Personalised dynamic super learning: an application in predicting hemodiafiltration's convection volumes: supplemental document

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Fig. S1. Calibration-in-the-small (or moderate calibration) of the POSLs and their candidate learners. Flexible curves were obtained through generalised additive models with integrated smoothness estimation. The dashed line represents an ideal calibration. Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; MARS, multivariate adaptive regression splines; POSL, Personalised Online Super Learner; RF, random forest screening before training; and XGBoost, extreme gradient boosting tree.



Fig. S2. Discrimination, through the area under the receiver operating curve, of the POSLs and their candidate learners. Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; MARS, multivariate adaptive regression splines; POSL, Personalised Online Super Learner; RF, random forest screening before training; and XGBoost, extreme gradient boosting tree.



Fig. S3. Net benefit of monitoring more closely the patients according to their predicted convection volume using POSLs, an individual linear model, or a historical XGBoost.

Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; and XGBoost, extreme gradient boosting tree.



Fig. S4. Candidate learner distributions in the convex eSL and the dSL for the sensitivity analysis. (A) Percentage non-null weights in the eSL, (B) Sum of weights across time and individuals, (C) Percentage selection by dSL, (D) Number of learners composing the convex eSL over time, and (E) Sum of weights over time averaged between individuals. The X-axis of panels D and E is bound to 500 due to an insufficient number of observations after, and time 1 corresponds to the first predicted session. Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; MARS, multivariate adaptive splines regression; RF, random forest screening before training; ROCV, rolling-origin cross-validation; RWCV, rolling-window cross-validation; and XGBoost, extreme gradient boosting tree.



Fig. S5. Time-pooled performance measures of the different POSL implementations and their candidate learners for the sensitivity analysis. (A) Accuracy assessed by the MdAE, (B) Accuracy assessed by the MSE, (C) Calibration-in-the-large (or mean calibration) assessed by the calibration intercept, and (D) Weak calibration assessed by the calibration slope. The dashed line represents the median of the best-performing POSL for accuracy measures or the ideal value for calibration measures. Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; MARS, multivariate adaptive regression splines; MdAE,

median absolute error; MSE, mean square error; POSL, Personalised Online Super Learner; RF, random forest screening before training; and XGBoost, extreme gradient boosting tree.



Fig. S6. Calibration-in-the-small (or moderate calibration) of the POSLs and their candidate learners for the sensitivity analysis. Flexible curves were obtained through generalised additive models with integrated smoothness estimation. The dashed line represents an ideal calibration.

Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; MARS, multivariate adaptive regression splines; POSL, Personalised Online Super Learner; RF, random forest screening before training; and XGBoost, extreme gradient boosting tree.



Fig. S7. Discrimination, through the area under the receiver operating curve, of the POSLs and their candidate learners for the sensitivity analysis.

Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; MARS, multivariate adaptive regression splines; POSL, Personalised Online Super Learner; RF, random forest screening before training; and XGBoost, extreme gradient boosting tree.



Fig. S8. Decision curve analysis for the sensitivity analysis. Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; and XGBoost, extreme gradient boosting tree.

variables.	
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Table	

Variable description	Variable type	Measurement frequency	Recording	Measurement error / misclassification ^{\ddagger}
Outcome of HDF session				
Convection volume, L† Predictors – Between dialvsis s	Continuous	Each dialysis	Automatic	Dialiser's inadequate monitoring: Very low risk
Time hetween HDF sessions days	Continuous	Hach dialweis	Automatic	Very low risk
Hemoglobin, g/L	Continuous	Monthly or more frequent	Automatic	Interpolation of values: Low to moderate risk
Albumin, g/L^{\dagger}	Continuous	Monthly or more frequent	Automatic	Interpolation of values: Low to moderate risk
CVC change	Dichotomous	Each new catheter installed	Automatic	Low risk
Predictors – At start of dialysi	is session			
Excess weight, kg [†]	Continuous	Each dialysis	Manual	Human: Low risk
Dalteparin dose, IU†	Discrete	Each dialysis	Manual	Human: Low risk
Access by CVC	Dichotomous	Each dialysis	Manual	Human: Low risk
Intercurrent hospitalisation	Dichotomous	Each hospitalisation	Automatic	Very low risk
Predictors – During dialysis (fi	or history)			
Inversion of dialysis lines	Dichotomous	Each dialysis	Manual	Human: Low risk
Alteplase doses	Discrete	Each dose given	Manual	Human: Low risk
Predictors - Demographics and	d comorbidities			
Age at baseline	Continuous	Cohort start	Manual	Human: Very low risk
Male sex	Dichotomous	Cohort start	Manual	Human: Very low risk
Hypertension	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Diabetes	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Peripheral vascular disease	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Congestive heart failure	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Cardiac arrhythmia	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Acute myocardial infarction	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Chronic pulmonary disease	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Liver disease	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Valvular disease	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Cancer	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Metastatic solid tumour	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Cerebrovascular disease	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Dementia	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Peptic ulcer disease	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Hemi- or paraplegia	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Rheumatic disease	Dichotomous	Onset carried forward	Manual	Human: Moderate risk
Missingness reason: (a) Convection	on volume: Sessic	in by hemodialysis, session inc	omplete or car	ncelled, or outlier (>80L); (b) Albumin: Not

measured; (c) Excess weight: Session by hemodialysis, session incomplete or cancelled, or outlier (>6L); and (d) Dalteparin dose: Outlier set

Table S2. Replication requirements.

Purpose	R Package	Version	Authors	Learner [†]	Hyperparameters [†]	Reference
Candidate learners	glmnet	4.1-6	J. Friedman, T. Hastie, R. Tibshirani	lasso	$\lambda = 0.004$ $\alpha = 1^{\ddagger}$	(1)
				ridge	$\lambda = 0.285$ $\alpha = 0^{\ddagger}$	
	earth	5.3.2	S. Milborrow	MARS	$egin{array}{c} { m nprune}{=}6 \ { m degree}{=}1 \end{array}$	(2)
Screening	xgboost	0.14.1	Chen <i>et al.</i> [†] M.N. Wright	XGBoost	nrounds=150 maxdepth=3 $\eta = 0.4$ $\gamma = 0$ colsample_bytree=0.8 min_child_weigth=1 subsample=1 mtry=30	(3)
bereening	Taliger	0.14.1	MIN. WIIGHU	101	splitrule="extratrees" min.node.size=5	(1)
Hyperparameters tuning	caret	6.0 - 93	M. Kuhn	-	-	-
Meta-learner	nnls	1.4	K.M. Mullen, I.H.M. van Stokkum	-	-	-
SL utilities	sl3	1.4.4	Coyle <i>et al.</i> [§]	-	-	-
$_{\rm CV}$	origami	1.0.7	Coyle <i>et al.</i> [§]	-	-	-
AUROC	pROC	1.18.0	Robin <i>et al.</i> [§]	-	-	(5)
Flexible curve	mgcv	1.8-41	S. Wood	-	-	(6)
Figures	ggpubr	0.6.0	A. Kassambara	-	-	-

R version: 4.2.2 (Windows 10 x64)

Only for candidates learners

User-fixed hyperparameter

T. Chen, T. He, M. Benesty, V. Khotilovich, Y. Tang, H. Cho, K. Chen, R. Mitchell, I. Cano, T. Zhou, M. Li, J. Xie, M. Lin, Y. Geng, Y. Li, and J. Yuan; J. Coyle, N. Hejazi, I. Malenica, R. Phillips, and O. Sofrygin; J. Coyle, N. Hejazi, I. Malenica, and R. Phillips; X. Robin, N. Turck, A. Hainard, N. Tiberti, F. Lisacek, J.-C. Sanchez, and M. Müller.

Friedman J, Hastie T, Tibshirani R (2010). Regularization paths for generalized linear models via coordinate descent. J. Stat. Softw., 33(1), 1.

Friedman J (1991). Multivariate Adaptive Regression Splines (with discussion) Annals of Statistics 19(1), 1–141

Chen T, Guestrin C (2016). XGBoost: A scalable tree boosting system. In: Proceedings of the 22nd ACM SIGKDD international conference on knowledge discovery and data mining, 785–794.

Wright MN, Ziegler A (2017). ranger: A fast implementation of random forests for high dimensional data in C++ and R. J. Stat. Softw. 77:1-17.

Robin X, Turck N, Hainard A, *et al.* (2011) pROC: an open-source package for R and S+ to analyze and compare ROC curves. BMC Bioinformatics 7, 77

Wood SN (2004). Stable and efficient multiple smoothing parameter estimation for generalized additive models. J. Amer. Statist. Ass. 99:673-686.

Abbreviations: AUROC, area under the receiver operating curve; CV, cross-validation; MARS, multivariate adaptive regression splines; RF, random forest; SL, super learning; XGBoost, extreme gradient boosting trees.

Table S3.	Description	of the	included	and	excluded	sessions.

	Overall n=170.761	Included n=149.160	Excluded n=21.601	SMD
Time between UDD acceione days (mean (SD))	2 56 (6 06)	2 45 (5 20)	2.96 (12.40)	0.070
Time in the graft weiting list days (mean (SD))	2.30(0.90)	2.40 (0.09)	5.20(15.49)	0.079
Here a show a strain (SD)	107.05(402.30)	109.01 (199.20)	106.00(14.01)	0.134
Albumin π/L (mean (SD))	107.93 (13.49) 27.10 (2.00)	106.21 (15.55) 27.20 (2.86)	100.20 (14.23)	0.140
Deltonerin doce III (mean (SD))	37.10 (3.90) 4002 40 (2560 22)	57.20(3.00) 5067.45(2484.22)	30.44 (4.10)	0.191
Are at baseline, years (mean (SD))	4993.40(2009.00) 67.02(14.01)	5007.45(2404.22) 67.17(12.02)	4402.04 (3043.03) 67.62 (14.58)	0.211 0.021
Freese weight kg (mean (SD))	1.23(14.01) 1.74(1.20)	1.17 (13.92)	1.02(14.36) 1.71(1.34)	0.031
Convection volume history [±] I (mean (SD))	1.74(1.30) 27.30(2.05)	1.74(1.29) 27.36(2.01)	1.71(1.04) 26.88(2.14)	0.023 0.150
Inversion of HDE lines historyt(mean (SD))	27.30(2.93)	27.30(2.91) 0.02(0.00)	20.00(3.14) 0.03(0.11)	0.159
Alterlage deces history (mean (SD))	0.02 (0.09)	0.02 (0.09) 0.05 (0.26)	0.03(0.11)	0.003
Antephase doses $\operatorname{Instory}(\operatorname{Inean}(SD))$	0.05(0.20)	0.05(0.20)	0.00(0.28)	0.050
2017	28250 (16 6)	25827(17.3)	2522(11.7)	0.200
2017	23550(10.0) 44081(26.3)	20021 (11.3) 30870 (26.7)	5111(23.7)	
2010	44901 (20.3) 47182 (27.6)	39810(20.1) 41507(27.0)	5111(25.7) 5585(25.0)	
2019	47102(27.0) 43745(25.6)	41097(21.9) 36106(24.3)	7540(24.9)	
2020	43743(23.0) 6503(3.8)	5670(24.3)	822(30)	
CVC change since last session (N (%))	532(0.3)	388(0.3)	144 (0.7)	0.060
Hospitalisation $(N, (\%))$	10311(6.0)	300(0.3) 8013(5.4)	144(0.7) 2208(10.6)	0.000
Access by CVC (N $(\%)$)	82340(48.2)	70851 (47.5)	11408(53.2)	0.135
$M_{2} = (N_{1} (\%))$	107646 (63.0)	$0.0001 (41.0) \\ 0.0001 (63.5)$	11490(50.2) 12023(50.8)	0.115
Hypertension $(N_{(\%)})$	107040(03.0) 105715(61.0)	99125(00.0) 90435(60.6)	12323(03.0) 15280(70.7)	0.010
Diabetes $(N, (\%))$	70156(41.1)	50296(30.8)	10200(10.1) 10860(50.3)	0.214 0.213
Peripheral vascular disease $(N_{c}(\%))$	30222 (23.0)	32449 (21.8)	6773(314)	0.210
Congestive heart failure $(N, (\%))$	33758(19.8)	28583(19.2)	5175(24.0)	0.210 0.117
Cardiac arrhythmia $(N, (\%))$	34760(20.4)	28962 (19.2)	5798(26.8)	0.117 0.177
Acute myocardial infarction $(N_{-}(\%))$	26273(15.4)	20502 (15.4) 22214 (14.9)	4059(18.8)	0.117
Chronic pulmonary disease $(N, (\%))$	250275(10.4) 25028(14.7)	20563(13.8)	4000(10.0) 4465(20.7)	0.104 0.183
Liver disease $(N, (\%))$	20523(14.1) 20527(12.0)	17501 (11.7)	3026(14.0)	0.105
Valvular disease $(N, (\%))$	17777 (10.4)	15130(10.1)	2647 (12.3)	0.000 0.067
Cancer (N $(\%)$)	14873(87)	12369(83)	2504(11.6)	0.001
Metastatic solid tumour $(N_{(\%)})$	2243(13)	12003 (0.0) 1943 (13)	300(11.0)	0.007
Cerebrovascular disease $(N, (\%))$	15257(8.9)	11904(8.0)	3353(15.5)	0.001
Dementia $(N_{(\%)})$	6579(3.9)	4931 (33)	1648(76)	0.191
Peptic ulcer disease $(N, (\%))$	5373(3.1)	4383(2.9)	990(4.6)	0.087
Hemi- or paraplegia $(N, (\%))$	5723(3.4)	4470(3.0)	1253(5.8)	0.137
Bheumatic disease $(N, (\%))$	3563(21)	3268(22)	295(14)	0.062
Week-end HDF session $(N, (\%))$	28384(16.6)	24959(16.7)	3425(15.9)	0.024
Season $(N, (\%))$	20001 (1000)	1 000 (1011)	0120 (1010)	0.151
fall	42766(25.0)	37047(24.8)	5719(26.5)	0.101
spring	42598(24.9)	38388(25.7)	4210(19.5)	
summer	42446 (24.9)	36513(24.5)	5933(27.5)	
winter	42951 (25.2)	37212 (24.9)	5739 (26.6)	

Averaged over three months (convection volume) or one week (inversion lines or alteplase) Abbreviations: CVC, Central venous catheter; HDF, Hemodiafiltration; IU, International unit; SMD, Standardised mean difference.

Condidate learner			MdAE					MSE		
Candidate learner	Med	Mean	Var	Min	Max	Med	Mean	Var	Min	Max
non-convex eSL	1.50	1.74	0.66	0.63	5.36	9.79	14.97	245.68	1.32	137.19
convex eSL	1.59	1.91	0.89	0.65	6.40	9.87	14.58	226.25	1.32	139.28
dSL	1.60	1.88	0.91	0.59	6.58	10.02	14.49	167.65	1.60	108.76
Individual ridge	1.63	1.97	1.15	0.65	8.00	9.70	16.46	331.36	1.39	150.61
Historical ridge	1.67	2.01	1.11	0.72	6.71	8.84	12.60	109.32	1.52	70.14
Historical XGBoost	1.67	2.02	1.18	0.68	6.79	8.97	12.87	117.96	1.56	76.21
Individual $RF + ridge$	1.67	1.95	0.95	0.66	6.30	9.49	15.28	257.75	1.50	139.53
Historical lasso	1.69	1.97	1.06	0.53	6.53	8.77	12.56	109.39	1.52	70.00
Individual XGBoost	1.69	1.85	0.52	0.73	5.10	12.05	17.64	232.81	1.67	87.96
Historical $RF + lasso$	1.69	1.98	1.06	0.70	6.51	8.86	12.59	109.05	1.54	70.28
Individual $RF + lasso$	1.69	2.01	1.05	0.68	8.00	10.11	16.69	305.01	1.61	141.63
Historical linear model	1.70	1.97	1.06	0.53	6.54	8.76	12.56	109.51	1.53	70.03
Historical MARS	1.70	1.98	1.06	0.47	6.53	8.83	12.62	109.85	1.47	71.70
Historical $RF + linear model$	1.70	1.98	1.06	0.70	6.50	8.84	12.59	109.04	1.54	70.16
Individual $RF + linear model$	1.70	2.02	1.05	0.69	8.00	10.44	16.95	311.28	1.63	141.86
Historical $RF + ridge$	1.70	2.01	1.10	0.70	6.65	8.91	12.63	109.13	1.53	70.95
Historical $RF + XGBoost$	1.71	2.01	1.09	0.63	6.65	9.06	12.76	109.71	1.53	70.79
Historical $RF + MARS$	1.72	1.99	1.05	0.62	6.58	8.93	12.61	109.25	1.50	72.17
Individual lasso	1.75	2.14	1.54	0.68	8.67	11.95	22.14	799.49	1.53	202.59
Individual $RF + MARS$	1.76	2.01	0.82	0.76	6.66	14.82	20.13	236.10	2.20	109.70
Individual linear model	1.77	2.19	1.67	0.69	8.63	12.53	24.38	1122.40	1.56	235.55
Individual $RF + XGBoost$	1.78	1.86	0.54	0.82	5.72	12.10	18.10	236.95	1.71	85.18
Individual MARS	1.82	2.06	0.83	0.52	6.37	19.09	23.82	299.99	2.25	131.65
		Mean	calibra	ation			We	ak calibrat	tion	
Candidate learner	Med	Mean Mean	calibra Var	ation Min	Max	Med	We Mean	ak calibrat Var	tion Min	Max
Candidate learner non-convex eSL	Med 0.00	Mean Mean -0.00	calibra Var 0.23	Min -4.80	Max 3.88	Med 0.58	We Mean 0.54	ak calibrat Var 0.05	tion Min -0.31	Max 0.93
Candidate learner non-convex eSL convex eSL	Med 0.00 0.04	Mean Mean -0.00 0.03	Calibra Var 0.23 0.49	ation Min -4.80 -5.08	Max 3.88 3.97	Med 0.58 0.64	We Mean 0.54 0.61	ak calibrat Var 0.05 0.07	tion Min -0.31 -1.15	Max 0.93 1.05
Candidate learner non-convex eSL convex eSL dSL	Med 0.00 0.04 0.05	Mean Mean -0.00 0.03 0.07	0.23 0.49 0.15	Ation Min -4.80 -5.08 -1.78	Max 3.88 3.97 2.45	Med 0.58 0.64 0.55	We Mean 0.54 0.61 0.51	ak calibrat Var 0.05 0.07 0.05	tion Min -0.31 -1.15 -0.62	Max 0.93 1.05 1.04
Candidate learner non-convex eSL convex eSL dSL Individual ridge	Med 0.00 0.04 0.05 0.01	Mean Mean -0.00 0.03 0.07 0.00	Calibra Var 0.23 0.49 0.15 0.27	Ation Min -4.80 -5.08 -1.78 -5.21	Max 3.88 3.97 2.45 2.51	Med 0.58 0.64 0.55 0.54	We Mean 0.54 0.61 0.51 0.52	ak calibrat Var 0.05 0.07 0.05 0.05	Min -0.31 -1.15 -0.62 -0.28	Max 0.93 1.05 1.04 0.93
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge	Med 0.00 0.04 0.05 0.01 -0.04	Mean Mean -0.00 0.03 0.07 0.00 -0.07	0.23 0.49 0.15 0.27 0.40	Ation Min -4.80 -5.08 -1.78 -5.21 -4.33	Max 3.88 3.97 2.45 2.51 2.18	Med 0.58 0.64 0.55 0.54 0.97	We Mean 0.54 0.61 0.51 0.52 1.08	$\begin{array}{c} \text{ak calibrat} \\ \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51	Max 0.93 1.05 1.04 0.93 10.86
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost	Med 0.00 0.04 0.05 0.01 -0.04 -0.02	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04	Calibra Var 0.23 0.49 0.15 0.27 0.40 0.58	Ation Min -4.80 -5.08 -1.78 -5.21 -4.33 -5.07	Max 3.88 3.97 2.45 2.51 2.18 3.45	Med 0.58 0.64 0.55 0.54 0.97 0.87	We Mean 0.54 0.61 0.51 0.52 1.08 0.88	ak calibrat Var 0.05 0.07 0.05 0.05 0.72 0.23	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46	Max 0.93 1.05 1.04 0.93 10.86 6.59
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge	Med 0.00 0.04 0.05 0.01 -0.04 -0.02 0.01	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01	Calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30	Min -4.80 -5.08 -1.78 -5.21 -4.33 -5.07 -5.29	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45	Med 0.58 0.64 0.55 0.54 0.97 0.87 0.58	We Mean 0.54 0.61 0.51 0.52 1.08 0.88 0.55	ak calibrat Var 0.05 0.07 0.05 0.05 0.72 0.23 0.06	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51	Max 0.93 1.05 1.04 0.93 10.86 6.59 1.04
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso	Med 0.00 0.04 0.05 0.01 -0.04 -0.02 0.01 -0.02	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06	Calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33	Min -4.80 -5.08 -1.78 -5.21 -4.33 -5.07 -5.29 -4.35	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20	Med 0.58 0.64 0.55 0.54 0.97 0.87 0.58 0.91	Wean 0.54 0.61 0.52 1.08 0.88 0.55 1.02	ak calibrat Var 0.05 0.07 0.05 0.05 0.72 0.23 0.06 0.69	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.47	Max 0.93 1.05 1.04 0.93 10.86 6.59 1.04 10.46
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost	Med 0.00 0.04 0.05 0.01 -0.04 -0.02 0.01 -0.02 0.24	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07	Ation Min -4.80 -5.08 -1.78 -5.21 -4.33 -5.07 -5.29 -4.35 -0.89	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55	Med 0.58 0.64 0.55 0.54 0.97 0.87 0.58 0.91 0.40	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40	ak calibrat Var 0.05 0.07 0.05 0.72 0.23 0.06 0.69 0.03	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.47	Max 0.93 1.05 1.04 0.93 10.86 6.59 1.04 10.46 0.85
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso	Med 0.00 0.04 0.05 0.01 -0.04 -0.02 0.01 -0.02 0.24 -0.02	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34	Ation Min -4.80 -5.08 -1.78 -5.21 -4.33 -5.07 -5.29 -4.35 -0.89 -4.58	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14	Med 0.58 0.64 0.55 0.54 0.97 0.87 0.58 0.91 0.40 0.91	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.47 -0.15 -0.48	Max 0.93 1.05 1.04 0.93 10.86 6.59 1.04 10.46 0.85 10.40
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso	Med 0.00 0.04 0.05 0.01 -0.04 -0.02 0.01 -0.02 0.24 -0.02 0.03	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46	Min -4.80 -5.08 -1.78 -5.21 -4.33 -5.07 -5.29 -4.35 -0.89 -4.58 -5.47	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14 5.55	$\begin{tabular}{ c c c c c } \hline Med \\ \hline 0.58 \\ 0.64 \\ 0.55 \\ 0.54 \\ 0.97 \\ 0.87 \\ 0.58 \\ 0.91 \\ 0.40 \\ 0.91 \\ 0.52 \end{tabular}$	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49	$\begin{array}{c} \text{ak calibrat}\\ \hline \text{Var}\\ \hline 0.05\\ 0.07\\ 0.05\\ 0.72\\ 0.23\\ 0.06\\ 0.69\\ 0.03\\ 0.71\\ 0.05\\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.47 -0.48	$\begin{array}{r} Max \\ \hline 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical linear model	Med 0.00 0.04 0.05 0.01 -0.04 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33	Min -4.80 -5.08 -1.78 -5.21 -4.33 -5.07 -5.29 -4.35 -0.89 -4.58 -5.47 -4.33	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14 5.55 2.25	$\begin{tabular}{ c c c c c } \hline Med \\ \hline 0.58 \\ 0.64 \\ 0.55 \\ 0.54 \\ 0.97 \\ 0.87 \\ 0.58 \\ 0.91 \\ 0.40 \\ 0.91 \\ 0.52 \\ 0.90 \end{tabular}$	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.47 -0.15 -0.48 -0.48	$\begin{array}{c} \text{Max} \\ \hline 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical linear model Historical MARS	Med 0.00 0.04 0.05 0.01 -0.04 -0.02 0.24 -0.02 0.03 -0.02 -0.03	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35	$\begin{array}{c} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \end{array}$	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14 5.55 2.25 2.19	$\begin{tabular}{ c c c c c } \hline Med \\ \hline 0.58 \\ 0.64 \\ 0.55 \\ 0.54 \\ 0.97 \\ 0.87 \\ 0.58 \\ 0.91 \\ 0.40 \\ 0.91 \\ 0.52 \\ 0.90 \\ 0.90 \\ 0.90 \end{tabular}$	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.69 \\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.47 -0.48 -0.48 -0.48	$\begin{array}{c} \text{Max} \\ \hline 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical linear model Historical MARS Historical RF + linear model	Med 0.00 0.04 0.05 0.01 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02 -0.03 -0.02	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34	$\begin{array}{c} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \end{array}$	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14 5.55 2.25 2.19 2.14	$\begin{array}{c} {\rm Med} \\ 0.58 \\ 0.64 \\ 0.55 \\ 0.54 \\ 0.97 \\ 0.87 \\ 0.58 \\ 0.91 \\ 0.40 \\ 0.91 \\ 0.52 \\ 0.90 \\ 0.90 \\ 0.91 \end{array}$	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00 1.03	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ $	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.47 -0.48 -0.48 -0.48	$\begin{array}{c} \text{Max} \\ \hline 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \\ 10.24 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical linear model Historical MARS Historical RF + linear model Individual RF + linear model	Med 0.00 0.04 0.05 0.01 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02 -0.03 -0.02 0.04	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06 0.03	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34 0.47	$\begin{array}{c} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \\ -5.49 \end{array}$	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14 5.55 2.25 2.19 2.14 5.56	$\begin{tabular}{ c c c c c c } \hline Med \\ \hline 0.58 \\ 0.64 \\ 0.55 \\ 0.54 \\ 0.97 \\ 0.87 \\ 0.58 \\ 0.91 \\ 0.40 \\ 0.91 \\ 0.52 \\ 0.90 \\ 0.90 \\ 0.91 \\ 0.52 \end{tabular}$	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00 1.03 0.48	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.69 \\ 0.69 \\ 0.05 \\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48	$\begin{array}{c} \text{Max} \\ \hline 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \\ 10.24 \\ 0.94 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical linear model Historical MARS Historical RF + linear model Individual RF + linear model Historical RF + linear model Historical RF + ridge	Med 0.00 0.04 0.05 0.01 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02 -0.03 -0.02 0.04 -0.03	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06 0.03 -0.06 0.03 -0.07	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34 0.47 0.40	$\begin{array}{c} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \\ -5.49 \\ -4.65 \end{array}$	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14 5.55 2.25 2.19 2.14 5.56 2.12	$\begin{tabular}{ c c c c c } \hline Med \\ \hline 0.58 \\ 0.64 \\ 0.55 \\ 0.54 \\ 0.97 \\ 0.87 \\ 0.58 \\ 0.91 \\ 0.40 \\ 0.91 \\ 0.52 \\ 0.90 \\ 0.90 \\ 0.91 \\ 0.52 \\ 0.97 \end{tabular}$	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00 1.03 0.48 1.10	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.69 \\ 0.69 \\ 0.69 \\ 0.05 \\ 0.77 \\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.53	$\begin{array}{c} {\rm Max}\\ \hline 0.93\\ 1.05\\ 1.04\\ 0.93\\ 10.86\\ 6.59\\ 1.04\\ 10.46\\ 0.85\\ 10.40\\ 0.94\\ 10.31\\ 12.65\\ 10.24\\ 0.94\\ 10.83\\ \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical linear model Historical MARS Historical RF + linear model Individual RF + linear model Historical RF + linear model Historical RF + ridge Historical RF + ridge	Med 0.00 0.04 0.05 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02 -0.03 -0.02 0.04 -0.03 -0.03 -0.03 -0.03 -0.03	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06 0.03 -0.06 0.03 -0.07 -0.05	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34 0.47 0.40 0.44	$\begin{array}{c} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \\ -5.49 \\ -4.65 \\ -4.47 \end{array}$	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14 5.55 2.25 2.19 2.14 5.56 2.12 2.76	Med 0.58 0.64 0.55 0.54 0.97 0.87 0.58 0.91 0.40 0.91 0.52 0.90 0.90 0.91 0.52 0.97 0.87	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00 1.03 0.48 1.10 0.89	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.69 \\ 0.69 \\ 0.05 \\ 0.77 \\ 0.20 \\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.48 -0.41	$\begin{array}{c} {\rm Max} \\ 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \\ 10.24 \\ 0.94 \\ 10.83 \\ 4.40 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical linear model Historical RF + linear model Historical RF + linear model Individual RF + linear model Historical RF + ridge Historical RF + xGBoost Historical RF + XGBoost Historical RF + MARS	Med 0.00 0.04 0.05 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02 0.04 -0.03 -0.03 -0.03 -0.03 -0.03 -0.02	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06 0.03 -0.06 0.03 -0.07 -0.05 -0.06	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34 0.47 0.40 0.44 0.435	$\begin{array}{c} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \\ -5.49 \\ -4.65 \\ -4.47 \\ -4.72 \end{array}$	$\begin{array}{c} \text{Max} \\ 3.88 \\ 3.97 \\ 2.45 \\ 2.51 \\ 2.18 \\ 3.45 \\ 4.45 \\ 2.20 \\ 1.55 \\ 2.14 \\ 5.55 \\ 2.25 \\ 2.19 \\ 2.14 \\ 5.56 \\ 2.12 \\ 2.76 \\ 2.02 \end{array}$	Med 0.58 0.64 0.55 0.54 0.97 0.87 0.58 0.91 0.40 0.91 0.52 0.90 0.90 0.91 0.52 0.97 0.87 0.87 0.91	We Mean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00 1.03 0.48 1.10 0.89 1.03	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.69 \\ 0.05 \\ 0.77 \\ 0.20 \\ 0.90 \\ \end{array}$	$\begin{array}{c} \mbox{Min} \\ \hline \mbox{Min} \\ \mbox{-}0.31 \\ \mbox{-}1.15 \\ \mbox{-}0.62 \\ \mbox{-}0.28 \\ \mbox{-}0.28 \\ \mbox{-}0.51 \\ \mbox{-}0.46 \\ \mbox{-}0.51 \\ \mbox{-}0.47 \\ \mbox{-}0.48 \\ \mbox{-}0.87 \\ \mbox{-}0.53 \\ \mbox{-}0.42 \\ \mbox{-}0.60 \end{array}$	$\begin{array}{c} {\rm Max} \\ 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \\ 10.24 \\ 0.94 \\ 10.83 \\ 4.40 \\ 12.96 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical Inear model Historical RF + linear model Historical RF + linear model Individual RF + linear model Historical RF + ridge Historical RF + xGBoost Historical RF + MARS Individual lasso	Med 0.00 0.04 0.05 0.01 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02 0.04 -0.03 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.01 -0.02 0.03 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06 0.03 -0.06 0.03 -0.07 -0.05 -0.06 -0.00 -0.00	Calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34 0.47 0.40 0.44 0.35 0.74	$\begin{array}{c} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \\ -5.49 \\ -4.65 \\ -4.47 \\ -4.72 \\ -6.97 \end{array}$	Max 3.88 3.97 2.45 2.51 2.18 3.45 4.45 2.20 1.55 2.14 5.55 2.25 2.19 2.14 5.56 2.12 2.76 2.02 4.04	$\begin{tabular}{ c c c c c } \hline Med \\ \hline 0.58 \\ \hline 0.64 \\ \hline 0.55 \\ \hline 0.54 \\ \hline 0.97 \\ \hline 0.87 \\ \hline 0.87 \\ \hline 0.40 \\ \hline 0.91 \\ \hline 0.52 \\ \hline 0.90 \\ \hline 0.90 \\ \hline 0.91 \\ \hline 0.52 \\ \hline 0.97 \\ \hline 0.87 \\ \hline 0.91 \\ \hline 0.43 \end{tabular}$	Wean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00 1.03 0.48 1.10 0.89 1.03 0.42	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.05 \\ 0.77 \\ 0.20 \\ 0.90 \\ 0.04 \\ \end{array}$	$\begin{array}{c} \mbox{Min} \\ \hline \mbox{Min} \\ \mbox{-}0.31 \\ \mbox{-}1.15 \\ \mbox{-}0.62 \\ \mbox{-}0.28 \\ \mbox{-}0.28 \\ \mbox{-}0.28 \\ \mbox{-}0.51 \\ \mbox{-}0.46 \\ \mbox{-}0.51 \\ \mbox{-}0.47 \\ \mbox{-}0.48 \\ \mbox{-}0.48 \\ \mbox{-}0.48 \\ \mbox{-}0.48 \\ \mbox{-}0.48 \\ \mbox{-}0.61 \\ \mbox{-}0.48 \\ \mbox{-}0.53 \\ \mbox{-}0.42 \\ \mbox{-}0.60 \\ \mbox{-}0.18 \end{array}$	$\begin{array}{c} {\rm Max} \\ \hline 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \\ 10.24 \\ 0.94 \\ 10.83 \\ 4.40 \\ 12.96 \\ 0.90 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical Inear model Historical RF + linear model Historical RF + linear model Individual RF + linear model Historical RF + ridge Historical RF + xGBoost Historical RF + MARS Individual lasso Individual RF + MARS	Med 0.00 0.04 0.05 0.01 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02 0.04 -0.03 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.04 -0.03 -0.03 -0.04 -0.03 -0.05 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06 0.03 -0.06 -0.08 -0.06 0.03 -0.07 -0.05 -0.06 -0.00 0.07	Calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34 0.47 0.40 0.44 0.35 0.74 0.17	$\begin{array}{r} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \\ -5.49 \\ -4.65 \\ -4.47 \\ -4.72 \\ -6.97 \\ -1.61 \end{array}$	$\begin{array}{c} {\rm Max} \\ 3.88 \\ 3.97 \\ 2.45 \\ 2.51 \\ 2.18 \\ 3.45 \\ 4.45 \\ 2.20 \\ 1.55 \\ 2.14 \\ 5.55 \\ 2.25 \\ 2.19 \\ 2.14 \\ 5.56 \\ 2.12 \\ 2.76 \\ 2.02 \\ 4.04 \\ 2.29 \end{array}$	$\begin{tabular}{ c c c c c c } \hline Med \\ \hline 0.58 \\ \hline 0.64 \\ \hline 0.55 \\ \hline 0.54 \\ \hline 0.97 \\ \hline 0.87 \\ \hline 0.87 \\ \hline 0.91 \\ \hline 0.40 \\ \hline 0.91 \\ \hline 0.52 \\ \hline 0.90 \\ \hline 0.90 \\ \hline 0.91 \\ \hline 0.52 \\ \hline 0.97 \\ \hline 0.87 \\ \hline 0.91 \\ \hline 0.43 \\ \hline 0.32 \end{tabular}$	$\begin{array}{r} \text{We}\\ \text{Mean}\\ \hline 0.54\\ 0.61\\ 0.51\\ 0.52\\ 1.08\\ 0.88\\ 0.55\\ 1.02\\ 0.40\\ 1.03\\ 0.49\\ 1.02\\ 1.00\\ 1.03\\ 0.48\\ 1.10\\ 0.89\\ 1.03\\ 0.42\\ 0.31\\ \end{array}$	$\begin{array}{c} \text{ak calibrat} \\ \hline \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.05 \\ 0.77 \\ 0.20 \\ 0.90 \\ 0.04 \\ 0.05 \\ \end{array}$	$\begin{array}{c} {\rm Min} \\ \hline {\rm Min} \\ \hline -0.31 \\ -1.15 \\ -0.62 \\ -0.28 \\ -0.51 \\ -0.46 \\ -0.51 \\ -0.47 \\ -0.15 \\ -0.48 \\ -0.88 \\ -0.48 \\ -0.61 \\ -0.48 \\ -0.61 \\ -0.48 \\ -0.87 \\ -0.53 \\ -0.42 \\ -0.60 \\ -0.18 \\ -2.39 \end{array}$	$\begin{array}{c} {\rm Max} \\ \hline 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \\ 10.24 \\ 0.94 \\ 10.83 \\ 4.40 \\ 12.96 \\ 0.90 \\ 0.81 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical Inear model Historical RF + linear model Individual RF + linear model Historical RF + ridge Historical RF + ridge Historical RF + xGBoost Historical RF + MARS Individual Lasso Individual RF + MARS Individual RF + MARS Individual RF + MARS	Med 0.00 0.04 0.05 0.01 -0.02 0.01 -0.02 0.02 -0.02 0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.02 0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.03 -0.02 0.03 -	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06 0.03 -0.07 -0.05 -0.06 -0.00 0.07 0.01	calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34 0.47 0.40 0.44 0.47 0.40 0.44 0.35 0.74 0.17 0.90	$\begin{array}{r} \text{Min} \\ \hline \\ \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \\ -5.49 \\ -4.65 \\ -4.47 \\ -4.72 \\ -6.97 \\ -1.61 \\ -7.60 \end{array}$	$\begin{array}{c} {\rm Max} \\ 3.88 \\ 3.97 \\ 2.45 \\ 2.51 \\ 2.18 \\ 3.45 \\ 4.45 \\ 2.20 \\ 1.55 \\ 2.14 \\ 5.55 \\ 2.25 \\ 2.19 \\ 2.14 \\ 5.56 \\ 2.12 \\ 2.76 \\ 2.02 \\ 4.04 \\ 2.29 \\ 4.08 \end{array}$	$\begin{tabular}{ c c c c c } \hline Med \\ \hline 0.58 \\ \hline 0.64 \\ \hline 0.55 \\ \hline 0.54 \\ \hline 0.97 \\ \hline 0.87 \\ \hline 0.87 \\ \hline 0.91 \\ \hline 0.40 \\ \hline 0.91 \\ \hline 0.52 \\ \hline 0.90 \\ \hline 0.90 \\ \hline 0.91 \\ \hline 0.52 \\ \hline 0.97 \\ \hline 0.87 \\ \hline 0.91 \\ \hline 0.43 \\ \hline 0.32 \\ \hline 0.41 \end{tabular}$	Wean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00 1.03 0.48 1.10 0.89 1.03 0.42 0.31 0.40	$\begin{array}{c} \text{ak calibrat} \\ & \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.05 \\ 0.77 \\ 0.20 \\ 0.90 \\ 0.04 \\ 0.05 \\ 0.04 \\ 0.05 \\ 0.04 \\ \end{array}$	Min -0.31 -1.15 -0.62 -0.28 -0.51 -0.46 -0.51 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.48 -0.41 -0.42 -0.60 -0.18 -2.39 -0.18	$\begin{array}{c} {\rm Max} \\ 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \\ 10.24 \\ 0.94 \\ 10.83 \\ 4.40 \\ 12.96 \\ 0.90 \\ 0.81 \\ 0.90 \end{array}$
Candidate learner non-convex eSL convex eSL dSL Individual ridge Historical ridge Historical XGBoost Individual RF + ridge Historical lasso Individual XGBoost Historical RF + lasso Individual RF + lasso Historical Inear model Historical RF + linear model Individual RF + linear model Historical RF + ridge Historical RF + ridge Historical RF + XGBoost Historical RF + MARS Individual lasso Individual RF + MARS Individual RF + MARS Individual RF + MARS	Med 0.00 0.04 0.05 0.01 -0.04 -0.02 0.01 -0.02 0.24 -0.02 0.03 -0.02 -0.03 -0.02 0.04 -0.03 -0.02 0.04 -0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.02 0.03 -0.03 -0.02 0.03 -0.03 -0.03 -0.03 -0.02 0.03 -0.13 -0.14 -0.14	Mean Mean -0.00 0.03 0.07 0.00 -0.07 -0.04 0.01 -0.06 0.29 -0.06 0.03 -0.06 -0.08 -0.06 -0.08 -0.07 -0.05 -0.06 -0.00 0.07 0.01 0.15	Calibra Var 0.23 0.49 0.15 0.27 0.40 0.58 0.30 0.33 0.07 0.34 0.46 0.33 0.35 0.34 0.47 0.40 0.44 0.35 0.74 0.74 0.17 0.90 0.10	$\begin{array}{r} \text{Min} \\ \hline \\ -4.80 \\ -5.08 \\ -1.78 \\ -5.21 \\ -4.33 \\ -5.07 \\ -5.29 \\ -4.35 \\ -0.89 \\ -4.58 \\ -5.47 \\ -4.33 \\ -4.62 \\ -4.56 \\ -5.49 \\ -4.65 \\ -4.47 \\ -4.72 \\ -6.97 \\ -1.61 \\ -7.60 \\ -1.81 \end{array}$	$\begin{array}{c} {\rm Max} \\ 3.88 \\ 3.97 \\ 2.45 \\ 2.51 \\ 2.18 \\ 3.45 \\ 4.45 \\ 2.20 \\ 1.55 \\ 2.14 \\ 5.55 \\ 2.25 \\ 2.19 \\ 2.14 \\ 5.56 \\ 2.12 \\ 2.76 \\ 2.02 \\ 4.04 \\ 2.29 \\ 4.08 \\ 2.21 \end{array}$	$\begin{tabular}{ c c c c c c } \hline Med \\ \hline 0.58 \\ \hline 0.64 \\ \hline 0.55 \\ \hline 0.54 \\ \hline 0.97 \\ \hline 0.87 \\ \hline 0.87 \\ \hline 0.91 \\ \hline 0.40 \\ \hline 0.91 \\ \hline 0.52 \\ \hline 0.90 \\ \hline 0.90 \\ \hline 0.91 \\ \hline 0.52 \\ \hline 0.97 \\ \hline 0.87 \\ \hline 0.91 \\ \hline 0.43 \\ \hline 0.32 \\ \hline 0.41 \\ \hline 0.38 \end{tabular}$	Wean 0.54 0.61 0.52 1.08 0.88 0.55 1.02 0.40 1.03 0.49 1.02 1.00 1.03 0.48 1.10 0.89 1.03 0.42 0.31 0.40 0.38	$\begin{array}{c} \text{ak calibrat} \\ & \text{Var} \\ \hline 0.05 \\ 0.07 \\ 0.05 \\ 0.05 \\ 0.72 \\ 0.23 \\ 0.06 \\ 0.69 \\ 0.03 \\ 0.71 \\ 0.05 \\ 0.66 \\ 0.69 \\ 0.05 \\ 0.77 \\ 0.20 \\ 0.90 \\ 0.04 \\ 0.05 \\ 0.04 \\ 0.03 \\ \end{array}$	$\begin{tabular}{ c c c c } \hline Min & Min \\ \hline -0.31 & -1.15 & -0.62 & -0.28 & -0.51 & -0.46 & -0.51 & -0.46 & -0.51 & -0.47 & -0.15 & -0.48 & -0.48 & -0.48 & -0.48 & -0.48 & -0.48 & -0.48 & -0.48 & -0.48 & -0.48 & -0.42 & -0.60 & -0.18 & -2.39 & -0.18 & -0.22 & -0.18 & -0.28 & -$	$\begin{array}{c} Max \\ 0.93 \\ 1.05 \\ 1.04 \\ 0.93 \\ 10.86 \\ 6.59 \\ 1.04 \\ 10.46 \\ 0.85 \\ 10.40 \\ 0.94 \\ 10.31 \\ 12.65 \\ 10.24 \\ 0.94 \\ 10.83 \\ 4.40 \\ 12.96 \\ 0.90 \\ 0.81 \\ 0.90 \\ 0.81 \\ 0.90 \\ 0.81 \end{array}$

 Table S4.
 Summary of the main performance measures for each candidate learner ordered according to the MdAE.

Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; RF, random forest screening; MARS, multivariate adaptive regression splines; Max, maximum; MdAE, median absolute error; Med, median; Min, minimum; MSE, mean square error; Var, Variance; and XGBoost, extreme gradient boosting tree.

Table S5.	Sensitivity	analysis'	summary	of the main	n performance	measures fo	or each	candidate	learner	ordered	according	to the
MdAE.												

			MdAE					MSE		
Candidate learner	Med	Mean	Var	Min	Max	Med	Mean	Var	Min	Max
Individual XGBoost	0.08	0.09	0.01	0.00	0.95	0.18	0.18	0.00	0.03	0.90
Individual logistic model	0.09	0.12	0.01	0.00	1.00	0.19	0.20	0.01	0.04	1.00
Individual MARS	0.10	0.12	0.01	0.00	1.00	0.19	0.20	0.01	0.04	1.00
Individual $RF + XGBoost$	0.10	0.11	0.01	0.00	0.95	0.17	0.17	0.00	0.03	0.90
Individual $RF + MARS$	0.11	0.13	0.01	0.00	1.00	0.18	0.19	0.01	0.04	1.00
non-convex eSL	0.13	0.14	0.01	0.00	0.46	0.16	0.15	0.00	0.00	0.30
Individual $RF + logistic model$	0.14	0.16	0.02	0.00	1.00	0.17	0.18	0.01	0.04	1.00
Individual ridge	0.16	0.18	0.01	0.00	1.00	0.17	0.16	0.01	0.03	1.00
dSL	0.17	0.19	0.01	0.00	0.54	0.16	0.16	0.00	0.00	0.35
Individual $RF + ridge$	0.17	0.19	0.01	0.00	1.00	0.16	0.16	0.01	0.03	1.00
convex eSL	0.20	0.20	0.01	0.00	0.47	0.16	0.15	0.00	0.00	0.30
Historical logistic model	0.20	0.22	0.01	0.01	0.69	0.16	0.15	0.00	0.00	0.36
Historical $RF + logistic model$	0.20	0.22	0.01	0.01	0.66	0.16	0.15	0.00	0.00	0.35
Historical $RF + MARS$	0.20	0.23	0.01	0.03	0.66	0.16	0.15	0.00	0.00	0.35
Historical MARS	0.21	0.23	0.01	0.03	0.67	0.16	0.15	0.00	0.00	0.36
Historical ridge	0.22	0.24	0.01	0.02	0.70	0.16	0.15	0.00	0.00	0.36
Historical $RF + ridge$	0.22	0.24	0.01	0.02	0.67	0.16	0.15	0.00	0.00	0.34
Historical XGBoost	0.24	0.24	0.02	0.00	0.67	0.15	0.15	0.00	0.00	0.34
Historical RF $+$ XGBoost	0.24	0.25	0.02	0.00	0.64	0.16	0.15	0.00	0.00	0.34
Candidata learner		Mean calibration				Weak calibration				
Candidate learner	Med	Mean	Var	Min	Max	Med	Mean	Var	Min	Max
Individual XGBoost	0.30	0.26	0.90	-4.30	2.74	2.51	2.35	2.11	-13.44	7.35
Individual logistic model	0.32	0.27	0.94	-4.35	2.80	0.00				12543.66
Individual MARS	0.01				2.00	2.38	-10074.71	30616891130.52	-3025561.87	
Lulinidual DE + VOD and	0.31	0.27	0.94	-4.32	2.00 2.71	2.38 2.15	-10074.71 -34976.05	$\begin{array}{c} 30616891130.52\\ 215116138454.45\end{array}$	-3025561.87 -7447005.24	18.96
Individual $RF + AGBOOSt$	$\begin{array}{c} 0.31 \\ 0.31 \end{array}$	$0.27 \\ 0.26$	$\begin{array}{c} 0.94 \\ 0.90 \end{array}$	-4.32 -4.30	2.71 2.74	2.38 2.15 2.63	-10074.71 -34976.05 2.49	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77 \end{array}$	-3025561.87 -7447005.24 -9.10	$\begin{array}{c} 18.96 \\ 6.43 \end{array}$
Individual $RF + AGBOOSt$ Individual $RF + MARS$	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \end{array}$	$\begin{array}{c} 0.27 \\ 0.26 \\ 0.27 \end{array}$	$0.94 \\ 0.90 \\ 0.94$	-4.32 -4.30 -4.33	2.71 2.74 2.72	$2.38 \\ 2.15 \\ 2.63 \\ 2.30$	-10074.71 -34976.05 2.49 -18849.08	$\begin{array}{r} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78 \end{array}$	-3025561.87 -7447005.24 -9.10 -5636551.63	$18.96 \\ 6.43 \\ 22.04$
Individual $RF + AGBOOSt$ Individual $RF + MARS$ non-convex eSL	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \end{array}$	$0.27 \\ 0.26 \\ 0.27 \\ 0.24$	$0.94 \\ 0.90 \\ 0.94 \\ 0.88$	-4.32 -4.30 -4.33 -4.10	$2.71 \\ 2.74 \\ 2.72 \\ 2.72 \\ 2.72$	$2.38 \\ 2.15 \\ 2.63 \\ 2.30 \\ 3.27$	-10074.71 -34976.05 2.49 -18849.08 -1.07	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ \end{array}$	-3025561.87 -7447005.24 -9.10 -5636551.63 -1268.77	$18.96 \\ 6.43 \\ 22.04 \\ 5.90$
Individual $RF + AGBOOSt$ Individual $RF + MARS$ non-convex eSL Individual $RF + logistic model$	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \end{array}$	$\begin{array}{c} 0.27 \\ 0.26 \\ 0.27 \\ 0.24 \\ 0.27 \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34	$2.71 \\ 2.74 \\ 2.72 \\ 2.72 \\ 2.72 \\ 2.77$	$2.38 \\ 2.15 \\ 2.63 \\ 2.30 \\ 3.27 \\ 2.83$	-10074.71 -34976.05 2.49 -18849.08 -1.07 2.86	$\begin{array}{r} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ \end{array}$	-3025561.87 -7447005.24 -9.10 -5636551.63 -1268.77 -0.43	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \end{array}$	$\begin{array}{c} 0.27 \\ 0.26 \\ 0.27 \\ 0.24 \\ 0.27 \\ 0.25 \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31	2.71 2.74 2.72 2.72 2.72 2.77 2.78	2.38 2.15 2.63 2.30 3.27 2.83 3.28	-10074.71 -34976.05 2.49 -18849.08 -1.07 2.86 8.48	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\end{array}$	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \end{array}$	$\begin{array}{c} 0.27 \\ 0.26 \\ 0.27 \\ 0.24 \\ 0.27 \\ 0.25 \\ 0.26 \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.87 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31 -4.09	2.71 2.74 2.72 2.72 2.72 2.77 2.78 2.71	$2.38 \\ 2.15 \\ 2.63 \\ 2.30 \\ 3.27 \\ 2.83 \\ 3.28 \\ 3.20$	$\begin{array}{r} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\end{array}$	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\\ 3.80\\ \end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\end{array}$	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \end{array}$	$\begin{array}{c} 0.27 \\ 0.26 \\ 0.27 \\ 0.24 \\ 0.27 \\ 0.25 \\ 0.26 \\ 0.25 \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.87 \\ 0.89 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31 -4.09 -4.31	2.71 2.74 2.72 2.72 2.72 2.77 2.78 2.71 2.78	$2.38 \\ 2.15 \\ 2.63 \\ 2.30 \\ 3.27 \\ 2.83 \\ 3.28 \\ 3.20 \\ 3.43$	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\end{array}$	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\\ 3.80\\ 10362.75\\ \end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\end{array}$	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57 \\ 1763.43$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge convex eSL	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \\ 0.32 \end{array}$	$\begin{array}{c} 0.27 \\ 0.26 \\ 0.27 \\ 0.24 \\ 0.27 \\ 0.25 \\ 0.26 \\ 0.25 \\ 0.28 \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.87 \\ 0.89 \\ 0.89 \\ 0.89 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31 -4.09 -4.31 -4.09	2.71 2.74 2.72 2.72 2.72 2.77 2.78 2.71 2.78 2.71 2.78 2.72	$\begin{array}{c} 2.38\\ 2.15\\ 2.63\\ 2.30\\ 3.27\\ 2.83\\ 3.28\\ 3.20\\ 3.43\\ 3.67\end{array}$	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\\ -4.01\\ \end{array}$	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\\ 3.80\\ 10362.75\\ 17301.98\\ \end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\\ -2270.77\end{array}$	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57 \\ 1763.43 \\ 11.22$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge convex eSL Historical logistic model	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \\ 0.32 \\ 0.26 \end{array}$	$\begin{array}{c} 0.27\\ 0.26\\ 0.27\\ 0.24\\ 0.27\\ 0.25\\ 0.26\\ 0.25\\ 0.28\\ 0.24\\ \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.87 \\ 0.89 \\ 0.89 \\ 0.88 \\ 0.88 \end{array}$	$\begin{array}{r} -4.32 \\ -4.30 \\ -4.33 \\ -4.10 \\ -4.34 \\ -4.31 \\ -4.09 \\ -4.31 \\ -4.09 \\ -4.17 \end{array}$	2.71 2.74 2.72 2.72 2.77 2.78 2.71 2.78 2.71 2.78 2.72 2.79	$\begin{array}{c} 2.38\\ 2.15\\ 2.63\\ 2.30\\ 3.27\\ 2.83\\ 3.28\\ 3.20\\ 3.43\\ 3.67\\ 4.82\end{array}$	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\\ -4.01\\ 9.26\end{array}$	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\\ 3.80\\ 10362.75\\ 17301.98\\ 1073.34 \end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\\ -2270.77\\ -55.75\end{array}$	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57 \\ 1763.43 \\ 11.22 \\ 544.17 \\$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge convex eSL Historical logistic model Historical RF + logistic model	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \\ 0.32 \\ 0.26 \\ 0.26 \end{array}$	$\begin{array}{c} 0.27\\ 0.26\\ 0.27\\ 0.24\\ 0.27\\ 0.25\\ 0.26\\ 0.25\\ 0.28\\ 0.24\\ 0.24\\ \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.88 \\ 0.89 \end{array}$	$\begin{array}{r} -4.32\\ -4.30\\ -4.33\\ -4.10\\ -4.34\\ -4.31\\ -4.09\\ -4.31\\ -4.09\\ -4.17\\ -4.17\end{array}$	2.71 2.74 2.72 2.72 2.77 2.78 2.71 2.78 2.71 2.78 2.72 2.79 2.78	2.38 2.15 2.63 2.30 3.27 2.83 3.28 3.20 3.43 3.67 4.82 4.77	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\\ -4.01\\ 9.26\\ 9.67\end{array}$	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\\ 3.80\\ 10362.75\\ 17301.98\\ 1073.34\\ 792.31\\ \end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\\ -2270.77\\ -55.75\\ -30.50\end{array}$	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57 \\ 1763.43 \\ 11.22 \\ 544.17 \\ 439.70$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge convex eSL Historical logistic model Historical RF + logistic model Historical RF + MARS	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \\ 0.32 \\ 0.26 \\ 0.26 \\ 0.25 \end{array}$	$\begin{array}{c} 0.27\\ 0.26\\ 0.27\\ 0.24\\ 0.27\\ 0.25\\ 0.26\\ 0.25\\ 0.28\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.87 \\ 0.89 \\ 0.89 \\ 0.88 \\ 0.89 \\ 0.89 \\ 0.89 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31 -4.09 -4.31 -4.09 -4.17 -4.17 -4.12	2.71 2.74 2.72 2.72 2.77 2.78 2.71 2.78 2.71 2.78 2.72 2.79 2.78 2.78	$\begin{array}{c} 2.38\\ 2.15\\ 2.63\\ 2.30\\ 3.27\\ 2.83\\ 3.28\\ 3.20\\ 3.43\\ 3.67\\ 4.82\\ 4.77\\ 4.89\end{array}$	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\\ -4.01\\ 9.26\\ 9.67\\ 8.71\end{array}$	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\\ 3.80\\ 10362.75\\ 17301.98\\ 1073.34\\ 792.31\\ 891.16\\ \end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\\ -2270.77\\ -55.75\\ -30.50\\ -4.48\end{array}$	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57 \\ 1763.43 \\ 11.22 \\ 544.17 \\ 439.70 \\ 507.56 \\ 18.96 \\ 19.97 \\ 10.97 \\$
Individual RF + AGBOOSt Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge convex eSL Historical logistic model Historical RF + logistic model Historical RF + MARS Historical MARS	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \\ 0.32 \\ 0.26 \\ 0.26 \\ 0.25 \\ 0.26 \end{array}$	$\begin{array}{c} 0.27\\ 0.26\\ 0.27\\ 0.24\\ 0.27\\ 0.25\\ 0.26\\ 0.25\\ 0.28\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.87 \\ 0.89 \\ 0.89 \\ 0.88 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.89 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31 -4.09 -4.31 -4.09 -4.17 -4.17 -4.12 -4.12	2.71 2.74 2.72 2.72 2.77 2.78 2.71 2.78 2.71 2.78 2.72 2.79 2.78 2.78 2.78 2.78 2.79	$\begin{array}{c} 2.38\\ 2.15\\ 2.63\\ 2.30\\ 3.27\\ 2.83\\ 3.28\\ 3.20\\ 3.43\\ 3.67\\ 4.82\\ 4.77\\ 4.89\\ 4.98\end{array}$	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\\ -4.01\\ 9.26\\ 9.67\\ 8.71\\ 8.47\end{array}$	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\\ 3.80\\ 10362.75\\ 17301.98\\ 1073.34\\ 792.31\\ 891.16\\ 842.23\\ \end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\\ -2270.77\\ -55.75\\ -30.50\\ -4.48\\ -3.21\\ \end{array}$	$18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57 \\ 1763.43 \\ 11.22 \\ 544.17 \\ 439.70 \\ 507.56 \\ 494.53 \\ 11.23 \\ 10.23 $
Individual RF + AGBOOSt Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge convex eSL Historical logistic model Historical RF + logistic model Historical RF + MARS Historical MARS Historical ridge	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \\ 0.32 \\ 0.26 \\ 0.26 \\ 0.25 \\ 0.26 \\ 0.27 \end{array}$	$\begin{array}{c} 0.27\\ 0.26\\ 0.27\\ 0.24\\ 0.27\\ 0.25\\ 0.26\\ 0.25\\ 0.28\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.87 \\ 0.89 \\ 0.89 \\ 0.88 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.92 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31 -4.09 -4.31 -4.09 -4.17 -4.17 -4.12 -4.12 -4.23	2.71 2.74 2.72 2.72 2.77 2.78 2.71 2.78 2.71 2.78 2.72 2.79 2.78 2.78 2.78 2.79 2.78 2.79 2.81	$\begin{array}{c} 2.38\\ 2.15\\ 2.63\\ 2.30\\ 3.27\\ 2.83\\ 3.28\\ 3.20\\ 3.43\\ 3.67\\ 4.82\\ 4.77\\ 4.89\\ 4.98\\ 5.66\end{array}$	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\\ -4.01\\ 9.26\\ 9.67\\ 8.71\\ 8.47\\ 10.73\end{array}$	30616891130.52 215116138454.45 1.77 106256654902.78 5412.12 2.80 8522.58 3.80 10362.75 17301.98 1073.34 792.31 891.16 842.23 1619.07	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\\ -2270.77\\ -55.75\\ -30.50\\ -4.48\\ -3.21\\ -36.86\end{array}$	$\begin{array}{c} 18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57 \\ 1763.43 \\ 11.22 \\ 544.17 \\ 439.70 \\ 507.56 \\ 494.53 \\ 679.12 \end{array}$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge convex eSL Historical logistic model Historical RF + logistic model Historical RF + MARS Historical MARS Historical ridge Historical RF + ridge	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \\ 0.32 \\ 0.26 \\ 0.26 \\ 0.25 \\ 0.26 \\ 0.27 \\ 0.27 \\ 0.27 \end{array}$	$\begin{array}{c} 0.27\\ 0.26\\ 0.27\\ 0.24\\ 0.27\\ 0.25\\ 0.26\\ 0.25\\ 0.28\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.23\\ \end{array}$	$\begin{array}{c} 0.94 \\ 0.90 \\ 0.94 \\ 0.88 \\ 0.92 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.88 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.89 \\ 0.92 \\ 0.92 \\ 0.92 \end{array}$	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31 -4.09 -4.31 -4.09 -4.17 -4.17 -4.12 -4.12 -4.23 -4.22	2.71 2.74 2.72 2.72 2.77 2.78 2.71 2.78 2.71 2.78 2.72 2.79 2.78 2.79 2.78 2.79 2.78 2.79 2.81 2.80	$\begin{array}{c} 2.38\\ 2.15\\ 2.63\\ 2.30\\ 3.27\\ 2.83\\ 3.28\\ 3.20\\ 3.43\\ 3.67\\ 4.82\\ 4.77\\ 4.89\\ 4.98\\ 5.66\\ 5.58\end{array}$	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\\ -4.01\\ 9.26\\ 9.67\\ 8.71\\ 8.47\\ 10.73\\ 10.77\end{array}$	30616891130.52 215116138454.45 1.77 106256654902.78 5412.12 2.80 8522.58 3.80 10362.75 17301.98 1073.34 792.31 891.16 842.23 1619.07 923.11	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\\ -2270.77\\ -55.75\\ -30.50\\ -4.48\\ -3.21\\ -36.86\\ -24.52\end{array}$	$\begin{array}{c} 18.96\\ 6.43\\ 22.04\\ 5.90\\ 20.87\\ 1599.23\\ 13.57\\ 1763.43\\ 11.22\\ 544.17\\ 439.70\\ 507.56\\ 494.53\\ 679.12\\ 472.46\end{array}$
Individual RF + AGBoost Individual RF + MARS non-convex eSL Individual RF + logistic model Individual ridge dSL Individual RF + ridge convex eSL Historical logistic model Historical RF + logistic model Historical RF + MARS Historical MARS Historical ridge Historical RF + ridge Historical RF + ridge	$\begin{array}{c} 0.31 \\ 0.31 \\ 0.31 \\ 0.27 \\ 0.32 \\ 0.29 \\ 0.30 \\ 0.29 \\ 0.32 \\ 0.26 \\ 0.26 \\ 0.25 \\ 0.26 \\ 0.27 \\ 0.27 \\ 0.27 \\ 0.29 \end{array}$	$\begin{array}{c} 0.27\\ 0.26\\ 0.27\\ 0.24\\ 0.27\\ 0.25\\ 0.26\\ 0.25\\ 0.28\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.24\\ 0.23\\ 0.24\\ \end{array}$	0.94 0.90 0.94 0.88 0.92 0.89 0.92 0.92 0.90	-4.32 -4.30 -4.33 -4.10 -4.34 -4.31 -4.09 -4.31 -4.09 -4.17 -4.17 -4.12 -4.12 -4.23 -4.22 -4.09	2.71 2.74 2.72 2.72 2.77 2.78 2.71 2.78 2.71 2.78 2.72 2.79 2.78 2.79 2.78 2.79 2.78 2.79 2.81 2.80 2.71	$\begin{array}{c} 2.38\\ 2.15\\ 2.63\\ 2.30\\ 3.27\\ 2.83\\ 3.28\\ 3.20\\ 3.43\\ 3.67\\ 4.82\\ 4.77\\ 4.89\\ 4.98\\ 5.66\\ 5.58\\ 5.31\end{array}$	$\begin{array}{c} -10074.71\\ -34976.05\\ 2.49\\ -18849.08\\ -1.07\\ 2.86\\ 8.48\\ 3.16\\ 9.27\\ -4.01\\ 9.26\\ 9.67\\ 8.71\\ 8.47\\ 10.73\\ 10.77\\ 6.48 \end{array}$	$\begin{array}{c} 30616891130.52\\ 215116138454.45\\ 1.77\\ 106256654902.78\\ 5412.12\\ 2.80\\ 8522.58\\ 3.80\\ 10362.75\\ 17301.98\\ 1073.34\\ 792.31\\ 891.16\\ 842.23\\ 1619.07\\ 923.11\\ 20.14\\ \end{array}$	$\begin{array}{r} -3025561.87\\ -7447005.24\\ -9.10\\ -5636551.63\\ -1268.77\\ -0.43\\ -6.67\\ -16.65\\ -4.58\\ -2270.77\\ -55.75\\ -30.50\\ -4.48\\ -3.21\\ -36.86\\ -24.52\\ -0.39\end{array}$	$\begin{array}{c} 18.96 \\ 6.43 \\ 22.04 \\ 5.90 \\ 20.87 \\ 1599.23 \\ 13.57 \\ 1763.43 \\ 11.22 \\ 544.17 \\ 439.70 \\ 507.56 \\ 494.53 \\ 679.12 \\ 472.46 \\ 38.64 \end{array}$

Abbreviations: dSL, discrete super learner; eSL, ensemble super learner; RF, random forest screening; MARS, $multivariate \ adaptive \ regression \ splines; \ Max, \ maximum; \ MdAE, \ median \ absolute \ error; \ Med, \ median;$