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Outcomes, Cost, and Readmission After Surgical Aortic or Mitral Valve Replacement at Safety-Net and Non–Safety-Net Hospitals

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Abstract

BACKGROUND—Safety-net hospitals provide essential services to vulnerable patients with complex medical and socioeconomic circumstances. We hypothesized that matched patients at safety-net hospitals and non–safety-net hospitals would have comparable outcomes, costs, and readmission rates after isolated surgical aortic valve replacement (AVR) or mitral valve replacement (MVR).

METHODS—The National Readmissions Database was queried to identify patients who underwent isolated AVR (n = 109 744) or MVR (n = 31 475) from 2016 to 2018. Safety-net burden was defined as the percentage of patients who were uninsured or insured with Medicaid, with hospitals in the top quartile designated as safety-net hospitals. After propensity score

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matching, outcomes for AVR and MVR at safety-net hospitals vs non–safety-net hospitals were compared.

RESULTS—Overall, 17 925 AVRs (16%) and 5516 MVRs (18%) were performed at safety-net hospitals, and these patients had higher comorbidity rates, had lower socioeconomic status, and more frequently required urgent surgery. Observed inhospital mortality was similar between safety-net hospitals and non–safety-net hospitals (AVR 2.2% vs 2.1%, $P = .4$; MVR 4.8% vs 4.3%, $P = .1$). After matching, rates of inhospital mortality, major morbidity, and readmission were similar; however, safety-net hospitals had longer length of stay after AVR (7 vs 6 days, $P = .001$) and higher total cost after AVR ($49 015 vs $42 473, $P < .001$) and MVR ($59 253 vs $52 392, $P < .001$).

CONCLUSIONS—Isolated surgical AVR and MVR are both performed at safety-net hospitals with outcomes comparable to those at non–safety-net hospitals, supporting efforts to expand access to these procedures for underserved populations. Investment in care coordination resources to reduce length of stay and curtail cost at safety-net hospitals is warranted.

Safety-net hospitals provide essential services, including cardiac surgical care, to vulnerable patients with complex medical and socioeconomic circumstances, regardless of their ability to pay. Important disparities exist for these patients in terms of the burden of cardiovascular risk factors,[1] disease severity at presentation,[2] and access to cardiac surgical interventions.[3-5] Furthermore, safety-net hospitals have been the subject of scrutiny with respect to quality of cardiac surgical care; several studies suggest that safety-net hospitals lag behind non–safety-net hospitals.[6-8]

Although previous studies have identified patient-level disparities in terms of outcomes after surgical aortic valve replacement (AVR) or mitral valve replacement (MVR) in the United States,[9-12] few have compared outcomes based on hospital safety-net status.[13] We hypothesized that, among propensity score matched patients from a nationwide sample, safety-net hospitals and non–safety-net hospitals would have comparable outcomes, cost, and readmission rates after isolated surgical AVR or MVR.

PATIENTS AND METHODS

STUDY POPULATION AND DATA COLLECTION.

A retrospective cohort study was conducted using Nationwide Readmissions Database data. All index admissions of patients aged 18 years or more who underwent surgical AVR or MVR between January 2016 and December 2018 were identified by the corresponding International Classification of Disease, Tenth Revision (ICD-10) codes. The ICD-10 Clinical Modification and Procedure Coding System codes were used to exclude patients with a diagnosis of endocarditis and patients who underwent concomitant cardiac procedures (Supplemental Table 1). Given that only deidentified data were used, this study was deemed exempt from Institutional Review Board approval.

STUDY DEFINITIONS.

Safety-net burden was defined as the percentage of all admissions with the patient’s primary payer designated as uninsured, or insured by Medicaid. In line with previous studies,[7]

hospitals in the top quartile of safety-net burden were defined as safety-net hospitals and the remaining hospitals as non–safety-net hospitals. Demographic characteristics including age, sex, primary payer, and median household income quartile were abstracted directly from the Nationwide Readmissions Database. Comorbidities were identified by using the corresponding ICD-10 Clinical Modification codes with a custom Python script (Python Language Reference 3.7; Python Software Foundation). The composite Elixhauser comorbidity index, used to quantify comorbidity burden, was calculated with a Python implementation of Healthcare Cost and Utilization Project Software and Tools (hcuppy 0.0.7).

OUTCOMES.

Our primary outcome was inhospital mortality. Our secondary outcomes were major morbidity (acute kidney injury, stroke, and respiratory failure), length of stay (LOS), total cost of hospitalization, and 30- and 90-day readmission. Total cost was calculated by multiplying the total hospital charge by cost-to-charge ratios provided by the Nationwide Readmissions Database.

STATISTICAL ANALYSIS.

Analyses were performed in SAS 9.4 (SAS Institute) and R 4.1 (The R Project for Statistical Computing). In all analyses, we accounted for the complex survey design of the Nationwide Readmissions Database, including clustering, stratification, and discharge weighting. Categoric variables are presented as number (percentage) and continuous variables are presented as median (interquartile range). Univariate comparisons were performed with the χ^2 test with Rao and Scott's correction or the Wilcoxon rank sum test adjusted for complex survey design, as appropriate. A P value of less than .05 was considered statistically significant.

PROPENSITY SCORE MATCHED ANALYSIS.

A propensity score matched analysis was performed to compare outcomes between safety-net hospitals and non-safety-net hospitals after adjusting for differences in baseline characteristics. Cohorts were matched by age, sex, insurance status, household income quartile, prosthesis type, elective admission status, and Elixhauser comorbidities. Greedy nearest-neighbor matching through the PSMATCH function in SAS 9.4 was used to create pairs in a 1:1 ratio between safety-net hospitals and non-safety-net hospitals with a caliper of 0.005 standard deviation of the logit. Quality of match was assessed with overall propensity score balance, individual standard mean differences of the covariates, and statistical insignificance of the covariates after matching. An average standard mean difference of 0.10 was considered acceptable. After matching, univariate comparisons were performed with the tests described in preceding text.

RESULTS

PATIENTS UNDERGOING AVR AT SAFETY-NET VS NON–SAFETY-NET HOSPITALS.

Preoperative Characteristics.—A weighted total of 109 744 patients (64.0% male) underwent isolated surgical AVR in the United States between 2016 and 2018 (17 925

[16.3%] at safety-net hospitals; 91 819 [83.7%] at non–safety-net hospitals; Figure 1A). In terms of differences in baseline characteristics between the two cohorts, patients who underwent AVR at safety-net hospitals were younger (median age 66 vs 67 years), more often in the lowest household income quartile (27.5% vs 21.1%), less often in the highest household income quartile (20.0% vs 23.3%), and more likely to undergo nonelective surgery (25.2% vs 18.5%) than patients at non–safety-net hospitals (all $P < .001$; Table 1). In addition, patients at safety-net hospitals had a higher burden of comorbidities, including anemia (15.8% vs 12.2%, $P < .001$), congestive heart failure (38.2% vs 34.6%, $P < .001$), and diabetes mellitus (14.3% vs 12.8%, $P < .001$), whereas patients at non–safety-net hospitals had higher rates of hypertension (48.5% vs 47.5%, $P = .01$) and obesity (27.4% vs 25.9%, $P < .001$). Last, patients at safety-net hospitals were more likely to receive a mechanical valve than patients at non–safety-net hospitals.

Postoperative Outcomes.—In terms of unadjusted outcomes after AVR, we observed similar rates of inhospital mortality at safety-net hospitals and non–safety-net hospitals (2.2% vs 2.1%, $P = .4$); however, there were several differences in the incidence of major morbidity (Table 2). The rates of acute kidney injury (16.6% vs 16.0%, $P = .04$) and stroke (2.2% vs 1.9%, $P = .003$) were higher at safety-net hospitals, whereas the rate of respiratory failure (10.9% vs 9.4%, $P < .001$) was higher at non–safety-net hospitals. In addition, patients at safety-net hospitals had longer LOS (median 7 vs 6 days, $P < .001$), incurred higher total cost (mean $49 091 vs $41 746, $P < .001$), and had a higher rate of readmission within 90 days (15.4% vs 14.6%, $P = .01$).

After propensity score matching to create 10 537 matched pairs, there were no significant differences between cohorts in the rates of inhospital mortality, acute kidney injury, stroke, or readmission within 30 or 90 days (Table 2); however, the higher rate of respiratory failure (11.3% vs 9.3%, $P < .001$) observed at non–safety-net hospitals persisted, along with the longer LOS (median 7 vs 6 days; $P = .001$) and higher total cost (median $49 015 vs $42 473; $P < .001$) observed at safety-net hospitals.

PATIENTS UNDERGOING MVR AT SAFETY-NET VS NON–SAFETY-NET HOSPITALS.

Preoperative Characteristics.—A weighted total of 31 475 patients (40.6% male) underwent isolated surgical MVR in the United States between 2016 and 2018 (5516 [17.5%] at safety-net hospitals and 25 959 [82.5%] at non–safety-net hospitals; Figure 1B). Again, patients who underwent MVR at safety-net hospitals were younger (median age 64 vs 67 years), more often in the lowest household income quartile (33.1% vs 26.1%), less often in the highest household income quartile (16.7% vs 20.5%), and more likely to undergo nonelective surgery (33.4% vs 28.1%) than patients at non–safety-net hospitals (all $P < .001$; Table 3). The overall burden of comorbidities was similar between groups; however, patients at safety-net hospitals had higher rates of anemia (20.7% vs 17.0%, $P < .001$) and diabetes mellitus (11.6% vs 8.6%, $P < .001$), whereas patients at non–safety-net hospitals had higher rates of chronic kidney disease (20.6% vs 18.7%, $P = .002$), obesity (22.4% vs 20.2%, $P < .001$), and peripheral arterial disease (9.4% vs 8.0%, $P = .001$). Last, patients at safety-net hospitals were more likely to receive a mechanical valve than patients at non–safety-net hospitals.

Postoperative Outcomes.—In terms of unadjusted outcomes after MVR at safety-net hospitals and non–safety-net hospitals, respectively, we observed similar rates of inhospital mortality (4.8% vs 4.3%, $P = .1$), acute kidney injury (25.5% vs 25.8%, $P = .7$), stroke (2.8% vs 2.4%, $P = .2$), and readmission within 30 days (16.2% vs 16.1%, $P = 1$) and 90 days (22.8% vs 23.1%, $P = .6$); however, non–safety-net hospitals had a higher rate of respiratory failure (14.6% vs 11.6%, $P < .001$; Table 4). In addition, although patients at safety-net hospitals and non–safety-net hospitals had similar LOS (median 9 vs 9 days; $P < .001$), patients at safety-net hospitals incurred higher total cost (median $59 524 vs $52 638; $P < .001$).

After propensity score matching to create 3175 matched pairs, there were no significant differences between cohorts in the rates of inhospital mortality, acute kidney injury, stroke, respiratory failure, LOS, or readmission within 30 or 90 days (Table 4). However, the higher total cost observed at safety-net hospitals persisted (median $59 253 vs $52 392; $P < .001$).

COMMENT

Studies comparing outcomes after cardiac surgery at safety-net hospitals vs non–safety-net hospitals have yielded conflicting results.[6-8,13-15] We speculated that differences in outcomes after cardiac surgery may be attributable in part to differences in medical and socioeconomic complexity between patients at safety-net hospitals vs non-safety-net hospitals, as has been previously described.[6,13,15,16] In line with our hypothesis, we found that after propensity score matching, inhospital mortality and major morbidity were comparable or better for patients who underwent isolated surgical AVR or MVR at safety-net hospitals vs non–safety-net hospitals. Indeed, non–safety-net hospitals were inferior to safety-net hospitals in the observed rate of postoperative respiratory failure, although this difference did not persist after matching. One possible explanation for this finding is baseline differences between cohorts in the rates of chronic respiratory diseases, which were not included in our analysis or captured in the Nationwide Readmissions Database. Also of note, important predictors of postoperative respiratory failure, including cardiopulmonary bypass time and perioperative transfusions, were not available in the Nationwide Readmissions Database.

In a previous study by Ando and colleagues,[13] hospitals were divided into quintiles based on safety-net burden, and outcomes after AVR were compared among low-, medium-, and high-burden hospitals. Consistent with the findings of the present study, the investigators found that after adjusting for patient- and hospital-level characteristics through multivariable logistic regression, inhospital mortality and major morbidity were similar at low- and high-burden hospitals. Similar findings have been described for transcatheter aortic valve replacement.[17]

Interestingly, we found that both LOS (for AVR) and total cost (for AVR and MVR) remained greater for patients who underwent valve replacement surgery at safety-net hospitals after propensity score matching, similar to the findings reported by Ando and colleagues.[13] Although an association between longer LOS and higher total cost is intuitive, it remains to be determined how much the differences in LOS (1 day for AVR and 0

days for MVR) contribute to the variation in total cost ($6542 for AVR and $6861 for MVR) observed in our study. In addition, the root cause of greater LOS at safety-net hospitals compared with non–safety-net hospitals warrants further study. One possible explanation is the constraint in coordination of care and limited access to post-hospital facilities (eg, acute rehabilitation, skilled nursing, long-term acute care) for underinsured or uninsured patients.[18] As a result, patients at safety-net hospitals may require a protracted hospital course to ensure safe discharge, thereby incurring higher total cost. Implementing enhanced recovery protocols and streamlined care pathways at these centers could help bridge both of these residual gaps between safety-net and non–safety-net hospitals.[19] Given the substantial overall cost of valve replacement surgery, targeted strategies to reduce LOS are warranted for safety-net hospitals to facilitate cost containment. In terms of additional cost-containment strategies, we observed no differences in the rates of 30-day and 90-day readmission between safety-net hospitals and non-safety-net hospitals in our matched analysis. This finding is encouraging, given that previous studies have found higher rates of readmission at safety-net hospitals than at non–safety-net hospitals.[7,15]

An important consideration in interpreting studies such as the present one is that patient- and hospital-level socioeconomic factors are inherently interconnected. Patients at safety-net hospitals, many of whom are uninsured, may be more likely to forgo necessary care and screening[20] and, as a result, present with more advanced disease and higher acuity.[2,11] Indeed, lower socioeconomic status[21-25] and lack of insurance[12,26] are independently associated with greater morbidity and mortality after cardiac surgery, and likely exert a synergistic effect on access to cardiac surgical care.[3] Additional studies are needed to elucidate the complex relationship between patient- and hospital-level socioeconomic factors, their relative impact on outcomes after cardiac surgery, and where the greatest return on investment may lie for policymakers and other stakeholders aiming to improve the quality of cardiac surgical care for vulnerable populations.

STUDY LIMITATIONS.

Our findings should be interpreted in the context of the limitations inherent to all retrospective studies and administrative databases. Although the Nationwide Readmissions Database provides a large sample size capable of powering a robust propensity score matched analysis, administrative data can be incomplete, and their accuracy relies on nonclinician coding. Consequently, patients with limited access to or use of routine health care services before surgery may be “undercoded” with respect to comorbidities. In addition, we attempted to minimize the influence of baseline covariates by using established comorbidity codes; however, the influence of residual confounding factors cannot be fully excluded. Several potential unmeasured confounders influencing the findings of this study include race and ethnicity, preoperative risk modification, lesion severity, and variation in surgical technique. In addition, although both surgeon and center volume substantially affect outcomes after valve surgery, we were unable to match patients by these volumes. Last, transcatheter therapies have become an integral component of the armamentarium for treating aortic and mitral valve pathologies; however, we elected to exclude these because including them would have complicated our analysis and obfuscated the focus of the present study. Moreover, the introduction of these therapies has altered the landscape of aortic and

mitral valve surgery, rendering isolated aortic and mitral valve replacement less common. Although including concomitant cardiac procedures may have enhanced the generalizability of our results, we elected to exclude these procedures as well, given the lack of granularity in the Nationwide Readmissions Database in terms of complex reconstructive techniques, including those often required for patients with infective endocarditis.

CONCLUSION.

After propensity score matching, we found that outcomes of patients who underwent isolated surgical AVR or MVR were comparable at safety-net hospitals and non–safety-net hospitals, supporting efforts to expand access to these procedures for underserved populations. Investment in care coordination resources to reduce length of stay and curtail cost at safety-net hospitals is warranted.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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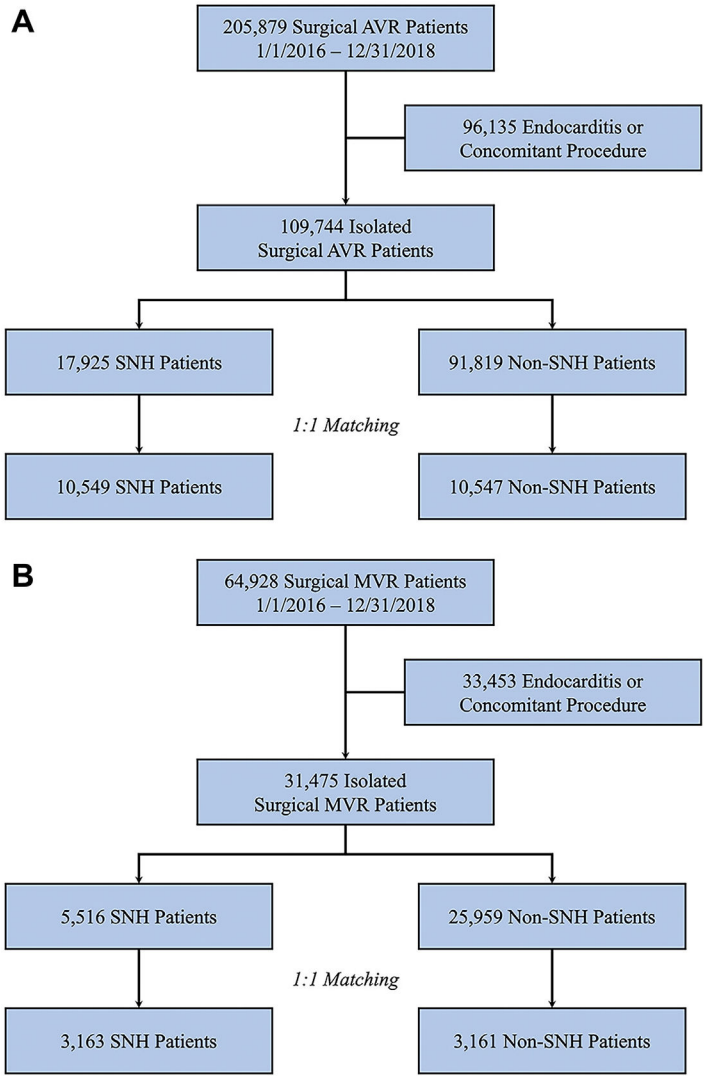

FIGURE.

Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) diagrams for (A) aortic valve replacement (AVR) and (B) mitral valve replacement (MVR) at safety-net hospitals (SNH) and non–safety-net hospitals.

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TABLE 1

Preoperative Characteristics of Patients Who Underwent Isolated Surgical Aortic Valve Replacement at Safety-Net vs Non–Safety-Net Hospitals

	Unmatched (n = 109 744)			Matched (n = 20 074)		
Variable	**Safety-Net Hospitals (n = 17 925)**	**Non–Safety-Net Hospitals (n = 91 819)**	***P* Value**	**Safety-Net Hospitals (n = 10 537)**	**Non–Safety-Net Hospitals (n = 10 537)**	**SMD**
Age, y	66 (58-73)	67 (59-74)	<.001	66 (58-73)	66 (57-73)	−0.001
Male	11 467 (64.0)	58 805 (64.0)	.9	6739 (64.0)	6550 (62.2)	−0.037
Elixhauser score	10 (2-19)	10 (2-18)	.03	10 (2-19)	10 (2-19)	…[b]
Anemia	2834 (15.8)	11 186 (12.2)	<.001	1,626 (15.4)	1687 (16.0)	−0.006
Chronic kidney disease	2375 (13.3)	12 160 (13.2)	1	1362 (12.9)	1446 (13.7)	−0.024
COPD	3644 (20.3)	18 315 (20.0)	.2	2142 (20.3)	2234 (21.2)	−0.022
Coagulopathy	5814 (32.4)	31 566 (34.4)	<.001	3416 (32.4)	3604 (34.2)	−0.038
Congestive heart failure	6845 (38.2)	31 722 (34.6)	<.001	3981 (37.8)	4099 (38.9)	−0.023
Diabetes mellitus	2560 (14.3)	11 731 (12.8)	<.001	1505 (14.3)	1573 (14.9)	−0.019
Drug abuse	426 (2.4)	1055 (1.2)	<.001	228 (2.2)	231 (2.2)	−0.002
Hypertension	8506 (47.5)	44 540 (48.5)	.01	5039 (47.8)	4863 (46.2)	0.033
Obesity	4645 (25.9)	25 139 (27.4)	<.001	2712 (25.7)	2910 (27.6)	−0.042
Peripheral arterial disease	4747 (26.5)	24 496 (26.7)	.6	2752 (26.1)	2860 (27.1)	−0.023
Household income[a]			<.001			
Quartile 1	4854 (27.5)	19 102 (21.1)		2703 (26.1)	2699 (26.0)	0.001
Quartile 2	4906 (27.8)	25 175 (27.8)		2819 (27.2)	2854 (27.5)	−0.008
Quartile 3	4369 (24.8)	25 133 (27.8)		2653 (25.6)	2638 (25.4)	0.003
Quartile 4	3522 (20.0)	21 048 (23.3)		2190 (21.1)	2185 (21.1)	0.001
Bioprosthetic	13 441 (75.0)	72 750 (79.2)	<.001	7898 (75.0)	7826 (74.3)	−0.016
Mechanical valve	4498 (25.1)	19 119 (20.8)	<.001	2639 (25.0)	2711 (25.7)	0.017
Nonelective	4515 (25.2)	16 958 (18.5)	<.001	2631 (25.0)	2683 (25.5)	0.409

[a]Indexed to patient’s zip code

[b]Cohorts matched by each individual Elixhauser comorbidity but not composite score. Values are median (interquartile range) or n (%). COPD, chronic obstructive pulmonary disease; SMD, standardized mean difference.

TABLE 2

Postoperative Outcomes of Patients After Isolated Surgical Aortic Valve Replacement at Safety-Net vs Non–Safety-Net Hospitals

Variable	Unmatched (n = 109 744)			Matched (n = 20 074)		
	Safety-Net Hospitals (n = 17 925)	Non–Safety-Net Hospitals (n = 91 819)	*P* Value	Safety-Net Hospitals (n = 10 537)	Non–Safety-Net Hospitals (n = 10 537)	*P* Value
Inhospital mortality	388 (2.2)	1899 (2.1)	.4	223 (2.1)	252 (2.4)	.2
Acute kidney injury	2979 (16.6)	14 679 (16)	.04	1725 (16.4)	1787 (17.0)	.3
Stroke	392 (2.2)	1706 (1.9)	.003	216 (2.1)	257 (2.4)	.1
Respiratory failure	1682 (9.4)	10 017 (10.9)	<.001	982 (9.3)	1186 (11.3)	<.001
Length of stay, d	7 (5-10)	6 (5-9)	<.001	7 (5-10)	6 (5-10)	.001
Total cost, $	49 091 (38 614-65 523)	41 746 (32 213-57 805)	<.001	49 015 (38 570-65 198)	42 473 (32 786-59 409)	<.001
Readmission within 30 days	1979 (11.0)	9858 (10.7)	.2	1136 (10.8)	1,189 (11.3)	.2
Readmission within 90 days	2762 (15.4)	13 425 (14.6)	.01	1596 (15.2)	1,646 (15.6)	.3
Discharged home[a]	14 896 (83.1)	76 241 (83)	.8	8759 (83.1)	8,653 (82.1)	.1

[a]With or without home health care. Values are n (%) or median (interquartile range).

TABLE 3

Preoperative Characteristics of Patients Who Underwent Isolated Surgical Mitral Valve Replacement at Safety-Net vs Non–Safety-Net Hospitals

	Unmatched (n = 31 475)			Matched (n = 6350)		
Variable	Safety-Net Hospitals (n = 5516)	Non–Safety-Net Hospitals (n = 25 959)	*P* Value	Safety-Net Hospitals (n = 3175)	Non–Safety-Net Hospitals (n = 3175)	SMD
Age, y	64 (55-73)	67 (58-75)	<.001	64 (55-73)	64 (55-73)	−0.005
Male	2201 (39.9)	10 579 (40.8)	.2	1893 (59.6)	1932 (60.9)	−0.025
Elixhauser score	14 (6-22)	14 (6-22)	.2	14 (6-22)	14 (6-22)	…[b]
Anemia	1144 (20.7)	4410 (17.0)	<.001	651 (20.5)	633 (19.9)	0.014
Chronic kidney disease	1031 (18.7)	5342 (20.6)	.002	596 (18.8)	614 (19.4)	0.005
COPD	1467 (26.6)	7175 (27.6)	.1	595 (18.7)	589 (18.6)	−0.021
Coagulopathy	1942 (35.2)	9646 (37.2)	.006	1121 (35.3)	1116 (35.2)	0.003
Congestive heart failure	3476 (63.0)	16 111 (62.1)	.2	2005 (63.2)	1989 (62.7)	0.010
Diabetes mellitus	642 (11.6)	2232 (8.6)	< .001	372 (11.7)	363 (11.4)	0.009
Drug abuse	1638 (29.7)	7474 (28.8)	.2	943 (29.7)	957 (30.1)	−0.009
Hypertension	215 (3.9)	438 (1.7)	<.001	95 (3.0)	90 (2.9)	0.009
Obesity	1116 (20.2)	5823 (22.4)	<.001	626 (19.7)	619 (19.5)	0.005
Peripheral arterial disease	443 (8.0)	2450 (9.4)	.001	252 (7.9)	248 (7.8)	0.004
Household income[a]			<.001			
Quartile 1	1795 (33.1)	6680 (26.1)		979 (31.4)	971 (31.1)	0.006
Quartile 2	1454 (26.8)	7196 (28.2)		836 (26.8)	832 (26.7)	0.003
Quartile 3	1269 (23.4)	6447 (25.2)		757 (24.3)	778 (24.9)	−0.015
Quartile 4	904 (16.7)	5241 (20.5)		548 (17.6)	539 (17.3)	0.007
Bioprosthetic valve	3531 (64.0)	18 353 (70.7)	<.001	2035 (64.1)	2015 (63.5)	−0.014
Mechanical valve	1981 (35.9)	7615 (29.3)	<.001	1139 (35.9)	1160 (35.5)	0.013
Nonelective	1839 (33.4)	7284 (28.1)	< .001	1028 (32.4)	1053 (33.2)	0.504

[a]Indexed to patient's zip code

[b]Cohorts matched by each individual Elixhauser comorbidity and not composite score. Values are median (interquartile range) or n (%). COPD, chronic obstructive pulmonary disease; SMD, standardized mean difference.

TABLE 4

Postoperative Outcomes of Patients Who Underwent Isolated Surgical Mitral Valve Replacement at Safety-Net vs Non–Safety-Net Hospitals

	Unmatched (n = 31 475)			Matched (n = 6,350)		
Variable	Safety-Net Hospitals (n = 5516)	Non–Safety-Net Hospitals (n = 25 959)	*P* Value	Safety-Net Hospitals (n = 3175)	Non–Safety-Net Hospitals (n = 3175)	*P* Value
Inhospital mortality	265 (4.8)	1116 (4.3)	.1	139 (4.4)	124 (3.9)	.3
Acute kidney injury	1407 (25.5)	6689 (25.8)	.7	783 (24.7)	782 (24.6)	1
Stroke	151 (2.8)	1631 (2.4)	.2	89 (2.8)	88 (2.8)	.9
Respiratory failure	638 (11.6)	3782 (14.6)	<.001	371 (11.7)	420 (13.2)	.1
Length of stay, d	9 (7-16)	9 (6-16)	<.001	9 (7-16)	9 (6-15)	.1
Total cost, $	59 524 (45 252-82 443)	52 638 (38 813-75 443)	<.001	59 253 (45 222-82 286)	52 392 (38 745-74 034)	<.001
Readmission within 30 days	891 (16.2)	4187 (16.1)	1	506 (15.9)	506 (15.9)	1
Readmission within 90 days	1258 (22.8)	6004 (23.1)	.6	728 (22.9)	725 (22.8)	.9
Discharged home[a]	4151 (75.3)	19 133 (71.3)	.02	2419 (76.2)	2405 (75.8)	.7

[a]With or without home health care. Values are n (%) or median (interquartile range).