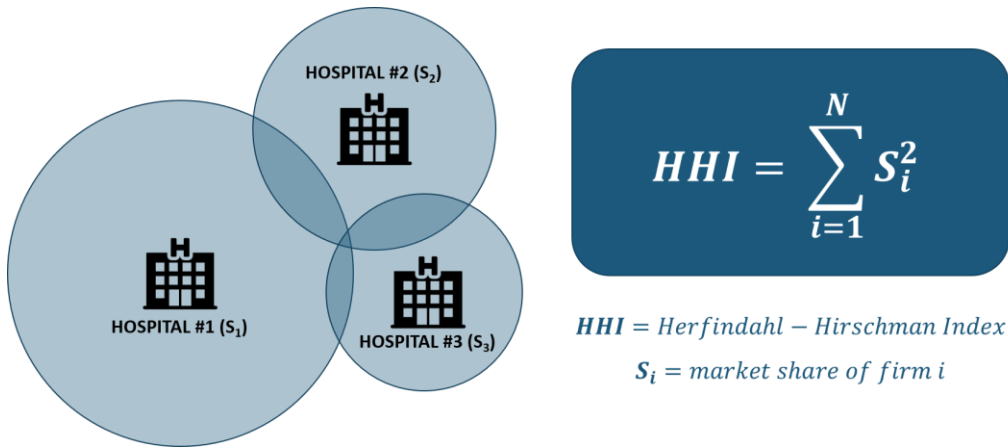


SUPPLEMENTAL MATERIAL

“Hospital Market Concentration and the Use of Mechanical Circulatory Support Devices in Acute Myocardial Infarction Complicated by Cardiogenic Shock”

Figure S1: Herfindahl-Hirschman Index. (A) Definition of HHI. HHI is defined as the square of sum of market shares of all hospitals in a market. **(B) Defining Hospital Radius.** A hospital's market can be defined as either a fixed or variable radius. Fixed radius evaluates all hospitals within a certain distance of the hospital. Variable radius evaluates a distance that encompasses a percentage of a hospital's discharges.

A



B

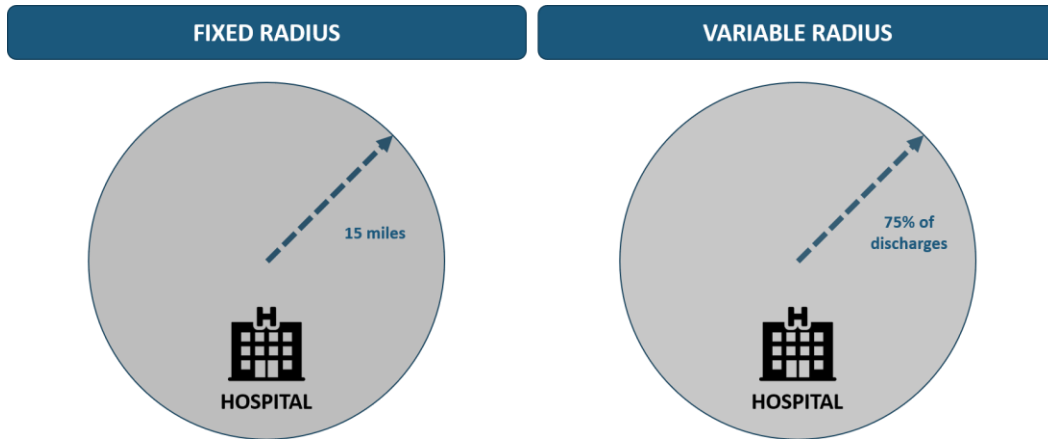


Table S1: Administrative Codes Used to Define Variables

Variable Name	ICD-9-CM Code
Percutaneous devices	37.68
Non-percutaneous devices	37.60, 36.65
IABP	37.61
ECMO	39.65, 39.66
Coronary angiography	37.22, 37.23, 88.52, 88.53, 88.54, 88.55, 88.56, 88.57
PCI	00.66, 17.55, 36.01, 36.02, 36.05, 36.06, 36.07
CABG	36.10-36.17, 36.19
Right heart catheterization	37.21
Congestive heart failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0- 428.9
Valvular disease	093.20- 093.24, 394.0- 397.1, 397.9, 424.0- 424.99, 746.3- 746.6, V42.2, V43.3
Pulmonary circulation disorders	415.0, 415.11- 415.19, 416.0- 416.9, 417.0-417.9
Peripheral vascular disorders	440-440.9, 441.00- 441.9, 442.0- 442.9, 443.1- 443.9, 444.21- 444.22, 447.1,449, 557.1, 557.9, V43.4
Paralysis	342.0- 344.9
Other neurological disorders	330.0- 331.9, 332.0, 333.4, 333.5, 333.71, 333.72, 333.79, 333.85, 333.94, 334.0- 335.9, 338.0, 340, 341.1- 341.9, 345.00- 345.11, 345.2- 345.3, 345.40- 345.91, 347.00- 347.01, 347.10- 347.11, 649.40- 649.44, 768.7, 768.70, 768.71, 768.72, 768.73, 780.3, 780.31, 780.32, 780.33, 780.39, 780.97, 784.3
Chronic pulmonary disease	490-492.8, 493.00- 493.92, 494-494.1, 495.0-505, 506.4
Diabetes, uncomplicated	249.00- 249.31, 250.00- 250.33, 648.00- 648.04
Diabetes with chronic complications	249.40- 249.91, 250.40- 250.93, 775.1
Hypothyroidism	243-244.2, 244.8, 244.9
Renal failure	403.01, 403.11, 403.90, 403.91, 404.02, 404.03, 404.12, 404.13, 404.92, 404.93, 585.3, 585.4, 585.5, 585.6, 585.9, 586, V42.0, V45.1, V45.11, V45.12, V56.0- V56.32, V56.8
Liver disease	070.22, 070.23, 070.32, 070.33 , 070.44, 070.54, 456.0, 456.1, 456.20, 456.21, 571.0, 571.2, 571.3, 571.40- 571.49, 571.5, 571.6, 571.8, 571.9, 572.3, 572.8, 573.5, V42.7
Peptic ulcer disease excluding bleeding	531.41, 531.51, 531.61, 531.70, 531.71, 531.91, 532.41, 532.51, 532.61, 532.70, 532.71, 532.91, 533.41, 533.51, 533.61, 533.70, 533.71, 533.91, 534.41, 534.51, 534.61, 534.70, 534.71, 534.91
Acquired immune deficiency syndrome	042.0
Lymphoma	200.00- 202.38, 202.50- 203.01, 203.02- 203.82, 203.8- 203.81, 238.6, 273.3
Metastatic cancer	196.0- 199.2, 209.70, 209.71, 209.72, 209.73, 209.74, 209.75, 209.79, 789.51
Solid tumor without metastasis	140.0- 172.9, 174.0- 175.9, 179-195.8, 209.00- 209.24, 209.25- 209.3, 209.30- 209.36, 258.01- 258.03
Rheumatoid arthritis/collagen vascular diseases	701.0, 710.0- 710.9, 714.0- 714.9, 720.0- 720.9, 725
Coagulopathy	286.0- 286.9, 287.1, 287.3- 287.5, 289.84, 649.30- 649.34
Obesity	278.0, 278.00, 278.01, 278.03, 649.10- 649.14, 793.91, V85.30- V85.39, V85.41- V85.45, V85.54
Weight loss	260-263.9, 783.21, 783.22
Fluid and electrolyte disorders	276.0- 276.9
Chronic blood loss anemia	280.0, 648.20- 648.24
Deficiency anemias	280.1- 281.9, 285.21- 285.29, 285.9
Alcohol abuse	291.0- 291.3, 291.5, 291.8, 291.81, 291.82, 291.89, 291.9, 303.00- 303.93, 305.00- 305.03
Drug abuse	292.0, 292.82- 292.89, 292.9, 304.00- 304.93, 305.20- 305.93, 648.30- 648.34
Psychoses	295.00- 298.9, 299.10, 299.11
Depression	300.4, 301.12, 309.0, 309.1, 311
Hypertension, complicated and uncomplicated	401.1, 401.9, 642.00- 642.04

Table S2: Multivariable Logistic Mixed Effects Model, Patient Characteristics (2003 – 2009)

Variable	Odds Ratio	Confidence interval	p-value
Age	0.98	0.98 – 0.99	<0.01
Female	0.76	0.72 – 0.80	<0.01
Race			
<i>White (reference)</i>	REF	REF	REF
<i>Black</i>	0.79	0.69 – 0.89	<0.01
<i>Hispanic</i>	0.98	0.87 – 1.10	0.77
<i>Asian or Pacific Islander</i>	1.18	0.98 – 1.41	0.08
<i>Native American</i>	1.04	0.71 – 1.51	0.85
<i>Other / Unknown</i>	1.06	0.98 – 1.15	0.14
Comorbid Conditions			
<i>Congestive heart failure</i>	1.25	1.19 – 1.33	<0.01
<i>Valvular disease</i>	1.14	1.07 – 1.22	<0.01
<i>Pulmonary circulation disorders</i>	1.0	0.88 – 1.13	0.99
<i>Peripheral vascular disease</i>	0.70	0.64 – 0.76	<0.01
<i>Paralysis</i>	0.84	0.63 – 1.12	0.24
<i>Neurologic disease</i>	0.74	0.65 – 0.83	<0.01
<i>Chronic obstructive pulmonary disease</i>	0.76	0.71 – 0.81	<0.01
<i>Diabetes mellitus, uncomplicated</i>	1.09	1.02 – 1.17	<0.01
<i>Diabetes mellitus, with chronic complications</i>	0.94	0.82 – 1.06	0.30
<i>Hypothyroidism</i>	0.98	0.86 – 1.10	0.69
<i>Chronic kidney disease</i>	0.83	0.77 – 0.90	<0.01
<i>Liver disease</i>	0.76	0.59 – 0.98	0.03
<i>Peptic ulcer disease</i>	0.00	0.00 - NA	0.94
<i>Acquired immune deficiency syndrome</i>	0.76	0.38 – 1.53	0.44
<i>Lymphoma</i>	0.65	0.45 – 0.94	0.02
<i>Solid tumor without metastasis</i>	0.92	0.76 – 1.12	0.41
<i>Metastatic cancer</i>	0.74	0.54 – 1.00	0.05
<i>\Collagen vascular disease</i>	0.81	0.65 – 1.01	0.07
<i>Coagulopathy</i>	1.44	1.31 – 1.57	<0.01
<i>Obesity</i>	1.05	0.93 – 1.18	0.44
<i>Weight loss</i>	0.97	0.86 – 1.10	0.65
<i>Fluid and electrolyte disorders</i>	1.09	1.03 – 1.15	<0.01
<i>Chronic blood loss anemia</i>	0.92	0.75 – 1.12	0.42
<i>Deficiency anemia</i>	0.95	0.88 – 1.03	0.24
<i>Alcohol abuse</i>	0.86	0.74 – 1.00	0.05
<i>Drug abuse</i>	0.83	0.66 – 1.05	0.12
<i>Psychoses</i>	0.94	0.74 – 1.16	0.50
<i>Depression</i>	0.84	0.71 – 0.99	0.04
<i>Hypertension</i>	0.88	0.83 – 0.93	<0.01

Table S3: Multivariable Logistic Mixed Effects Model, Admission and Hospital Characteristics (2003 – 2009)

Variable	Odds Ratio	Confidence interval	p-value
Admission Type			
<i>Emergency (reference)</i>	REF	REF	REF
<i>Urgent</i>	1.01	0.94 – 1.09	0.78
<i>Elective</i>	1.19	1.07 – 1.32	<0.01
<i>Trauma Center</i>	0.81	0.41 – 1.60	0.55
<i>Other / Unknown</i>	1.06	0.92 – 1.22	0.45
Weekend Admission	0.98	0.92 – 1.04	0.49
Hospital Bedsize			
<i>Small (reference)</i>	REF	REF	REF
<i>Medium</i>	0.98	0.82 – 1.16	0.79
<i>Large</i>	1.04	0.89 – 1.23	0.61
Hospital Control			
<i>Government or private, collapsed (reference)</i>	REF	REF	REF
<i>Government, nonfederal, public</i>	0.88	0.68 – 1.13	0.31
<i>Private, non-profit, voluntary</i>	0.87	0.74 – 1.02	0.08
<i>Private, invest-own</i>	0.99	0.83 – 1.17	0.87
<i>Private, collapsed</i>	0.96	0.66 – 1.39	0.83
Teaching Hospital	0.93	0.81 – 1.06	0.28
Urban	0.96	0.74 – 1.24	0.77
Procedures			
<i>Left heart catherization</i>	5.07	4.74 – 5.43	<0.01
<i>Percutaneous coronary intervention</i>	2.62	2.46 – 2.79	<0.01
<i>Coronary artery bypass graft</i>	4.34	4.03 – 4.68	<0.01
Herfindal-Hirschman Index (variable radius 75%)	0.91	0.76 – 1.10	0.34

Figure S2: Mechanical Circulatory Support by Year (2003 – 2009). Mechanical circulatory support utilization has increased over the study time period including substantial increase in percutaneous devices and extracorporeal membrane oxygenations. The rise in percutaneous devices, such as Impella, has been most prominent in competitive markets.

