

## SUPPLEMENTAL MATERIAL

### Code lists

‘codelists.xlsx’

### Supplemental table 1

Cohort characteristics at the first time period of cohort entry for each individual. N = 6,483 individuals were eligible for mineralocorticoid receptor antagonist prescription. BMI: body mass index, BP: blood pressure, GFR: glomerular filtration rate, LV: left ventricle. Median (IQR); n (%).

Variable	MRA not prescribed	MRA prescribed	Total
<b>n</b>	3,384	3,099	6,483
Age (years)	76 (68, 83)	70 (61, 78)	73 (64, 81)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Alcohol consumption (units per week)	7 (2, 14)	8 (2, 14)	7 (2, 14)
Missing (n)	2,771 (81.9%)	2,560 (82.6%)	5,331 (82.2%)
BMI (kg/m <sup>2</sup> )	29 (25, 33)	29 (26, 34)	29 (25, 33)
Missing (n)	1,277 (37.7%)	1,155 (37.3%)	2,432 (37.5%)
BP: diastolic (mmHg)	73 (67, 79)	71 (65, 77)	72 (66, 78)
Missing (n)	311 (9.2%)	309 (10%)	620 (9.6%)
BP: systolic (mmHg)	129 (119, 139)	121 (111, 131)	125 (115, 136)
Missing (n)	311 (9.2%)	309 (10%)	620 (9.6%)
Country			
England	1,565 (46%)	1,368 (44%)	2,933 (45%)
Northern Ireland	142 (4.2%)	165 (5.3%)	307 (4.7%)
Scotland	1,084 (32%)	792 (26%)	1,876 (29%)
Wales	593 (18%)	774 (25%)	1,367 (21%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Diabetes	911 (27%)	822 (27%)	1,733 (27%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Dilated cardiomyopathy	145 (4.3%)	288 (9.3%)	433 (6.7%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Ethnicity			
White	1,403 (97%)	1,168 (94%)	2,571 (95%)
South Asian	20 (1.4%)	42 (3.4%)	62 (2.3%)
Black	16 (1.1%)	22 (1.8%)	38 (1.4%)
Other	9 (0.6%)	9 (0.7%)	18 (0.7%)
Mixed	1 (<0.1%)	6 (0.5%)	7 (0.3%)
Missing (n)	1,935 (57.2%)	1,852 (59.8%)	3,787 (58.4%)
Gender			
Male	2,206 (65%)	2,283 (74%)	4,489 (69%)
Female	1,178 (35%)	816 (26%)	1,994 (31%)

Missing (n)	0 (0%)	0 (0%)	0 (0%)
GFR (mL/min/1.73m <sup>2</sup> )	62 (49, 76)	64 (51, 77)	63 (50, 76)
Missing (n)	436 (12.9%)	334 (10.8%)	770 (11.9%)
GFR group (mL/min/1.73m <sup>2</sup> )			
G1 (>90)	277 (9.4%)	283 (10%)	560 (9.8%)
G2 (60-90)	1,306 (44%)	1,270 (46%)	2,576 (45%)
G3 (30-60)	1,365 (46%)	1,212 (44%)	2,577 (45%)
Missing (n)	436 (12.9%)	334 (10.8%)	770 (11.9%)
Hypertension	2,003 (59%)	1,490 (48%)	3,493 (54%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Ischaemic heart disease	1,595 (47%)	1,397 (45%)	2,992 (46%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
LV impairment	3,326 (98%)	2,988 (96%)	6,314 (97%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Myocardial infarction	1,179 (35%)	1,119 (36%)	2,298 (35%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Potassium max (mmol/L)	4.60 (4.30, 4.90)	4.80 (4.50, 5.10)	4.70 (4.40, 5.00)
Missing (n)	532 (15.7%)	409 (13.2%)	941 (14.5%)
Potassium mean (mmol/L)	4.42 (4.20, 4.70)	4.57 (4.30, 4.80)	4.50 (4.23, 4.75)
Missing (n)	532 (15.7%)	409 (13.2%)	941 (14.5%)
Prescription: antihypertensives	802 (24%)	356 (11%)	1,158 (18%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Prescription: sacubitril/valsartan	19 (0.6%)	174 (5.6%)	193 (3.0%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Prescription: SGLT2 inhibitor	34 (1.0%)	43 (1.4%)	77 (1.2%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)
Smoking status			
Never	574 (26%)	461 (24%)	1,035 (25%)
Past	1,289 (58%)	1,153 (59%)	2,442 (58%)
Current	373 (17%)	325 (17%)	698 (17%)
Missing (n)	1,148 (33.9%)	1,160 (37.4%)	2,308 (35.6%)
Sodium (mmol/L)	140.00 (138.25, 142.00)	139.00 (137.50, 141.00)	140.00 (138.00, 141.33)
Missing (n)	513 (15.2%)	405 (13.1%)	918 (14.2%)
Time period			
2014	1,288 (38%)	903 (29%)	2,191 (34%)
2015	511 (15%)	429 (14%)	940 (14%)
2016	500 (15%)	515 (17%)	1,015 (16%)
2017	414 (12%)	435 (14%)	849 (13%)
2018	393 (12%)	467 (15%)	860 (13%)
2019	278 (8.2%)	350 (11%)	628 (9.7%)
Missing (n)	0 (0%)	0 (0%)	0 (0%)

### *Supplemental table 2*

Variable selection procedure. The outcome was mineralocorticoid receptor antagonist (MRA) prescription. The count of LASSO models (n=10) selecting each variable and the LASSO coefficient at penalty 'lambda-1SE' are presented. DCM: dilated cardiomyopathy, GFR: glomerular filtration rate group (units: mL/min/1.73m<sup>2</sup>), IHD: ischaemic heart disease.

Variable	Coefficient	Count
Prescription: sacubitril/valsartan	1.52	10
Prescription: antihypertensives	-0.72	10
DCM	0.25	10
Age	-0.37	10
Female	-0.13	10
Time period (continuous)	0.11	10
(Intercept)	0.07	10
GFR (30-60)	0.03	6
Hypertension	NA	2
Male	0.00	10
GFR (continuous)	-0.05	9

### *Supplemental table 3*

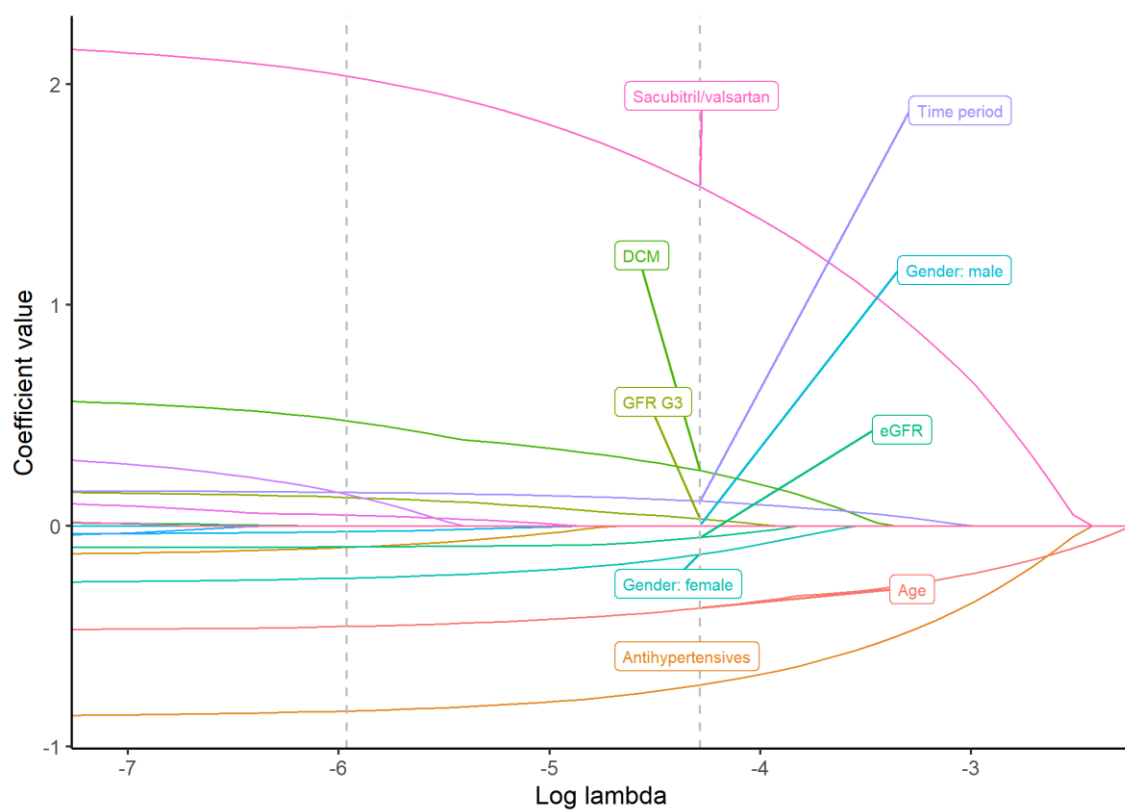
Variance Inflation Factor (VIF) analysis of the multivariable mixed logistic regression model. VIF value demonstrated no issue with multicollinearity. DCM: dilated cardiomyopathy, GFR: glomerular filtration rate group (G1 >90, G2 60-90, G3 30-60 mL/min/1.73m<sup>2</sup>), IHD: ischaemic heart disease.

Term	VIF	VIF CI low	VIF CI high
Age	1.5	1.46	1.54
Prescription of anti-hypertensives	1.09	1.07	1.12
GFR group	2.32	2.25	2.39
DCM	1.03	1.01	1.06
GFR (continuous)	2.56	2.48	2.64

Gender	1.06	1.05	1.09
Hypertension	1.06	1.04	1.09
Time period	1.16	1.14	1.19
Prescription of sacubitril/valsartan	1.06	1.05	1.09

### Supplemental figure 1

Variable selection a multivariable LASSO logistic regression model. The outcome was mineralocorticoid receptor antagonist prescription. 17 variables entered the model and the path of each variable coefficient is plotted across lambda penalty values. Penalty values associated with the best fit (lambda-minimum; left) and within one standard error binomial deviance of the best fit (lambda-1SE; right) are marked with dashed lines. The set of variables selected at the lambda-1SE penalty are labelled. DCM: dilated cardiomyopathy, GFR: glomerular filtration rate group (G1 >90, G2 60-90, G3 30-60 mL/min/1.73m<sup>2</sup>).



### Supplemental figure 2

The proportion of people with heart failure with reduced ejection fraction (HFrEF) meeting the eligibility criteria for potassium binder treatment by calendar year starting 2014 to 2019. Eligibility criteria were serum potassium greater than 6.0 mmol/L in the prior 12 months in those who otherwise were eligible for MRA therapy. Error bars show the 95% confidence interval.

