

SUPPLEMENTARY MATERIAL

Supplementary Table 1. Age standardized transcatheter aortic valve replacement rates from 2011 to 2016 in the state of Florida by population density defined as total population per square mile after excluding uninhabited land (i.e. zero block population).

Age Group	Zero Block Population Density per Square Mile	TAVR Utilization by Age Group	2011–2016 Florida Population by Age Group	2000 U.S. Standard Population Proportions	Age Standardized Rates*
<65	<50	1	549,296	0.873614	0.2
65–74	<50	5	69,759	0.066037	7.2
75–84	<50	9	36,804	0.044841	24.5
85+	<50	10	12,712	0.015508	78.7
Total	<50	25	668,571	1.000000	2.9
<65	50–99	8	2,277,852	0.873614	0.4
65–74	50–99	39	286,166	0.066037	13.6
75–84	50–99	64	149,434	0.044841	42.8
85+	50–99	45	50,766	0.015508	86.7
Total	50–99	156	2,764,218	1.000000	4.5
<65	100–249	9	4,714,285	0.873614	0.2
65–74	100–249	62	936,181	0.066037	6.6
75–84	100–249	189	534,905	0.044841	35.3
85+	100–249	168	179,558	0.015508	93.0
Total	100–249	428	6,364,929	1.000000	3.6
<65	250–749	92	28,719,557	0.873614	0.3
65–74	250–749	293	4,273,495	0.066037	6.9
75–84	250–749	851	2,474,109	0.044841	34.4
85+	250–749	779	971,906	0.015508	80.2
Total	250–749	2,015	36,439,067	1.000000	3.5
<65	≥750	146	60,174,416	0.873614	0.2
65–74	≥750	471	6,604,679	0.066037	7.1

75–84	≥750	1,466	3,886,618	0.044841	37.7
85+	≥750	1,824	1,794,811	0.015508	101.6
Total	≥750	3,907	72,460,524	1.000000	4.0
<65	All	256	96,435,406	0.873614	0.3
65–74	All	871	12,170,280	0.066037	7.1
75–84	All	2,580	7,081,870	0.044841	36.4
85+	All	2,824	3,009,753	0.015508	93.8
Total*	All	6,531	118,697,309	1.000000	3.8

*The 2000 U.S. Standard Population for calculating the age standardized rates (see <https://seer.cancer.gov/stdpopulations/stdpop.19ages.html>)

Supplementary Table 2. Age standardized transcatheter aortic valve replacement rates from 2011 to 2016 in the state of Florida by population density defined as the median population density per square mile.

Age Group	Median Density per Square Mile	TAVR Utilization by Age Group	2011–2016 Florida Population by Age Group	2000 U.S. Standard Population Proportions	Age Standardized Rates *
<65	<250	2	1,148,528	0.873614	0.2
65–74	<250	14	143,159	0.066037	9.8
75–84	<250	28	75,404	0.044841	37.1
85+	<250	30	28,324	0.015508	105.9
Total	<250	74	1,395,415	1.000000	4.1
<65	250–749	10	2,390,288	0.873614	0.4
65–74	250–749	43	296,453	0.066037	14.5
75–84	250–749	83	150,038	0.044841	55.3
85+	250–749	58	49,970	0.015508	114.1
Total	250–749	194	2,886,749	1.000000	5.6
<65	750–1,999	32	7,243,037	0.873614	0.4
65–74	750–1,999	88	1,199,743	0.066037	7.3
75–84	750–1,999	309	692,132	0.044841	44.6
85+	750–1,999	248	252,504	0.015508	97.8
Total	750–1,999	677	9,387,416	1.000000	4.4
<65	2,000–3,499	68	25,952,640	0.873614	0.3
65–74	2,000–3,499	267	4,358,676	0.066037	6.1
75–84	2,000–3,499	774	2,566,734	0.044841	30.2
85+	2,000–3,499	770	1,008,421	0.015508	76.4
Total	2,000–3,499	1,879	33,886,471	1.000000	3.2
<65	≥3,500	144	59,700,913	0.873614	0.2
65–74	≥3,500	458	6,172,249	0.066037	7.4

75-84	≥3,500	1,385	3,597,562	0.044841	38.5
85+	≥3,500	1,720	1,670,534	0.015508	103.0
Total	≥3,500	3,707	71,141,258	1.000000	4.0
<65	All	256	96,435,406	0.873614	0.3
65-74	All	871	12,170,280	0.066037	7.1
75-84	All	2,580	7,081,870	0.044841	36.4
85+	All	2,824	3,009,753	0.015508	93.8
Total	All	6,531	118,697,309	1.000000	3.8

* The 2000 U.S. Standard Population for calculating the age standardized rates (see <https://seer.cancer.gov/stdpopulations/stdpop.19ages.html>)

Supplementary Table 3. Age standardized transcatheter aortic valve replacement rates from 2011 to 2016 in the state of Florida by population density defined as the 95th percentile of population per square mile of land.

Age Group	95th Percentile Density per Square Mile	TAVR Utilization by Age Group	2011–2016 Florida Population by Age Group	2000 U.S. Standard Population Proportions	Age Standardized Rates *
<65	<4,000	3	1,590,350	0.873614	0.2
65–74	<4,000	30	210,459	0.066037	14.3
75–84	<4,000	48	106,762	0.044841	45.0
85+	<4,000	37	36,366	0.015508	101.7
Total	<4,000	118	1,943,937	1.000000	4.7
<65	4,000–5,999	23	6,159,481	0.873614	0.4
65–74	4,000–5,999	78	1,183,870	0.066037	6.6
75–84	4,000–5,999	273	689,717	0.044841	39.6
85+	4,000–5,999	218	246,799	0.015508	87.9
Total	4,000–5,999	592	8,279,867	1.000000	3.9
<65	6,000–7,999	43	12,670,391	0.873614	0.3
65–74	6,000–7,999	155	2,413,585	0.066037	6.4
75–84	6,000–7,999	461	1,425,672	0.044841	32.3
85+	6,000–7,999	470	569,421	0.015508	82.5
Total	6,000–7,999	1,129	17,079,069	1.000000	3.5
<65	8,000–11,999	58	20,103,911	0.873614	0.3
65–74	8,000–11,999	199	2,453,266	0.066037	8.1
75–84	8,000–11,999	500	1,371,269	0.044841	36.5
85+	8,000–11,999	429	540,333	0.015508	79.2
Total	8,000–11,999	1,186	24,468,779	1.000000	3.7
<65	≥12,000	129	55,911,273	0.873614	0.2
65–74	≥12,000	408	5,909,100	0.066037	6.9
75–84	≥12,000	1,297	3,488,450	0.044841	37.2

85+	≥12,000	1,672	1,616,834	0.015508	103.4
Total	≥12,000	3,506	66,925,657	1.000000	3.9
<65	All	256	96,435,406	0.873614	0.3
65–74	All	871	12,170,280	0.066037	7.1
75–84	All	2,579	7,081,870	0.044841	36.4
85+	All	2,825	3,009,753	0.015508	93.8
Total	All	6,531	118,697,309	1.000000	3.8

* The 2000 U.S. Standard Population for calculating the age standardized rates (see <https://seer.cancer.gov/stdpopulations/stdpop.19ages.html>)

Supplementary Table 4. Multivariable logistic regression analysis examining the association between different definitions of population density on hospital mortality after transcatheter aortic valve replacement in (A) all TAVR; (B) high volume TAVR centers defined as a center performing >50 procedures per year in Florida from 2011 to 2016. Note that the reference group is high-population density areas.

	All TAVR Centers *				High Volume TAVR Center			
	OR [#]	P Value	95% CI		OR ^f	P Value	95% CI	
Total Land **								
<50	2.31	0.043	1.02	5.23	2.60	0.024	1.13	5.96
50 - 99	0.48	0.163	0.17	1.33	0.43	0.165	0.13	1.40
100 - 249	0.78	0.344	0.47	1.29	0.64	0.175	0.34	1.21
250 - 749	0.58	0.002	0.41	0.81	0.56	0.011	0.40	0.88
Zero Block †								
<50	6.13	0.002	1.97	19.1	7.24	0.001	2.28	23.0
50 - 99	0.67	0.506	0.21	2.15	0.81	0.733	0.25	2.63
100 - 249	0.73	0.381	0.36	1.46	0.78	0.540	0.35	1.71
250 - 749	0.63	0.015	0.44	0.91	0.63	0.039	0.41	0.97
Median ‡								
<250	2.12	0.158	0.74	6.02	2.50	0.089	0.78	7.19
250 - 749	0.87	0.774	0.35	2.18	0.63	0.449	0.19	2.05
750 - 1,999	0.51	0.042	0.26	0.97	0.66	0.232	0.33	1.29
2000 - 3,499	0.86	0.415	0.61	1.22	1.02	0.911	0.68	1.52
95th % ††								
<4000	0.90	0.866	0.27	2.92	1.05	0.929	0.32	3.44
4000 - 5,999	0.80	0.468	0.45	1.43	0.74	0.400	0.38	1.46
6000 - 7,999	0.78	0.273	0.50	1.21	1.03	0.884	0.65	1.64
8000 - 11,999	0.86	0.491	0.57	1.30	0.99	0.980	0.59	1.65

Abbreviations: CI = Confidence interval. *(Reference: >750 people per square mile). **Total land area of the state of Florida by population density measured as people per square miles; † excluding uninhabited land (i.e. excluding blocks with zero inhabitants) (Reference: >3,500 people per square mile); ‡ Median population density per square mile of land; †† 95th percentile of population density per square mile of land (Reference: >12,000 people per square mile); # The models were adjusted for age, gender, and elixhauser comorbidity index.