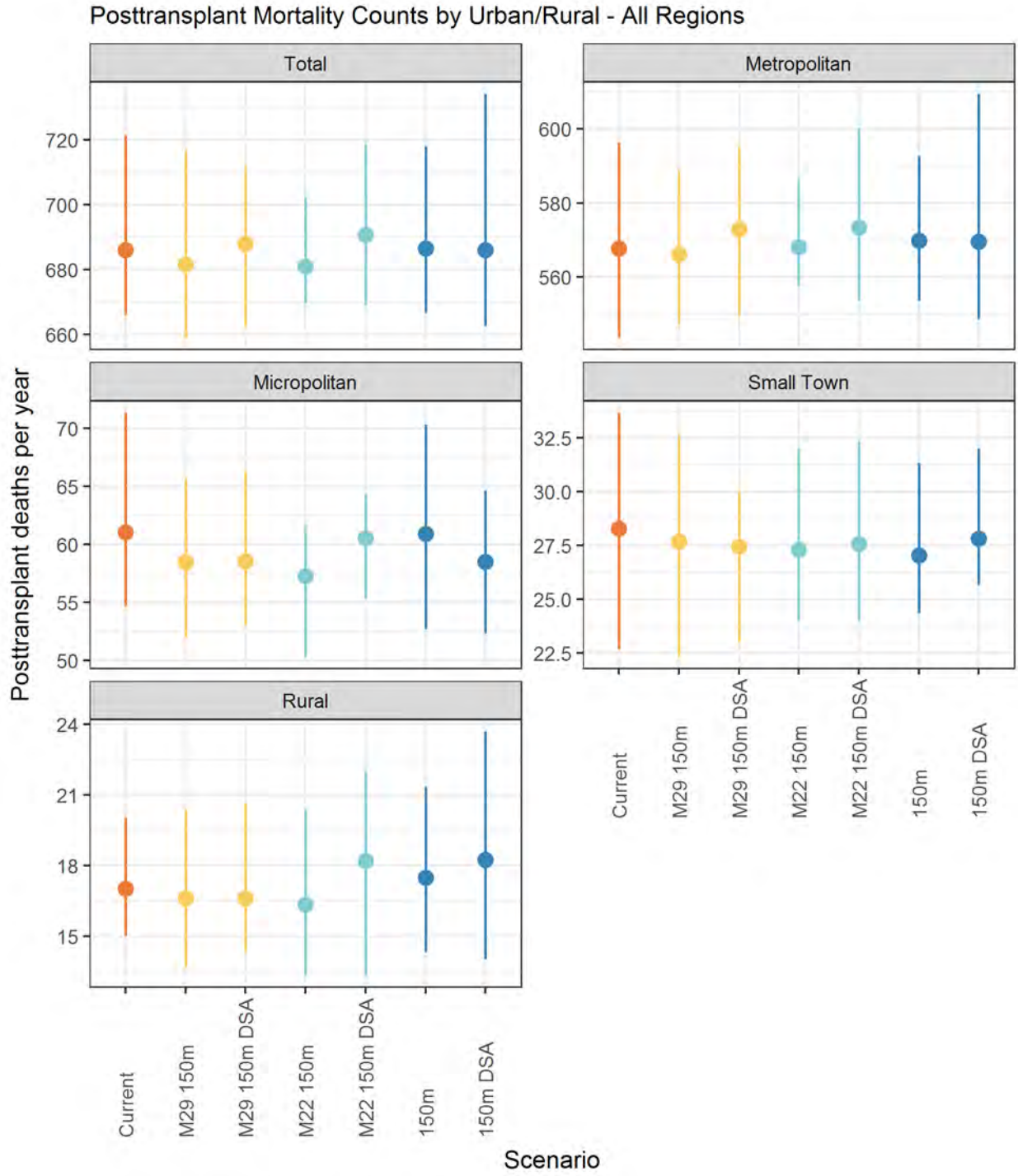


Figure 215 Posttransplant mortality counts by urban/rural - all regions

Transport

Median Transport Time

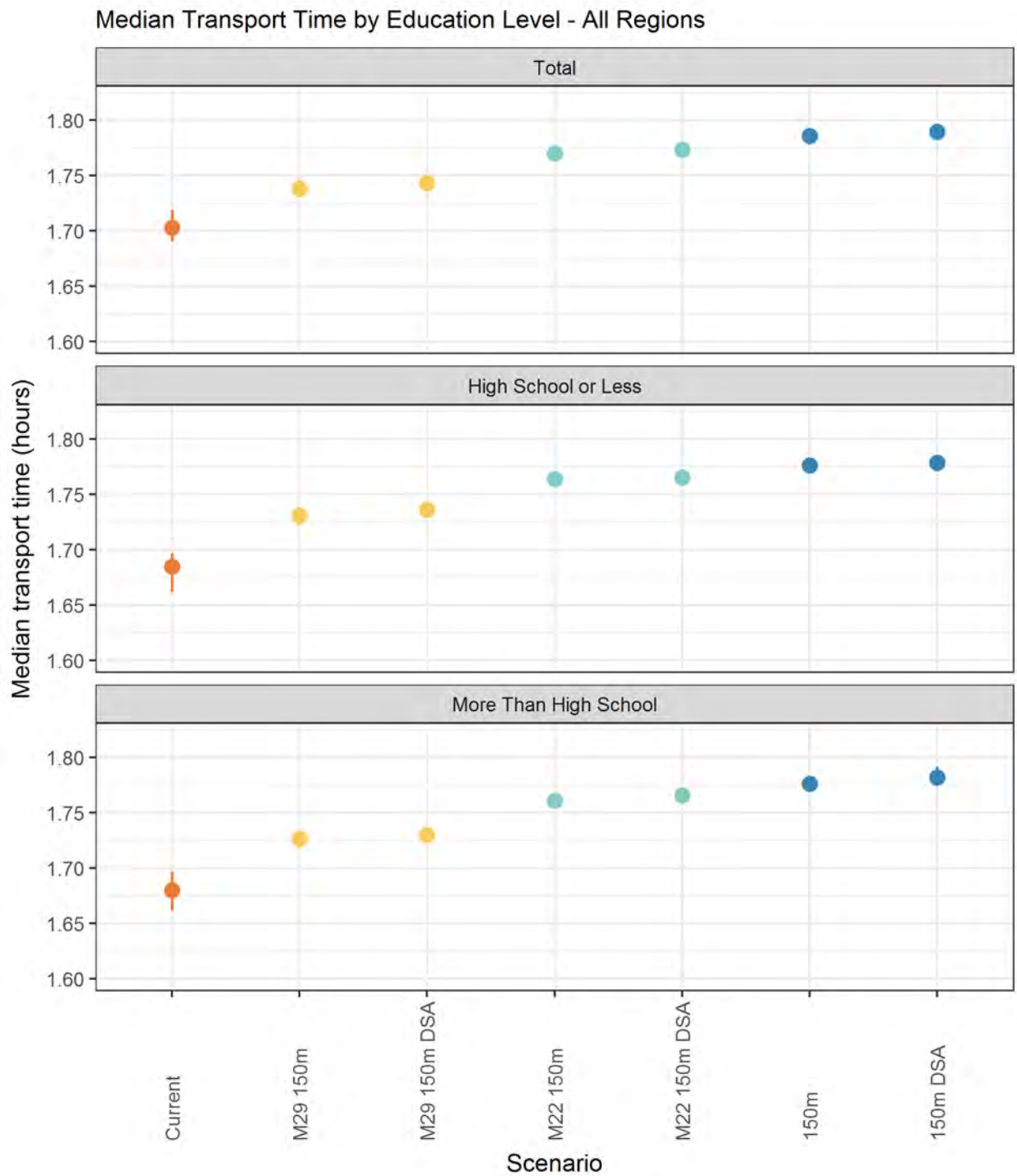


Figure 216 Median Transport Time by education level - all regions

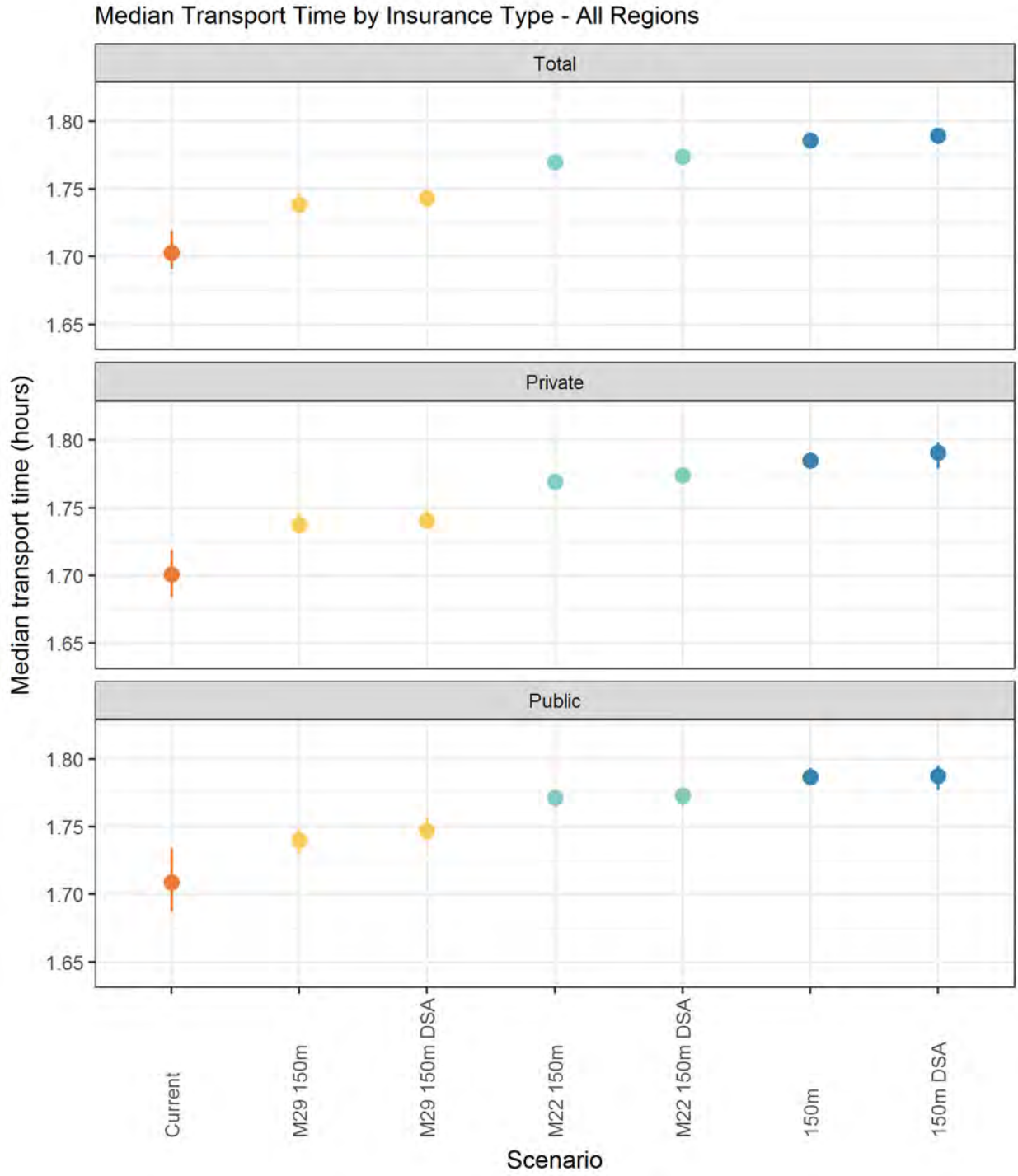


Figure 217 Median Transport Time by insurance type - all regions

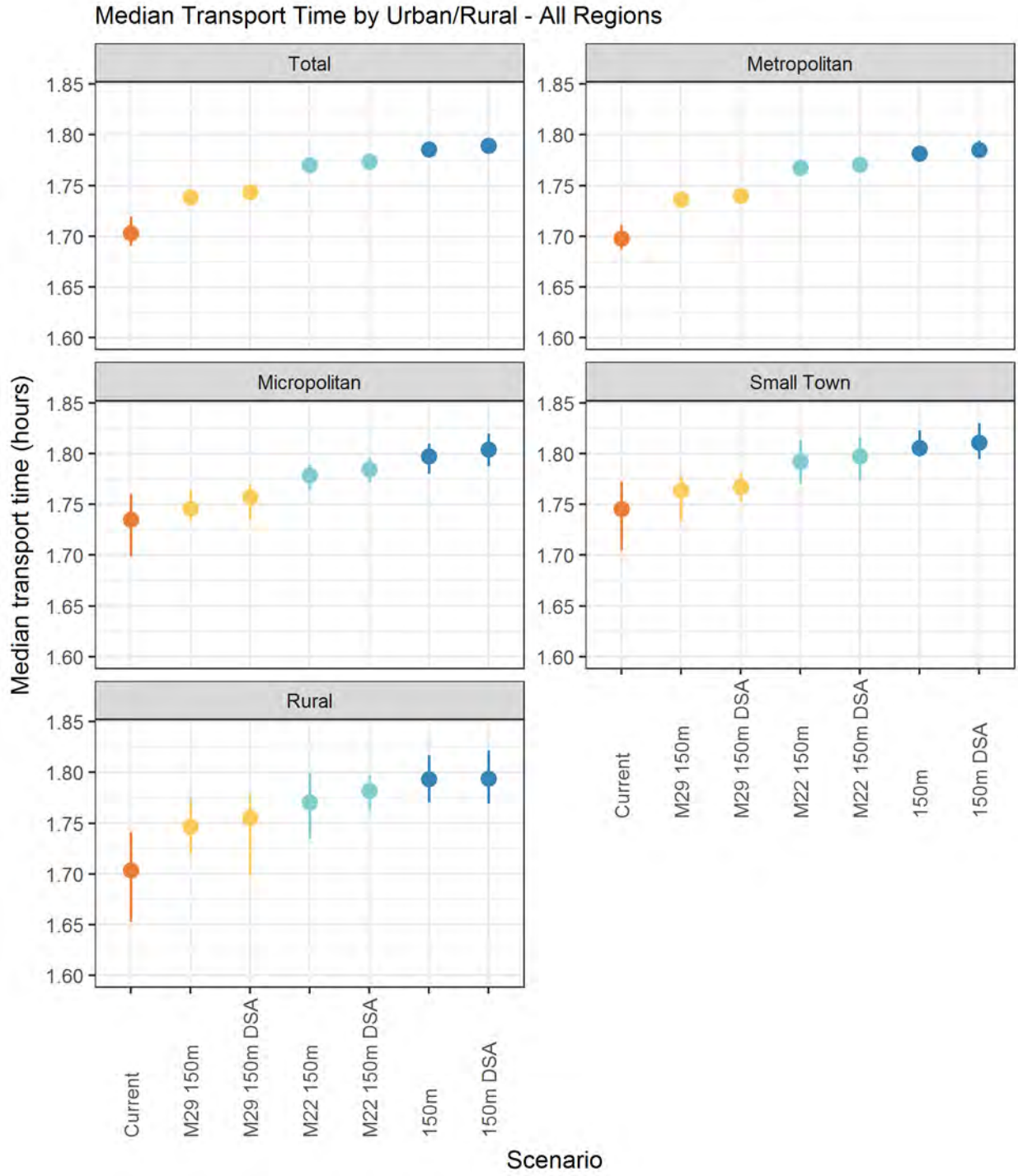


Figure 218 Median Transport Time by urban/rural - all regions

Median Transport Distance

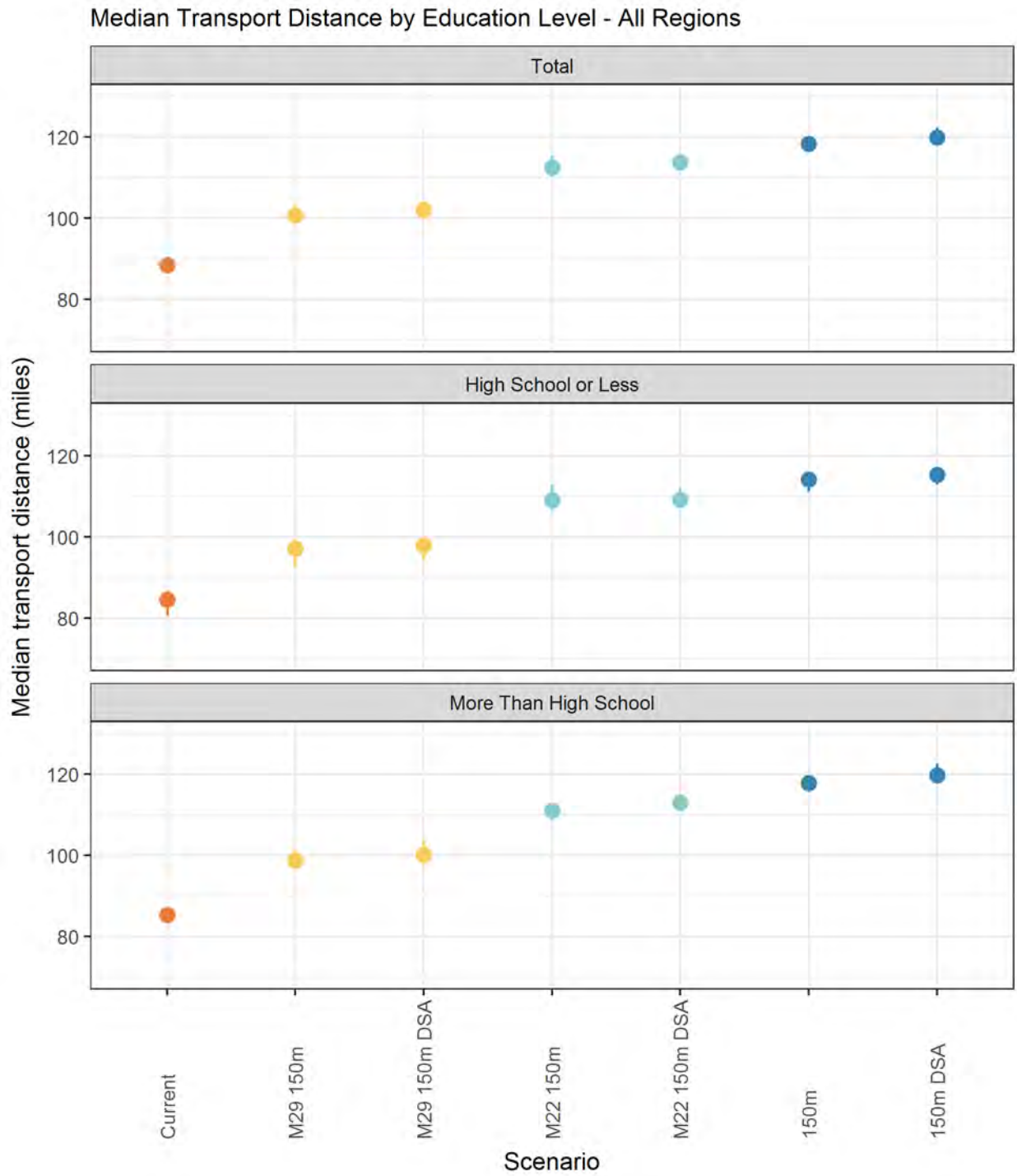


Figure 219 Median Transport Distance by education level - all regions

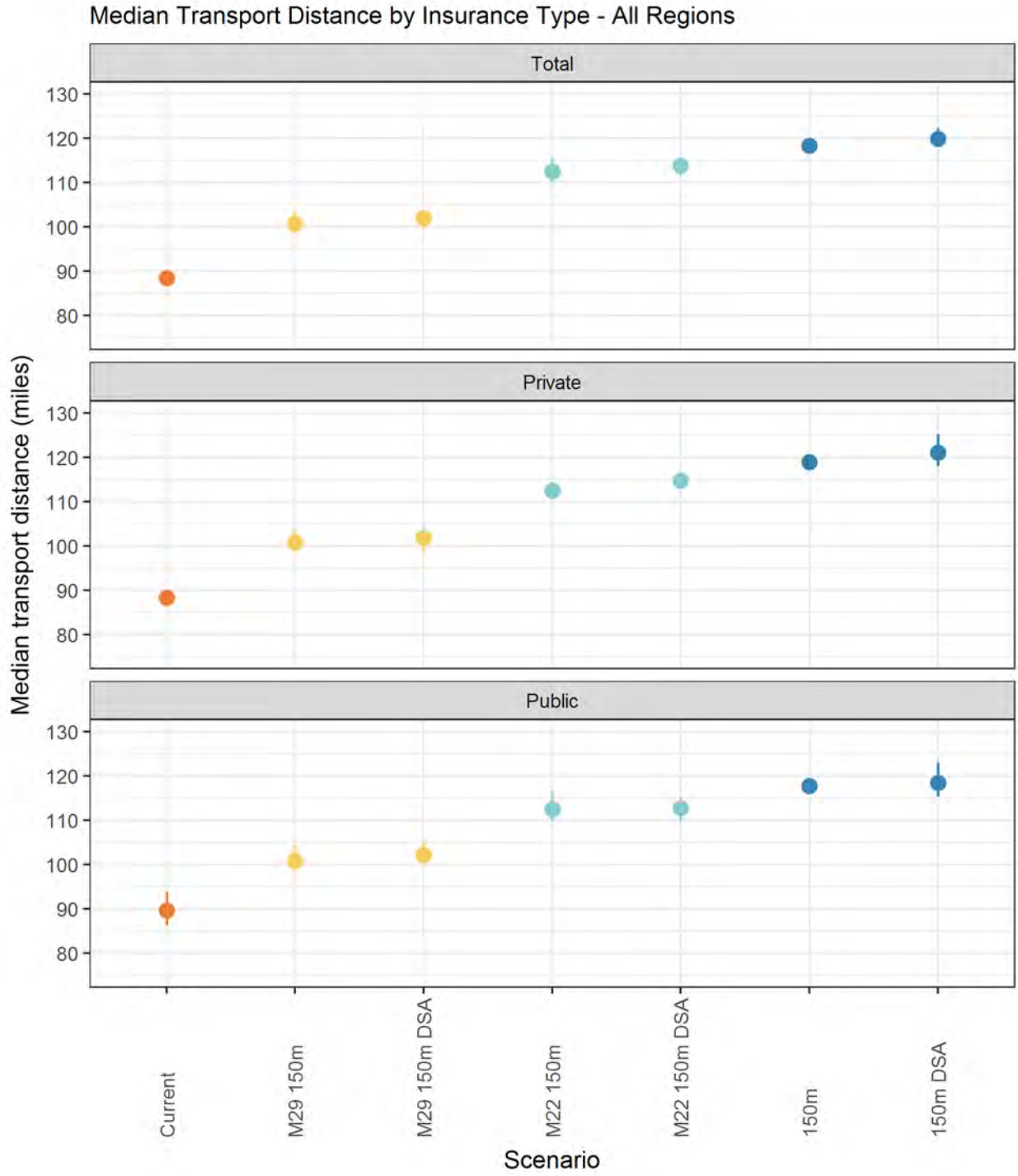


Figure 220 Median Transport Distance by insurance type - all regions

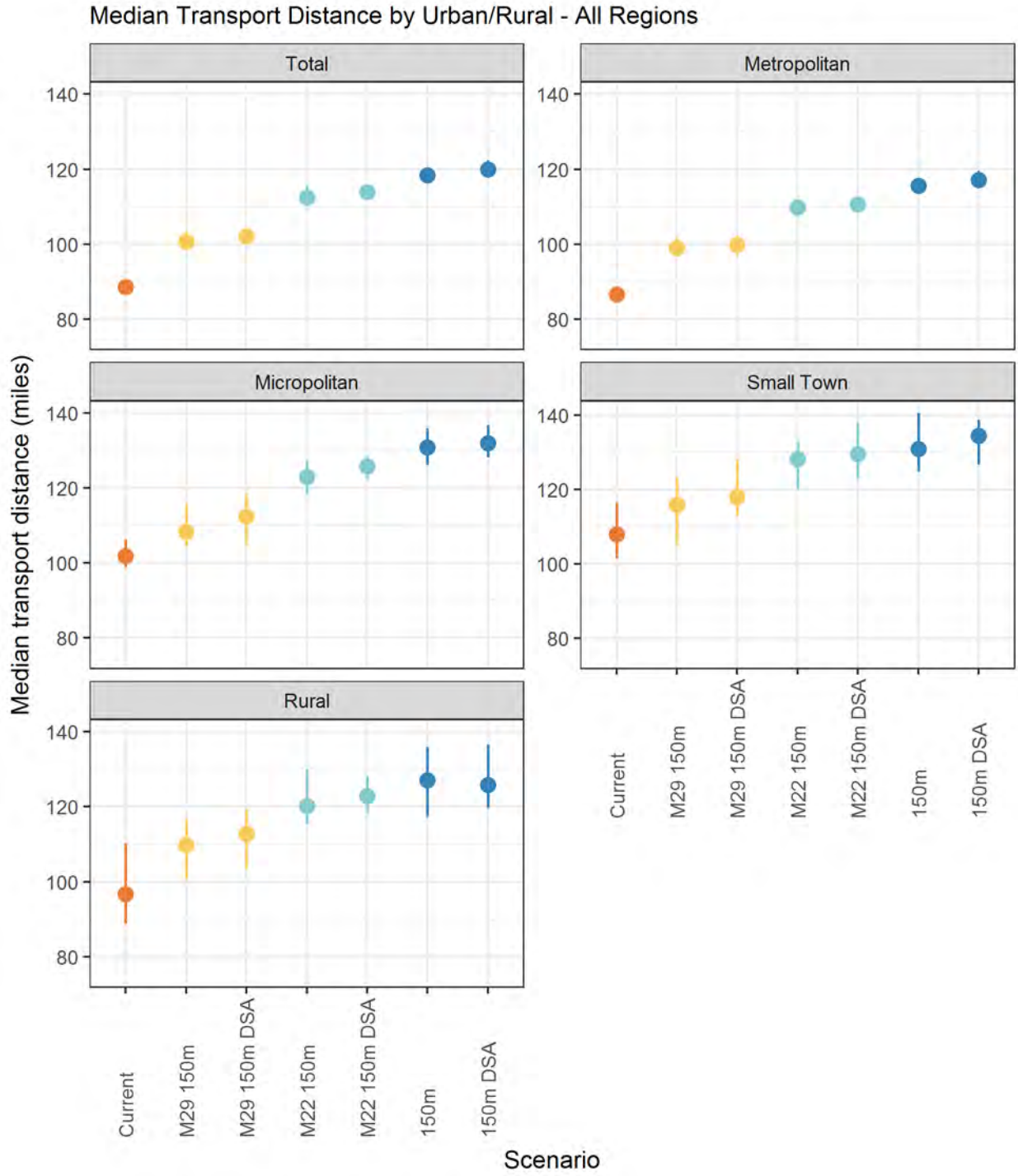


Figure 221 Median Transport Distance by urban/rural - all regions

Percent of Organs Flown

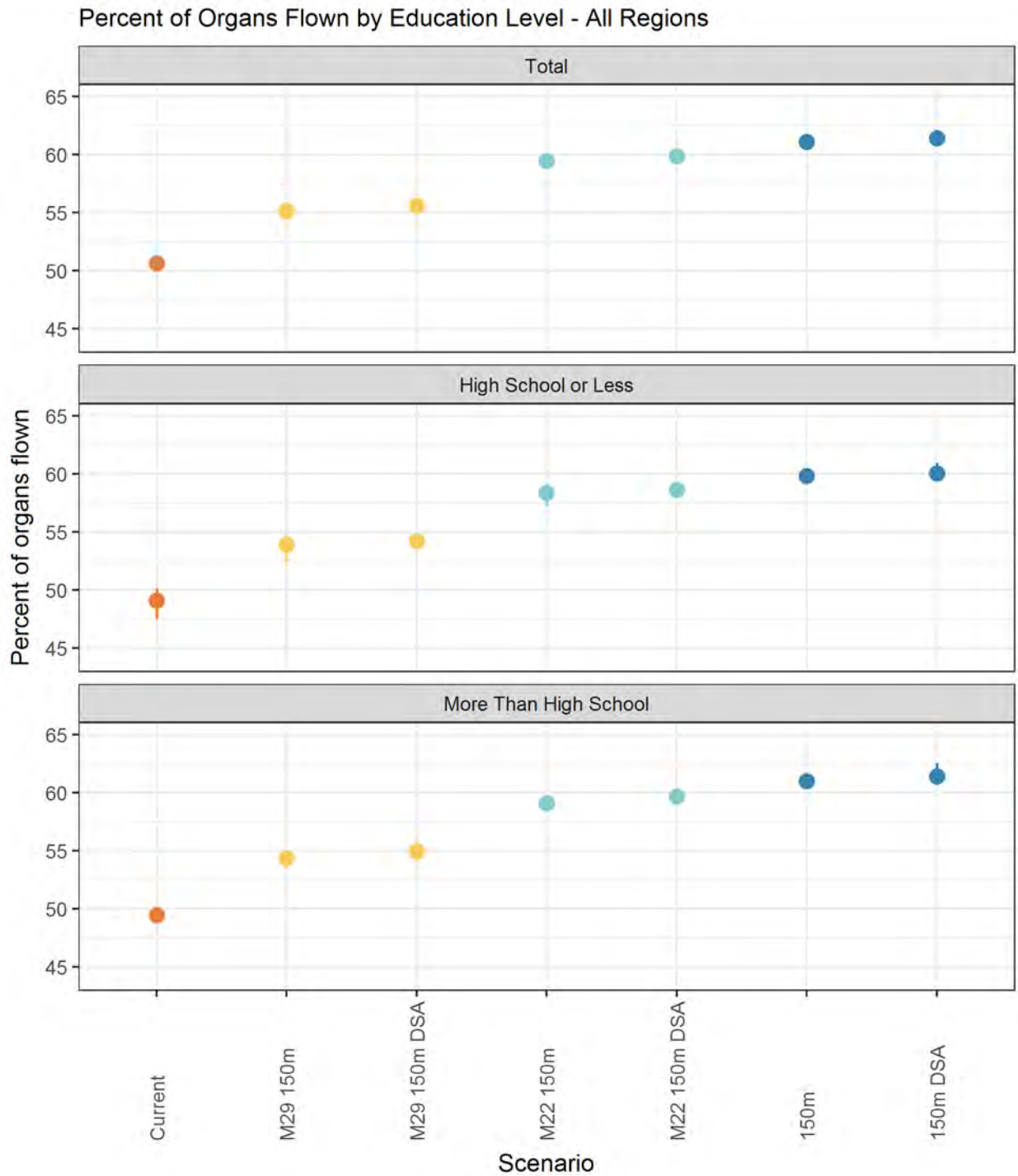


Figure 222 Percent of Organs Flown by education level - all regions

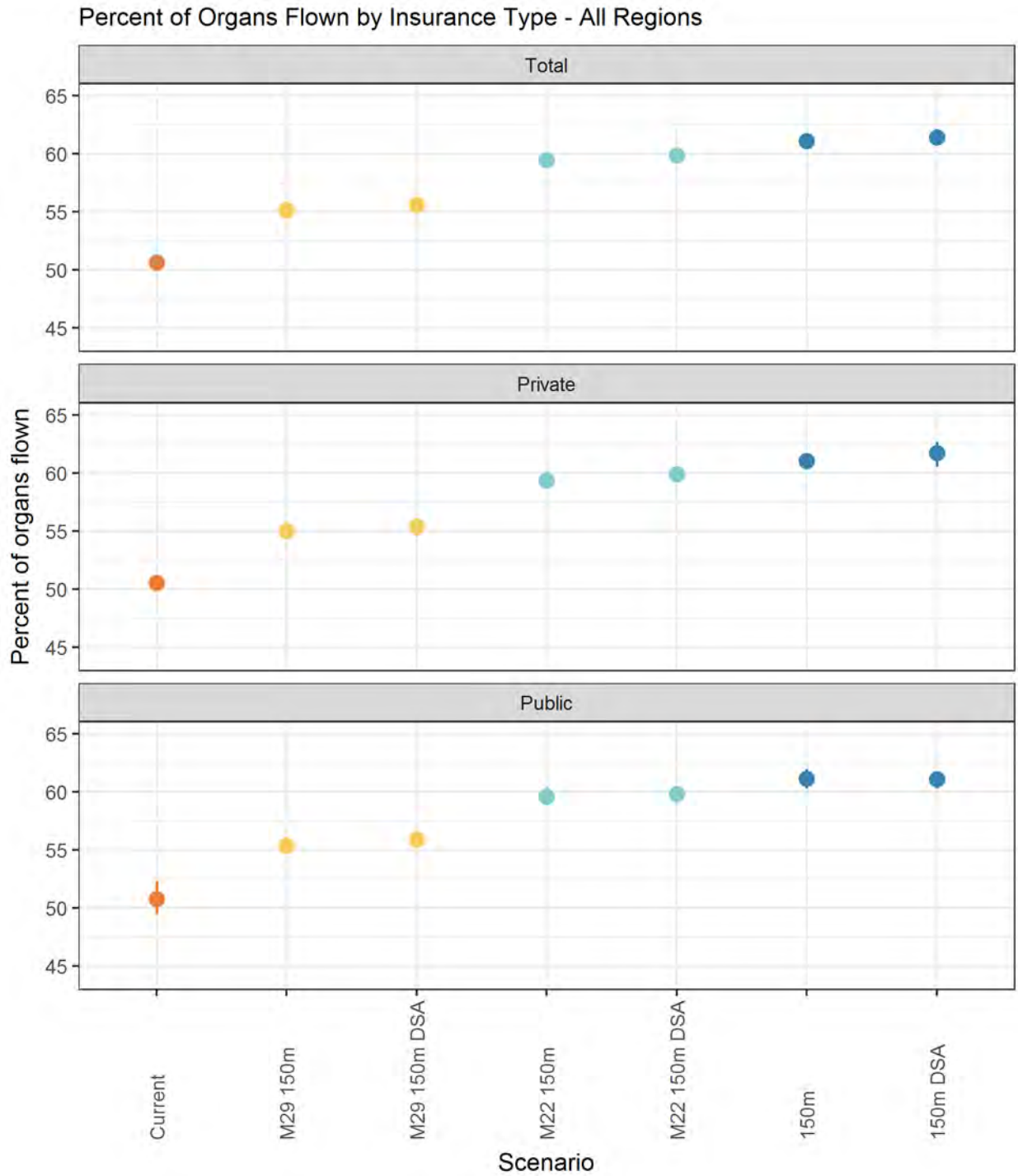


Figure 223 Percent of Organs Flown by insurance type - all regions

Percent of Organs Flown by Urban/Rural - All Regions

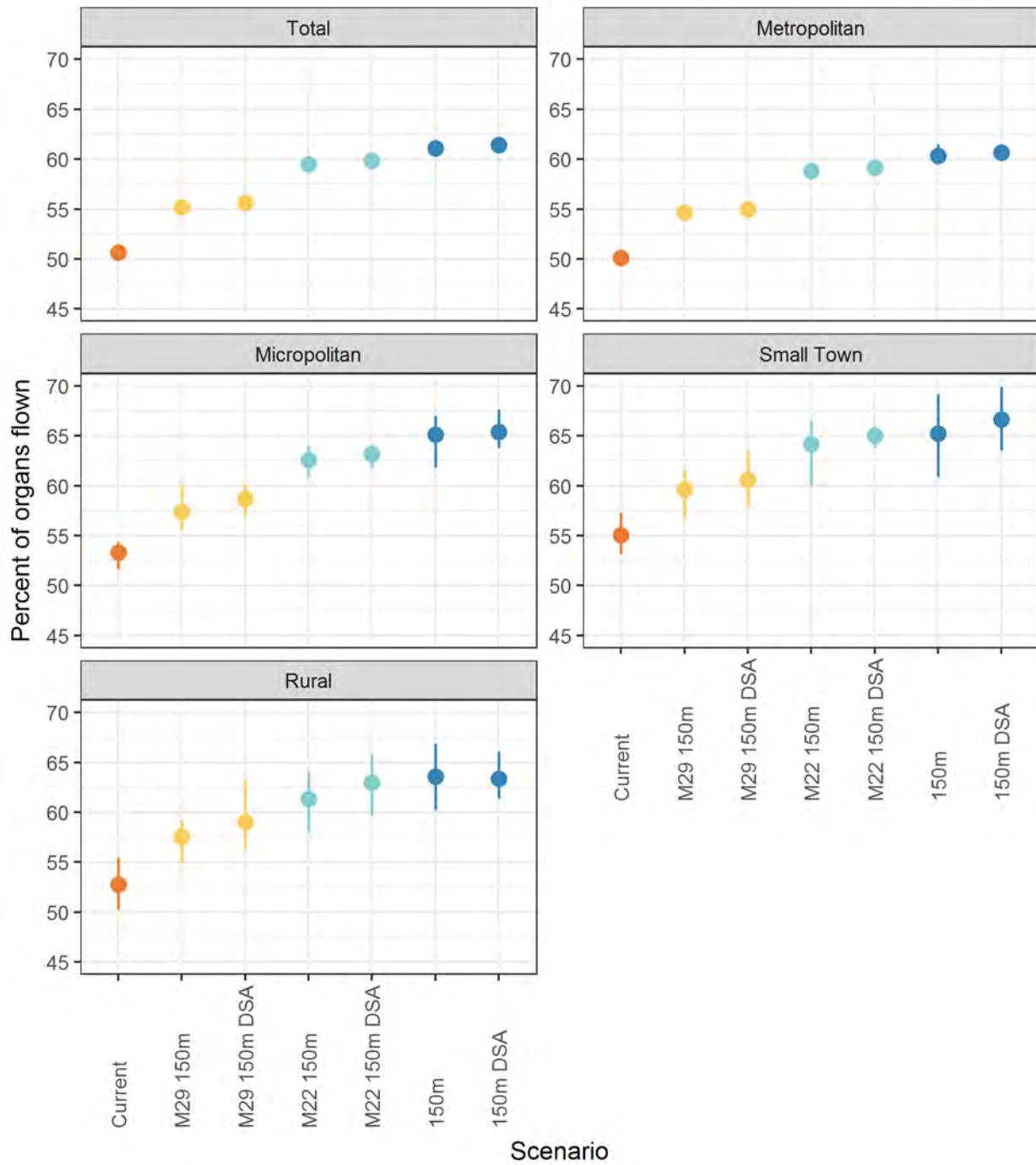


Figure 224 Percent of Organs Flown by urban/rural - all regions

Percent of Within DSA Transplants

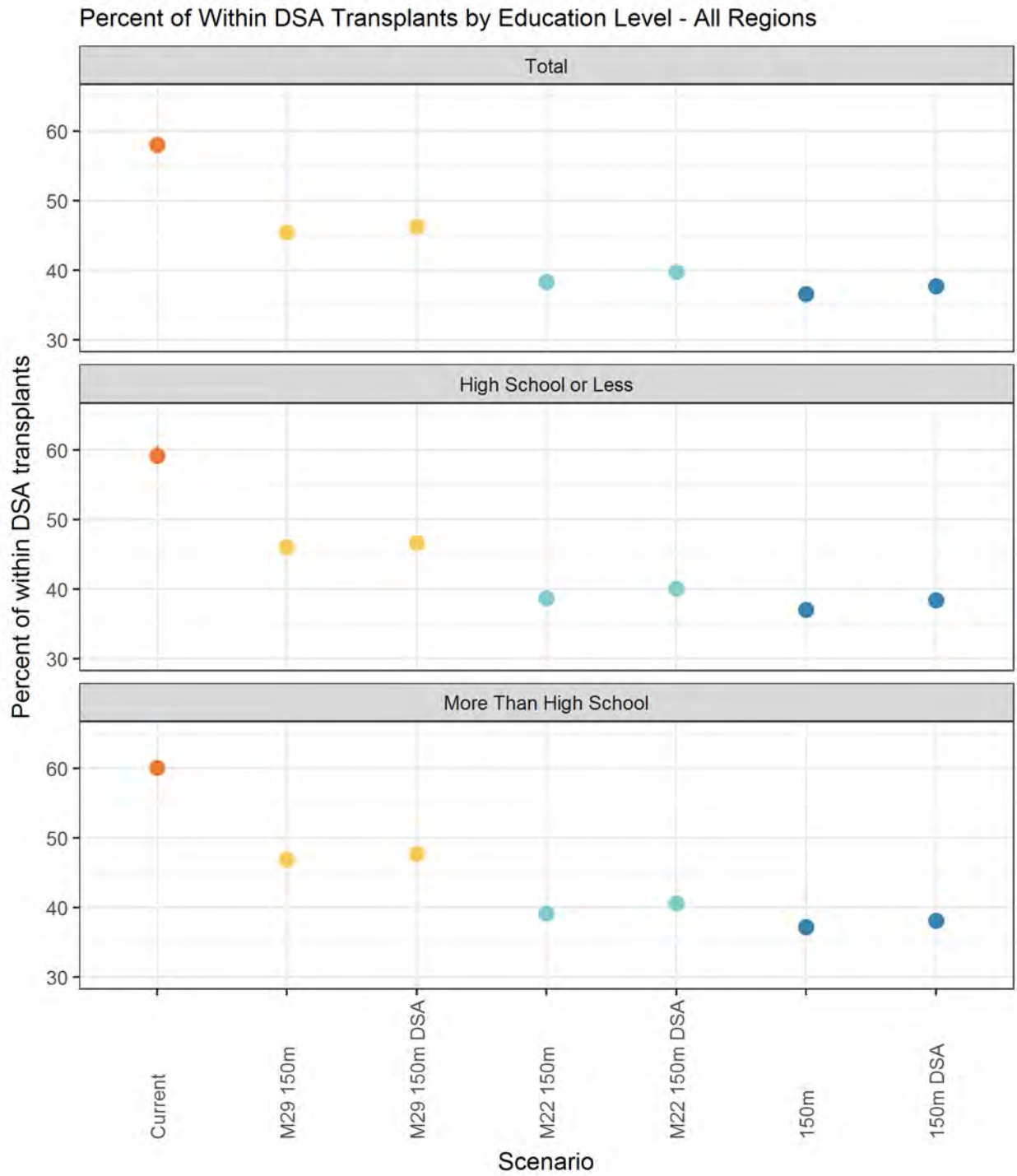


Figure 225 Percent of within DSA transplants by education level - all regions

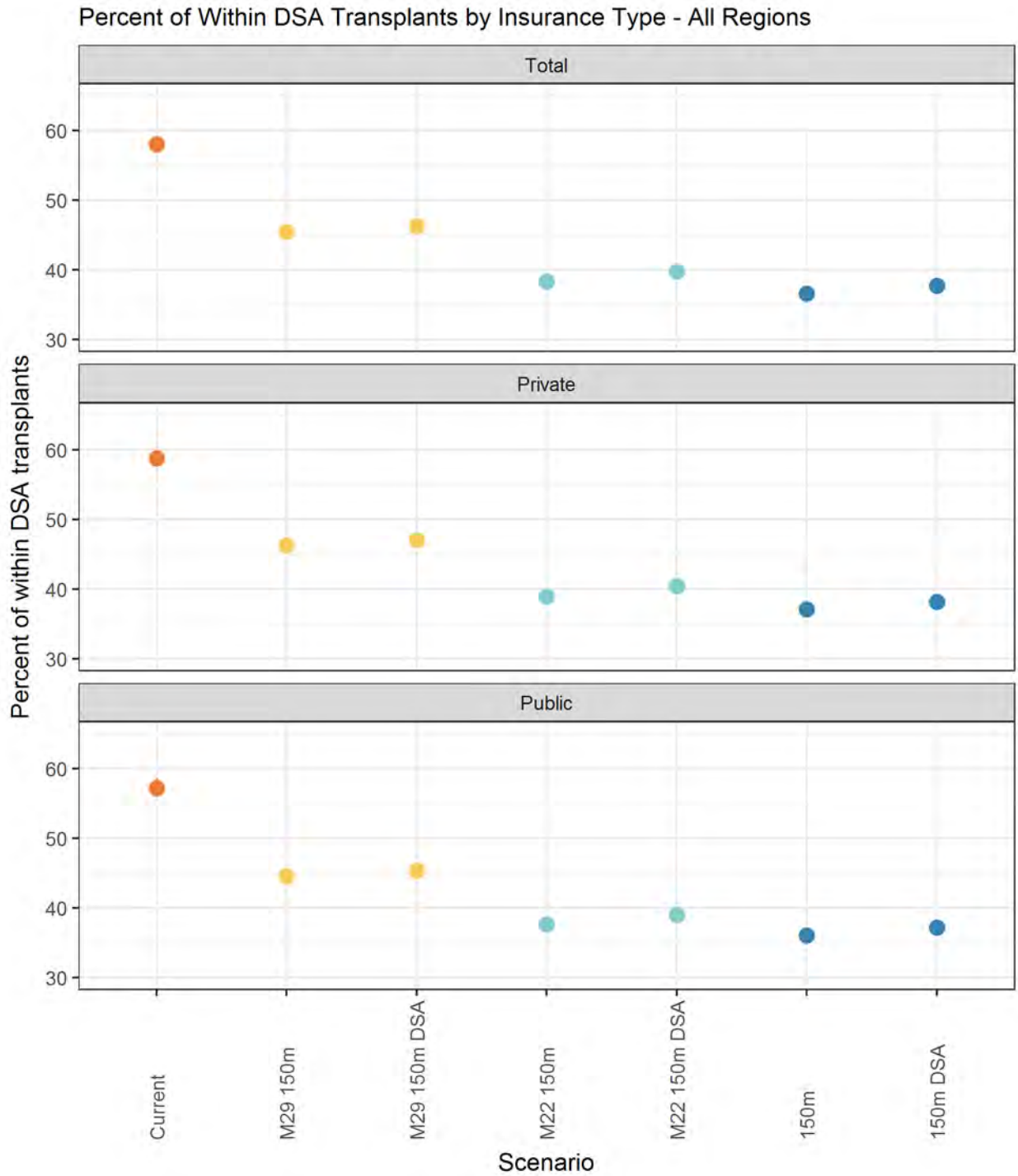


Figure 226 Percent of within DSA transplants by insurance type - all regions

Percent of Within DSA Transplants by Urban/Rural - All Regions

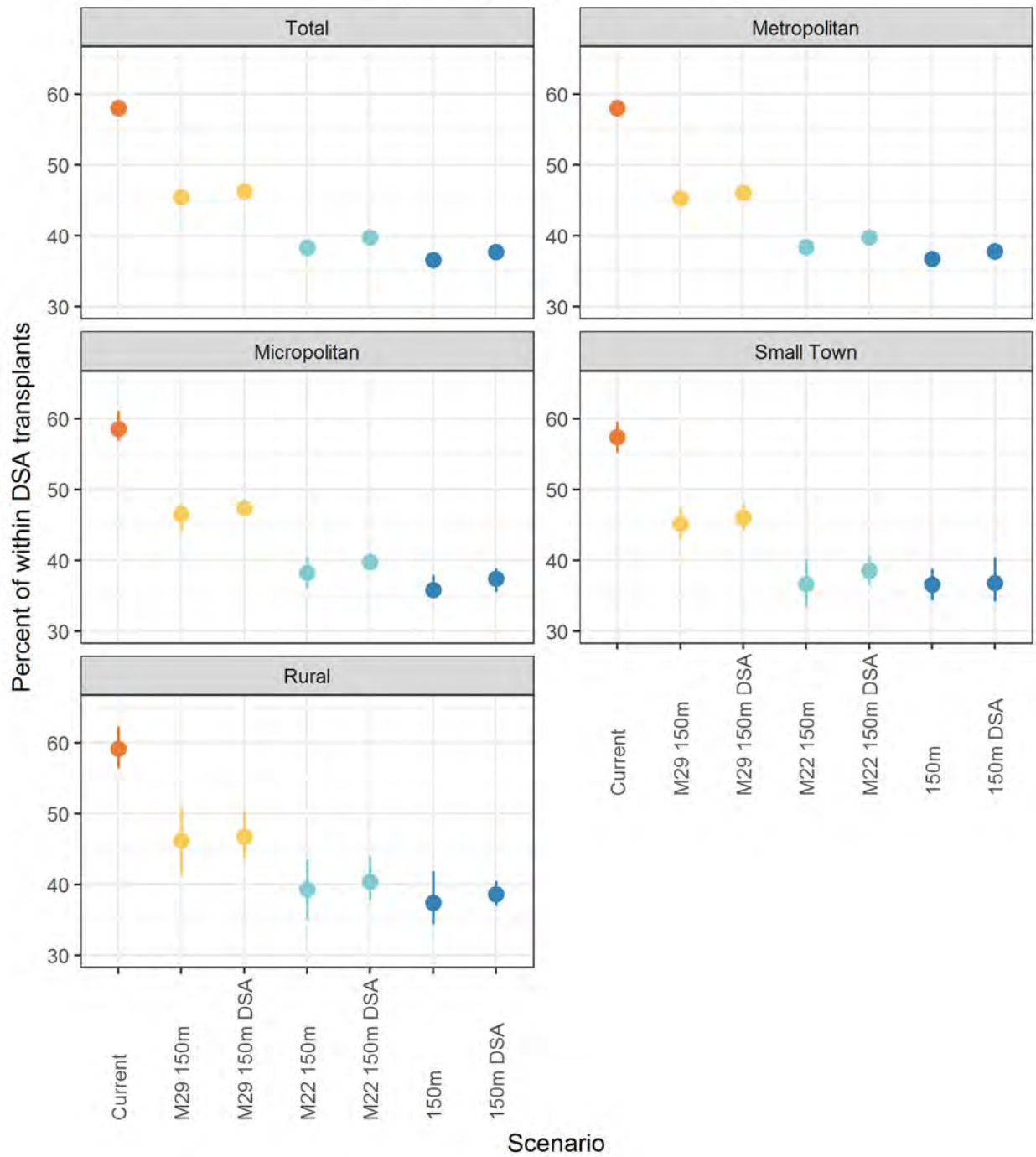


Figure 227 Percent of within DSA transplants by urban/rural - all regions

Appendix D: Allocation ordering for policy scenarios simulated in LI2017_02

Current allocation (scenario 1)

For adult donors:

1. Regional Status 1A
2. Regional Status 1B
3. DSA and Regional MELD/PELD ≥ 35 (by MELD)
4. DSA MELD/PELD 15-34
5. Regional MELD/PELD 15-34
6. National Status 1A
7. National Status 1B
8. National MELD/PELD ≥ 15
9. DSA MELD/PELD < 15
10. Regional MELD/PELD < 15
11. National MELD/PELD < 15

For adolescent donors (11-17 years):

1. DSA Pediatric Status 1A
2. Regional Pediatric Status 1A
3. DSA Adult Status 1A
4. Regional Adult Status 1A
5. DSA Pediatric Status 1B
6. Regional Pediatric Status 1B
7. DSA and Regional Any PELD
8. DSA MELD ≥ 15 , 12-17 years
9. DSA MELD ≥ 15 , ≥ 18 years
10. Regional MELD ≥ 15 , 12-17 years
11. Regional MELD ≥ 15 , ≥ 18 years
12. DSA MELD < 15 , 12-17 years

13. DSA MELD < 15, ≥ 18 years
14. Regional MELD < 15, 12-17 years
15. Regional MELD < 15, ≥ 18 years
16. National Pediatric Status 1A
17. National Adult Status 1A
18. National Pediatric Status 1B
19. National Any PELD
20. National Any MELD, 12-17 years
21. National Any MELD, ≥ 18 years

For child donors (0-10 years):

1. Regional Pediatric Status 1A
2. National Pediatric Status 1A, 0-11 years
3. DSA Adult Status 1A
4. Regional Adult Status 1A
5. Regional Pediatric Status 1B
6. Regional Any PELD
7. DSA MELD ≥ 15, 12-17 years
8. DSA MELD ≥ 15, ≥ 18 years
9. Regional MELD ≥ 15, 12-17 years
10. Regional MELD ≥ 15, ≥ 18 years
11. DSA MELD < 15, 12-17 years
12. DSA MELD < 15, ≥ 18 years
13. Regional MELD < 15, 12-17 years
14. Regional MELD < 15, ≥ 18 years
15. National Status 1A, 12-17 years
16. National Status 1A, ≥ 18 years
17. National Status 1B, 0-17 years

18. National Any PELD
19. National Any MELD, 12-17 years
20. National Any MELD, ≥ 18 years

M29 150m (scenario 2)

For adult candidates, "MELD" below will use the larger of allocation MELD or the calculated MELD plus 150 mile proximity points (as applicable)

For DCD and/or 70+ years old donors:

1. Enhanced-Region Status 1A
2. Enhanced-Region Status 1B
3. DSA MELD/PELD ≥ 15
4. Enhanced-Region MELD/PELD ≥ 15
5. National Status 1A
6. National Pediatric Status 1B
7. National MELD/PELD ≥ 15
8. DSA MELD/PELD < 15
9. Enhanced-Region MELD/PELD < 15
10. National MELD/PELD < 15

For adult donors:

1. Enhanced-Region Status 1A
2. Enhanced-Region Status 1B
3. Enhanced-Region adjusted MELD/PELD ≥ 29
 - The adjusted MELD/PELD is equal to the calculated (lab) MELD plus 150 mile proximity points (as applicable) for adults, or the allocation MELD/PELD plus 150 mile proximity points (as applicable) for candidates aged < 18 .
4. DSA MELD/PELD ≥ 15 (exclude tier 3 eligible)
5. Enhanced-Region MELD/PELD ≥ 15 (exclude tier 3 eligible)
6. National Status 1A
7. National Status 1B
8. National MELD/PELD ≥ 15

9. DSA MELD/PELD < 15 (exclude tier 3 eligible)
10. Enhanced-Region MELD/PELD < 15 (exclude tier 3 eligible)
11. National MELD/PELD < 15

For adolescent donors (11-17 years):

1. Enhanced-Region Pediatric (0-17 years) Status 1A
2. Enhanced-Region Adult Status 1A
3. Enhanced-Region Pediatric (0-17 years) Status 1B
4. Enhanced-Region any PELD (< 12 years)
5. Enhanced-Region Adolescent (12- 17 years) MELD >= 15
6. Enhanced-Region Adult MELD >= 15
7. Enhanced-Region Adolescent (12- 17 years) MELD < 15
8. Enhanced-Region Adult MELD < 15
9. National Pediatric (0-17 years) Status 1A
10. National Adult Status 1A
11. National Pediatric (0-17 years) Status 1B
12. National any PELD (< 12 years)
13. National Adolescent (12- 17 years) any MELD
14. National Adult any MELD

For child donors (0-10 years):

1. Enhanced-Region Pediatric Status 1A
2. National Pediatric (0-11 years) Status 1A
3. Enhanced-Region Adult Status 1A
4. Enhanced-Region Pediatric Status 1B
5. Enhanced-Region any PELD (< 12 years)
6. Enhanced-Region Adolescent (12- 17 years) MELD >= 15
7. Enhanced-Region Adult MELD >= 15
8. Enhanced-Region Adolescent (12- 17 years) MELD < 15

9. Enhanced-Region Adult MELD < 15
10. National Adolescent (12- 17 years) Status 1A
11. National Adult Status 1A
12. National Pediatric Status 1B
13. National any PELD (< 12 years)
14. National Adolescent (12- 17 years) any MELD
15. National Adult any MELD

M29 150m DSA (scenario 3)

For adult candidates, "MELD" below will use the larger of allocation MELD or the calculated MELD plus 150 mile or DSA proximity points (as applicable)

For DCD and/or 70+ years old donors: No change from scenario 2.

For adult donors:

1. Enhanced-Region Status 1A
2. Enhanced-Region Status 1B
3. Enhanced-Region adjusted MELD/PELD \geq 29
 - The adjusted MELD/PELD is equal to the calculated (lab) MELD plus 150 mile or DSA proximity points (as applicable) for adults, or the allocation MELD/PELD plus 150 mile or DSA proximity points (as applicable) for candidates aged <18.
4. DSA MELD/PELD \geq 15 (exclude tier 3 eligible)
5. Enhanced-Region MELD/PELD \geq 15 (exclude tier 3 eligible)
6. National Status 1A
7. National Status 1B
8. National MELD/PELD \geq 15
9. DSA MELD/PELD < 15 (exclude tier 3 eligible)
10. Enhanced-Region MELD/PELD < 15 (exclude tier 3 eligible)
11. National MELD/PELD < 15

For adolescent donors (11-17 years): No change from scenario 2.

For child donors (0-10 years): No change from scenario 2.

M22 150m (scenario 4)

For adult candidates, "MELD" below will use the larger of allocation MELD or the calculated MELD plus 150 mile proximity points (as applicable)

For DCD and/or 70+ years old donors: No change from scenario 2.

For adult donors:

1. Enhanced-Region Status 1A
2. Enhanced-Region Status 1B
3. Enhanced-Region adjusted MELD/PELD ≥ 22
 - The adjusted MELD/PELD is equal to the calculated (lab) MELD plus 150 mile proximity points (as applicable) for adults, or the allocation MELD/PELD plus 150 mile proximity points (as applicable) for candidates aged <18 .
4. DSA MELD/PELD ≥ 15 (exclude tier 3 eligible)
5. Enhanced-Region MELD/PELD ≥ 15 (exclude tier 3 eligible)
6. National Status 1A
7. National Status 1B
8. National MELD/PELD ≥ 15
9. DSA MELD/PELD < 15 (exclude tier 3 eligible)
10. Enhanced-Region MELD/PELD < 15 (exclude tier 3 eligible)
11. National MELD/PELD < 15

For adolescent donors (11-17 years): No change from scenario 2.

For child donors (0-10 years): No change from scenario 2.

M22 150m DSA (scenario 5)

For adult candidates, "MELD" below will use the larger of allocation MELD or the calculated MELD plus 150 mile or DSA proximity points (as applicable)

For DCD and/or 70+ years old donors: No change from scenario 2.

For adult donors:

1. Enhanced-Region Status 1A
2. Enhanced-Region Status 1B
3. Enhanced-Region adjusted MELD/PELD ≥ 22

- The adjusted MELD/PELD is equal to the calculated (lab) MELD plus 150 mile or DSA proximity points (as applicable) for adults, or the allocation MELD/PELD plus 150 mile or DSA proximity points (as applicable) for candidates aged <18.
4. DSA MELD/PELD \geq 15 (exclude tier 3 eligible)
 5. Enhanced-Region MELD/PELD \geq 15 (exclude tier 3 eligible)
 6. National Status 1A
 7. National Status 1B
 8. National MELD/PELD \geq 15
 9. DSA MELD/PELD $<$ 15 (exclude tier 3 eligible)
 10. Enhanced-Region MELD/PELD $<$ 15 (exclude tier 3 eligible)
 11. National MELD/PELD $<$ 15

For adolescent donors (11-17 years): No change from scenario 2.

For child donors (0-10 years): No change from scenario 2.

150m (scenario 6)

For adult candidates, "MELD" below will use the larger of allocation MELD or the calculated MELD plus 150 mile proximity points (as applicable)

For DCD and/or 70+ years old donors: No change from scenario 2.

For adult donors:

1. Enhanced-Region Status 1A
2. Enhanced-Region Status 1B
3. Enhanced-Region MELD/PELD
4. National Status 1A
5. National Status 1B
6. National MELD/PELD

For adolescent donors (11-17 years): No change from scenario 2.

For child donors (0-10 years): No change from scenario 2.

150m DSA (scenario 7)

For adult candidates, "MELD" below will use the larger of allocation MELD or the calculated MELD plus 150 mile or DSA proximity points (as applicable)

For DCD and/or 70+ years old donors: No change from scenario 2.

For adult donors: No change from scenario 6.

For adolescent donors (11-17 years): No change from scenario 2.

For child donors (0-10 years): No change from scenario 2.

Appendix E: DSA-level data tables

Background

The Committee requested further analysis of certain metrics consisting of data provided at a DSA level. The data shown in these tables are estimated data based on the SRTR liver simulated allocation model (LSAM, 2017).

While the policies governing liver allocation are clearly established, some random variation is associated with the process, for instance, when and where a liver becomes available, whether an offered organ is accepted by a given candidate, and how long a liver graft survives posttransplant. These events are fixed when reviewing historical data, but are unlikely to repeat themselves in exactly the same ways in the future. To help separate the effects of allocation changes from simple variation over time, LSAM uses several statistical modeling techniques:

- Each allocation scenario is simulated 10 times, with an independent set of candidates and donors for each iteration.
- Graft survival time for each simulated transplant is predicted based on a historical model of candidate and donor characteristics.
- Each simulated organ offer is accepted or declined based on a model of historical acceptance behavior, also taking into account candidate and donor characteristics.

These modeling elements introduce variation, presented as a range of results across the 10 iterations for each modeled scenario. Comparing the range of variation within a scenario with the variation between scenarios can help distinguish differences due to random variation from those due to a change in allocation rules.

The modeling used in LSAM has limitations. Predictions are most reliable on a national level, because the statistical models are based on average national behavior and outcomes. LSAM cannot predict outcomes on a center-by-center basis, because the individual variations in practice and procedure are not represented in the models. Predictions are based on historical listing and offer acceptance behavior. If the rules of a simulated scenario are likely to result in changes to listing or acceptance behavior, this should be factored in when evaluating the results.

Data Tables

Because of the large amount of data included in the DSA-level data tables, the tables themselves are attached to this report in Microsoft Excel spreadsheet format.

Within each data cell in the attached tables, the data are provided in the format mean (minimum, maximum). The mean is the mean value across the 10 simulated iterations for each scenario, the minimum is the minimum value across the 10 iterations, and the maximum is the maximum value across the 10 iterations.

The data tables included are:

- Table 1. Transplant counts by DSA
- Table 2. Transplant rates by DSA
- Table 3. Waitlist mortality counts by DSA
- Table 4. Waitlist mortality rates by DSA

- Table 5. Median MELD/PELD at transplant (MMaT) by DSA
- Table 6. Percent of organs transplanted within the DSA that were flown
- Table 7. Percent of organs recovered within the DSA that were flown
- Table 8. Percent of organs transplanted within the DSA that were also recovered within the DSA (local transplants)
- Table 9. Percent of organs recovered within the DSA that were transplanted within the DSA