

SUPPLEMENTARY INFORMATION

Predictors of 1-year drug-related admissions in older multimorbid hospitalized adults

Supplementary Text S1. International Classification of Diseases German Modification version 10 codes for comorbidities not included in the Charlson Comorbidity Index.

Anemia: D50.X-D64.X
Hypertension: I10.X-15.X
Atrial fibrillation: I48.X
Depression: F32.X

Supplementary Text S2. Anatomical Therapeutic and Chemical codes to define medication classes.

Beta-blockers:

C07AA01-C07AA02-C07AA03-C07AA05-C07AA06-C07AA07-C07AA12-C07AA14-C07AA15-C07AA16-C07AA17-C07AA19-C07AA23-C07AA27 -C07AB01-C07AB02-C07AB03-C07AB04-C07AB05-C07AB06-C07AB07-C07AB08-C07AB09-C07AB10-C07AB11-C07AB12-C07AB13-C07AB14-C07AG01-C07AG02-C07BB02-C07BB03-C07BB04-C07BB06-C07BB07-C07BB12-C07BB52-C07BG01-C07CA02-C07CA03-C07CA17-C07CA23-C07CB02-C07CB03-C07CB53-C07CG01-C07DA06-C07CB53-C07DB01-C07BA02-C07BA05-C07BA06-C07BA07-C07BA12-C07BA68-C07FB02-C07FB03-C07FB07-C07FB12-C07FB13-C07FX01-C07FX02-C07FX03-C07FX04-C07FX05-C07FX06

Calcium channel blockers:

C07FB02-C07FB03-C07FB07-C07FB12-C07FB13-C08CA01-C08CA02-C08CA03-C08CA04-C08CA05-C08CA06-C08CA07-C08CA08-C08CA09-C08CA10-C08CA11-C08CA12-C08CA13-C08CA14-C08CA15-C08CA16-C08CA51-C08CA55-C08CX01-C08EA01-C08EA02-C08EX01-C08EX02-C08GA01-C08GA02

Alpha-blockers:

C02AA01-C02AA02-C02AA03-C02AA04-C02AA05-C02AA06-C02AA07-C02AA52-C02AA53-C02AA57-C02AB01-C02AB02-C02AC01-C02AC02-C02AC03-C02AC04-C02AC05-C02AC06-C02C-C02BB01-C02BA01-C02CA01-C02CA02-C02CA03-C02CA04-C02CA06-C02CC01-C02CC02-C02CC03-C02CC04-C02CC05-C02CC06-C02CC07-`var' ==C02LA01-C02LA02 - C02LA03-C02LA04-C02LA07-C02LA08-C02LA09-C02LA50-C02LA51-C02LA52-C02LA71-C02LB01-C02LC01-C02LC05-C02LC51-C02LE01

Renin angiotensin system blockers:

C09AA01-C09AA02-C09AA03-C09AA04-C09AA05-C09AA06-C09AA07-C09AA08-C09AA09-C09AA10-C09AA11-C09AA12-C09AA15-C09AA13-C09AA14-C09AA16-C09BA01-C09BA02-C09BA03-C09BA04-C09BA05-C09BA06-C09BA07-C09BA08-C09BA09-C09BA10-C09BA11-C09BA12-C09BA13-C09BA15-C09BB02-C09BB03-C09BB05-C09BB06-C09BB07-C09BB10-C09BB12-C09BX01-C09BX02-C09BX03-C09BX04-A02AB05-A02AB06-A02AB07-A02AB10-A02AC01-A02AC02-A02AC10-A02AD01-A02AD02-A02AD03-A02AD04-A02AD05-A02AF01-A02AF02-A02AG-A02AH-A02AX

Nitrates:

C01DA02-C01DA04-C01DA05-C01DA07-C01DA08-C01DA06-C01DA13-C01DA14-C01DA20-C01DA38-C01DA52-C01DA54-C01DA55-C01DA57-C01DA58-C01DA59-C01DA63-C01DA70

Diuretics:

C03AA01-C03AA02-C03AA03-C03AA04-C03AA05-C03AA06-C03AA07-C03AA08-C03AA09-C03AA13-C03AB01-C03AB02-C03AB03-C03AB04-C03AB05-C03AB06-C03AB07-C03AB08-C03AB09-C03AH01-C03AH02-C03AX01-C03BA03-C03BA04-C03BA05-C03BA07-C03BA08-C03BA09-C03BA10-C03BA11-C03BA12-C03BA13-C03BA82-C03BB02-C03BB04-C03BB05-C03BB06-C03BB07-C03BC01-C03BD01-C03BB02-C03BX03-C03CA01-C03CA02-C03CA03-C03CA04-C03CC01-C03CC02-C03CB01-C03CB02-C03CD01-C03CX01-C03DA01-C03DA02-C03DA03-C03DA04-C03DB01-C03DB02-C03EA01-C03EA05-C03EA06-C03EA04-C03EA05-

C03EA06-C03EA07-C03EA12-C03EA13-C03EA14-C03EB01-C03EB02 -C09BA01-C09BA02-C09BA03-C09BA04-C09BA05-C09BA06-C09BA07-C09BA08-C09BA09-C09BA10-C09BA11-C09BA12-C09BA13-C09BA15-C09BX03-C09BX01-C02LA01-C02LA02 -C02LA03-C02LA04-C02LA07-C02LA08-C02LA09-C02LA50-C02LA51-C02LA52-C02LA71-C02LB01-C02LC01-C02LC05-C02LC51-C02LE01-C02LF01-C02LG01-C02LG02-C02LG03-C02LG51-C02LG73-C02LK01-C02LL01-C02LX01-C07BA05-C07BA06-C07BA07-C07BA12-C07BA68-C07BB02-C07BB03-C07BB04-C07BB06-C07BB07-C07BB12-C07BB52-C07BG01-C07CA02-C07CA03-C07CA17-C07CA23-C07CB02-C07CB03-C07CB53-C07CG01-C07DA06-C07CB53-C07DB01-C07BA02-C07BA05-C07BA06-C07BA07-C07BA12-C07BA68-C08GA01-C08GA02

Antiplatelets:

B01AC01-B01AC02-B01AC03-B01AC04-B01AC05-B01AC06-B01AC07-B01AC08-B01AC09-B01AC10-B01AC11-B01AC13-B01AC15-B01AC16-B01AC17-B01AC18-B01AC19-B01AC21-B01AC22-B01AC23-B01AC24-B01AC25-B01AC26-B01AC27-B01AC30-B01AC56

Anticoagulants:

B01AA01-B01AA02-B01AA03-B01AA04-B01AA07-B01AA08-B01AA09-B01AA10-B01AA11-B01AA12-B01AB01-B01AB02-B01AB04-B01AB05-B01AB06-B01AB07-B01AB08-B01AB09-B01AB10-B01AB11-B01AB12-B01AE01-B01AE01-B01AE02-B01AE04-B01AE05-B01AE06-B01AE07-B01AF01-B01AF02-B01AF03-B01AF04-B01AX01-B01AX04-B01AX05-B01AX07

Antidiabetic agents other than insulin:

A10BX01-A10BX02-A10BX03-A10BX08-A10BX05-A10BX06 -A10BK01-A10BK02-A10BK03-A10BK04-A10BK05-A10BK06-A10BD15-A10BD16-A10BD19-A10BD20-A10BD21-A10BD23-A10BD24-A10BD25-A10BJ01-A10BJ02-A10BJ03-A10BJ04-A10BJ05-A10BJ06-A10BD14-A10BH01-A10BH02-A10BH03-A10BH04-A10BH05-A10BH06-A10BH07-A10BH51-A10BH52-A10BD07-A10BD08-A10BD09-A10BD10-A10BD11-A10BD12-A10BD13-A10BD18-A10BD19-A10BD21-A10BD22-A10BD24-A10BD25-A10BF01-A10BF02-A10BF03-A10BD17-A10BG01-A10BG02-A10BG03-A10BD03-A10BD05-A10BD04-A10BD06-A10BD09 - A10BB01-A10BB02-A10BB03-A10BB04-A10BB05-A10BB06-A10BB07-A10BB08-A10BB09-A10BB10-A10BB11-A10BB12-A10BB31-A10BC01-A10BD01-A10BD02-A10BD04-A10BD06-A10BA01-A10BA02-A10BA03-A10BD01-A10BD02-A10BD03-A10BD01-A10BD02-A10BD03-A10BD01-A10BD02-A10BD03-A10BD01-A10BD02-A10BD03-A10BD05-A10BD07-A10BD08-A10BD10-A10BD11-A10BD13-A10BD14-A10BD15-A10BD16-A10BD17-A10BD18-A10BD20-A10BD23-A10BD24-A10BD25

Insulin:

A10AB01 -A10AD01-A10AD02-A10AD03-A10AD04-A10AD05-A10AD06-A10AD30-A10AE01-A10AE02-A10AE03-A10AE04-A10AE05-A10AE06-A10AE30-A10AE54-A10AE56-A10AF01-A10AB02-A10AB03-A10AB04-A10AB05-A10AB06-A10AB30-A10AC01-A10AC02-A10AC03-A10AC04-A10AC30

Non-steroidal anti-inflammatory drugs:

M01AA01-M01AA02-M01AA03-M01AA05-M01AA06-M01AB01-M01AB01-M01AB01-M01AB02-M01AB03-M01AB04-M01AB05-M01AB06-M01AB07-M01AB08-M01AB09-M01AB12-M01AB13-M01AB14-M01AB15-M01AB16-M01AB17-M01AB51-M01AB55-M01AC01-M01AC02-M01AC04-M01AC05-M01AC06-M01AC56-M01AE01-M01AE02-M01AE03-M01AE04-M01AE05-M01AE06-M01AE07-M01AE08-M01AE09-M01AE10-M01AE11-M01AE12-M01AE13-M01AE14-M01AE15-M01AE16-M01AE17-M01AE18-M01AE51-M01AE52-M01AE53-M01A5E6-M01AG01-M01AG02-M01AG03-M01AG04-M01AH01-M01AH02-M01AH03-M01AH04-M01AH05-M01AH06-M01AH07-M01AX01-M01AX02-M01AX04-M01AX05-M01AX07-M01AX12-M01AX13-M01AX14-M01AX17-M01AX18-M01AX21-M01AX22-M01AX23-M01AX24-M01AX25-M01AX26-M01AX68

Opioids:

N02AA01 -N02AA02-N02AA03-N02AA04-N02AA05-N02AA08-N02AA10-N02AA51-N02AA53-
N02AA55-N02AA56-N02AA58-N02AA59-N02AA79-N02AB01-N02AB02-N02AB03-N02AB52-
N02AB72-N02AC01-N02AC03-N02AC04-N02AC05-N02AC52-N02AC54-N02AC74-N02AD01-
N02AD02-N02AE01-N02AF01-N02AF02-N02AG01-N02AG02-N02AG03-N02AG04-N02AJ01-
N02AJ02-N02AJ03-N02AJ06-N02AJ07-N02AJ08-N02AJ09-N02AJ13-N02AJ14-N02AJ15-
N02AJ17-N02AJ18-N02AJ19-N02AX01-N02AX02-N02AX03-N02AX05-N02AX06-N02BA01

Oral corticosteroids:

H02AB01-H02AB02-H02AB03-H02AB04 -H02AB05-H02AB06-H02AB07-H02AB08-H02AB09-
H02AB10-H02AB11-H02AB12-H02AB13-H02AB14-H02AB415-H02AB17-H02AX01

Proton pump inhibitors:

A02BC01-A02BC02-A02BC03-A02BC04-A02BC05-A02BC06-A02BC07-A02BC08-A02BC53-
A02BD01-A02BD02-A02BD03-A02BD04-A02BD05-A02BD06-A02BD07-A02BD09-A02BD10-
A02BD11-A02BD12-A02BD13-A02BD14-A02BD15-B01AC56

Hypnotics:

N05BA01-N05BA02-N05BA03-N05BA04-N05BA05-N05BA06-N05BA07-N05BA08-N05BA09-
N05BA10-N05BA11-N05BA12-N05BA13-N05BA14-N05BA15-N05BA16-N05BA17-N05BA18-
N05BA19-N05BA21-N05BA22-N05BA23-N05BA24-N05BA56-N05CD01-N05CD02-N05CD03-
N05CD04-N05CD05-N05CD06-N05CD07-N05CD08-N05CD09-N05CD10-N05CD11-N05CD12-
N05CD13-N05CD14-N05CF01-N05CF02-N05CF03-N05CF04

Antidepressants:

N06AB02-N06AB03-N06AB04-N06AB05-N06AB06-N06AB07-N06AB08-N06AB09-N06AB10-
N06AA01-N06AA02-N06AA03-N06AA04-N06AA05-N06AA06-N06AA07-N06AA08-N06AA09-
N06AA10-N06AA11-N06AA12-N06AA13-N06AA14-N06AA15 -N06AA16-N06AA17-N06AA18-
N06AA19-N06AA21-N06AA23-N06AF01-N06AF02-N06AF03-N06AF04-N06AF05-N06AF06-
N06AG02-N06AG03-N06AX01-N06AX02-N06AX03-N06AX04-N06AX05-N06AX06-N06AX07-
N06AX08-N06AX09-N06AX10 -N06AX11 -N06AX12-N06AX13-N06AX14-N06AX15-N06AX16-
N06AX17-N06AX18-N06AX19-N06AX21-N06AX22-N06AX23-N06AX24-N06AX25-N06AX26-
N06AX27-N06CA01-N06CA02-N06CA03

Antipsychotics:

N05AA01-N05AA02-N05AA03-N05AA04-N05AA05-N05AA06-N05AA07-N05AB01-N05AB02-
N05AB03-N05AB04-N05AB05-N05AB06-N05AB07-N05AB08-N05AB09-N05AB10-N05AC01-
N05AC02-N05AC03-N05AC04-N05AD01-N05AD02-N05AD03-N05AD04-N05AD05-N05AD06-
N05AD07-N05AD08-N05AD09-N05AE01-N05AE02-N05AE03-N05AE04-N05AE05-N05AF01-
N05AF02-N05AF03-N05AF04-N05AF05-N05AG01-N05AG02-N05AG03-N05AH01-N05AH02-
N05AH03-N05AH04-N05AH05-N05AH06-N05AL01-N05AL02-N05AL03-N05AL04-N05AL05-
N05AL06-N05AL07-N05AX07-N05AX08-N05AX09-N05AX10-N05AX11-N05AX12-N05AX13-
N05AX14-N05AX15-N05AX16-N05AX17

Antiparkinsonian agents:

N04AA01-N04AA02-N04AA03-N04AA04-N04AA05-N04AA08-N04AA09-N04AA10-N04AA11-
N04AA12 -N04AB01-N04AB02-N04AC01-N04AC30-N04BA01-N04ABA02-N04BA03-
N04ABA04-N04BA05-N04ABA06-N04BB01-N04BC01-N04ABC02-N04BC03-N04ABC04-
N04BC05-N04ABC06-N04ABC07-N04ABC08-N04ABC09-N04BD01-N04ABD02-N04BD03-
N04BX01-N04ABX02-N04BX03-N04BX04

Supplemental Table 1. Results of univariable logistic regression analysis.

Variables	OR (95%CI)	P-value
Age	1.02 (1.00-1.03)	0.14
Sex (female)	0.84 (0.68-1.04)	0.12
Hospitalizations <1 year, n		
0	<i>Reference</i>	-
1	1.45 (1.12-1.88)	0.005
2	1.47 (1.04-2.09)	0.03
≥3	2.73 (1.98-3.77)	<0.001
Emergency room <6 months	1.17 (0.93-1.47)	0.18
Non-elective admission	1.63 (1.25-2.15)	0.001
Length of stay, days	1.00 (0.99-1.00)	0.36
Surgical ward (vs. medical ward)	0.60 (0.43-0.83)	0.002
Discharge home	0.99 (0.78-1.26)	0.96
Number of comorbidities	1.15 (1.09-1.21)	<0.001
Congestive heart failure	1.56 (1.23-1.96)	<0.001
Atrial fibrillation	1.45 (1.16-1.80)	0.001
Myocardial infarction	1.35 (0.97-1.88)	0.08
Stroke	1.01 (0.80-1.28)	0.92
Hypertension	0.72 (0.58-0.91)	0.005
Peripheral vascular disorder	1.16 (0.90-1.51)	0.26
Chronic kidney disease	1.53 (1.22-1.92)	<0.001
Chronic kidney disease stage 3	1.55 (1.14-2.10)	0.005
Chronic kidney disease stage 4	1.36 (0.71-2.61)	0.71
Chronic kidney disease stage 5	2.22 (0.79-6.23)	0.13
Chronic hepatitis / cirrhosis without portal hypertension	1.11 (0.65-1.89)	0.70
Cirrhosis with portal hypertension	3.36 (1.33-8.53)	0.01
Anemia	1.35 (1.08-1.63)	0.008
Diabetes	1.26 (0.98-1.61)	0.07
Blood malignancy	1.78 (1.06-2.98)	0.03
Solid tumor without metastasis	1.08 (0.83-1.41)	0.55
Metastatic solid tumor	1.08 (0.62-1.89)	0.78
Chronic pulmonary disease	1.41 (1.12-1.78)	0.004
Connective tissue disorder	1.12 (0.75-1.67)	0.60
Peptic ulcer disease	1.15 (0.69-1.94)	0.59
Hemiplegia	0.57 (0.28-1.17)	0.13
Dementia	0.84 (0.55-1.29)	0.43
Depression	1.34 (0.87-2.06)	0.19
	1.06 (1.04-1.09)	<0.001
Number of chronic medications	1.10 (0.89-1.37)	0.37
Beta-blocker	0.94 (0.74-1.19)	0.62
Renin angiotensin system blocker	0.75 (0.57-0.97)	0.03
Calcium channel blocker	1.09 (0.56-2.05)	0.80
Alpha-blocker	1.44 (1.16-1.78)	<0.001
Diuretic	0.90 (0.59-1.38)	0.64
Nitrate		0.97
Anticoagulant and antiplatelet		

	0.99 (0.70-	0.03
Anticoagulant alone	1.42) 1.28 (1.02-	0.97
Antiplatelet alone	1.61)	0.43
Statin	1.00 (0.80-1.2.5)	0.07
Proton pump inhibitor	0.92 (0.74-1.14)	0.64
Antidiabetic other than insulin	1.22 (0.98-1.52)	0.03
Insulin	0.92 (0.65-1.30)	<0.001
Oral corticosteroid	1.39 (1.03-1.87)	0.01
Non-steroidal anti-inflammatory drug	1.87 (1.41-2.49)	0.17
Opioid	0.46 (0.25-0.88)	0.20
Hypnotic	1.21 (0.92-1.59)	0.51
Antidepressant	1.18 (0.92-1.52)	0.77
Antipsychotic	1.09 (0.84-1.40)	0.61
Antiparkinsonian	1.07 (0.68-1.69)	
	0.87 (0.39-1.73)	

Abbreviations: CI, confidence interval; OR, odds ratio.

Legend: Variables with a p-value <0.20 (highlighted in bold) were entered in the multivariable backward regression.