Supplementary Table 1. List of ICD-9-CM codes used for data extraction, 2010-2015, NRD.

| ICD-9-CM code | Description |
|----------------|-------------|
| 433.10         | Occlusion and stenosis of carotid artery without mention of cerebral infarction |
| 433.30         | Occlusion and stenosis of multiple and bilateral precerebral arteries without mention of cerebral infarction |
| 433.11, 433.31, 433.81, 433.91 | Occlusion and stenosis of carotid and precerebral arteries with cerebral infarction |
| 434.01, 434.11, 434.91 | Cerebral thrombosis, embolism, or artery occlusion with cerebral infarction |
| 435.8-435.9 | Transient cerebral ischemia |
| 437.1 | Other generalized ischemic cerebrovascular disease |
| 362.34, 362.84, 368.12 | Transient retinal arterial occlusion, retinal ischemia, or transient visual loss |
| 38.12 | Endarterectomy, other vessels of head and neck |
| 39.90 | Insertion of non-drug-eluting peripheral (non-coronary) vessel stent(s) |
| 00.63 | Percutaneous insertion of carotid artery stent(s) |
| 410, 410.0-410.9, 410.00-410.92, 997.1 | Cardiac events |
| 415, 415.0, 415.1, 415.11, 415.19 | Pulmonary embolization |
| 453.2, 453.4, 453.41, 453.42, 453.8, 453.81-453.89, 483.9 | Deep vein thrombosis |
| 451, 451.0-451.9, 451.11-451.89 | Phlebitis & thrombophlebitis |
| 518.4, 518.5, 518.51-518.53, 518.81 | Acute respiratory failure |
| 584, 584.5-584.9 | Acute renal failure |
| 780.3, 780.31, 780.39 | Seizure |
| 997.02 | Iatrogenic cerebrovascular infarction or hemorrhage |
| 998.1, 998.11, 998.12 | Hematoma/Hemorrhage |
Supplementary Table 2. Comparison of baseline characteristics of patients treated for symptomatic and asymptomatic carotid stenosis, 2010-2015.

| Factors                              | Asymptomatic carotid stenosis (n=522040) | Symptomatic carotid stenosis (n=55485) |
|--------------------------------------|------------------------------------------|----------------------------------------|
|                                      | No. of events (%)                        | No. of events (%)                      | No. of events (%)                        | No. of events (%)                        |
| Age Groups                           | CEA (n=460811)                           | CAS (n=61229)                          | CEA (n=44766)                           | CAS (n=10719)                           |
|                                      |                                          |                                        |                                          |                                        |
| <65 years                            | 104008 (22.6)                            | 14685 (24.0)                           | 13582 (30.3)                            | 3611 (33.7)                            |
| 65-79 years                          | 265169 (57.5)                            | 34334 (56.1)                           | 22261 (49.7)                            | 4937 (46.1)                            |
| ≥80 years                            | 91634 (19.9)                             | 12210 (19.9)                           | 8922 (19.9)                             | 2171 (20.3)                            |
| Sex                                  |                                          |                                        |                                          |                                        |
| Female                               | 193147 (41.9)                            | 23738 (38.8)                           | 16936 (37.8)                            | 3905 (36.4)                            |
| Male                                 | 267664 (58.1)                            | 37491 (61.2)                           | 27830 (62.2)                            | 6814 (63.6)                            |
| Median household income              |                                          |                                        |                                          |                                        |
| 1st quartile                         | 347947 (75.7)                            | 46698 (76.5)                           | 30572 (68.4)                            | 7063 (66.0)                            |
| 2nd quartile                         | 14532 (3.2)                              | 2435 (4.0)                             | 2318 (5.2)                              | 773 (7.2)                              |
| 3rd quartile                         | 84287 (18.3)                             | 9587 (15.7)                            | 9170 (20.5)                             | 2128 (19.9)                            |
| 4th quartile                         | 13057 (2.8)                              | 2287 (3.7)                             | 2615 (5.9)                              | 733 (6.9)                              |
| Hospital size                        |                                          |                                        |                                          |                                        |
| Small                                | 50479 (11.0)                             | 4321 (7.1)                             | 3700 (8.3)                              | 447 (4.2)                              |
| Medium                               | 101797 (22.1)                            | 11695 (19.1)                           | 9860 (22.0)                             | 1761 (16.4)                            |
| Hospital Ownership Status            |                                          |                                        |                                          |                                        |
| Government, nonfederal              | 46270 (10.0)                             | 6777 (11.1)                            | 4744 (10.6)                             | 1426 (13.3)                            |
| Private, not-profit                  | 339265 (73.6)                            | 45323 (74.0)                           | 33634 (75.1)                            | 7761 (72.4)                            |
| Private, invest-own                  | 75277 (16.3)                             | 9129 (14.9)                            | 6388 (14.3)                             | 1532 (14.3)                            |
| Hospital City Status                 |                                          |                                        |                                          |                                        |
| Large City (>1ml)                    | 202490 (43.9)                            | 30613 (50.0)                           | 21592 (48.2)                            | 6886 (64.2)                            |
| Small City (<1ml)                    | 258321 (56.1)                            | 30616 (50.0)                           | 23174 (51.8)                            | 3833 (35.8)                            |
| Hospital Teaching Status             |                                          |                                        |                                          |                                        |
| Non-teaching                         | 217122 (47.1)                            | 23255 (38.0)                           | 17951 (40.1)                            | 3050 (28.5)                            |
| Teaching                             | 243689 (52.9)                            | 37975 (62.0)                           | 26815 (59.9)                            | 7669 (71.5)                            |
| APR-DRG Mortality Risk              |                                          |                                        |                                          |                                        |
| Minor                                | 306297 (66.5)                            | 35571 (58.1)                           | 10363 (23.1)                            | 1231 (11.5)                            |
| Moderate                             | 126012 (27.3)                            | 20071 (32.8)                           | 27210 (60.8)                            | 6050 (56.4)                            |
| Major                                | 23130 (5.0)                              | 4609 (7.5)                             | 5665 (12.6)                             | 2093 (19.5)                            |
| Extreme                              | 5372 (1.2)                               | 979 (1.6)                              | 1537 (3.4)                              | 1346 (12.6)                            |
| APR-DRG Severity                    |                                          |                                        |                                          |                                        |
| Minor                                | 271063 (58.8)                            | 30832 (50.4)                           | 8209 (18.3)                             | 970 (9.0)                              |
| Moderate                             | 157018 (34.1)                            | 24458 (39.9)                           | 13439 (30.0)                            | 2211 (20.6)                            |
| Major                                | 27685 (6.0)                              | 5208 (8.5)                             | 21597 (48.2)                            | 6207 (57.9)                            |
| Extreme                              | 5046 (1.1)                               | 731 (1.2)                              | 1520 (3.4)                              | 1331 (12.4)                            |
| Comorbidity                          |                                          |                                        |                                          |                                        |
| Score (Mean ± SD)                    | 2.33 ± 1.50                              | 2.42 ± 1.57                            | 2.64 ± 1.69                             | 3.13 ± 1.87                            |
Supplementary Table 3. Comparison of baseline characteristics of patients treated for asymptomatic carotid stenosis after matching, 2010-2015.

| Factors                        | Asymptomatic carotid stenosis or occlusion (30-day) | Asymptomatic carotid stenosis or occlusion (90-day) |
|-------------------------------|-----------------------------------------------------|-----------------------------------------------------|
|                               | CEA (n=19900)                                       | CAS (n=19900)                                       | CEA (n=17116)                           | CAS (n=17116)                           |
|                               | No. of events (%)                                  | No. of events (%)                                  | p-value                                | p-value                                |
| Age Groups                    |                                                     |                                                     |                                       |                                       |
| <65 years                     | 4314 (21.7)                                        | 4349 (21.9)                                        | 0.91                                   | 0.61                                   |
| 65-79 years                   | 11505 (57.8)                                       | 11480 (57.7)                                       | 3678 (21.5)                            | 3746 (21.9)                            |
| ≥80 years                     | 4081 (20.5)                                        | 4071 (20.5)                                        | 9912 (57.9)                            | 9831 (57.4)                            |
| Sex                           |                                                     |                                                     |                                       |                                       |
| Female                        | 7798 (39.2)                                        | 7783 (39.1)                                        | 6685 (39.1)                            | 6720 (39.3)                            |
| Male                          | 12102 (60.8)                                       | 12117 (60.9)                                       | 10431 (60.9)                           | 10396 (60.7)                           |
| Median household income       |                                                     |                                                     |                                       |                                       |
| 1st quartile                  | 6129 (30.8)                                        | 6114 (30.7)                                        | 5258 (30.7)                            | 5199 (30.4)                            |
| 2nd quartile                  | 5386 (27.1)                                        | 5298 (26.6)                                        | 4640 (27.1)                            | 4598 (26.9)                            |
| 3rd quartile                  | 4750 (23.9)                                        | 4789 (24.1)                                        | 4119 (24.1)                            | 4159 (24.3)                            |
| 4th quartile                  | 3635 (18.3)                                        | 3699 (18.6)                                        | 3099 (18.1)                            | 3160 (18.5)                            |
| Insurance                     |                                                     |                                                     |                                       |                                       |
| Medicare                      | 15756 (79.2)                                       | 15665 (78.7)                                       | 13531 (79.1)                           | 13450 (78.5)                           |
| Medicaid                      | 636 (3.2)                                          | 655 (3.3)                                          | 552 (3.2)                              | 599 (3.5)                              |
| Private                       | 3014 (15.1)                                        | 3017 (15.2)                                        | 2598 (15.2)                            | 2576 (15.1)                            |
| Self-pay/No charge/Other      | 494 (2.5)                                          | 563 (2.8)                                          | 435 (2.5)                              | 491 (2.9)                              |
| Hospital size                 |                                                     |                                                     |                                       |                                       |
| Small                         | 1168 (5.9)                                         | 1183 (5.9)                                         | 1043 (6.1)                             | 1074 (6.3)                             |
| Medium                        | 4110 (20.7)                                        | 4100 (20.6)                                        | 3675 (21.5)                            | 3627 (21.2)                            |
| Large                         | 14622 (73.5)                                       | 14617 (73.5)                                       | 12398 (72.4)                           | 12415 (72.5)                           |
| Hospital Ownership Status     |                                                     |                                                     |                                       |                                       |
| Government, nonfederal        | 2374 (11.9)                                        | 2389 (12.0)                                        | 2018 (11.8)                            | 2091 (12.2)                            |
| Private, not-profit           | 14432 (72.5)                                       | 14333 (72.0)                                       | 12374 (72.3)                           | 12229 (71.4)                           |
| Private, invest-own           | 3094 (15.5)                                        | 3178 (16.0)                                        | 2724 (15.9)                            | 2796 (16.3)                            |
| Hospital City Status          |                                                     |                                                     |                                       |                                       |
| Large City (>1ml)             | 10427 (52.4)                                       | 10431 (52.4)                                       | 8959 (52.3)                            | 8932 (52.2)                            |
| Small City (<1ml)             | 9473 (47.6)                                        | 9469 (47.6)                                        | 8157 (47.7)                            | 8184 (47.8)                            |
| Hospital Teaching Status      |                                                     |                                                     |                                       |                                       |
| Non-teaching                  | 7933 (39.9)                                        | 7933 (39.9)                                        | 6738 (39.4)                            | 6723 (39.3)                            |
| Teaching                      | 11967 (60.1)                                       | 11967 (60.1)                                       | 10378 (60.6)                           | 10393 (60.7)                           |
| APR-DRG Mortality Risk        |                                                     |                                                     |                                       |                                       |
| Minor                         | 12119 (60.9)                                       | 12049 (60.5)                                       | 10329 (60.3)                           | 10285 (60.1)                           |
| Moderate                      | 6556 (32.9)                                        | 6567 (33.0)                                        | 5710 (33.4)                            | 5690 (33.2)                            |
| Major                         | 1125 (5.7)                                         | 1179 (5.9)                                         | 977 (5.7)                              | 1040 (6.1)                             |
| Extreme                       | 100 (0.5)                                          | 105 (0.5)                                          | 100 (0.6)                              | 101 (0.6)                              |
| APR-DRG Severity              |                                                     |                                                     |                                       |                                       |
| Minor                         | 10698 (53.8)                                       | 10633 (53.4)                                       | 9241 (54.0)                            | 9074 (53.0)                            |
| Moderate                      | 7905 (39.7)                                        | 7942 (39.9)                                        | 6735 (39.3)                            | 6838 (40.0)                            |
| Major                         | 1209 (6.1)                                         | 1244 (6.3)                                         | 1055 (6.2)                             | 1126 (6.6)                             |
| Extreme                       | 88 (0.4)                                           | 81 (0.4)                                           | 85 (0.5)                               | 78 (0.5)                               |
| Comorbidity                   |                                                     |                                                     |                                       |                                       |
| Score (Mean ± SD)             | 2.36 ± 1.48                                        | 2.37 ± 1.50                                        | 2.37 ± 1.50                            | 2.39 ± 1.52                            |

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Supplementary Table 4. Comparison of baseline characteristics of patients treated for symptomatic carotid stenosis after matching, 2010-2015.

| Factors                        | Symptomatic carotid stenosis or occlusion (30-day) | Symptomatic carotid stenosis or occlusion (90-day) |
|-------------------------------|-----------------------------------------------|-----------------------------------------------|
|                               | CEA (n=3617) | CAS (n=3617) | p-value | CEA (n=3054) | CAS (n=3054) | p-value |
| No. of events (%)             | No. of events (%) | p-value | No. of events (%) | No. of events (%) | p-value |
| Age Groups                    |                |              |        |                |              |        |
| <65 years                     | 1152 (31.8)   | 1194 (33.0)  | 0.56   | 950 (31.1)     | 1002 (32.8)  | 0.36   |
| 65-79 years                   | 1735 (48.0)   | 1698 (46.9)  |        | 1478 (48.4)    | 1440 (47.2)  |        |
| ≥80 years                     | 730 (20.2)    | 725 (20.0)   |        | 626 (20.5)     | 612 (20.0)   |        |
| Sex                           |                |              | 0.43   |                |              | 0.59   |
| Female                        | 1285 (35.5)   | 1317 (36.4)  |        | 1091 (35.7)    | 1111 (36.4)  |        |
| Male                          | 2332 (64.5)   | 2300 (63.6)  |        | 1963 (64.3)    | 1943 (63.6)  |        |
| Median household income       |                |              | >0.99  |                |              | 0.90   |
| 1st quartile                  |                |              |        |                |              |        |
| Medicaid                      | 2422 (67)     | 2395 (66.2)  |        | 2062 (67.5)    | 2017 (66.0)  |        |
| 2nd quartile                  | 973 (26.9)    | 974 (26.9)   | 0.59   | 812 (26.6)     | 815 (26.7)   | 0.63   |
| 3rd quartile                  | 923 (25.5)    | 921 (25.4)   |        | 761 (24.9)     | 784 (25.7)   |        |
| 4th quartile                  | 702 (19.4)    | 709 (19.6)   |        | 596 (19.5)     | 585 (19.2)   |        |
| Insurance                     |                |              |        |                |              |        |
| Medicare                      | 245 (6.8)     | 260 (7.2)    |        | 209 (6.8)      | 227 (7.4)    |        |
| Medicaid                      | 245 (6.8)     | 260 (7.2)    |        | 209 (6.8)      | 227 (7.4)    |        |
| Private                       | 724 (20.0)    | 712 (19.7)   |        | 590 (19.3)     | 613 (20.1)   |        |
| Hospital size                 |                |              | 0.52   |                |              | 0.89   |
| Small                         | 159 (4.4)     | 172 (4.8)    |        | 155 (5.1)      | 147 (4.8)    |        |
| Medium                        | 564 (15.6)    | 589 (16.3)   |        | 504 (16.5)     | 507 (16.6)   |        |
| Large                         | 2894 (80.0)   | 2856 (79.0)  |        | 2395 (78.4)    | 2400 (78.6)  |        |
| Hospital Ownership Status     |                |              | 0.70   |                |              | 0.55   |
| Government, nonfederal        |                |              |        |                |              |        |
| Private, not-profit           | 2602 (71.9)   | 2570 (71.1)  |        | 2222 (72.8)    | 2187 (71.6)  |        |
| Private, invest-own           | 512 (14.2)    | 532 (14.7)   |        | 439 (14.4)     | 448 (14.7)   |        |
| Hospital City Status          |                |              | 0.53   |                |              | 0.61   |
| Large City (>1ml)             | 2287 (63.2)   | 2313 (63.9)  |        | 1932 (63.3)    | 1951 (63.9)  |        |
| Small City (<1ml)             | 1330 (36.8)   | 1304 (36.1)  |        | 1122 (36.7)    | 1103 (36.1)  |        |
| Hospital Teaching Status      |                |              | 0.60   |                |              | 0.47   |
| Non-teaching                  | 1047 (28.9)   | 1027 (28.4)  |        | 829 (27.1)     | 854 (28.0)   |        |
| Teaching                      | 2570 (71.0)   | 2590 (71.6)  |        | 2225 (72.9)    | 2200 (72.0)  |        |
| APR-DRG Mortality Risk        |                |              | 0.67   |                |              | 0.92   |
| Minor                         | 482 (13.3)    | 456 (12.6)   |        | 380 (12.4)     | 377 (12.3)   |        |
| Moderate                      | 2121 (58.6)   | 2146 (59.3)  |        | 1797 (58.8)    | 1798 (58.9)  |        |
| Major                         | 685 (18.9)    | 703 (19.4)   |        | 586 (19.2)     | 601 (19.7)   |        |
| Extreme                       | 329 (9.1)     | 312 (8.6)    |        | 291 (9.5)      | 278 (9.1)    |        |
| APR-DRG Severity              |                |              | 0.60   |                |              | 0.47   |
| Minor                         | 389 (10.8)    | 371 (10.3)   |        | 288 (9.4)      | 316 (10.3)   |        |
| Moderate                      | 782 (21.6)    | 800 (22.1)   |        | 696 (22.8)     | 667 (21.8)   |        |
| Major                         | 2116 (58.5)   | 2142 (59.2)  |        | 1780 (58.3)    | 1798 (58.9)  |        |
| Extreme                       | 330 (9.1)     | 304 (8.4)    |        | 290 (9.5)      | 273 (8.9)    |        |
| Comorbidity                   |                |              | 0.53   |                |              | 0.63   |
| Score (Mean ± SD)             | 3.09 ± 1.85   | 3.06 ± 1.82  |        | 3.09 ± 1.81    | 3.07 ± 1.81  |        |
Supplementary Figure 1. Grouped categories tabulating proportion of causes of readmission for asymptomatic stenosis (left) and symptomatic stenosis (right).

CAS = carotid artery stenting; CEA = carotid endarterectomy; DVT = deep vein thrombosis; ENT = ear, nose, and throat; GI = gastrointestinal; GU = genitourinary; PE = pulmonary embolism.
### Asymptomatic Stenosis

| Age Group | aRR* (95% CI) | p-value |
|-----------|---------------|---------|
| <65       | Ref           | Ref     |
| 65-79     | 0.91 (0.88-0.95) <0.001 | 1.11 (1.00-1.23) 0.05 |
| ≥80       | 1.13 (1.08-1.18) <0.001 | 1.17 (1.04-1.31) 0.009 |

| Sex       | aRR* (95% CI) | p-value |
|-----------|---------------|---------|
| Female    | Ref           | Ref     |
| Male      | 1.13 (1.11-1.16) <0.001 | 1.15 (1.08-1.22) <0.001 |

| Income† | aRR* (95% CI) | p-value |
|---------|---------------|---------|
| 1st Quartile | Ref | Ref |
| 2nd Quartile | 0.99 (0.96-1.02) 0.45 | 1.05 (0.97-1.14) 0.22 |
| 3rd Quartile | 0.99 (0.96-1.02) 0.48 | 1.02 (0.94-1.11) 0.01 |
| 4th Quartile | 1.00 (0.96-1.04) 0.95 | 0.99 (0.90-1.09) 0.82 |

| Health Insurance | aRR* (95% CI) | p-value |
|------------------|---------------|---------|
| Medicare         | Ref           | Ref     |
| Medicaid         | 1.22 (1.14-1.30) <0.001 | 1.25 (1.08-1.43) 0.002 |
| Private           | 0.75 (0.72-0.78) <0.001 | 0.79 (0.71-0.89) <0.001 |
| Other             | 0.97 (0.91-1.05) 0.48 | 0.88 (0.75-1.04) 0.13 |

| Hospital Size | aRR* (95% CI) | p-value |
|---------------|---------------|---------|
| Small         | Ref           | Ref     |
| Medium        | 0.93 (0.89-0.97) 0.01 | 1.01 (0.89-1.16) 0.86 |
| Large         | 0.97 (0.94-1.01) 0.15 | 1.01 (0.90-1.15) 0.85 |

| Hospital Ownership Status | aRR* (95% CI) | p-value |
|---------------------------|---------------|---------|
| Government                | Ref           | Ref     |
| Private, not-profit       | 0.92 (0.88-0.95) <0.001 | 0.82 (0.75-0.90) <0.001 |
| Private, invest-own       | 1.10 (1.06-1.15) <0.001 | 0.90 (0.80-1.01) 0.08 |

| Hospital City Status | aRR* (95% CI) | p-value |
|----------------------|---------------|---------|
| Large City (>1ml)    | Ref           | Ref     |
| Small City (<1ml)    | 0.90 (0.88-0.92) <0.001 | 0.93 (0.87-0.99) 0.02 |

| Hospital Teaching Status | aRR* (95% CI) | p-value |
|--------------------------|---------------|---------|
| Non-teaching             | Ref           | Ref     |
| Teaching                 | 1.01 (0.99-1.04) 0.38 | 0.93 (0.87-0.99) 0.02 |

| APRDRG Mortality Risk | aRR* (95% CI) | p-value |
|-----------------------|---------------|---------|
| Minor                 | Ref           | Ref     |
| Moderate              | 1.28 (1.24-1.32) <0.001 | 1.28 (1.10-1.49) 0.001 |
| Major                 | 1.36 (1.29-1.44) <0.001 | 1.73 (1.46-2.05) <0.001 |
| Extreme               | 1.49 (1.33-1.67) <0.001 | 1.54 (1.24-1.93) <0.001 |

| APRDRG Severity | aRR* (95% CI) | p-value |
|-----------------|---------------|---------|
| Minor           | Ref           | Ref     |
| Moderate        | 1.22 (1.19-1.26) <0.001 | 1.19 (1.01-1.40) 0.03 |
| Major           | 1.60 (1.52-1.69) <0.001 | 1.39 (1.17-1.65) <0.001 |
| Extreme†        | 2.27 (2.02-2.55) <0.001 | 2.14 (1.71-2.69) <0.001 |

| Procedure | aRR* (95% CI) | p-value |
|-----------|---------------|---------|
| CEA       | Ref           | Ref     |
| CAS       | 1.10 (1.06-1.14) <0.001 | 0.99 (0.92-1.07) 0.78 |
| Comorbidity Score | 1.11 (1.11-1.12) <0.001 | 1.11 (1.09-1.12) <0.001 |

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**Supplementary Figure 2.** 30-day readmission in asymptomatic and symptomatic patients after CEA or CAS.

APR-DRG = All Patients Refined Diagnosis Related Groups; aRR = adjusted risk ratio; CAS = carotid artery stenting; CEA = carotid endarterectomy; CI = confidence interval; ECI = Elixhauser comorbidity index; Ref = reference.

* Risk ratios were adjusted for age, sex, race, household income, health insurance, hospital characteristics (type, region, size), APR-DRG severity and mortality and comorbidity indices, and type of procedure.

† Median household income for patient’s ZIP Code, from lowest (1st) to highest (4th) quartile.

‡ The marker for APR-DRG severity (extreme) exceeded the routine discharge scale.
|                        | Asymptomatic Stenosis | Symptomatic Stenosis |
|------------------------|-----------------------|----------------------|
| **Age Group**          |                       |                      |
| <65                    | Ref                   | Ref                  |
| 65-79                  | 0.88 (0.86-0.91) <0.001 | 1.12 (1.03-1.22) 0.007 |
| 80+                    | 1.06 (1.02-1.09) 0.003 | 1.25 (1.14-1.37) <0.001 |
| **Sex**                |                       |                      |
| Female                 | Ref                   | Ref                  |
| Male                   | 1.11 (1.09-1.13) <0.001 | 1.15 (1.09-1.20) <0.001 |
| **Income**             |                       |                      |
| 1st Quartile           | Ref                   | Ref                  |
| 2nd Quartile           | 0.97 (0.95-0.99) 0.01 | 1.04 (0.98-1.11) 0.20 |
| 3rd Quartile           | 0.99 (0.94-0.99) 0.01 | 0.99 (0.93-1.06) 0.75 |
| 4th Quartile           | 0.96 (0.93-0.99) 0.005 | 1.01 (0.94-1.09) 0.81 |
| **Health Insurance**   |                       |                      |
| Medicare               | Ref                   | Ref                  |
| Medicaid               | 1.29 (1.23-1.35) <0.001 | 1.24 (1.11-1.39) <0.001 |
| Private                | 0.73 (0.70-0.76) <0.001 | 0.79 (0.72-0.87) <0.001 |
| Other                  | 0.91 (0.86-0.97) 0.003 | 0.79 (0.69-0.91) 0.001 |
| **Hospital Size**      |                       |                      |
| Small                  | Ref                   | Ref                  |
| Medium                 | 0.94 (0.91-0.97) <0.001 | 1.05 (0.94-1.17) 0.40 |
| Large                  | 0.96 (0.95-1.01) 0.12 | 1.05 (0.95-1.16) 0.38 |
| **Hospital Ownership Status** |                   |                      |
| Government             | Ref                   | Ref                  |
| Private, not-profit    | 0.91 (0.88-0.94) <0.001 | 0.85 (0.79-0.92) <0.001 |
| Private, invest-own    | 1.09 (1.05-1.13) <0.001 | 0.93 (0.85-1.03) 0.16 |
| **Hospital City Status** |                   |                      |
| Large City (>1mil)     | Ref                   | Ref                  |
| Small City (<1mil)     | 0.94 (0.92-0.96) <0.001 | 0.92 (0.87-0.97) 0.002 |
| **Hospital Teaching Status** |               |                      |
| Non-teaching           | Ref                   | Ref                  |
| Teaching               | 1.00 (0.96-1.02) 0.91 | 0.90 (0.85-0.95) <0.001 |
| **APR-DRG Mortality Risk** |                   |                      |
| Minor                  | Ref                   | Ref                  |
| Moderate               | 1.34 (1.31-1.37) <0.001 | 1.22 (1.08-1.38) 0.001 |
| Major                  | 1.49 (1.42-1.56) <0.001 | 1.47 (1.28-1.69) <0.001 |
| Extreme                | 1.71 (1.56-1.87) <0.001 | 1.23 (1.03-1.47) 0.02 |
| **APR-DRG Severity**   |                       |                      |
| Minor                  | Ref                   | Ref                  |
| Moderate               | 1.23 (1.20-1.26) <0.001 | 1.22 (1.07-1.38) 0.003 |
| Major                  | 1.52 (1.45-1.59) <0.001 | 1.54 (1.34-1.77) <0.001 |
| Extreme                | 1.74 (1.58-1.91) <0.001 | 2.46 (2.05-2.95) <0.001 |
| **Procedure**          |                       |                      |
| CEA                    | Ref                   | Ref                  |
| CAS                    | 1.17 (1.14-1.20) <0.001 | 1.13 (1.06-1.20) <0.001 |
| Comorbidity Score      | 1.12 (1.11-1.12) <0.001 | 1.12 (1.10-1.13) <0.001 |

Supplementary Figure 3. 90-day readmission in asymptomatic and symptomatic patients after CEA or CAS.

APR-DRG = All Patients Refined Diagnosis Related Groups; aRR = adjusted risk ratio; CAS = carotid artery stenting; CEA = carotid endarterectomy; CI = confidence interval; ECI = Elixhauser comorbidity index; Ref = reference.

* Risk ratios were adjusted for age, sex, race, household income, health insurance, hospital characteristics (type, region, size), APR-DRG severity and mortality and comorbidity indices, and type of procedure.

† Median household income for patient’s ZIP Code, from lowest (1st) to highest (4th) quartile.

‡ The marker for APR-DRG severity (extreme) exceeded the routine discharge scale.
Supplementary Figure 4. Unplanned carotid revascularization after index CEA or CAS.

CAS = carotid artery stenting; CEA = carotid endarterectomy.
### Readmission After CEA

| Asymptomatic Stenosis        | RR (95% CI)   | p-value | RR (95% CI)   | p-value |
|------------------------------|---------------|---------|---------------|---------|
| Seizure                      | 1.00 (0.52-1.91) | 0.99    |               |         |
| PE/DVT                       | 1.12 (0.92-1.37) | 0.25    | 1.14 (0.98-1.32) | 0.09    |
| Stroke                       | 1.49 (0.93-2.41) | 0.10    | 1.71 (1.22-2.41) | 0.002   |
| Hematoma/Hemorrhage          | 1.38 (1.10-1.72) | 0.005   | 1.25 (0.97-1.59) | 0.08    |
| Acute Renal Failure          | 2.30 (1.89-2.81) <0.001|       | 2.17 (1.82-2.60) <0.001|       |
| Acute Respiratory Failure    | 2.11 (1.65-2.69) <0.001|       | 2.52 (1.82-3.50) <0.001|       |
| Cardiac Events               | 1.88 (1.47-2.34) <0.001|       | 1.33 (1.05-1.69) 0.02 |       |
| Non-routine Discharge        | 1.90 (1.72-2.11) <0.001|       | 2.07 (1.88-2.27) <0.001|       |

### Readmission After CAS

| Symptomatic Stenosis         | RR (95% CI)   | p-value | RR (95% CI)   | p-value |
|------------------------------|---------------|---------|---------------|---------|
| Seizure                      | 1.89 (1.12-3.18) | 0.02    | 1.91 (1.32-2.77) | 0.001  |
| PE/DVT                       | 1.21 (0.92-1.58) | 0.18    | 1.15 (0.91-1.45) | 0.26   |
| Stroke                       | 1.64 (1.12-2.41) | 0.01    | 0.82 (0.43-1.56) | 0.54   |
| Hematoma/Hemorrhage          | 1.20 (0.86-1.67) | 0.28    | 1.48 (1.03-2.13) | 0.04   |
| Acute Renal Failure          | 1.82 (1.49-2.21) <0.001|       | 1.70 (1.38-2.10) <0.001|       |
| Acute Respiratory Failure    | 1.96 (1.58-2.43) <0.001|       | 1.71 (1.35-2.15) <0.001|       |
| Cardiac Events               | 1.85 (1.41-2.42) <0.001|       | 1.53 (1.13-2.06) 0.006|       |
| Non-routine Discharge        | 2.06 (1.76-2.42) <0.001|       | 1.77 (1.52-2.05) <0.001|       |

Supplementary Figure 5. Postoperative adverse events or outcome at initial carotid revascularization and risk ratio of 90-day readmission.

CAS = carotid artery stenting; CEA = carotid endarterectomy; CI = confidence interval, DVT = deep vein thrombosis; PE = pulmonary embolism; RR = risk ratio.