

Appendix

Linking the Paul Coverdell National Acute Stroke Program to commercial claims for real-world stroke research

Table of Contents

Table 1. Presence of PCNASP elements over calendar time.....	4
Table 2. Comparison of claims variables between beneficiaries in Optum with versus without successful PCNASP-linkage in patients less than 65 years and 65-year old and older	5
Table 3. Comparison of claims variables between beneficiaries in Optum with versus without successful PCNASP-linkage in commercially-insured and Medicare Advantage insured patients	8
Table 4. Assessment of discordance among selected variables from the PCNASP and claims data among linked patients less than 65 years and 65-year old and older	11
Table 5. Assessment of discordance among selected variables from the PCNASP and claims data among linked commercially-insured and Medicare Advantage insured patients	12
Table 6. Percentage of missingness for PCNASP elements	13
Figure 1. Antihypertensive and lipid-lowering medication use prior and subsequent to index stroke hospitalization as measured in PCNASP and in claims at 90 days pre-stroke and 90 days post discharge among linked patients less than 65 years and 65-year old and older	14
Figure 2. Antihypertensive and lipid-lowering medication use prior and subsequent to index stroke hospitalization as measured in PCNASP and in claims at 90 days pre-stroke and 90 days post discharge among linked commercially-insured and Medicare Advantage insured patients	15

Table 1. Presence of PCNASP elements over calendar time

	2007	2010	2012	2014	2015
Comorbidities¹					
Hypertension	X	X	X	X	X
Diabetes mellitus	X	X	X	X	X
Dyslipidemia	X	X	X	X	X
Prior ischemic stroke	X	X	X	X	X
Prior transient ischemic attack	X	X	X	X	X
History of atrial fibrillation	X	X	X	X	X
Carotid stenosis	X	X	X	X	X
Ischemic heart disease	X	X	X	X	X
Peripheral vascular disease	X	X	X	X	X
Congestive heart failure	X	X	X	X	X
Chronic kidney disease			X	X	X
Obesity		X	X	X	X
Smoking	X	X	X	X	X
Drug or alcohol abuse			X	X	X
Depression		X	X	X	X
Medications reported upon admission					
Antihypertensive drugs ²	X	X	X	X	X
Lipid-lowering drugs ³	X	X	X	X	X
Stroke severity and functional information at discharge					
NIH Stroke Scale	X	X	X	X	X
Ambulatory status at discharge	X	X	X	X	X
Medications prescribed at discharge					
Antihypertensive drugs ²	X	X	X	X	X
Statins	X	X	X	X	X

1. Based on recorded medical history during stroke hospitalization

2. Antihypertensive drugs: includes ACE-inhibitors, ARBs, beta-blockers, calcium channel blockers, thiazide diuretics, loop diuretics, and other antihypertensives

3. Lipid-lowering drugs: includes statins or other lipid-lowering medications.

Table 2. Comparison of claims variables between beneficiaries in Optum with versus without successful PCNASP-linkage in patients less than 65 years and 65-year old and older

Patient characteristics	Patients less than 65 years			Patients 65 year-old and older		
	Linked (n=1,597) N (%)	Unlinked (n=22,838) N (%)	Standardized difference	Linked (n=4,047) N (%)	Unlinked (n=76,058) N (%)	Standardized difference
Demographics						
Age, mean (SD)	54.4 (8.3)	54.2 (8.4)	0.03	75.8 (6.3)	78.0 (6.7)	-0.33
Female	688 (43.1)	9375 (41.1)	0.04	2109 (52.1)	42446 (55.8)	-0.07
Comorbidities¹						
Combined comorbidity index, mean (SD)	0.8 (2.1)	0.8 (2.0)	0.02	1.6 (2.5)	1.7 (2.5)	-0.03
Hypertension	924 (57.9)	11900 (52.1)	0.12	2942 (72.7)	52775 (69.4)	0.07
Diabetes	520 (32.6)	6876 (30.1)	0.05	1454 (35.9)	25088 (33.0)	0.06
Dyslipidemia	628 (39.3)	8364 (36.6)	0.06	2082 (51.5)	35220 (46.3)	0.10
Prior ischemic stroke	344 (21.5)	4108 (18.0)	0.09	848 (21.0)	13744 (18.1)	0.07
Prior transient ischemic attack	148 (9.3)	1967 (8.6)	0.02	378 (9.3)	6835 (9.0)	0.01
History of atrial fibrillation	96 (6.0)	1218 (5.3)	0.03	724 (17.9)	16166 (21.3)	-0.08
Carotid stenosis	82 (5.1)	1031 (4.5)	0.03	329 (8.1)	5311 (7.0)	0.04
Prior hemorrhagic stroke	28 (1.8)	251 (1.1)	0.06	55 (1.4)	816 (1.1)	0.03
Ischemic heart disease or procedure	242 (15.2)	3398 (14.9)	0.01	1099 (27.2)	19576 (25.7)	0.03
Peripheral vascular disease (PVD) or PVD surgery	84 (5.3)	1179 (5.2)	0.00	413 (10.2)	8845 (11.6)	-0.05
Congestive heart failure	151 (9.5)	1747 (7.7)	0.06	635 (15.7)	12740 (16.8)	-0.03
Chronic kidney disease	122 (7.6)	1499 (6.6)	0.04	577 (14.3)	11839 (15.6)	-0.04
Chronic obstructive pulmonary disease	117 (7.3)	1772 (7.8)	-0.02	577 (14.3)	11000 (14.5)	-0.01
Pneumonia	60 (3.8)	892 (3.9)	-0.01	286 (7.1)	4998 (6.6)	0.02
Dementia	33 (2.1)	574 (2.5)	-0.03	542 (13.4)	11513 (15.1)	-0.05
Cancer or history of malignant neoplasm	85 (5.3)	1422 (6.2)	-0.04	576 (14.2)	9906 (13.0)	0.04
Obesity	225 (14.1)	2820 (12.4)	0.05	586 (14.5)	10537 (13.9)	0.02
Smoking	186 (11.7)	2500 (11.0)	0.02	269 (6.7)	3911 (5.1)	0.06
Alcohol abuse or dependence	22 (1.4)	453 (2.0)	-0.05	54 (1.3)	768 (1.0)	0.03
Drug abuse or dependence	31 (1.9)	431 (1.9)	0.00	30 (0.7)	560 (0.7)	0.00
Depression	153 (9.6)	2234 (9.8)	-0.01	403 (10.0)	6960 (9.2)	0.03
Medication use¹						
Any antihypertensives ²	910 (57.0)	11851 (51.9)	0.10	2527 (62.4)	50668 (66.6)	-0.09
Angiotensin-converting enzyme inhibitors	430 (26.9)	5987 (26.2)	0.02	1126 (27.8)	22460 (29.5)	-0.04
Angiotensin II receptor blockers	213 (13.3)	2603 (11.4)	0.06	525 (13.0)	10341 (13.6)	-0.02
Beta-blockers	473 (29.6)	5959 (26.1)	0.08	1507 (37.2)	29604 (38.9)	-0.03
Calcium channel blockers	332 (20.8)	4044 (17.7)	0.08	1029 (25.4)	19897 (26.2)	-0.02

Thiazide diuretics	354 (22.2)	4016 (17.6)	0.11	793 (19.6)	14135 (18.6)	0.03
Loop diuretics	166 (10.4)	2089 (9.2)	0.04	671 (16.6)	13432 (17.7)	-0.03
Other antihypertensives	140 (8.8)	1578 (6.9)	0.07	318 (7.9)	6467 (8.5)	-0.02
Nitrates and other antianginal therapies	77 (4.8)	898 (3.9)	0.04	312 (7.7)	5190 (6.8)	0.03
Antiarrhythmics	25 (1.6)	324 (1.4)	0.01	80 (2.0)	1720 (2.3)	-0.02
Digoxin	27 (1.7)	363 (1.6)	0.01	149 (3.7)	3966 (5.2)	-0.07
Any Lipid-lowering agents ³	527 (33.0)	6902 (30.2)	0.06	1617 (40.0)	29392 (38.6)	0.03
Statins	493 (30.9)	6383 (28.0)	0.06	1523 (37.6)	27594 (36.3)	0.03
Other lipid-lowering agents	98 (6.1)	1316 (5.8)	0.02	242 (6.0)	3915 (5.2)	0.04
Antiplatelets ⁴	185 (11.6)	2038 (8.9)	0.09	509 (12.6)	8442 (11.1)	0.05
Anticoagulants ⁵	98 (6.1)	1284 (5.6)	0.02	393 (9.7)	7879 (10.4)	-0.02
Warfarin	78 (4.9)	998 (4.4)	0.02	305 (7.5)	6780 (8.9)	-0.05
Direct oral anticoagulants	11 (0.7)	195 (0.9)	-0.02	83 (2.1)	1003 (1.3)	0.06
Heparin, LMWH, or fondaparinux	21 (1.3)	274 (1.2)	0.01	45 (1.1)	661 (0.9)	0.02
Insulin	190 (11.9)	2606 (11.4)	0.02	432 (10.7)	6331 (8.3)	0.08
Non-insulin glucose-lowering medications	314 (19.7)	4029 (17.6)	0.05	720 (17.8)	13400 (17.6)	0.00
Antidepressants ⁶	334 (20.9)	4623 (20.2)	0.02	811 (20.0)	14523 (19.1)	0.02
Measures of healthcare utilization¹						
Any hospitalization, %	295 (18.5)	3419 (15.0)	0.09	920 (22.7)	14043 (18.5)	0.11
Number of any hospitalization, mean (SD)	0.3 (0.7)	0.2 (0.7)	0.06	0.3 (0.7)	0.3 (0.7)	0.08
Any hospitalization within prior 30 days, %	125 (7.8)	1333 (5.8)	0.08	342 (8.5)	5093 (6.7)	0.07
N hospital days, mean (SD)	1.7 (6.6)	1.5 (6.3)	0.03	2.0 (5.8)	1.6 (5.3)	0.08
Number of emergency department (ED) visits, mean (SD)	307 (19.2)	3484 (15.3)	0.11	1671 (41.3)	25657 (33.7)	0.16
Number of any physician visit, mean (SD)	9.9 (15.3)	8.9 (14.3)	0.07	14.0 (18.5)	10.9 (16.1)	0.18
Total N distinct pharmacological agents prescribed, mean (SD)	6.3 (5.7)	5.9 (5.9)	0.06	6.6 (6.1)	6.4 (5.5)	0.03
Laboratory values¹						
LDL, mg/dl, mean (SD)	111.8 (57.2)	108.1 (45.7)	0.07	77.1 (47.5)	101.1 (38.9)	-0.55
LDL, N (%)	100 (6.3)	2043 (9.0)	-0.10	23 (0.6)	428 (0.6)	0.00
Total cholesterol, mg/dl, mean (SD)	203.7 (62.0)	195.3 (49.0)	0.15	180.2 (59.0)	183.9 (46.5)	-0.07
Total cholesterol, N (%)	99 (6.2)	2080 (9.1)	-0.11	21 (0.5)	434 (0.6)	-0.01
INR, mean (SD)	1.7 (1.1)	1.6 (0.9)	0.03	1.6 (0.5)	1.8 (1.1)	-0.22
INR, N (%)	14 (0.9)	303 (1.3)	-0.04	5 (0.1)	81 (0.1)	0.01
Creatinine, mg/dl, mean (SD)	1.1 (0.5)	1.1 (2.2)	-0.04	1.0 (0.3)	1.2 (0.8)	-0.20
Creatinine, N (%)	141 (8.8)	2786 (12.2)	-0.11	30 (0.7)	607 (0.8)	-0.01
HbA1c, %, mean (SD)	8.1 (2.5)	7.9 (2.3)	0.08	8.5 (2.4)	7.3 (1.8)	0.57
HbA1c, N (%)	79 (5.0)	1279 (5.6)	-0.03	11 (0.3)	251 (0.3)	-0.01
Characteristics of stroke hospitalization						
Length of stay of index hospitalization, mean (SD)	5.3 (4.5)	5.9 (7.2)	-0.11	5.8 (4.7)	5.9 (6.7)	-0.02
Discharge status						
Home	1154 (72.3)	15955 (69.9)	0.05	1537 (38.0)	25236 (33.2)	0.10

Home health care	66 (4.1)	831 (3.6)	0.03	614 (15.2)	9545 (12.6)	0.08
Rehabilitation facility	44 (2.8)	726 (3.2)	-0.02	436 (10.8)	7870 (10.4)	0.01
Skilled nursing facility	62 (3.9)	836 (3.7)	0.01	873 (21.6)	18930 (24.9)	-0.08
Other acute inpatient facility	153 (9.6)	2667 (11.7)	-0.07	178 (4.4)	4034 (5.3)	-0.04
Hospice	11 (0.7)	69 (0.3)	0.06	179 (4.4)	4029 (5.3)	-0.04
In-hospital mortality ⁷	25 (1.6)	254 (1.1)	0.04	8 (0.2)	262 (0.3)	-0.03

Values are N (%) unless otherwise specified. SD: standard deviation; LMWH: low-molecular-weight heparin; LDL: low-density lipoprotein; INR: international normalised ratio; HbA1c: hemoglobin A1c

1 Unless otherwise specified, measured during the six months preceding the index stroke hospitalization

2 Includes ACE-inhibitors, ARBs, beta-blockers, calcium channel blockers, thiazide diuretics, loop diuretics, and other antihypertensives

3 Includes statins or other lipid-lowering medications

4 Includes aspirin, clopidogrel, prasugrel, ticagrelor, dipyridamole, aspirin-dipyridamole, ticlopidine

5 Includes warfarin, dabigatran, rivaroxaban, apixaban, edoxaban, heparin, dalteparin, enoxaparin, tinzaparin, fondaparinux, argatroban, desirudin, lipirudin

6 Includes selective serotonin reuptake inhibitors (SSRIs) and non-SSRI antidepressants

7 Information on mortality is available in Optum through linkage with the Social Security Administration Death Master File. This capture is limited by a policy change in 2011 concerning the extent of the Social Security Administration disclosure of death records received from states (Important notice: change in public death master file records. 2011; <https://classic.ntis.gov/assets/pdf/import-change-dmf.pdf>).

Table 3. Comparison of claims variables between beneficiaries in Optum with versus without successful PCNASP-linkage in commercially-insured and Medicare Advantage insured patients

Patient characteristics	Commercially insured patients			Medicare Advantage insured patients		
	Linked (n=1,495) N (%)	Unlinked (n=25,824) N (%)	Standardized difference	Linked (n=4,149) N (%)	Unlinked (n=73,072) N (%)	Standardized difference
Demographics						
Age, mean (SD)	57.1 (11.5)	60.2 (13.4)	-0.25	74.3 (8.0)	76.8 (8.3)	-0.31
Female	614 (41.1)	10810 (41.9)	-0.02	2183 (52.6)	41011 (56.1)	-0.07
Comorbidities¹						
Combined comorbidity index, mean (SD)	0.7 (2.1)	0.8 (2.0)	-0.02	1.6 (2.5)	1.7 (2.5)	-0.04
Hypertension	806 (53.9)	13353 (51.7)	0.04	3060 (73.8)	51322 (70.2)	0.08
Diabetes	406 (27.2)	6621 (25.6)	0.03	1568 (37.8)	25343 (34.7)	0.06
Dyslipidemia	544 (36.4)	9119 (35.3)	0.02	2166 (52.2)	34465 (47.2)	0.10
Prior ischemic stroke	280 (18.7)	4295 (16.6)	0.05	912 (22.0)	13557 (18.6)	0.09
Prior transient ischemic attack	126 (8.4)	2213 (8.6)	-0.01	400 (9.6)	6589 (9.0)	0.02
History of atrial fibrillation	113 (7.6)	2252 (8.7)	-0.04	707 (17.0)	15132 (20.7)	-0.09
Carotid stenosis	74 (5.0)	1239 (4.8)	0.01	337 (8.1)	5103 (7.0)	0.04
Prior hemorrhagic stroke	19 (1.3)	276 (1.1)	0.02	64 (1.5)	791 (1.1)	0.04
Ischemic heart disease or procedure	213 (14.3)	3910 (15.1)	-0.03	1128 (27.2)	19064 (26.1)	0.02
Peripheral vascular disease (PVD) or PVD surgery	67 (4.5)	1426 (5.5)	-0.05	430 (10.4)	8598 (11.8)	-0.04
Congestive heart failure	126 (8.4)	1937 (7.5)	0.03	660 (15.9)	12550 (17.2)	-0.03
Chronic kidney disease	93 (6.2)	1593 (6.2)	0.00	606 (14.6)	11745 (16.1)	-0.04
Chronic obstructive pulmonary disease	78 (5.2)	1790 (6.9)	-0.07	616 (14.9)	10982 (15.0)	-0.01
Pneumonia	53 (3.6)	956 (3.7)	-0.01	293 (7.1)	4934 (6.8)	0.01
Dementia	43 (2.9)	1204 (4.7)	-0.09	532 (12.8)	10883 (14.9)	-0.06
Cancer or history of malignant neoplasm	107 (7.2)	2239 (8.7)	-0.06	554 (13.4)	9089 (12.4)	0.03
Obesity	178 (11.9)	2581 (10.0)	0.06	633 (15.3)	10776 (14.8)	0.01
Smoking	140 (9.4)	1979 (7.7)	0.06	315 (7.6)	4432 (6.1)	0.06
Alcohol abuse or dependence	14 (0.9)	347 (1.3)	-0.04	62 (1.5)	874 (1.2)	0.03
Drug abuse or dependence	15 (1.0)	229 (0.9)	0.01	46 (1.1)	762 (1.0)	0.01
Depression	109 (7.3)	1910 (7.4)	0.00	447 (10.8)	7284 (10.0)	0.03
Medication use¹						
Any antihypertensives ²	812 (54.3)	13856 (53.7)	0.01	2625 (63.3)	48663 (66.6)	-0.07
Angiotensin-converting enzyme inhibitors	356 (23.8)	6273 (24.3)	-0.01	1200 (28.9)	22174 (30.4)	-0.03
Angiotensin II receptor blockers	208 (13.9)	3437 (13.3)	0.02	530 (12.8)	9507 (13.0)	-0.01
Beta-blockers	414 (27.7)	7015 (27.2)	0.01	1566 (37.7)	28548 (39.1)	-0.03
Calcium channel blockers	283 (18.9)	4845 (18.8)	0.00	1078 (26.0)	19096 (26.1)	0.00

Thiazide diuretics	305 (20.4)	4636 (18.0)	0.06	842 (20.3)	13515 (18.5)	0.05
Loop diuretics	129 (8.6)	2474 (9.6)	-0.03	708 (17.1)	13047 (17.9)	-0.02
Other antihypertensives	100 (6.7)	1509 (5.8)	0.03	358 (8.6)	6536 (8.9)	-0.01
Nitrates and other antianginal therapies	55 (3.7)	919 (3.6)	0.01	334 (8.1)	5169 (7.1)	0.04
Antiarrhythmics	22 (1.5)	433 (1.7)	-0.02	83 (2.0)	1611 (2.2)	-0.01
Digoxin	30 (2.0)	653 (2.5)	-0.04	146 (3.5)	3676 (5.0)	-0.07
Any Lipid-lowering agents ³	480 (32.1)	8007 (31.0)	0.02	1664 (40.1)	28287 (38.7)	0.03
Statins	455 (30.4)	7413 (28.7)	0.04	1561 (37.6)	26564 (36.4)	0.03
Other lipid-lowering agents	86 (5.8)	1396 (5.4)	0.02	254 (6.1)	3835 (5.3)	0.04
Antiplatelets ⁴	160 (10.7)	2250 (8.7)	0.07	534 (12.9)	8230 (11.3)	0.05
Anticoagulants ⁵	89 (6.0)	1692 (6.6)	-0.02	402 (9.7)	7471 (10.2)	-0.02
Warfarin	68 (4.6)	1338 (5.2)	-0.03	315 (7.6)	6440 (8.8)	-0.04
Direct oral anticoagulants	12 (0.8)	259 (1.0)	-0.02	82 (2.0)	939 (1.3)	0.05
Heparin, LMWH, or fondaparinux	20 (1.3)	286 (1.1)	0.02	46 (1.1)	649 (0.9)	0.02
Insulin	134 (9.0)	2138 (8.3)	0.02	488 (11.8)	6799 (9.3)	0.08
Non-insulin glucose-lowering medications	253 (16.9)	4143 (16.0)	0.02	781 (18.8)	13286 (18.2)	0.02
Antidepressants ⁶	269 (18.0)	4375 (16.9)	0.03	876 (21.1)	14771 (20.2)	0.02
Measures of healthcare utilization¹						
Any hospitalization, %	258 (17.3)	3221 (12.5)	0.13	957 (23.1)	14241 (19.5)	0.09
Number of any hospitalization, mean (SD)	0.2 (0.6)	0.2 (0.6)	0.11	0.3 (0.7)	0.3 (0.7)	0.07
Any hospitalization within prior 30 days, %	109 (7.3)	1139 (4.4)	0.12	358 (8.6)	5287 (7.2)	0.05
N hospital days, mean (SD)	1.4 (5.6)	1.2 (5.6)	0.04	2.2 (6.2)	1.7 (5.5)	0.07
Number of emergency department (ED) visits, mean (SD)	116 (7.8)	1434 (5.6)	0.09	1862 (44.9)	27707 (37.9)	0.14
Number of any physician visit, mean (SD)	8.2 (11.8)	8.1 (11.4)	0.01	14.5 (19.2)	11.3 (16.9)	0.18
Total N distinct pharmacological agents prescribed, mean (SD)	5.6 (5.3)	5.5 (5.3)	0.02	6.8 (6.2)	6.6 (5.6)	0.04
Laboratory values¹						
LDL, mg/dl, mean (SD)	106.3 (58.1)	107.1 (44.8)	-0.02	86.8 (19.2)	100.3 (38.7)	-0.44
LDL, N (%)	117 (7.8)	2417 (9.4)	-0.05	6 (0.1)	54 (0.1)	0.02
Total cholesterol, mg/dl, mean (SD)	201.9 (62.4)	193.6 (48.7)	0.15	156.2 (25.8)	179.4 (49.2)	-0.59
Total cholesterol, N (%)	114 (7.6)	2460 (9.5)	-0.07	6 (0.1)	54 (0.1)	0.02
INR, mean (SD)	1.5 (0.9)	1.7 (0.9)	-0.18	2.4 (1.1)	1.9 (0.9)	0.56
INR, N (%)	16 (1.1)	376 (1.5)	-0.03	3 (0.1)	8 (0.0)	0.03
Creatinine, mg/dl, mean (SD)	1.1 (0.5)	1.1 (2.1)	-0.05	1.1 (0.3)	1.1 (0.3)	0.04
Creatinine, N (%)	159 (10.6)	3317 (12.8)	-0.07	12 (0.3)	76 (0.1)	0.04
HbA1c, %, mean (SD)	8.2 (2.5)	7.8 (2.3)	0.13	8.5 (2.2)	7.0 (1.4)	0.78
HbA1c, N (%)	86 (5.8)	1498 (5.8)	0.00	4 (0.1)	32 (0.0)	0.02
Characteristics of stroke hospitalization						
Length of stay of index hospitalization, mean (SD)	5.1 (4.0)	5.9 (7.0)	-0.13	5.9 (4.9)	6.0 (6.7)	-0.02
Discharge status						
Home	1155 (77.3)	18770 (72.7)	0.11	1536 (37.0)	22421 (30.7)	0.13

Home health care	5 (0.3)	37 (0.1)	0.04	675 (16.3)	10339 (14.2)	0.06
Rehabilitation facility	8 (0.5)	104 (0.4)	0.02	472 (11.4)	8492 (11.6)	-0.01
Skilled nursing facility	8 (0.5)	65 (0.3)	0.05	927 (22.3)	19701 (27.0)	-0.11
Other acute inpatient facility	218 (14.6)	4697 (18.2)	-0.10	113 (2.7)	2004 (2.7)	0.00
Hospice	2 (0.1)	12 (0.1)	0.03	188 (4.5)	4086 (5.6)	-0.05
In-hospital mortality ⁷	33 (2.2)	511 (2.0)	0.02	0 (0.0)	5 (0.0)	-0.01

Values are N (%) unless otherwise specified. SD: standard deviation; LMWH: low-molecular-weight heparin; LDL: low-density lipoprotein; INR: international normalised ratio; HbA1c: hemoglobin A1c

1 Unless otherwise specified, measured during the six months preceding the index stroke hospitalization

2 Includes ACE-inhibitors, ARBs, beta-blockers, calcium channel blockers, thiazide diuretics, loop diuretics, and other antihypertensives

3 Includes statins or other lipid-lowering medications

4 Includes aspirin, clopidogrel, prasugrel, ticagrelor, dipyridamole, aspirin-dipyridamole, ticlopidine

5 Includes warfarin, dabigatran, rivaroxaban, apixaban, edoxaban, heparin, dalteparin, enoxaparin, tinzaparin, fondaparinux, argatroban, desirudin, lipirudin

6 Includes selective serotonin reuptake inhibitors (SSRIs) and non-SSRI antidepressants

7 Information on mortality is available in Optum through linkage with the Social Security Administration Death Master File. This capture is limited by a policy change in 2011 concerning the extent of the Social Security Administration disclosure of death records received from states (Important notice: change in public death master file records. 2011; <https://classic.ntis.gov/assets/pdf/import-change-dmf.pdf>).

Table 4. Assessment of discordance among selected variables from the PCNASP and claims data among linked patients less than 65 years and 65-year old and older

	Patients less than 65 years				Patients 65-year old and older			
	PCNASP-based variables (n=1,597)	Claims-based variables (n=1,597)	McNemar's test p-value	Absolute difference	PCNASP-based variables (n=4,047)	Claims-based variables (n=4,047)	McNemar's test p-value	Absolute difference
Comorbidities¹, N (%)								
Hypertension	1053 (66.1)	924 (57.9)	0.00	8.2	2968 (73.6)	2942 (72.7)	0.31	0.9
Diabetes mellitus	532 (33.5)	520 (32.6)	0.33	0.9	1248 (31.1)	1454 (35.9)	0.00	4.8
Dyslipidemia	612 (38.5)	628 (39.3)	0.46	0.9	1978 (49.2)	2082 (51.5)	0.01	2.3
Prior ischemic stroke	228 (16.0)	344 (21.5)	0.00	5.5	847 (24.3)	848 (21.0)	0.00	3.4
Prior transient ischemic attack	96 (6.7)	148 (9.3)	0.03	2.6	310 (8.7)	378 (9.3)	0.46	0.6
History of atrial fibrillation	122 (7.6)	96 (6.0)	0.01	1.6	1033 (25.5)	724 (17.9)	0.00	7.6
Carotid stenosis	34 (2.1)	82 (5.1)	0.00	3.0	188 (4.7)	329 (8.1)	0.00	3.4
Ischemic heart disease	256 (16.1)	242 (15.2)	0.31	1.0	1067 (26.6)	1099 (27.2)	0.35	0.6
Peripheral vascular disease	50 (3.2)	84 (5.3)	0.00	2.1	265 (6.6)	413 (10.2)	0.00	3.6
Congestive heart failure	93 (5.9)	151 (9.5)	0.00	3.6	356 (8.9)	635 (15.7)	0.00	6.8
Chronic kidney disease	39 (16.7)	122 (7.6)	0.00	9.0	99 (10.1)	577 (14.3)	0.00	4.1
Obesity	194 (54.0)	225 (14.1)	0.00	40.0	430 (35.3)	586 (14.5)	0.00	20.8
Smoking	463 (29.1)	186 (11.7)	0.00	17.5	561 (14.0)	269 (6.7)	0.00	7.4
Drug or alcohol abuse	10 (4.7)	31 (1.9)	0.81	2.8	22 (2.3)	30 (0.7)	0.86	1.6
Depression	40 (4.1)	153 (9.6)	0.00	5.5	134 (6.2)	403 (10.0)	0.00	3.7
Stroke severity and functional information at discharge²								
NIH Stroke Scale								
mean (SD)	5.0 (6.4)	N/A	N/A	N/A	6.6 (7.4)	N/A	N/A	N/A
median (IQR)	3 (1-6)	N/A	N/A	N/A	4 (1-9)	N/A	N/A	N/A
Ambulatory status at discharge								
Able to ambulate independently with or without device, N (%)	1020 (66.6)	N/A	N/A	N/A	1678 (43.9)	N/A	N/A	N/A

SD: standard deviation; NIH: National Institutes of Health; IQR: 25th-75th interquartile; N/A: not applicable

¹ Comorbidities in the PCNASP are based on recorded medical history during stroke hospitalization; comorbidities for in claims are based on ICD9 diagnoses recorded during the 183-day period prior to the stroke hospitalization. Comorbidities in the PCNASP were characterized by varying level of missingness: information on prior ischemic stroke, transient ischemic attack, obesity, chronic kidney disease, drug or alcohol abuse, and depression was missing for 13.0%, 11.6%, 72.1%, 78.6%, 79.6% and 44.7%, respectively; information on the other comorbidities was missing for <1%.

² Information on NIH Stroke Scale and Ambulatory status at discharge was missing for 28.9% and 5.2% patients, respectively.

Table 5. Assessment of discordance among selected variables from the PCNASP and claims data among linked commercially-insured and Medicare Advantage insured patients

	Commercially insured patients				Medicare Advantage insured patients			
	PCNASP-based variables (n=1,495)	Claims-based variables (n=1,495)	McNemar's test p-value	Absolute difference	PCNASP-based variables (n=4,149)	Claims-based variables (n=4,149)	McNemar's test p-value	Absolute difference
Comorbidities¹, N (%)								
Hypertension	1005 (67.5)	806 (53.9)	0.00	13.5	3016 (72.9)	3060 (73.8)	0.31	0.8
Diabetes mellitus	449 (30.3)	406 (27.2)	0.00	3.1	1331 (32.3)	1568 (37.8)	0.00	5.5
Dyslipidemia	598 (40.3)	544 (36.4)	0.01	3.9	1992 (48.2)	2166 (52.2)	0.01	4.0
Prior ischemic stroke	183 (13.3)	280 (18.7)	0.00	5.5	892 (25.3)	912 (22.0)	0.00	3.3
Prior transient ischemic attack	100 (7.3)	126 (8.4)	0.17	1.2	306 (8.5)	400 (9.6)	0.22	1.2
History of atrial fibrillation	163 (10.9)	113 (7.6)	0.00	3.4	992 (23.9)	707 (17.0)	0.00	6.9
Carotid stenosis	35 (2.4)	74 (5.0)	0.00	2.6	187 (4.5)	337 (8.1)	0.00	3.6
Ischemic heart disease	256 (17.3)	213 (14.3)	0.00	3.0	1067 (25.9)	1128 (27.2)	0.05	1.3
Peripheral vascular disease	48 (3.3)	67 (4.5)	0.06	1.2	267 (6.5)	430 (10.4)	0.00	3.9
Congestive heart failure	82 (5.6)	126 (8.4)	0.00	2.9	367 (8.9)	660 (15.9)	0.00	7.0
Chronic kidney disease	26 (1.9)	93 (6.2)	0.00	8.6	112 (10.8)	606 (14.6)	0.00	3.8
Obesity	149 (53.6)	178 (11.9)	0.00	41.7	475 (36.6)	633 (15.3)	0.00	21.3
Smoking	360 (24.4)	140 (9.4)	0.00	15.0	664 (16.1)	315 (7.6)	0.00	8.5
Drug or alcohol abuse	5 (3.2)	15 (1.0)	0.26	2.2	27 (2.7)	46 (1.1)	1.00	1.6
Depression	30 (3.2)	109 (7.3)	0.00	4.1	144 (6.6)	447 (10.8)	0.00	4.2
Stroke severity and functional information at discharge²								
NIH Stroke Scale								
mean (SD)	4.8 (6.4)	N/A	N/A	N/A	6.6 (7.4)	N/A	N/A	N/A
median (IQR)	2 (1-6)	N/A	N/A	N/A	4 (1-9)	N/A	N/A	N/A
Ambulatory status at discharge								
Able to ambulate independently with or without device, N (%)	995 (69.5)	N/A	N/A	N/A	1703 (43.4)	N/A	N/A	N/A

SD: standard deviation; NIH: National Institutes of Health; IQR: 25th-75th interquartile; N/A: not applicable

¹ Comorbidities in the PCNASP are based on recorded medical history during stroke hospitalization; comorbidities for in claims are based on ICD9 diagnoses recorded during the 183-day period prior to the stroke hospitalization. Comorbidities in the PCNASP were characterized by varying level of missingness: information on prior ischemic stroke, transient ischemic attack, obesity, chronic kidney disease, drug or alcohol abuse, and depression was missing for 13.0%, 11.6%, 72.1%, 78.6%, 79.6% and 44.7%, respectively; information on the other comorbidities was missing for <1%.

² Information on NIH Stroke Scale and Ambulatory status at discharge was missing for 28.9% and 5.2% patients, respectively.

Table 6. Percentage of missingness for PCNASP elements

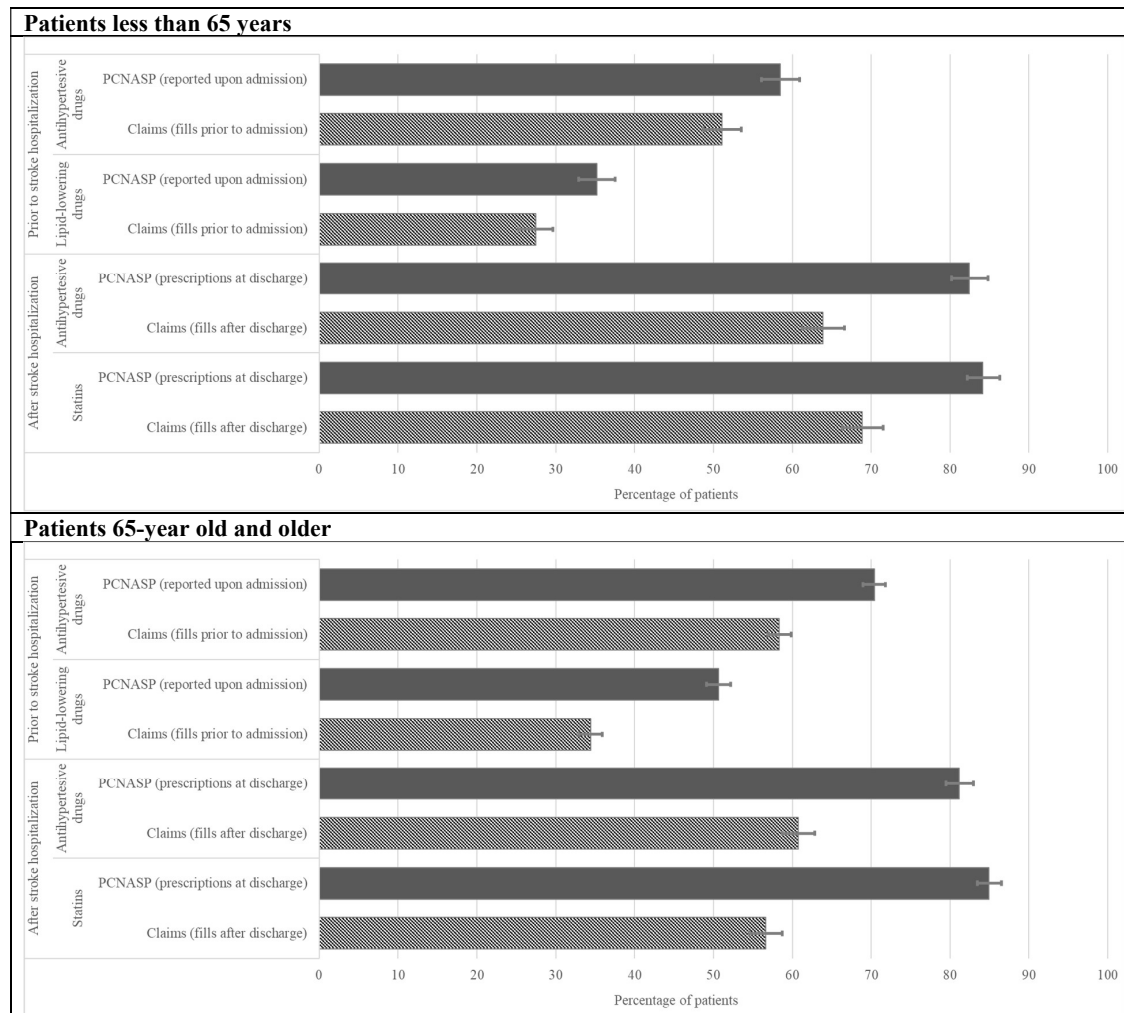
	% missing
Comorbidities¹, N (%)	
Hypertension	0.3
Diabetes mellitus	0.7
Dyslipidemia	0.6
Prior ischemic stroke	13.0
Prior transient ischemic attack	11.6
History of atrial fibrillation	0.8
Carotid stenosis	0.9
Ischemic heart disease	0.8
Peripheral vascular disease	0.9
Congestive heart failure	0.9
Chronic kidney disease	78.6
Obesity	72.1
Smoking	0.9
Drug or alcohol abuse	79.6
Depression	44.7
Medications reported upon admission	
Antihypertensive drugs ²	0.2
Lipid-lowering drugs ³	0.0
Stroke severity and functional information at discharge	
NIH Stroke Scale	28.9
Ambulatory status at discharge	5.2
Medications prescribed at discharge	
Antihypertensive drugs ²	11.3
Statins	1.7

1. Based on recorded medical history during stroke hospitalization

2. Antihypertensive drugs: includes ACE-inhibitors, ARBs, beta-blockers, calcium channel blockers, thiazide diuretics, loop diuretics, and other antihypertensives

3. Lipid-lowering drugs: includes statins or other lipid-lowering medications.

Figure 1. Antihypertensive and lipid-lowering medication use prior and subsequent to index stroke hospitalization as measured in PCNASP and in claims at 90 days pre-stroke and 90 days post discharge among linked patients less than 65 years and 65-year old and older



PCNASP (reported upon admission): based on medications reported upon admission in PCNASP registry.

Claims (fills prior to admission): based on prescription medications filled in the 90 days prior to the stroke hospitalization in claims.

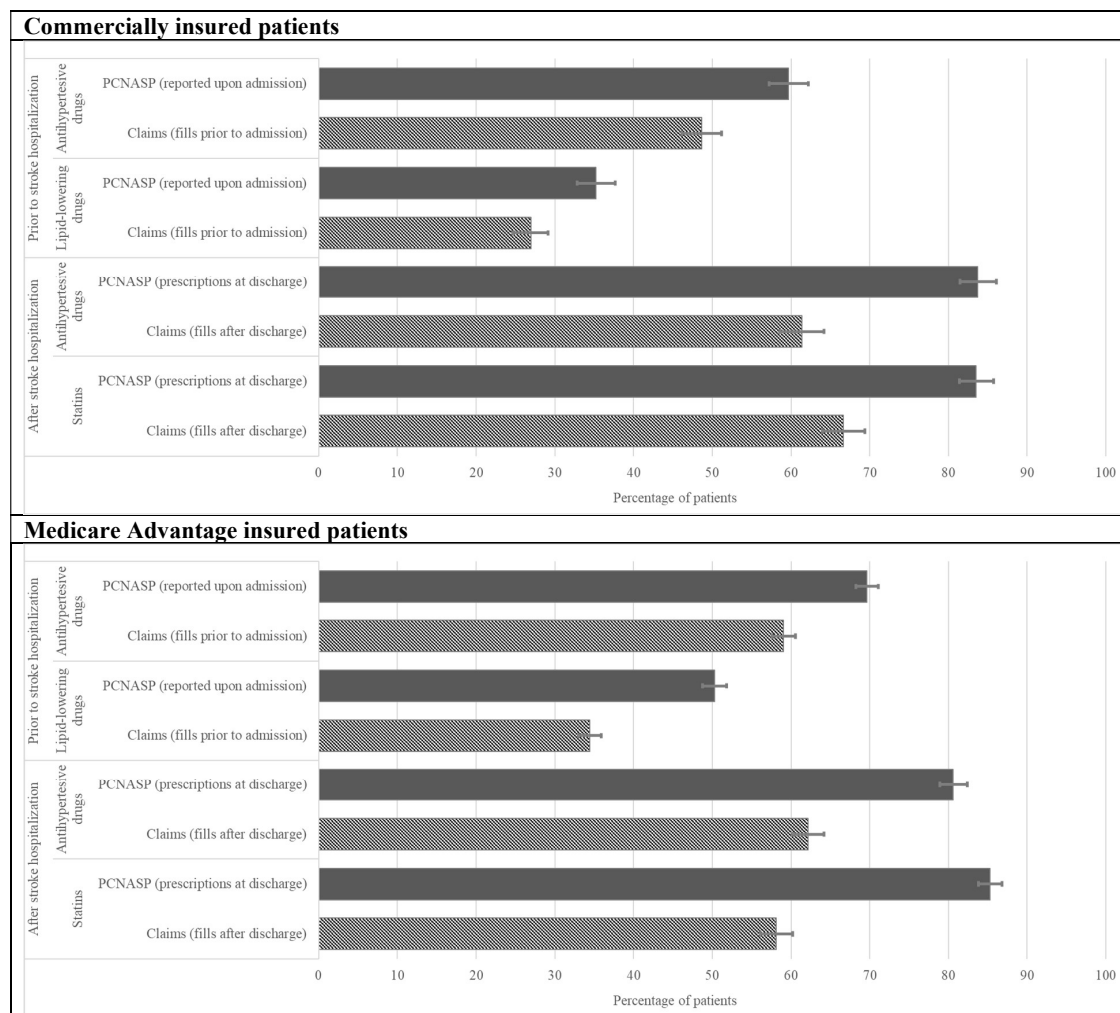
PCNASP (prescription at discharge): based on medications prescribed at discharge in PCNASP among patients discharged home.

Claims (fills after discharge): based on prescription medications filled in the 90 days following discharge as recorded in claims among patients discharged home. To evaluate prescription medications filled following discharge in claims, analyses were limited to patients with continuous enrollment for the 90 days after the stroke hospitalization.

Antihypertensive drugs: includes ACE-inhibitors, ARBs, beta-blockers, calcium channel blockers, thiazide diuretics, loop diuretics, and other antihypertensives

Lipid-lowering drugs: includes statins or other lipid-lowering medications. PCNASP included information on the use of lipid-lowering drugs upon admission and on the prescription of statins at discharge.

Figure 2. Antihypertensive and lipid-lowering medication use prior and subsequent to index stroke hospitalization as measured in PCNASP and in claims at 90 days pre-stroke and 90 days post discharge among linked commercially-insured and Medicare Advantage insured patients



PCNASP (reported upon admission): based on medications reported upon admission in PCNASP registry,
 Claims (fills prior to admission): based on prescription medications filled in the 90 days prior to the stroke hospitalization in claims.
 PCNASP (prescription at discharge): based on medications prescribed at discharge in PCNASP among patients discharged home.
 Claims (fills after discharge): based on prescription medications filled in the 90 days following discharge as recorded in claims among patients discharged home. To evaluate prescription medications filled following discharge in claims, analyses were limited to patients with continuous enrollment for the 90 days after the stroke hospitalization.
 Antihypertensive drugs: includes ACE-inhibitors, ARBs, beta-blockers, calcium channel blockers, thiazide diuretics, loop diuretics, and other antihypertensives
 Lipid-lowering drugs: includes statins or other lipid-lowering medications. PCNASP included information on the use of lipid-lowering drugs upon admission and on the prescription of statins at discharge.