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Figure A1. Flow diagram of resident inclusion and exclusion in study cohort.

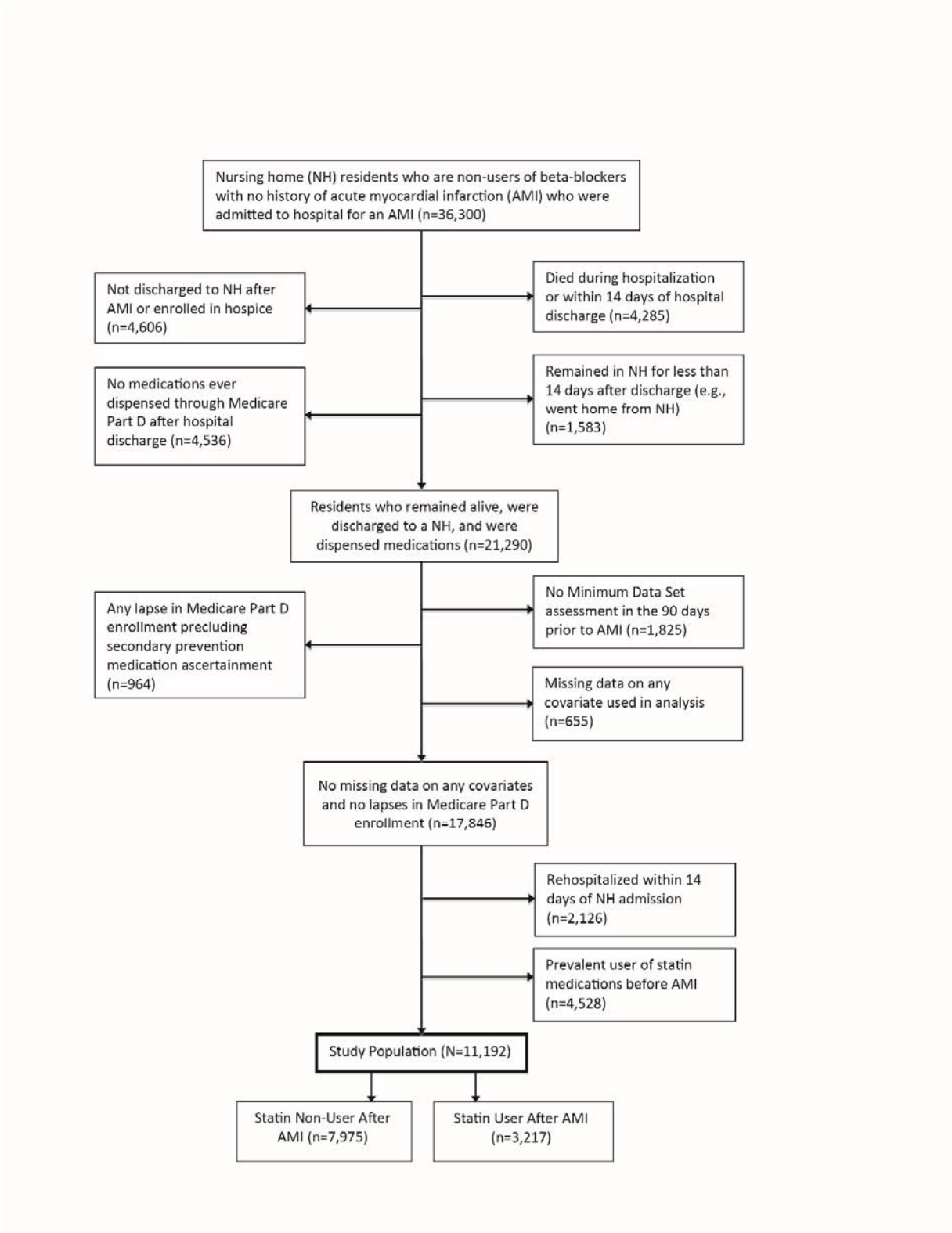


Table A1. List of Individual Statin Medications Considered in the Study and Details about Medication Exposure Definition.

Details of the complementary approaches used to ascertain medication exposure, including a validation cohort using complete prescription drug dispensing data from a large, national private NH chain (HCR ManorCare, Inc., Toledo, OH), are described elsewhere.[1-3] *In brief, those approaches are important because Medicare Part D drug dispensing claims are not generated while NH residents receive care through the Skilled Nursing Facility (SNF) benefit.* [1-3]

Individual Statin Drugs Considered
Atorvastatin
Fluvastatin
Lovastatin
Pitavastatin
Pravastatin
Rosuvastatin
Simvastatin

Table A2. Variables included in the propensity score estimation model.

Part A claims were used to document characteristics of the recent AMI hospital course (including procedures), severity of cardiovascular disease, and the Elixhauser Comorbidity Index score.[4] Pre-AMI medication use was included as a marker of residents' clinically active conditions and risk of future clinical events (e.g., residents prescribed warfarin may be at higher risk of future cerebrovascular hospitalizations). A number of MDS items have been structured into reliable, valid measures of resident functional status.[5-7] The level of functional impairment for each resident was estimated with the MDS ADL score.[8] Cognitive function was measured with the Cognitive Performance Scale; scores range from 0 (intact) to 6 (severe impairment).[6] Other geriatric syndromes (weight loss, falls, presence and frequency of pain, and Changes in Health, End-Stage Disease, Signs, and Symptoms Scale (CHESS) score) and do not resuscitate (DNR) order status were also measured in the MDS. Facility characteristics and indicators of care quality were obtained from the most recent OSCAR survey before the acute AMI hospitalization.

Variable Name	**Data Source**	**Description**
chess_nh	MDS	Comorbidity index, Changes in Health, End-stage disease, and Signs and Symptoms (CHESS) Scale (0 to 5) 0=Not at all unstable,5=Highly unstable
CXBREAT_max	MDS	Binary indicator of presence of shortness of breath in prior 7 days on last MDS assessment

back		prior to index MI
cxdizz_maxback	MDS	Binary indicator of presence of dizziness/vertigo in prior 7 days on last MDS assessment prior to index MI
CXFL180_maxback	MDS	Binary indicator of presence of fell in the past 31 to 180 days on last MDS assessment prior to index MI
CXPAIN_maxback	MDS	Categorical variable for highest level of pain present in the prior 7 days (i.e., frequency with which resident complains or shows evidence of pain) on last MDS assessment prior to index MI
CXSYNCO_maxback	MDS	Binary indicator of presence of syncope/fainting in prior 7 days on last MDS assessment prior to index MI
dmrace	MDS	Race/ethnicity
dmsex	MDS	Gender
idage	MDS	Age at assessment
nhlos	MDS	Nursing home length of stay before MI (calculated using residential history file algorithm)

ORWTLOS	MDS	Weight loss (recent history of weight loss)
phadld	MDS	Morris additive ADL scale 0-28 (baseline)
phadld*phadld	MDS	Quadratic term for Morris additive ADL scale 0-28 (baseline)
phcps	MDS	Fries & Morris CPS index (cognitive performance score)
rhftype	MDS	Residential facility type
RXANXIE	MDS	# of days antianxiety/hypnotics
RXDEPRE	MDS	# of days antidepressants
RXHYPNO	MDS	# of days received hypnotic
RXNUMBE	MDS	Number of medications in last 7 days
RXPSYCH	MDS	# of days received antipsychotics
Dnr	MDS	Do not resuscitate order
dchrppd	OSCAR	Total direct care (RN/LPN/CNA) hrs/day/resident

lpn100t	OSCAR	Total LPN FTEs/100 beds
md100t	OSCAR	Total MD FTEs/100 beds
mdex100t	OSCAR	Total MD extender FTEs/100 beds
multifac	OSCAR	Facility is part of a chain
n_qol_def	OSCAR	OSCAR: quality-of-life deficiency score
occrate	OSCAR	OSCAR: Occupancy rate (range 0-1)
owner	OSCAR	Type of owner of nursing home
paymcaid	OSCAR	Pct Medicaid patients in nursing home
paymcare	OSCAR	Pct Medicare patients in nursing home
payoth2	OSCAR	Pct Other payer; excl Medicare residents
prov0740	OSCAR	Total number of nursing home facility beds
psychact	OSCAR	% receiving psychoactive drugs

psycha*psycha*psycha	OSCAR	Cubic term for % receiving psychoactive drugs
psychdx	OSCAR	Pct with psychiatric diagnosis
pt100t	OSCAR	Total physical therapy FTEs/100 beds
restrain	OSCAR	Pct physically restrained
rn100t	OSCAR	Total RN FTEs/100 beds
rn100t*rn100t	OSCAR	Quadratic term for total RN FTEs/100 beds
az_af	Part A	Binary indicator of presence of atrial fibrillation in 1 yr prior to index MI
az_alzheimers	Part A	Binary indicator of presence of Alzheimer's disease in 1 yr prior to index MI
az_angina_pectoris	Part A	Binary indicator of presence of angina pectoris in 1 yr prior to index MI
az_arthritis	Part A	Binary indicator of presence of arthritis in 1 yr prior to index MI
az_asthma	Part A	Binary indicator of presence of asthma in 1 yr prior to index MI

az_CHF	Part A	Binary indicator of presence of congestive heart failure in 1 yr prior to index MI
az_cop	Part A	Binary indicator of presence of chronic obstructive pulmonary disease in 1 yr prior to index MI
az_depression	Part A	Binary indicator of presence of depression in 1 yr prior to index MI
az_dm	Part A	Binary indicator of presence of diabetes mellitus in 1 yr prior to index MI
az_dyslipidemia	Part A	Binary indicator of presence of dyslipidemia in 1 yr prior to index MI
az_hypertension	Part A	Binary indicator of presence of hypertension in 1 yr prior to index MI
az_hypothyroidism	Part A	Binary indicator of presence of hypothyroidism in 1 yr prior to index MI
az_obesity	Part A	Binary indicator of presence of obesity in 1 yr prior to index MI
az_osteoporosis	Part A	Binary indicator of presence of osteoporosis in 1 yr prior to index MI
az_pvd	Part A	Binary indicator of presence of peripheral vascular disease in 1 yr prior to index MI
az_tachyarrhyth	Part A	Binary indicator of presence of arrhythmias in 1 yr prior to index MI

mias		
az_unstable_angina	Part A	Binary indicator of presence of unstable angina in 1 yr prior to index MI
hosp_count_1yr	Part A	Number of hospitalizations in 1 yr prior to index MI, from part A inpt
ICU_CCU_group	Part A	Group: Number of days at ICU or CCU during index MI hosp stay
los_mi_stay	Part A	Number of days in the hospital during index MI hospital stay
pcicabg	Part A	Coronary revascularization or angioplasty procedures performed during the acute myocardial infarction hospitalization
max_hielix	Part A	Max of Elixhauser among hospitalizations in 1 yr prior to the index MI, from Part A inpt
bb_exp	Part D	Binary indicator of concurrent prescribing of an oral beta-blocker drug (e.g., metoprolol) at the time the new statin prescription was dispensed after the index MI
asp_exp	Part D	Binary indicator of concurrent prescribing of an oral antiplatelet drug (e.g., clopidogrel) at the time the new statin prescription was dispensed after the index MI

aceorarb_exp	Part D	Binary indicator of concurrent prescribing of an oral renin angiotensin aldosterone system inhibitor drug (e.g., lisinopril) at the time the new statin prescription was dispensed after the index MI
d_alpha_adrenergic	Part D	Binary indicator of presence of alpha 2 adrenergic agonist drug (e.g. clonidine, guanfacine) in 1 yr prior to index MI
d_analgesic_comb	Part D	Binary indicator of presence of combination opioid analgesic drug (e.g. acetaminophen with oxycodone) in 1 yr prior to index MI
d_analgesic_opioid	Part D	Binary indicator of presence of opioid analgesic drug (e.g. oxycodone) in 1 yr prior to index MI
d_Antiarrhythmic_Ib	Part D	Binary indicator of presence of class Ib antiarrhythmic drug (e.g., lidocaine or phenytoin) in 1 yr prior to index MI
d_Antiarrhythmic_III	Part D	Binary indicator of presence of class III antiarrhythmic drug (e.g., amiodarone, sotalol, dofetilide) in 1 yr prior to index MI
d_Antiarrhythmi	Part D	Binary indicator of presence of class IV antiarrhythmic drug (i.e., non-dihydropyridine

c_IV		calcium channel blockers, e.g., diltiazem or verapamil) in 1 yr prior to index MI
d_Antiarrhythmic_mis	Part D	Binary indicator of presence of antiarrthymic drug (misc) in 1 yr prior to index MI
d_Anticholinergic	Part D	Binary indicator of presence of anticholinergic drug (e.g., ipratroium, tiotropium) in 1 yr prior to index MI
d_Anticoagulant	Part D	Binary indicator of presence of anticoagulant (e.g., dabigatran) in 1 yr prior to index MI
d_Anticoagulant_cou	Part D	Binary indicator of presence of coumarin derivative anticoagulant (e.g., warfarin) in 1 yr prior to index MI
d_Antidepressant_SAR	Part D	Binary indicator of presence of antidepressant in 1 yr prior to index MI
d_Antidepressant_SNR	Part D	Binary indicator of presence of SNRI antidepressant in 1 yr prior to index MI
d_Antidepressant_SSR	Part D	Binary indicator of presence of SSRI antidepressant in 1 yr prior to index MI

d_Antilipemic_2 Azeti	Part D	Binary indicator of presence of 2-azetidinone antilipemic drug (e.g., ezetimibe) in 1 yr prior to index MI
d_Antilipemic_B CS	Part D	Binary indicator of presence of bile acid sequestrant antilipemic drug (e.g., cholestyramine, colesevelam) in 1 yr prior to index MI
d_Antilipemic_F ibric	Part D	Binary indicator of presence of fibric acid antilipemic drug (e.g., gemfibrozil, fenofibrate) in 1 yr prior to index MI
d_antiparkinson_ Dopa	Part D	Binary indicator of presence of dopamine agonist drug in 1 yr prior to index MI
d_Antipsychotic _atyp	Part D	Binary indicator of presence of atypical antipsychotic drug in 1 yr prior to index MI
d_Antipsychotic _typi	Part D	Binary indicator of presence of typical antipsychotic drug in 1 yr prior to index MI
d_Benzodiazepin e	Part D	Binary indicator of presence of benzodiazepine drug (e.g., alprazolam, lorazepam) in 1 yr prior to index MI

d_Calcium	Part D	Binary indicator of presence of calcium channel blocker drug (e.g., amlodipine) in 1 yr prior to index MI
d_Diuretic_Loop	Part D	Binary indicator of presence of loop diuretic drug (e.g., furosemide) in 1 yr prior to index MI
d_Diuretic_Potassium	Part D	Binary indicator of presence of potassium-sparing diuretic drug (e.g., spironolactone) in 1 yr prior to index MI
d_Diuretic_Thiazide	Part D	Binary indicator of presence of thiazide diuretic drug (e.g., hydrochlorothiazide) in 1 yr prior to index MI
d_Diuretic_Thiazide_	Part D	Binary indicator of presence of thiazide-related diuretic in 1 yr prior to index MI
d_Hypnotic	Part D	Binary indicator of presence of nonbenzodiazpine hypnotic drug (e.g. zolpidem) in 1 yr prior to index MI
d_LMWH	Part D	Binary indicator of presence of low molecular weight heparin anticoagulant drug (e.g. enoxaparin) in 1 yr prior to index MI
d_nitrate	Part D	Binary indicator of presence of nitrate drug (nitroglycerin, isosorbide mononitrate, isosorbide

		dinitrate) in 1 yr prior to index MI
d_NSAID_cox2	Part D	Binary indicator of presence of cox-2 selective non-steroidal anti-inflammatory drug (e.g. celecoxib) in 1 yr prior to index MI
d_Vasodilator	Part D	Binary indicator of presence of direct-acting vasodilator drug (e.g. hydralazine) in 1 yr prior to index MI

Table A3. Covariate* balance between treatment groups before and after propensity score matching.

	Absolute Standardized Mean Differences	
Variable Name	**Before Matching**	**After Matching**
idage	0.34	0.02
phadld	0.18	0.02
rxpsych	0.04	0.03
rxanxie	0.00	0.01
rxdepre	0.02	0.00
rxhypno	0.04	0.01
psychdx	0.04	0.03
psychact	0.08	0.02
max_hielix	0.04	0.01
prov0740	0.10	0.01
RXNUMBE	0.05	0.02
dchrppd	0.06	0.01
lpn100t	0.02	0.02
md100t	0.05	0.01
mdex100t	0.10	0.01
n_qol_def	0.01	0.01
occrate	0.05	0.00

paymcaid	0.05	0.00
paymcare	0.11	0.01
payoth2	0.00	0.01
pt100t	0.05	0.03
restrain	0.04	0.01
rn100t	0.13	0.01
los_mi_stay	0.03	0.02
hosp_count_1yr	0.06	0.02
nhlos	0.19	0.06
chess_nh	0.09	0.02
CXBREAT_maxback	0.03	0.04
cxdizz_maxback	0.00	0.02
CXFL180_maxback	0.07	0.02
CXPAIN_maxback	0.05	0.02
CXSYNCO_maxback	0.03	0.01
dmrace	0.06	0.02
dmsex	0.16	0.02
ORWTLOS	0.10	0.02
phcps	0.26	0.05
rhftype	0.17	0.03
Dnr	0.17	0.03
multifac	0.06	0.01
owner	0.05	0.02

az_af	0.09	0.00
az_alzheimers	0.09	0.01
az_angina_pectoris	0.25	0.03
az_arthritis	0.04	0.01
az_asthma	0.03	0.02
az_CHF	0.01	0.01
az_cop	0.01	0.02
az_depression	0.03	0.02
az_dm	0.15	0.01
az_dyslipidemia	0.41	0.05
az_hypertension	0.13	0.01
az_hypothyroidism	0.04	0.03
az_obesity	0.09	0.01
az_osteoporosis	0.00	0.00
az_pvd	0.09	0.01
az_tachyarrhythmias	0.05	0.03
az_unstable_angina	0.01	0.01
ICU_CCU_group	0.22	0.03
pcicabg	0.22	0.03
bb_exp	0.62	0.03
asp_exp	0.53	0.02
aceorarb_exp	0.34	0.01
d_alpha_adrenergic	0.02	0.01

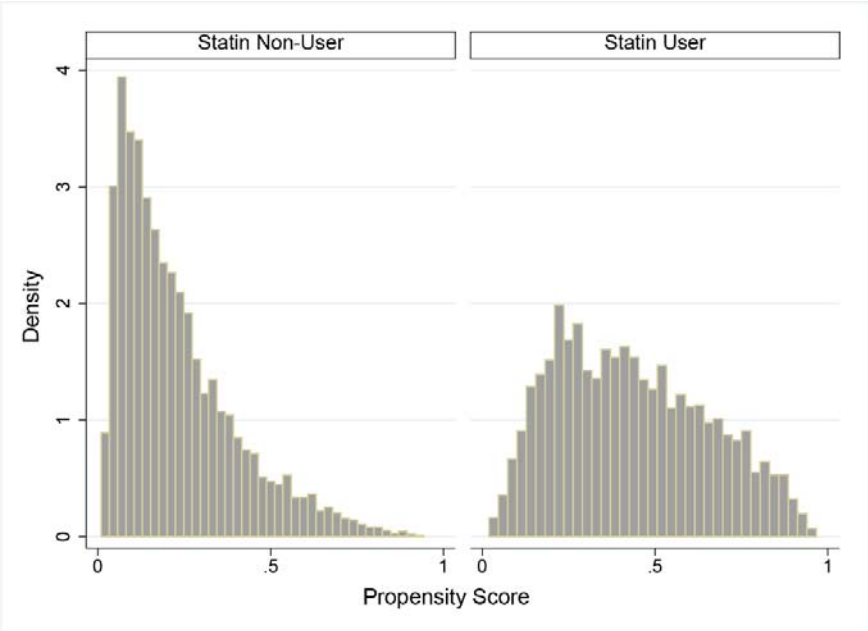
d_analgesic_comb	0.11	0.01
d_analgesic_opioid	0.12	0.01
d_Antiarrhythmic_Ib	0.02	0.00
d_Antiarrhythmic_III	0.06	0.01
d_Antiarrhythmic_IV	0.08	0.00
d_Antiarrhythmic_mis	0.08	0.00
d_Anticholinergic	0.10	0.04
d_Anticoagulant	0.00	0.00
d_Anticoagulant_cou	0.10	0.01
d_Antidepressant_SAR	0.10	0.01
d_Antidepressant_SNR	0.10	0.01
d_Antidepressant_SSR	0.10	0.01
d_Antilipemic_2Azeti	0.00	0.03
d_Antilipemic_BCS	0.03	0.03
d_Antilipemic_Fibric	0.03	0.01
d_antiparkinson_Dopa	0.03	0.01
d_Antipsychotic_atyp	0.03	0.01
d_Antipsychotic_typi	0.03	0.01
d_Benzodiazepine	0.01	0.00
d_Calcium	0.02	0.00
d_Diuretic_Loop	0.23	0.02
d_Diuretic_Potassium	0.08	0.01
d_Diuretic_Thiazide	0.02	0.00

d_Diuretic_Thiazide_	0.02	0.00
d_Hypnotic	0.03	0.01
d_LMWH	0.01	0.01
d_nitrate	0.18	0.01
d_NSAID_cox2	0.01	0.01
d_Vasodilator	0.18	0.01

*****A label and description for each covariate can be found in Table A2.

Figure A2. Distribution of the propensity score between statin users and nonusers before and after propensity score matching.

Before Matching



After Matching

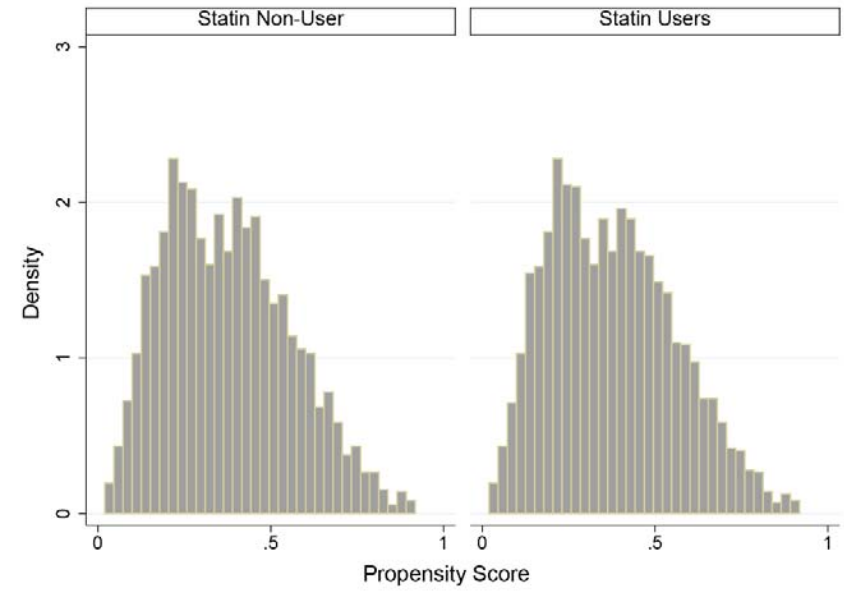


Table A4. Effect of statin use versus non-use on outcomes among frail older adults after myocardial infarction before vs. after propensity score matching.

	Matching	Events / n		PY		Percent with Outcome		HR (95% CLs)	Risk Difference (95% CLs)	NNT / NNH (95% CLs)	Difference in RMST (95% CLs)
Outcome		**Statin**	**No Statin**	**Statin**	**No Statin**	**Statin**	**No Statin**				
Mortality	Unmatched*	1,071 / 3,217	3,573 / 7,975	2,595	5,788	33.3	44.8	0.67 (0.63, 0.72)	-11.5 (-13.5, -9.6)	NNT 9 (8, 11)	30 (25, 34)
	Matched*	934 / 2,720	1,102 / 2,720	2,173	2,054	34.3	40.5	0.80 (0.73, 0.87)	-6.2 (-8.7, -3.6)	NNT 17 (12, 28)	16 (10, 22)
Rehospitalization	Unmatched*	1,707 / 3,217	3,806 / 7,975	2,037	5,326	53.1	47.7	1.16 (1.09, 1.22)	5.3 (3.3, 7.4)	NNH 19 (14, 31)	-13 (-18, -7)
	Matched*	1,438 / 2,720	1,374 / 2,720	1,728	1,760	52.9	50.5	1.06 (0.98, 1.14)	2.4 (-0.3, 5.0)	NNH 43 (NNT 313 to ∞ to NNH 20)	-4 (-12, 3)
Functional Decline	Unmatched*	650 / 3,217	1,124 / 7,975	2,265	5,255	20.2	14.1	1.37 (1.24, 1.51)	6.1 (4.5, 7.7)	NNH 17 (13, 21)	-14 (-18, -9)
	Matched*	507 / 2,720	484 / 2,720	1,813	1,917	18.6	17.8	1.00 (0.88, 1.14)	0.9 (-1.2, 2.9)	NNH 118 (NNT 86 to ∞ to NNH 35)	-1 (-6, 5)

Abbreviations: PY, person-years; HR, hazard ratio; CLs, confidence limits; NNT, number needed to treat; NNH, number needed to harm; RMST, restricted mean survival time.

*Unmatched analyses are analogous to “unadjusted” or “crude” analyses while the matched analyses are analogous to “adjusted” analyses accounting for differences in characteristics between statin users and non-users.

Table A5. Stability analysis using Fine and Gray subdistribution hazard model to estimate the effect of statin use versus non-use on outcomes while accounting for the competing risk of death among frail older adults after myocardial infarction in the propensity score-matched cohort.

Outcome	HR (95% CLs)
Rehospitalization	1.06 (0.99, 1.15)
Functional Decline	1.03 (0.91, 1.17)

Table A6. Subgroup analyses of the effect of statin use versus non-use on rehospitalization among frail older adults after myocardial infarction.

Subgroup	HR (95% CI)	*P*-Value for Effect Modification
Functional impairment*		
Independent to mild impairment	1.08 (0.95-1.23)	0.23
Moderate impairment	1.12 (0.98-1.27)	
Severe impairment	0.96 (0.84-1.10)	
Cognitive impairment†		
Intact cognition to mild impairment	1.03 (0.93-1.13)	0.43
Moderate to severe impairment	1.09 (0.97-1.22)	
Age, y		
<85	1.04 (0.95-1.15)	0.77
≥85	1.07 (0.95-1.20)	
Sex		
Male	1.04 (0.91-1.18)	0.73
Female	1.07 (0.97-1.17)	
ICU/CCU stay		
None	1.10 (0.97-1.24)	0.48
≥1 d	1.04 (0.90-1.21)	
Polypharmacy		
<11 medications	1.10 (0.98-1.24)	0.28
≥11 medications	1.01 (0.92-1.12)	

*Measured using the Minimum Data Set 28-point Activities of Daily Living (ADL) Scale; Independent to mild impairment is represented by an ADL score of 0 to 14 (independent to limited assistance required with ADLs), moderate impairment is represented by an ADL score of 15 to 19 (extensive assistance required with ADLs), and severe impairment is represented by an ADL score of ≥20 (extensive dependency in ADLs).
†Measured using the Minimum Data Set Cognitive Performance Score (CPS); Intact to Mild Impairment is represented by a CPS score of 0 to 2, and Moderate to Severe Impairment is a score of ≥3.

References for Online Appendices

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