Supplementary Table 1 Baseline characteristics of eligible participants grouped by history of

cataract surgery during follow-up period.

Item	Total	Non-cataract at follow-up	Cataract surgery at follow-up	p[a]
Number of participants	207573	184000	23573	-
Demographic characteristics				
Age group				**<0.001**
45-54	69527 (33.5%)	68038 (37.0%)	1489 (6.3%)	
55-64	70323 (33.9%)	64387 (35.0%)	5936 (25.2%)	
65-74	42334 (20.4%)	32567 (17.7%)	9767 (41.4%)	
≥75	25389 (12.2%)	19008 (10.3%)	6381 (27.1%)	
Gender				0.652
Male	97332 (46.9%)	86311 (46.9%)	11021 (46.8%)	
Female	110241 (53.1%)	97689 (53.1%)	12552 (53.2%)	
Income categories (AUD)				**<0.001**
<20000	33143 (16.0%)	28523 (15.5%)	4620 (19.6%)	
≥20000-39999	34956 (16.8%)	29807 (16.2%)	5149 (21.8%)	
≥40000-69999	39479 (19.0%)	35409 (19.2%)	4070 (17.3%)	
≥70000	56319 (27.1%)	52545 (28.6%)	3774 (16.0%)	
Missing	43676 (21.0%)	37716 (20.5%)	5960 (25.3%)	
Education level				**<0.001**
<10 years	21163 (10.2%)	18553 (10.1%)	2610 (11.1%)	
High school/TAFE	130931 (63.1%)	1155492 (62.8%)	15439 (65.5%)	
University or higher	52183 (25.1%)	47069 (25.6%)	5114 (21.7%)	
Missing	3296 (1.6%)	2886 (1.6%)	410 (1.7%)	
Country of birth				0.258
Australia	155537 (74.9%)	137799 (74.9%)	17738 (75.2%)	
Others	50412 (24.3%)	44772 (24.3%)	5640 (23.9%)	
Missing	1624 (0.8%)	1429 (0.8%)	195 (0.8%)	
Residential rurality				**<0.001**
Major cities	107427 (51.8%)	94602 (51.4%)	12825 (54.4%)	
Inner regional	72629 (35.0%)	64613 (35.1%)	8016 (34.0%)	
Outer regional	21469 (10.3%)	19331 (10.5%)	2138 (9.1%)	
Remote	2041 (1.0%)	1856 (1.0%)	185 (0.8%)	
Missing	4007 (1.9%)	3598 (2.0%)	409 (1.7%)	
Health insurance				**<0.001**
Private with extras	93980 (45.3%)	83048 (45.1%)	10932 (46.4%)	
Private without extras	24608 (11.9%)	21387 (11.6%)	3221 (13.7%)	
Veterans' Affairs card	3365 (1.6%)	3227 (1.8%)	138 (0.6%)	
Health care concession	47751 (23.0%)	40463 (22.0%)	7288 (30.9%)	
None of the above	33995 (16.4%)	32374 (17.6%)	1621 (6.9%)	

Missing	3874 (1.9%)	3501 (1.9%)	373 (1.6%)	
Marital status				0.157
Married/Partner	159477 (76.8%)	141452 (76.9%)	18025 (76.5%)	
Single/Widowed/Divorced	48096 (23.2%)	42548 (23.1%)	5548 (23.5%)	
Social economic status (SES)				<0.001
1st quintile	40717 (19.6%)	36480 (19.8%)	4237 (18.0%)	
2nd quintile	41912 (20.2%)	37156 (20.2%)	4756 (20.2%)	
3rd quintile	37771 (18.2%)	33385 (18.1%)	4386 (18.6%)	
4th quintile	34869 (16.8%)	30966 (16.8%)	3903 (16.6%)	
5th quintile	46648 (22.5%)	41022 (22.3%)	5626 (23.9%)	
Missing	5656 (2.7%)	4991 (2.7%)	665 (2.8%)	
Body mass index				<0.001
15-18.4 kg/m^2	2379 (1.1%)	2079 (1.1%)	300 (1.3%)	
18.5-24.9 kg/m^2	73767 (35.5%)	65138 (35.4%)	8629 (36.6%)	
25-29.9 kg/m^2	77461 (37.3%)	68481 (37.2%)	8980 (38.1%)	
≥30 kg/m^2	40574 (19.5%)	36444 (19.8%)	4130 (17.5%)	
Missing	13392 (6.5%)	11858 (6.4%)	1534 (6.5%)	
Chronic diseases and family history				
Diabetes at baseline				<0.001
No	192996 (93.0%)	171691 (93.3%)	21305 (90.4%)	
Yes	14577 (7.0%)	12309 (6.7%)	2268 (9.6%)	
Hypertension at baseline				<0.001
No	141208 (68.0%)	127574 (69.3%)	13634 (57.8%)	
Yes	66365 (32.0%)	56426 (30.7%)	9939 (42.2%)	
Dyslipidemia at baseline				<0.001
No	179966 (86.7%)	160707 (87.3%)	19259 (81.7%)	
Yes	27607 (13.3%)	23293 (12.7%)	4314 (18.3%)	
CVD at baseline				<0.001
No	185249 (89.2%)	165671 (90.0%)	19578 (83.1%)	
Yes	22324 (10.8%)	18329 (10.0%)	3995 (16.9%)	
Cancer at baseline				<0.001
No	178197 (85.8%)	159122 (86.5%)	19075 (80.9%)	
Yes	29376 (14.2%)	24878 (13.5%)	4498 (19.1%)	
Parkinson's disease at baseline				<0.001
No	206695 (99.6%)	183272 (99.6%)	23423 (99.4%)	
Yes	878 (0.4%)	728 (0.4%)	150 (0.6%)	
Anxiety at baseline				<0.001
No	162797 (78.4%)	144606 (78.6%)	18191 (77.2%)	
Yes	15537 (7.5%)	14061 (7.6%)	1476 (6.3%)	
Missing	29239 (14.1%)	25333 (13.8%)	3906 (16.6%)	
Family history of diabetes				<0.001
No	160629 (77.4%)	141922 (77.1%)	18707 (79.4%)	

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Yes	46934 (22.6%)	42069 (22.9%)	4865 (20.6%)	
Missing	10 (0.0%)	9 (0.0%)	1 (0.0%)	
Family history of hypertension				**<0.001**
No	102735 (49.5%)	90060 (48.9%)	12728 (54.0%)	
Yes	104824 (50.5%)	93929 (51.0%)	10842 (46.0%)	
Missing	14 (0.0%)	11 (0.0%)	3 (0.0%)	
Family history of CVD				**<0.001**
No	90690 (43.7%)	81565 (44.3%)	9125 (38.7%)	
Yes	116872 (56.3%)	102425 (55.7%)	14447 (61.3%)	
Missing	11 (0.0%)	10 (0.0%)	1 (0.0%)	
Family history of stroke				**<0.001**
No	155383 (74.9%)	138521 (75.3%)	16862 (71.5%)	
Yes	52178 (25.1%)	45468 (24.7%)	6710 (28.5%)	
Missing	12 (0.0%)	11 (0.0%)	1 (0.0%)	
Life style indicators				
Smoking				**<0.001**
Never smoked	120411 (58.0%)	106364 (57.8%)	14047 (59.6%)	
Ex-smoker	72231 (34.8%)	63574 (34.6%)	8657 (36.7%)	
Current smoker	14850 (7.2%)	13994 (7.6%)	856 (3.6%)	
Missing	81 (0.0%)	68 (0.0%)	13 (0.1%)	
Alcohol drinks				0.611
0	62591 (30.2%)	55384 (30.1%)	7207 (30.6%)	
1-4 drinks/week	42539 (20.5%)	38083 (20.7%)	4456 (18.9%)	
5-7 drinks/week	30641 (14.8%)	26857 (14.6%)	3784 (16.1%)	
7-14 drinks/week	37970 (18.3%)	33659 (18.3%)	4311 (18.3%)	
≥15 drinks/week	30538 (14.7%)	27173 (14.8%)	3365 (14.3%)	
Missing	3294 (1.6%)	2844 (1.5%)	450 (1.9%)	
Physical activities				0.911
0-4 sessions/week	34254 (16.5%)	30613 (16.6%)	3641 (15.4%)	
5-9 sessions/week	60496 (29.1%)	53483 (29.1%)	7013 (29.8%)	
10-14 sessions/week	50494 (24.3%)	44309 (24.1%)	6185 (26.2%)	
≥15 sessions/week	54746 (26.4%)	48917 (26.6%)	5829 (24.7%)	
Missing	7583 (3.7%)	6678 (3.6%)	905 (3.8%)	
Sleeping time				**<0.001**
<7 hours/day	31005 (14.9%)	27624 (15.0%)	3381 (14.3%)	
≥7-9 hours/day	158514 (76.4%)	140821 (76.5%)	17693 (75.1%)	
≥9 hours/day	12150 (5.9%)	10334 (5.6%)	1816 (7.7%)	
Missing	5904 (2.8%)	5221 (2.8%)	683 (2.9%)	
Sitting time				**<0.001**
<8 hours/day	145348 (70.0%)	127999 (69.6%)	17349 (73.6%)	
≥8 hours/day	46383 (22.3%)	42304 (23.0%)	4079 (17.3%)	
Missing	15842 (7.6%)	13697 (7.4%)	2145 (9.1%)	
Dietary indicators				

Vegetable intakes				**<0.001**
<5 serving/day	137343 (66.2%)	122626 (66.6%)	14717 (62.4%)	
≥5 servings/day	64811 (31.2%)	56574 (30.7%)	8237 (34.9%)	
Missing	5419 (2.6%)	4800 (2.6%)	619 (2.6%)	
Fruit intakes				**<0.001**
<2 serving/day	79881 (38.5%)	71880 (39.1%)	8001 (33.9%)	
≥2 servings/day	116701 (56.2%)	102339 (55.6%)	14362 (60.9%)	
Missing	10991 (5.3%)	9781 (5.3%)	1210 (5.1%)	
Breakfast cereal intakes				**<0.001**
Non-high fiber	30587 (14.7%)	26864 (14.6%)	3723 (15.8%)	
High fiber	138601 (66.8%)	122576 (66.6%)	16034 (68.0%)	
Missing	38376 (18.5%)	34560 (18.8%)	3816 (16.2%)	
Milk intakes				**<0.001**
None	10493 (5.1%)	9334 (5.1%)	1159 (4.9%)	
Skimmed fat/reduced fat/soy milk	125262 (60.3%)	110091 (59.8%)	15171 (64.4%)	
Whole milk	67136 (32.3%)	60434 (32.8%)	6702 (28.4%)	
Missing	4682 (2.3%)	4141 (2.3%)	541 (2.3%)	
Red meat intakes				**<0.001**
0 or 1 serving per week	25567 (12.3%)	23114 (12.6%)	2453 (10.4%)	
2 servings per week	35771 (17.2%)	32135 (17.5%)	3636 (15.4%)	
3 servings per week	18907 (9.1%)	16884 (9.2%)	2023 (8.6%)	
4 servings per week	37460 (18.0%)	33224 (18.1%)	4236 (18.0%)	
≥5 servings per week	54363 (26.2%)	47796 (26.0%)	6567 (27.9%)	
Missing	35505 (17.1%)	30847 (16.8%)	4658 (19.8%)	
Fish intakes				**<0.001**
1st quartile	14856 (7.2%)	13588 (7.4%)	1268 (5.4%)	
2nd quartile	82800 (39.9%)	73912 (40.2%)	8888 (37.7%)	
3rd quartile	30766 (14.8%)	26800 (14.6%)	3966 (16.8%)	
4th quartile	66957 (32.3%)	58904 (32.0%)	8053 (34.2%)	
Missing	12194 (5.9%)	10796 (5.9%)	1398 (5.9%)	
Cheese intakes				**<0.001**
1st quintile	14477 (7.0%)	12964 (7.0%)	1513 (6.4%)	
2nd quintile	46570 (22.4%)	41481 (22.5%)	5089 (21.6%)	
3rd quintile	48117 (23.2%)	42876 (23.3%)	5241 (22.2%)	
4th quintile	27141 (13.1%)	24011 (13.0%)	3130 (13.3%)	
5th quintile	57744 (27.8%)	50887 (27.7%)	6857 (29.1%)	
Missing	13524 (6.5%)	11781 (6.4%)	1743 (7.4%)	
Self-rated health				
Self-rated health status				**<0.001**
Excellent	35900 (17.3%)	32509 (17.7%)	3391 (14.4%)	
Very good	82525 (39.8%)	73005 (39.7%)	9520 (40.4%)	

Good	64499 (31.1%)	56613 (30.8%)	7886 (33.5%)	
Fair	15397 (7.4%)	13683 (7.4%)	1714 (7.3%)	
Poor	1550 (0.7%)	1431 (0.8%)	119 (0.5%)	
Missing	7702 (3.7%)	6759 (3.7%)	943 (4.0%)	
Self-rated quality of life				**<0.001**
Excellent	35128 (16.9%)	31830 (17.3%)	3298 (14.0%)	
Very good	80775 (38.9%)	71520 (38.9%)	9255 (39.3%)	
Good	62609 (30.2%)	54992 (29.9%)	7617 (32.3%)	
Fair	14621 (7.0%)	12986 (7.1%)	1635 (6.9%)	
Poor	1408 (0.7%)	1303 (0.7%)	105 (0.4%)	
Missing	11577 (5.6%)	10111 (5.5%)	1466 (6.2%)	
Social support/Psychological distress				
Social interaction				**<0.001**
Low	31907 (15.4%)	29166 (15.9%)	2741 (11.6%)	
Moderate	110543 (53.3%)	99079 (53.8%)	11464 (48.6%)	
High	45758 (22.0%)	38789 (21.1%)	6969 (29.6%)	
Missing	19365 (9.3%)	16966 (9.2%)	2399 (10.2%)	
Depression				**<0.001**
None	83911 (40.4%)	73156 (39.8%)	10755 (45.6%)	
Mild	67796 (32.7%)	61024 (33.2%)	6772 (28.7%)	
Moderate	26578 (12.8%)	24355 (13.2%)	2223 (9.4%)	
High	10347 (5.0%)	9632 (5.2%)	715 (3.0%)	
Missing	18941 (9.1%)	15833 (8.6%)	3108 (13.2%)	

[a]All P values were calculated using a t-test for continuous variables and the χ^2 test for categorical variables. Boldface indicates statistical significance, deemed as $p < 0.05$.

Supplementary Table 2 Baseline characteristics of 207,573 participants by residency in the 45-and-up study.

Item	City (Training set)	Regional/rural areas (Validating set)	Pᵃ
Number of participants	**107427**	**100146**	
Demographic characteristics			
Gender			**<0.001**
Male	51563(48.0%)	45769(45.7%)	
Female	55864(52.0%)	54377(54.3%)	
Ancestry			0.238
Australian	22495(20.9%)	27682(27.6%)	
Europe	25642(23.9%)	19312(19.3%)	
Asia	4332(4.0%)	348(0.3%)	
Mixture	7606(7.1%)	2543(2.5%)	
Mixure	46230(43.0%)	49037(49.0%)	
Missing	1122(1.0%)	1224(1.2%)	
Income categories			**<0.001**
<20000	15248(14.2%)	17895(17.9%)	
≥20000-39999	15248(14.2%)	19708(19.7%)	
≥40000-69999	19352(18.0%)	20127(20.1%)	
≥70000	34628(32.2%)	21691(21.7%)	
Missing	22951(21.4%)	20725(20.7%)	
Education level			**<0.001**
<10 years	9500(8.8%)	11663(11.6%)	
High school/TAFE	64878(60.4%)	66053(66.0%)	
University or higher	31353(29.2%)	20830(20.8%)	
Missing	1696(1.6%)	1600(1.6%)	
Country of birth			**<0.001**
Australia	72434(67.4%)	83103(83.0%)	
Others	34142(31.8%)	16270(16.2%)	
Missing	851(0.8%)	773(0.8%)	
Residential rurality			0.662
Major cities	107427(100%)		
Inner regional		72629(72.5%)	
Outer regional		21469(21.4%)	
Remote		2041(2.0%)	
Missing		4007(4.0%)	
Health insurance			**<0.001**
Private with extras	55097(51.3%)	38883(38.8%)	
Private without extras	12289(11.4%)	12319(12.3%)	
Veterans' Affairs white or gold card	1914(1.8%)	1451(1.4%)	
Health care concession	21284(19.8%)	26467(26.4%)	

None of the above	14916(13.9%)	19079(19.1%)	
Missing	1927(1.8%)	1947(1.9%)	
Marital status			**<0.001**
Married/Partner	81046(75.4%)	78431(78.3%)	
Single/Widowed/Divorced	26381(24.6%)	21715(21.7%)	
Social economic status (SES)			**<0.001**
1st quintile	13085(12.2%)	27632(27.6%)	
2nd quintile	15982(14.9%)	25930(25.9%)	
3rd quintile	17299(16.1%)	20472(20.4%)	
4th quintile	19847(18.5%)	15022(15.0%)	
5th quintile	40548(37.7%)	6100(6.1%)	
Missing	666(0.6%)	4990(5.0%)	
Body mass index			**<0.001**
15-18.4 kg/m^2	1286(1.2%)	1093(1.1%)	
18.5-24.9 kg/m^2	39737(37.0%)	34030(34.0%)	
25-29.9 kg/m^2	39793(37.0%)	37668(37.6%)	
≥30 kg/m^2	20080(18.7%)	20494(20.5%)	
Missing	6531(6.1%)	6861(6.9%)	
Chronic diseases and family history			
Diabetes at baseline			0.204
No	99809(92.9%)	93187(93.1%)	
Yes	7618(7.1%)	6959(6.9%)	
Hypertension at baseline			**0.001**
No	73449(68.4%)	67759(67.7%)	
Yes	33978(31.6%)	32387(32.3%)	
Dyslipidemia at baseline			**<0.001**
No	92429(86.0%)	87537(87.4%)	
Yes	14998(14.0%)	12609(12.6%)	
CVD at baseline			**0.001**
No	95642(89.0%)	89607(89.5%)	
Yes	11785(11.0%)	10539(10.5%)	
Cancer at baseline			**0.002**
No	92466(86.1%)	85731(85.6%)	
Yes	14961(13.9%)	14415(14.4%)	
Parkinson's disease at baseline			0.756
No	107E3(99.6%)	99727(99.6%)	
Yes	459(0.4%)	419(0.4%)	
Anxiety at baseline			**<0.001**
No	84567(78.7%)	78230(78.1%)	
Yes	8081(7.5%)	7456(7.4%)	
Missing	14779(13.8%)	14460(14.4%)	
Family history of diabetes			0.145

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No	82993(77.3%)	77636(77.5%)	
Yes	24428(22.7%)	22506(22.5%)	
Missing	6(0.0%)	4(0.0%)	
Family history of hypertension			**<0.001**
No	53616(49.9%)	49172(49.1%)	
Yes	53805(50.1%)	50966(50.9%)	
Missing	6(0.0%)	8(0.0%)	
Family history of CVD			**<0.001**
No	47630(44.3%)	43060(43.0%)	
Yes	59791(55.7%)	57081(57.0%)	
Missing	6(0.0%)	5(0.0%)	
Family history of stroke			0.481
No	80347(74.8%)	75036(74.9%)	
Yes	27074(25.2%)	25104(25.1%)	
Missing	6(0.0%)	6(0.0%)	
Life style indicators			
Smoking			**<0.001**
Never smoked	63899(59.5%)	56512(56.4%)	
Ex-smoker	36306(33.8%)	35925(35.9%)	
Current smoker	7186(6.7%)	7664(7.7%)	
Missing	36(0.0%)	45(0.0%)	
Number of alcohol drinks			**<0.001**
0	32785(30.5%)	29806(29.8%)	
1-4 drinks/week	22688(21.1%)	19851(19.8%)	
5-7 drinks/week	15851(14.8%)	14790(14.8%)	
7-14 drinks/week	19489(18.1%)	18481(18.5%)	
≥15 drinks/week	14670(13.7%)	15868(15.8%)	
Missing	1944(1.8%)	1350(1.3%)	
Physical activities			**<0.001**
0-4 sessions/week	18689(17.4%)	15565(15.5%)	
5-9 sessions/week	32128(29.9%)	28368(28.3%)	
10-14 sessions/week	25904(24.1%)	24590(24.6%)	
≥15 sessions/week	26978(25.1%)	27768(27.7%)	
Missing	3728(3.5%)	3855(3.8%)	
Sleeping time			**<0.001**
<7 hours/day	17683(16.5%)	13322(13.3%)	
≥7-9 hours/day	81145(75.5%)	77369(77.3%)	
≥9 hours/day	5356(5.0%)	6794(6.8%)	
Missing	3243(3.0%)	2661(2.7%)	
Sitting time			**<0.001**
<8 hours/day	71092(66.2%)	74256(74.1%)	
≥8 hours/day	28109(26.2%)	18274(18.2%)	
Missing	8226(7.7%)	7616(7.6%)	

Dietary indicators			
Vegetable intakes			**<0.001**
<5 serving/day	73446(68.4%)	63897(63.8%)	
≥5 servings/day	30885(28.7%)	33926(33.9%)	
Missing	3096(2.9%)	2323(2.3%)	
Fruit intakes			**<0.001**
<2 serving/day	40298(37.5%)	39583(39.5%)	
≥2 servings/day	61326(57.1%)	55375(55.3%)	
Missing	5803(5.4%)	5188(5.2%)	
Breakfast cereal intakes			**0.003**
Non-high fiber	16102(15.0%)	14485(14.5%)	
High fiber	70823(65.9%)	67787(67.7%)	
Missing	20502(19.1%)	17874(17.8%)	
Milk intakes			**<0.001**
None	5441(5.1%)	5052(5.0%)	
Skimmed fat/reduced fat/soy milk	66817(62.2%)	58445(58.4%)	
Whole milk	32636(30.4%)	34500(34.4%)	
Missing	2533(2.4%)	2149(2.1%)	
Red meat intakes			**<0.001**
0 or 1 serving per week	5441(5.1%)	5052(5.0%)	
2 servings per week	66817(62.2%)	58445(58.4%)	
3 servings per week	32636(30.4%)	34500(34.4%)	
4 servings per week	2533(2.4%)	2149(2.1%)	
Fish intakes			**<0.001**
1st quartile	5441(5.1%)	5052(5.0%)	
2nd quartile	66817(62.2%)	58445(58.4%)	
3rd quartile	32636(30.4%)	34500(34.4%)	
4th quartile	2533(2.4%)	2149(2.1%)	
Cheese intakes			**<0.001**
1st quartile	5441(5.1%)	5052(5.0%)	
2nd quartile	66817(62.2%)	58445(58.4%)	
3rd quartile	32636(30.4%)	34500(34.4%)	
4th quartile	2533(2.4%)	2149(2.1%)	
Self-rated health			.
Self-rated health status			0.188
Excellent	19117(17.8%)	16783(16.8%)	
Very good	41819(38.9%)	40706(40.6%)	
Good	33250(31.0%)	31249(31.2%)	
Fair	8153(7.6%)	7244(7.2%)	
Poor	884(0.8%)	666(0.7%)	
Missing	4204(3.9%)	3498(3.5%)	
Self-rated quality of life			0.545

Excellent	18706(17.4%)	16422(16.4%)	
Very good	40984(38.2%)	39791(39.7%)	
Good	32310(30.1%)	30299(30.3%)	
Fair	7750(7.2%)	6871(6.9%)	
Poor	798(0.7%)	610(0.6%)	
Missing	6123(5.7%)	5454(5.4%)	
Social support/Psychological distress			
Depression			**0.041**
None	43083(40.1%)	40828(40.8%)	
Mild	35348(32.9%)	32448(32.4%)	
Moderate	13928(13.0%)	12650(12.6%)	
High	5399(5.0%)	4948(4.9%)	
Missing	9669(9.0%)	9272(9.3%)	
Social interaction			**<0.001**
Low	15450(14.4%)	16457(16.4%)	
Moderate	58425(54.4%)	52118(52.0%)	
High	23536(21.9%)	22222(22.2%)	
Missing	10016(9.3%)	9349(9.3%)	

[a]All P values were calculated using a t-test for continuous variables and the χ^2 test for categorical

variables. Boldface indicates statistical significance, deemed as p < 0.05.

Supplementary Figure 1 Framework of the external validation (sensitivity analysis by treating city as training set and regional/rural as validation set).
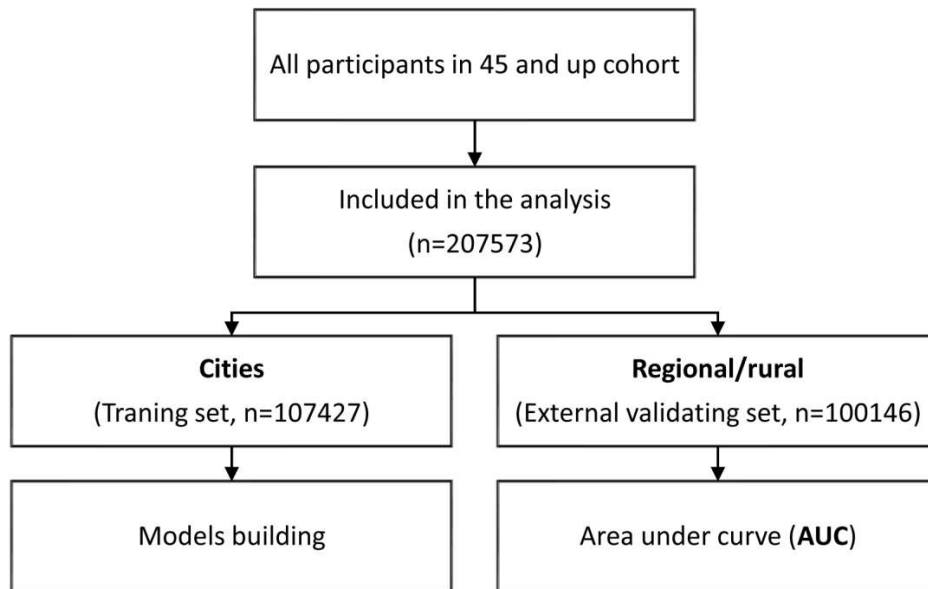
Supplementary Figure 2 Selection process of eligible participants. BL = baseline; FU = during follow-up
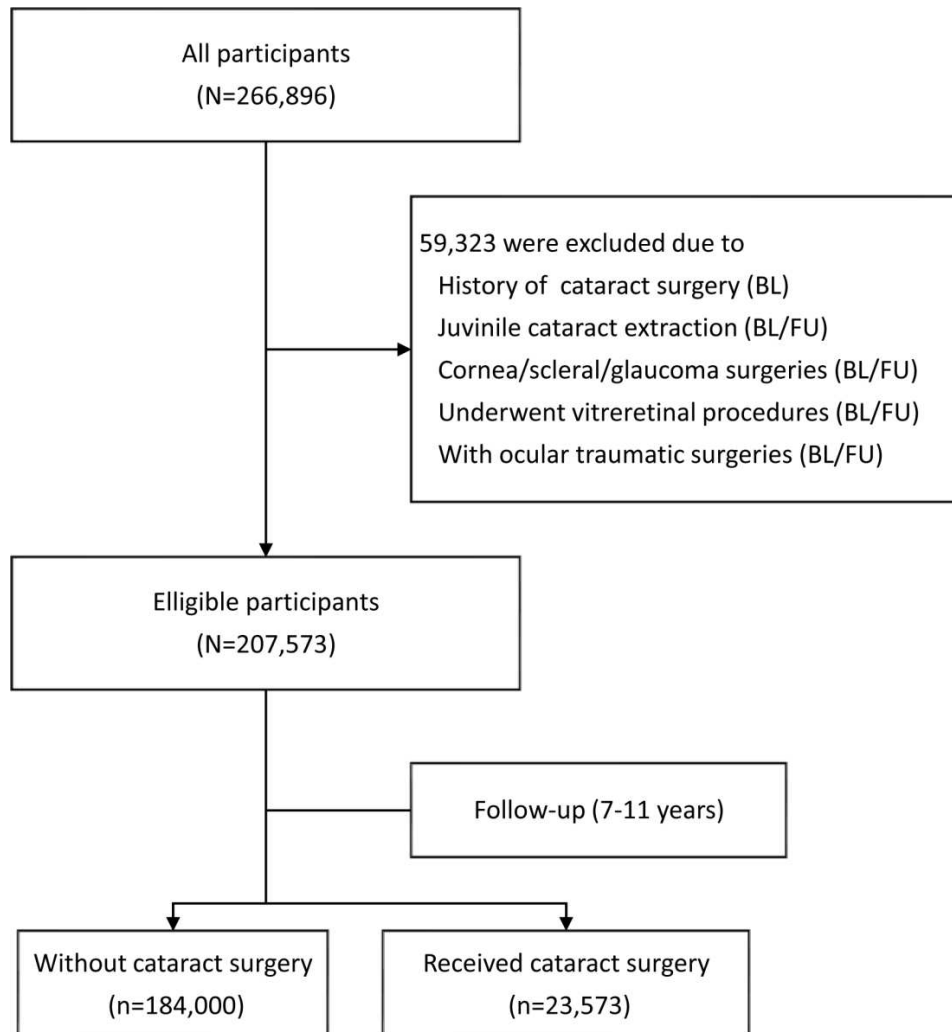
Supplementary Figure 3 Relative importance of top 10 leading predictors for each predictive model.