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THE IMPACT OF INTERHOSPITAL TRANSFER ON MORTALITY BENCHMARKING AT LEVEL III AND IV TRAUMA CENTERS: A STEP TOWARDS SHARED MORTALITY ATTRIBUTION IN A STATEWIDE SYSTEM

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Abstract

Introduction—Many injured patients presenting to level III/IV trauma centers will be transferred to level I/II centers, but how these transfers influence benchmarking at level III/IV centers has not been described. We hypothesized that the apparent observed to expected (O:E) mortality ratios at level III/IV centers are influenced by the location at which mortality is measured in transferred patients.

Methods—We conducted a retrospective study of adult patients presenting to Level III/IV trauma centers in Pennsylvania from 2008–2017. We used probabilistic matching to match patients transferred between centers. We used a risk-adjusted mortality model to estimate predicted mortality, which we compared to observed mortality at discharge from the level III/IV center (O¹) or observed mortality at discharge from the level III/IV center for non-transferred patients and at discharge from the level I/II center for transferred patients (O²).

Results—In total, 9,477 patients presented to 11 Level III/IV trauma centers over the study period (90% white, 49% female, 97% blunt mechanism, median ISS 8 IQR (4–10). Of these, 4,238

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(44%) were transferred to Level I/II centers, of which 3,586 (85%) were able to be matched. Expected mortality in the overall cohort was 332 (3.8%). A total of 332 (3.8%) patients died, of which 177 (53%) died at the initial level III/IV centers (O^1). Including post-transfer mortality for transferred patients in addition to observed mortality in non-transferred patients (O^2) resulted in worse apparent O:E ratios for all centers and significant differences in O:E ratios for the overall cohort (O^1 :E: 0.53, 95% CI 0.45–0.61 vs. O^2 :E: 1.00, 95% CI 0.92–1.11, $p<0.001$).

Conclusions—Apparent O:E mortality ratios at level III/IV centers are influenced by the timing of measurement. To provide fair and accurate benchmarking and identify opportunities across the continuum of the trauma system, a system of shared attribution for outcomes of transferred patients should be devised.

Keywords

Trauma outcomes; epidemiology; interhospital transfer

Introduction

The acute care of the injured patient spans a timeline from the point of injury to hospital discharge. Efforts to improve care for injured patients such as the American College of Surgeons Trauma Quality Improvement Program (ACS-TQIP) have to date primarily focused on the role of level I and level II trauma centers, but there has been less investigation into the role level III and IV centers play in patient outcomes. In largely rural states such as Pennsylvania, level III and IV centers may play an integral role in the early care of injured patients, with approximately 33% of patients arriving at level I and II hospitals after transfer from outside hospitals.

The fact that many patients treated at level III and IV centers will be ultimately transferred to level I and II centers has implications for typical risk-adjusted mortality modeling strategies, in which the outcome of interest is in-hospital mortality. Because expected survival until reaching the receiving center is a precondition of transfer in most cases, use of in-hospital mortality as a basis for risk-adjusted modelling at level III and IV centers may lead to observed to expected mortality ratios which may not reflect ultimate patient outcomes. For instance, a critically ill patient presenting to a level III trauma center may have a high predicted probability of mortality based on age, physiology, and injury severity. If transferred to a level I trauma center, from the perspective of the level III center this patient would represent an unexpected survivor since the outcome of interest is survival to hospital discharge despite the fact that such a patient might go on to die at the level I trauma center. This phenomenon has implications for apparent observed-to-expected mortality rates at both centers.

In the recently published report on population-based trauma outcomes, the National Quality Forum recommended advancing models of shared attribution that promote improved planning and coordination within regional trauma networks in order to promote shared accountability across relevant stakeholders and accelerate quality improvement in trauma care (1). With the long-term goal of developing a system of shared outcomes attribution between centers, in this study we sought to understand the influence of interhospital transfer

from level III and IV to level I and II centers on risk adjusted mortality at level III and IV centers. Because the sickest patients tend to be transferred from Level III and IV centers to Level I and II centers, we hypothesized that risk-adjusted mortality for Level III and IV centers (as measured by observed to expected mortality ratios) would appear worse when mortality for transferred patients was attributed to referring centers vs. receiving centers.

Materials and Methods

After approval from the University of Pennsylvania Institutional Review Board, we performed a retrospective analysis of the Pennsylvania Trauma Outcomes Study (PTOS) database from 2008 to 2017. The Pennsylvania Trauma Systems Foundation (PTSF) is the governing body that accredits all trauma centers in the Commonwealth of Pennsylvania. To maintain accreditation, Pennsylvania trauma centers must abstract, collect, and submit data on all trauma patients meeting inclusion criteria for the PTOS registry.

The population of interest in this study was all patients presenting to level III and IV trauma centers in Pennsylvania over the study period. The PTSF establishes standards for accrediting trauma centers based on a hospital's resources and capabilities based on the American College of Surgeons Committee on Trauma Resources for Optimal Care of the Injured Patient 2014 (2) and publishes standards for level I, level II, level III and level IV adult trauma centers, which are available online (3, 4). Patients under the age of 18 and patients with burns as a primary mechanism of injury were excluded from the study. Data was inspected for missingness, and multiple imputation was used to impute missing data found to be missing not completely at random. The PTOS registry, like the American College of Surgeon's National Trauma Data Bank, is an instance-based registry that does not contain a primary key variable that allows for identification of unique patients. This means that if an injured patient is transferred between two trauma centers, there will be two rows of data representing that patient in the dataset but there is no existing variable to track this patient longitudinally. For this reason, we used probabilistic matching to identify patients transferred from level III and IV centers to level I and II centers so that their records could be linked. We matched on patient age, sex, birth dates, zip codes, and dates of admissions using the 'dtalink' package (5) in Stata 15.0 (College Station, TX) using the 'calcweight' option to generate recommended weights for matching variables. Because no gold standard dataset exists against which to check the accuracy of our matching, we compared the characteristics of linked and unlinked transfers using standardized differences (6).

The primary exposure of interest in this study was interhospital transfer between a level III or IV center to a level I or II center. The primary outcome of interest was center-level observed to expected risk-adjusted in-hospital mortality. Because in transferred patients there are two opportunities to observe this outcome, we measured center level outcomes twice for transferred patients: O^1 , mortality status at discharge from the level III/IV center; and O^2 , mortality status at discharge from the level I/II center (see Figure 1 – conceptual diagram).

We based our risk-adjusted mortality model on the Pennsylvania Trauma Systems Foundation Risk Adjusted Mortality Model (7) which is in turn based on the published

description of the American College of Surgeons Trauma Quality Improvement risk-adjusted mortality model (8). This model contains 17 variables including sex, age, mechanism of injury, maximum head abbreviated injury scale (AIS), maximum lower extremity AIS, patient physiology (presenting GCS motor scores, systolic blood pressure, and pulse rate), and patient comorbidities. Because of the long timescale of the study, we included time in years as a candidate variable in our model to account for changes in quality of care over time. We used our final multivariable model to generate an expected probability of mortality for each patient presenting to a level III/IV center which were then summed by center to generate a center-level expected mortality (E). We then calculated the observed mortality for each level III/IV center using two different methods. First, we calculated observed mortality at each level III/IV center by summing observed in-hospital mortality at discharge from the level III/IV center for both non-transferred and transferred patients (O^1). Next, we calculated observed mortality for each level III/IV center by summing the observed mortality at discharge from the level III/IV center for non-transferred patients and the observed mortality at discharge from the level I/II center for transferred patients (O^2).

To examine differences in demographic, injury, and physiologic variables between transferred and non-transferred patients presenting to level III/IV centers, we used Mann-Whitney test to compare non-normally distributed continuous variables and two-sample t-test to compare normally distributed continuous variables. Chi-squared test was used to compare categorical variables. The methodology underlying the development of our risk-adjusted mortality model is described elsewhere (7). We used Stata v15.0 (College Station, TX) and R v3.5.2 for all statistical analysis.

Results

In total, 9,477 patients presented to 11 level III and IV trauma centers over the study period, of whom 8,825 were included in the final analysis. A flow diagram of the study can be seen in Figure 2. Overall, the cohort was 90% white 49% female, 97% blunt mechanism, and had a median ISS of 8 (IQR 4–10) (Table 1). Of these, 4,238 (45%) were transferred to Level I and II centers. Using probabilistic matching, we were able to successfully match 3,586 (85%) of these patients. Examination of standardized differences (SD) between age, sex, injury mechanism, physiology, and injury severity of matched and unmatched transferred patients was generally reassuring, with only ISS demonstrating a moderate risk of bias (SD –0.56), indicating that matched patients were on average more severely injured than unmatched patients.

Characteristics of patients presenting to Level III and IV trauma centers stratified by transfer status can be seen in Table 1. Compared to patients who were not transferred, transferred patients were younger (age 60, IQR 39–77 years vs. 69, IQR 50–83 years, $p < 0.001$), more likely to be male (59% vs. 46%, $p < 0.001$), and were more likely to be severely injured ($ISS > 15$) (18.1% vs. 13.0%, $p < 0.001$). Transferred patients were more likely to be head injured (52% vs. 27%, $p < 0.001$) and less likely to have extremity injuries (44% vs. 55%, $p < 0.001$).

Our risk adjusted mortality model (Table 2) had good characteristics, with excellent discrimination (AUC =0.93, 95%CI 0.92–0.95) and calibration. The Hosmer-Lemeshow test was not significant ($p=0.12$), indicating no significant difference between the observed and expected mortality and visual inspection of Hosmer-Lemeshow plots indicated good model calibration. As in prior work, the strongest predictors of mortality included low GCS motor scores, deranged systolic blood pressure and heart rate, gunshot wound as a mechanism of injury, and higher abbreviated injury scores. Based on our model, expected mortality in the overall cohort was 332 (3.8%).

A total of 332 (3.8%) patients died during the study period, of which 177 (53%) patients died at the initial level III and IV centers (Table 3). An additional 155 (47%) transferred patients died at the level I and II centers to which they were transferred. The attribution of these mortalities to the receiving vs. the referring center was resulted significant difference in O:E ratios for the overall cohort ($O^1:E: 0.53$, 95% CI 0.45–0.61 vs. $O^2:E: 1.00$, 95% CI 0.92–1.11, $p<0.001$). For each level III and IV center, including post-transfer mortality for transferred patients in addition to observed mortality in non-transferred patients (O^2) resulted in higher O:E ratios, in some cases shifting the apparent performance of a center from ‘as expected’ mortality to a significant outlier for higher than expected mortality (Figure 3).

Discussion

In this retrospective cohort study, we describe the impact of the frame of reference from which outcomes are observed on the apparent performance of level III and level IV centers. Because many of the sickest patients will be transferred to level I and level II centers for definitive management and all patients are transferred alive, methodology that examines observed to expected mortality at the center level will be influenced by these ‘unexpected survivors’ in proportion to the number that are transferred out. The net effect of this is that the performance of level III and IV centers may appear better than expected after considering patient factors associated with mortality. From the perspective of the receiving level I or II center, we have previously shown that these transfers may negatively influence apparent center performance, especially if patient physiology at the time of arrival to the level I or II center is used for risk adjustment rather than physiology at the time of arrival at the level III or IV center, and that this effect is proportional to the number of patients that such a center receives (9).

Of the deaths that occur in patients presenting to level III and IV centers, we found that nearly half occurred after the patient had been transferred to a level I or II center. This highlights the fact that in order for quality improvement efforts to be successful, they must span the continuum of care including interhospital transfer. It is incumbent upon referring centers to seek feedback on patients transferred, just as it is incumbent upon receiving centers to provide it. Such efforts have been shown to lead to improvements in the perception of care provided to injured patients as well as the development of performance improvement efforts at referring centers (10). As such, they are reflected in the American College of Surgeons Resources for the Optimal Care of the Injured Patient publication which states that receiving hospitals should have input from, provide feedback to, and maintain

adequate communication with the personnel responsible for the transport process and the referring hospital to ensure that problems occurring during and associated with transport are addressed in a timely manner (2).

This is the first study that we are aware of that examines benchmarking risk-adjusted mortality at Level III and IV centers. To date, reports regarding benchmarking specific to non level I and II trauma centers have generally been descriptive and have not included risk-adjusted mortality models. In a single state study in Ohio, one such study reported on the development of a benchmarking program for level III centers. This effort included structural measures (emergency department volume, rurality), process measures (average surgeon response time, % of orthopedic fractures managed operatively within 24 hours), and outcome measures (raw mortality) (11). Another single-state study from Colorado described the development of performance improvement filters relevant to level III and IV trauma centers, including such process measures as adherence to trauma team activation criteria, response time for trauma team leaders, and time to intubation for patients with Glasgow Coma Scores < 9 (12). Such efforts are invaluable to facilitate sharing of best practices and ongoing education of participants but are limited in their ability to provide meaningful feedback on risk-adjusted mortality between centers. Knowledge surrounding risk adjusted outcomes at Level III centers will hopefully be improved by the recent stipulation from the American College of Surgeons Committee on Trauma requiring participation in a risk-adjusted mortality benchmarking program for Level III trauma center verification.

The way in which outcomes of transferred patients are optimally attributed in trauma populations has yet to be discovered, but analogous work exists in other emergency care sensitive conditions (13). For instance, most hospital-based performance metrics surrounding acute myocardial infarction attribute the outcome of transferred patients to the referring hospital (14), and correspondingly the outcomes for transferred patients are excluded when calculating performance metrics for receiving centers. This methodology has been critiqued, however, because it may paint an incomplete picture of the quality of care for transferred patients and because apparent performance of the receiving center will change based on whether or not outcomes of transferred patients are attributed to receiving centers or excluded (15). Regardless of the center to which the outcome is attributed, systems in which outcomes are attributed solely to either the referring or to the receiving center do not adequately capture the relative contributions of these two centers to the patient's care. Methods of shared attribution, such as using marginal structural models to treat hospital quality as a time-varying covariate (16) have been proposed but have not been widely adopted.

While defining a method of shared attribution between two hospitals is challenging, defining a system of shared attribution that spans the continuum of care is more challenging still. Since the prehospital system, acute care hospitals, and post-acute care settings all contribute to patient outcomes, an ideal methodology would allow stakeholders to understand how they perform relative to peers while accounting for the variability present in other phases of care. While such methodology could prove invaluable in efforts to improve performance, another approach that has been suggested is the population health-based concept of 'coopetition' (17). Under this rubric, patterns of hospital use for emergency care-sensitive conditions

(including but not limited to trauma) are used to define emergency care service regions which are then benchmarked referent to other emergency care service regions. Because under this system hospitals would be incentivized and penalized at the level of the emergency care service region rather than the individual center, this approach would in theory foster collaboration between stakeholders that may currently be inhibited by local market forces.

Our study has limitations and suffers from the inherent weaknesses of a retrospective investigation. We chose to use a statewide dataset, and so our findings may not be generalizable to other regions with dissimilar rurality. However, national instance-based registries such as the NTDB do not contain unique identifiers for individual patients which makes direct tracking of patients transferred between centers impossible. Probabilistic matching could in theory be employed to identify patients transferred between centers, but only if both the referring and receiving centers contribute NTDB data. Given the absence of geographic identifiers and the lack of uniform reporting across the US, this approach is unlikely to be effective at this time but may become more feasible as more centers contribute data. Alternatively, many statewide datasets such as the Statewide Inpatient Dataset and the Statewide Emergency Dataset contain unique patient identifiers that allow for direct tracking of individual patients between centers, but as administrative datasets do not contain physiologic data which is necessary for valid risk-adjustment in trauma populations. The PTOS overcomes these challenges because all trauma centers in Pennsylvania are required to contribute data, including physiology on arrival. We cannot discern from the dataset the motivation for transferring patients from level III/IV centers to level I/II but note that this flow of patients is consistent with how a tiered trauma system should ideally function, with patients who will likely need the highest levels of care flowing to those centers with the greatest resources. We also were only able to match ~85% of transferred patients. Use of probabilistic matching must balance the competing priorities of complete matching vs. accurate matching. As constraints for matching are relaxed, the chance of incorrect matching rises which may limit the validity of findings, whereas tighter constraints result in more accurate matching at the expense of number of cases matched. Because of the relatively low number of unmatched patients and the generally low standardized differences between patient characteristics in the matched vs. unmatched sets of transferred patients, we believe the risk of bias introduced by our unmatched transferred patients is not likely to substantially influence the results of our study.

Conclusions

This is the first study that we are aware of in trauma populations to consider observed and actual mortality stemming from presentation to Level III and Level IV trauma patients. The apparent O:E mortality ratio at level III and IV centers is influenced by the time at which mortality is measured in transferred patients. To provide fair and accurate benchmarking for level III and IV centers and identify opportunities across the continuum of the acute hospital setting, a system of shared attribution for outcomes of transferred patients should be devised.

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Figure 1 -

Conceptual Diagram. Patients presenting to level III/IV centers may receive definitive care at these centers or may be transferred to level I/II centers. Apparent risk-adjusted outcomes at level III/IV centers may be influenced by the transfer rate and the outcome measured: in-hospital mortality at the level III/IV center (O^1) vs. in-hospital mortality at the I/II center (O^2)

Figure 2 -
Flow diagram of patients included in the study. Abbreviations: PTOS = Pennsylvania Trauma Outcomes Study.

Figure 3 -

Caterpillar plots of observed to expected mortality at Level II and IV trauma centers when mortality of transferred patients is attributed to the receiving Level I/II center (O^1) or to transferring Level III/IV center (O^2). Abbreviations: O:E = Observed to Expected.

Table 1 -

Demographics, mechanism of injury, injury severity, and presenting vital signs upon trauma center presentation for non-transferred and transferred patients. Data for nonparametric continuous variables expressed as median (interquartile Range); parametric continuous variables expressed as mean (standard deviation); categorical values expressed as n (%). P values are for Mann-Whitney test for nonparametric continuous variables, t-test for parametric continuous variables, and chi square test for categorical variables. GCS = Glasgow Coma Scale, BP = Blood Pressure, AIS = Abbreviated Injury Scale.

Patient Characteristic	Overall (n=8825)	Non transferred (n = 5239)	Transferred (n=3586)	p
Age (years)	65 (IQR 46–81)	69 (IQR 50–83)	60 (39–77)	<0.001
Male (%)	4488 (50.9)	2391 (45.6)	2097 (58.5)	<0.001
Race	256 (2.9)	139 (2.7)	117 (3.3)	0.004
White	7915 (89.7)	4719 (90.1)	3196 (89.1)	
Black	437 (5.0)	275 (5.2)	162 (4.5)	
Asian	68 (0.8)	32 (0.6)	36 (1.0)	
Other	147 (1.7)	72 (1.4)	75 (2.1)	
Blunt Mechanism	8565 (97.1)	5090 (97.2)	3475 (96.9)	0.534
Injury Severity Score				<0.001
<9	5829 (47.0%)	4366 (49.6%)	1463 (40.7%)	
9–15	4620 (37.3%)	3218 (36.5%)	1402 (39.0%)	
16–25	1168 (9.4%)	739 (8.4%)	429 (11.9%)	
>25	627 (5.1%)	403 (4.6%)	224 (6.2%)	
Missing	167 (1.4%)	86 (0.9%)	81 (2.3%)	
Maximum AIS, Head				<0.001
0	5512 (62.5)	3796 (72.5)	1716 (47.9)	
1	1003 (11.4)	640 (12.2)	363 (10.1)	
2	886 (10.0)	556 (10.6)	330 (9.2)	
3	655 (7.4)	45 (0.9)	610 (17.0)	
4	265 (3.0)	19 (0.4)	246 (6.9)	
5	185 (2.1)	25 (0.5)	160 (4.5)	
6	1 (0.0)	1 (0.0)	0 (0.0)	
Missing	318 (3.6)	157 (3.0)	161 (4.5)	
Maximum AIS, Lower Extremity				<0.001
0	4745 (53.8)	2374 (45.3)	2371 (66.1)	
1	1395 (15.8)	825 (15.7)	570 (15.9)	
2	1555 (17.6)	1204 (23.0)	351 (9.8)	
3	1096 (12.4)	813 (15.5)	283 (7.9)	
4	5 (0.1)	3 (0.1)	2 (0.1)	
5	1 (0.0)	1 (0.0)	0 (0.0)	
Missing	28 (0.3)	19 (0.4)	9 (0.3)	
Systolic Blood Pressure (mmHg)				0.221
0 to 40	3394 (38.5)	2008 (38.3)	1386 (38.7)	
41 to 90	4478 (50.7)	2688 (51.3)	1790 (49.9)	

Patient Characteristic	Overall (n=8825)	Non transferred (n = 5239)	Transferred (n=3586)	p
91 to 120	521 (5.9)	287 (5.5)	234 (6.5)	
121 to 160	91 (1.0)	50 (1.0)	41 (1.1)	
> 160	341 (3.9)	206 (3.9)	135 (3.8)	
Pulse (beats per minute)				0.001
0 to 50	1812 (20.5)	1005 (19.2)	807 (22.5)	
51 to 100	941 (10.7)	562 (10.7)	379 (10.6)	
101 to 150	6072 (68.8)	3672 (70.1)	2400 (66.9)	
GCS Motor Score				<0.001
6	7789 (88.3)	4663 (89.0)	3126 (87.2)	
1	188 (2.1)	122 (2.3)	66 (1.8)	
2	14 (0.2)	4 (0.1)	10 (0.3)	
3	13 (0.1)	3 (0.1)	10 (0.3)	
4	75 (0.8)	28 (0.5)	47 (1.3)	
5	209 (2.4)	101 (1.9)	108 (3.0)	
Missing	537 (6.1)	318 (6.1)	219 (6.1)	

Table 2 -

Results of the final PTOS-RAM model to estimate the risk of death based on patient demographic and clinical characteristics. GCS = Glasgow Coma Scale, BP = Blood Pressure, MVC = Motor Vehicle Collision, MCC = Motorcycle Collision, GSW = Gunshot wound, AIS = Abbreviated Injury Scale.

Patient Characteristic	OR	95% CI	
Age (years)	1.04	1.03	1.05
GCS motor			
6	ref		
1	113.67	70.61	186.94
2	8.85	1.96	36.94
3	19.27	4.51	81
4	4.82	2.17	10.1
5	3.52	2	5.97
Systolic blood pressure (mmHg)			
91 to 121	ref		
0 to 40	2.07	1.08	4.28
41 to 90	1.26	0.67	2.61
121 to 160	3.59	1.11	10.8
>160	6.68	3.14	15.08
Pulse (beats per minute)			
51 to 100	ref		
0 to 50	3.79	2.24	6.64
101 to 150	1.33	0.81	2.28
Injury Mechanism			
Fall	ref		
Pedestrian Struck	4.47	1.61	10.87
MVC	2.26	1.44	3.52
MCC	3.16	1.28	7.24
GSW	6.07	2.3	15.9
Assault	0.87	0.35	1.88
Stab	1.01	0.22	4.03
Other	1.49	1	2.19
Maximum AIS, head			
0	ref		
1	0.81	0.47	1.35
2	0.79	0.42	1.41
3	0.82	0.48	1.36
4	0.84	0.43	1.63
5	0.89	0.44	1.8
6	13,131.57	0	
Maximum AIS, Lower extremity			
0	ref		

Patient Characteristic	OR	95% CI	
1	0.74	0.49	1.11
2	0.93	0.52	1.62
3	0.76	0.46	1.25
4	3.11	0.11	35.61
5	161,841.00	0	
Maximum AIS			
1	ref		
2	0.63	0.35	1.17
3	1.61	0.93	2.86
4	3.41	1.72	6.77
5	13.12	6.31	27.49
6	24.09	2.59	239.52
Heart Disease	1.86	1.32	2.6
Cancer	2.09	0.78	4.75
Liver Disease	2.35	0.96	5.2
Hypertension	0.87	0.62	1.21
Dialysis	3.41	1.05	9.02
Impaired Sensorium	1.15	0.68	1.88
Functional Dependence	0.92	0.44	1.74
Bleeding Disorder	2.92	1.17	6.46
Peripheral Vascular Disease	1.57	0.46	4.16
Year of study	0.95	0.90	1.01

Table 3 -

Observed mortality, expected mortality and apparent O:E ratios when using patient status at discharge from the level III/IV center (O¹) for both transferred and non-transferred patients or patient status at discharge from the level III/IV center for non-transferred patients and patient status at discharge from the level I/II center (O²) for transferred patients.

Center	n	O ¹	O ²	E	O ¹ :E	95% CI		O ² :E	95% CI		O:E	95% CI	
1	5256	111	204	205.4	0.54	(0.44–	0.64)	0.99	(0.89–	1.13)	0.45	(0.36–	0.54)
2	393	5	12	11.5	0.43	(0.05–	0.82)	1.04	(0.66–	1.63)	0.61	(0.16–	1.06)
3	294	8	13	12.2	0.65	(0.20–	1.11)	1.06	(0.61–	1.64)	0.41	(0.05–	0.77)
4	205	3	9	8.4	0.36	–(0.05–	0.76)	1.07	(0.67–	1.77)	0.72	(0.14–	1.29)
5	322	5	12	6.6	0.76	(0.09–	1.42)	1.82	(1.16–	2.85)	1.06	(0.28–	1.85)
6	874	18	30	37.7	0.48	(0.26–	0.70)	0.80	(0.58–	1.08)	0.32	(0.14–	0.50)
7	598	12	23	23.2	0.52	(0.22–	0.81)	0.99	(0.70–	1.40)	0.47	(0.19–	0.76)
8	50	3	4	3.0	0.99	–(0.13–	2.10)	1.31	(0.20–	2.60)	0.33	–(0.32–	0.97)
9	33	0	1	1.0	0.00	(0.00–	0.00)	1.00	(1.00–	2.96)	1.00	–(0.96–	2.96)
10	654	9	19	18.1	0.50	(0.17–	0.82)	1.05	(0.72–	1.52)	0.55	(0.21–	0.89)
11	146	3	5	4.9	0.62	–(0.08–	1.31)	1.03	(0.33–	1.92)	0.41	–(0.16–	0.98)
Total	8825	177	332	332.0	0.53	(0.45–	0.61)	1.00	(0.92–	1.11)	0.47	(0.39–	0.54)