



```

1 .
2 . use "E:\16GBBACKUPUSB\BACKUP_USB_SEPTEMBER2014\May Baydoun_folder\UK_BIOBANK_PROJECT\UKB_PAPER8E_ADPRSROTD\
3 .
4 .
5 .
6 . *****PRINCIPAL COMPONENTS ANALYSIS OF TOP 86 PROTEINS VS. AD PRS P
> ENT MEDIATORS (N=11)
7 .
8 .
9 . **ztnc zpvr zpilrb znsc1 znefl zldlr zkynu zgfp zfurin zdcbl2 zbrk1
10 .
11 .
12 .
13 . pca ztnc zpvr zpilrb znsc1 znefl zldlr zkynu zgfp zfurin zdcbl2 zbrk1 if sample_final==1

```

```

Principal components/correlation      Number of obs   =    34,574
                                     Number of comp. =     11
                                     Trace              =     11
Rotation: (unrotated = principal)    Rho              =    1.0000

```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.35124	.816828	0.2137	0.2137
Comp2	1.53441	.491193	0.1395	0.3532
Comp3	1.04322	.0827641	0.0948	0.4481
Comp4	.960452	.0469388	0.0873	0.5354
Comp5	.913513	.0298163	0.0830	0.6184
Comp6	.883697	.0929687	0.0803	0.6988
Comp7	.790728	.0141283	0.0719	0.7707
Comp8	.7766	.142568	0.0706	0.8413
Comp9	.634032	.0112187	0.0576	0.8989
Comp10	.622814	.133513	0.0566	0.9555
Comp11	.489301	.	0.0445	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	Comp11
ztnc	0.1306	0.2488	0.7018	0.2756	-0.0646	0.2947	-0.1239	0.4651	0.0896	-0.0000	-0.0000
zpvr	0.2914	-0.1018	-0.1403	0.5660	-0.3884	-0.1748	0.5504	0.1183	-0.1247	0.0000	0.0000
zpilrb	0.2696	0.0842	0.1482	0.2684	0.7285	-0.4610	-0.0317	-0.1048	0.1493	0.0000	0.0000
znsc1	0.3469	0.1823	-0.4265	0.0602	-0.1854	-0.1162	-0.5088	0.3731	0.2657	0.0000	0.0000
znefl	0.2711	0.4987	-0.1513	-0.1036	0.0744	-0.1423	0.0081	0.0532	-0.6624	-0.0000	-0.0000
zldlr	0.3485	-0.3767	-0.1910	-0.1963	0.1781	0.3293	-0.1380	0.2733	-0.1617	0.0000	0.0000
zkynu	0.3600	-0.3695	0.0756	-0.0906	-0.1498	-0.2800	-0.0021	-0.0816	0.3477	-0.0000	-0.0000
zgfp	0.2296	0.3962	-0.0921	-0.4458	0.1079	0.1865	0.5768	0.1120	0.4334	0.0000	0.0000
zfurin	0.3849	-0.3820	0.1924	-0.1218	0.1803	0.2419	0.1342	-0.0321	-0.2888	-0.0000	-0.0000
zdcbl2	0.2984	0.2139	-0.1184	0.3327	-0.0235	0.5185	-0.1601	-0.6463	0.1371	-0.0000	-0.0000
zbrk1	0.3009	0.1081	0.3990	-0.3824	-0.4189	-0.2957	-0.1623	-0.3227	-0.0873	0.0000	0.0000

Variable	Comp1	Comp2	Comp3	Unexplained
ztnc	-0.0304	-0.0264	0.7549	.3511
zpvr	0.2769	0.1702	-0.0965	.7639
zpilrb	0.1524	0.1681	0.2242	.7953
znscs1	0.1133	0.5080	-0.2542	.4763
znefl	-0.1390	0.5645	0.0847	.4217
zldlr	0.4998	0.0418	-0.2198	.4587
zkynu	0.5181	-0.0508	0.0299	.4798
zgfap	-0.0983	0.4464	0.0963	.6263
zfurin	0.5512	-0.0893	0.1387	.3892
zdcbl2	0.0729	0.3778	0.0282	.7057
zbrk1	0.1734	0.1054	0.4693	.6031

Component rotation matrix

	Comp1	Comp2	Comp3
Comp1	0.7436	0.6296	0.2250
Comp2	-0.6664	0.6705	0.3261
Comp3	0.0545	-0.3924	0.9182

```

18 . scree
19 . graph save "scree.gph", replace
    file scree.gph saved
20 . loadingplot, factors(3)
21 . graph save "loadingplot.gph",replace
    file loadingplot.gph saved
22 .
23 . capture drop mediator*
24 . predict mediator1-mediator3
    (score assumed)

```

Scoring coefficients for orthogonal varimax rotation
sum of squares(column-loading) = 1

Variable	Comp1	Comp2	Comp3
ztnc	-0.0304	-0.0264	0.7549
zpvr	0.2769	0.1702	-0.0965
zpilrb	0.1524	0.1681	0.2242
znscs1	0.1133	0.5080	-0.2542
znefl	-0.1390	0.5645	0.0847
zldlr	0.4998	0.0418	-0.2198
zkynu	0.5181	-0.0508	0.0299
zgfap	-0.0983	0.4464	0.0963
zfurin	0.5512	-0.0893	0.1387
zdcbl2	0.0729	0.3778	0.0282
zbrk1	0.1734	0.1054	0.4693

```

25 .
26 .
27 . save, replace
    file E:\16GBBACKUPUSB\BACKUP_USB_SEPTEMBER2014\May Baydoun_folder\UK_BIOBANK_PROJECT\UKB_PAPER8E_ADPRSPROTDEM\DAT
28 .
29 .
30 . save, replace
    file E:\16GBBACKUPUSB\BACKUP_USB_SEPTEMBER2014\May Baydoun_folder\UK_BIOBANK_PROJECT\UKB_PAPER8E_ADPRSPROTDEM\DAT
31 .
32 .
33 .
34 . **OVERALL**
35 .
36 . forval x=1(1)3 {
    2.
37 . med4way AD_PGS mediator`x' AGE Agesq SEX PC1-PC20 if sample_final==1 , a0(0) a1(1) m(0) yreg(cox) mreg(linear)
    3.
38 .
39 . }

```

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20
> e mean.

-> Summary

```

Outcome (yvar): Age_dementia
Exposure (avar): AD_PGS
Mediator (mvar): mediator1
Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20

Model for the outcome (yreg): cox
Model for the mediator (mreg): linear

Referent exposure level (a0): 0
Actual exposure level (a1): 1
Mediator level for the decomposition (m): 0
Fixed values of the covariates (c): 60.85 3733 1.537 -1.822 1.441 -.153 .09108 -.06076 -.1461 .04663 -.1461 .04663 -.1461 .04663 -.1461 .04663 -.1461 .04663 -.1461 .04663

```

-> Model for the outcome

```

Failure _d: dem_diag==1
Analysis time _t: Age_dementia
Enter on or after: time AGE
ID variable: n_eid

```

```

Iteration 0: Log likelihood = -9439.9782
Iteration 1: Log likelihood = -9205.4937
Iteration 2: Log likelihood = -9156.0731
Iteration 3: Log likelihood = -9154.1669
Iteration 4: Log likelihood = -9154.1238
Iteration 5: Log likelihood = -9154.1228
Iteration 6: Log likelihood = -9154.1228
Refining estimates:
Iteration 0: Log likelihood = -9154.1228

```

Cox regression with Breslow method for ties

No. of subjects = 34,574
 No. of failures = 1,010
 Time at risk = 419,155.479

Number of obs = 34,574

Log likelihood = -9154.1228

LR chi2(26) = 571.71
 Prob > chi2 = 0.0000

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.760192	.0451493	22.04	0.000	1.673889	1.850945
mediator1	.9011949	.0255794	-3.67	0.000	.8524292	.9527504
_AD_PGSXmediator1_000	.9803994	.0188252	-1.03	0.303	.9441884	1.017999
AGE	.689823	.1524356	-1.68	0.093	.4473434	1.063737
Agesq	1.003263	.0017385	1.88	0.060	.999861	1.006676
SEX	.8003969	.0507913	-3.51	0.000	.7067896	.9064016
PC1	1.000889	.0007741	1.15	0.251	.9993725	1.002407
PC2	1.006151	.0036285	1.70	0.089	.9990643	1.013288
PC3	1.006892	.0060957	1.13	0.257	.9950152	1.01891
PC4	1.004565	.0036161	1.27	0.206	.9975023	1.011677
PC5	1.007148	.0038758	1.85	0.064	.99958	1.014773
PC6	1.003363	.0108469	0.31	0.756	.9823268	1.024849
PC7	1.002003	.0077068	0.26	0.795	.9870116	1.017223
PC8	.998094	.0093589	-0.20	0.839	.9799183	1.016607
PC9	1.001322	.0070494	0.19	0.851	.9875999	1.015234
PC10	1.002127	.009067	0.23	0.814	.9845127	1.020057
PC11	1.023102	.00789	2.96	0.003	1.007754	1.038684
PC12	.9792651	.0090177	-2.28	0.023	.9617494	.9970999
PC13	1.005827	.0177822	0.33	0.742	.971572	1.041291
PC14	.9872262	.0090023	-1.41	0.159	.9697387	1.005029
PC15	.9993566	.0102585	-0.06	0.950	.9794512	1.019667
PC16	.9993725	.0095834	-0.07	0.948	.9807649	1.018333
PC17	.9996568	.0127225	-0.03	0.978	.9750295	1.024906
PC18	.9954899	.0104954	-0.43	0.668	.9751303	1.016275
PC19	1.00825	.0111609	0.74	0.458	.9866108	1.030364
PC20	1.017552	.0114526	1.55	0.122	.995351	1.040248

-> Model for the mediator

Iteration 0: Log likelihood = -60725.305
 Iteration 1: Log likelihood = -60725.305

Linear regression (Maximum Likelihood)

Number of obs = 34,574
 Wald chi2(24) = 365.22
 Prob > chi2 = 0.0000

Log likelihood = -60725.305

mediator1	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	-.0197316	.0074408	-2.65	0.008	-.0343154	-.0051478
AGE	.2081742	.0308227	6.75	0.000	.1477628	.2685856
Agesq	-.0015958	.0002553	-6.25	0.000	-.0020961	-.0010955
SEX	-.0394457	.0151551	-2.60	0.009	-.0691492	-.0097421
PC1	-.0005741	.0001413	-4.06	0.000	-.000851	-.0002972
PC2	-.0014152	.0003171	-4.46	0.000	-.0020368	-.0007936
PC3	.004938	.0005871	8.41	0.000	.0037873	.0060887
PC4	.001698	.0007199	2.36	0.018	.0002871	.0031089
PC5	-.0004641	.0009947	-0.47	0.641	-.0024137	.0014854
PC6	.0010751	.0018286	0.59	0.557	-.0025089	.0046591
PC7	.0044167	.0015296	2.89	0.004	.0014188	.0074147
PC8	-.0025229	.0017149	-1.47	0.141	-.0058841	.0008383

PC9	-.0013874	.001695	-0.82	0.413	-.0047095	.0019348
PC10	.0024864	.0018948	1.31	0.189	-.0012272	.0062001
PC11	.0014336	.0018661	0.77	0.442	-.0022238	.005091
PC12	.0001766	.0020399	0.09	0.931	-.0038216	.0041748
PC13	.0084873	.0026387	3.22	0.001	.0033155	.013659
PC14	-.0062095	.0022476	-2.76	0.006	-.0106147	-.0018043
PC15	-.0045863	.0022893	-2.00	0.045	-.0090733	-.0000994
PC16	-.0074876	.0023671	-3.16	0.002	-.012127	-.0028482
PC17	-.0009114	.0028702	-0.32	0.751	-.006537	.0047142
PC18	.0006637	.0026287	0.25	0.801	-.0044884	.0058157
PC19	.0017405	.0026666	0.65	0.514	-.0034859	.0069669
PC20	.0066922	.0026834	2.49	0.013	.0014329	.0119515
_cons	-6.646864	.9245522	-7.19	0.000	-8.458953	-4.834775
<hr/>						
sigma2						
_cons	1.963828	.0149363	131.48	0.000	1.934554	1.993103

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.7722829	.0449585	17.18	0.000	.6841658	.8603999
ereri_cde	.7522627	.0447302	16.82	0.000	.6645931	.8399324
ereri_intref	.0156951	.0072057	2.18	0.029	.0015723	.029818
ereri_intmed	.0022702	.0010374	2.19	0.029	.000237	.0043033
ereri_pie	.0020549	.0009574	2.15	0.032	.0001784	.0039314
terira	1.772283	.0449585	39.42	0.000	1.684166	1.8604
p_cde	.9740767	.0104134	93.54	0.000	.9536667	.9944866
p_intref	.020323	.0092772	2.19	0.028	.0021401	.038506
p_intmed	.0029395	.0013293	2.21	0.027	.0003341	.0055449
p_pie	.0026608	.0012451	2.14	0.033	.0002205	.005101
op_m	.0056003	.00238	2.35	0.019	.0009356	.010265
op_ati	.0232626	.010053	2.31	0.021	.003559	.0429661
op_e	.0259233	.0104134	2.49	0.013	.0055134	.0463333

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intref=excess relative risk due to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk; op_m=overall proportion mediated interaction; p_intmed=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall proportion eliminated.

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20
> e mean.

-> Summary

Outcome (yvar): Age_dementia

Exposure (avar): AD_PGS

Mediator (mvar): mediator2

Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20

Model for the outcome (yreg): cox

Model for the mediator (mreg): linear

Referent exposure level (a0): 0

Actual exposure level (a1): 1

Mediator level for the decomposition (m): 0

Fixed values of the covariates (c): 60.85 3733 1.537 -1.822 1.441 -.153 .09108 -.06076 -.1461 .04663 -.1461 .04663 -.1461 .04663 -.1461 .04663 -.1461 .04663 -.1461 .04663

-> Model for the outcome

Failure _d: dem_diag==1
 Analysis time _t: Age_dementia
 Enter on or after: time AGE
 ID variable: n_eid

Iteration 0: Log likelihood = -9439.9782
 Iteration 1: Log likelihood = -9083.4905
 Iteration 2: Log likelihood = -9026.6115
 Iteration 3: Log likelihood = -9026.016
 Iteration 4: Log likelihood = -9025.9977
 Iteration 5: Log likelihood = -9025.9974
 Iteration 6: Log likelihood = -9025.9974
 Refining estimates:
 Iteration 0: Log likelihood = -9025.9974

Cox regression with Breslow method for ties

No. of subjects = 34,574
 No. of failures = 1,010
 Time at risk = 419,155.479

Number of obs = 34,574

Log likelihood = -9025.9974

LR chi2(26) = 827.96
 Prob > chi2 = 0.0000

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.679757	.0565812	15.40	0.000	1.572441	1.794396
mediator2	1.485727	.0384852	15.28	0.000	1.41218	1.563105
_AD_PG SXmediator2_000	1.010568	.017064	0.62	0.534	.9776701	1.044572
AGE	.7199394	.1594313	-1.48	0.138	.4664409	1.111208
Agesq	1.002524	.0017417	1.45	0.147	.9991158	1.005943
SEX	.7788905	.049338	-3.94	0.000	.6879516	.8818504
PC1	1.001589	.000807	1.97	0.049	1.000008	1.003172
PC2	1.006491	.0038949	1.67	0.095	.9988858	1.014154
PC3	1.005438	.0064923	0.84	0.401	.9927934	1.018244
PC4	1.004142	.0036539	1.14	0.256	.9970061	1.011329
PC5	1.007672	.0038773	1.99	0.047	1.000101	1.0153
PC6	1.002066	.0107401	0.19	0.847	.9812356	1.023339
PC7	1.00194	.0077817	0.25	0.803	.9868034	1.017308
PC8	1.002133	.0094519	0.23	0.821	.9837778	1.02083
PC9	1.002206	.0070344	0.31	0.754	.9885133	1.016089
PC10	1.003318	.0092027	0.36	0.718	.9854418	1.021518
PC11	1.020466	.0079315	2.61	0.009	1.005038	1.03613
PC12	.978397	.0092512	-2.31	0.021	.9604319	.9966981
PC13	1.0028	.0179986	0.16	0.876	.9681369	1.038705
PC14	.983935	.0090663	-1.76	0.079	.9663249	1.001866
PC15	.9975431	.0103495	-0.24	0.813	.9774633	1.018036
PC16	1.003327	.0096829	0.34	0.731	.9845269	1.022485
PC17	.9972419	.0115467	-0.24	0.811	.9748658	1.020132
PC18	.9978879	.0105161	-0.20	0.841	.9774882	1.018713
PC19	1.013107	.0112753	1.17	0.242	.9912467	1.035449
PC20	1.010141	.0114193	0.89	0.372	.9880061	1.032773

-> Model for the mediator

Iteration 0: Log likelihood = -55232.568
 Iteration 1: Log likelihood = -55232.568

Linear regression (Maximum Likelihood)

Number of obs = 34,574

Wald chi2(24) = 8545.55

Log likelihood = -55232.568

Prob > chi2 = 0.0000

mediator2	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	.0914844	.0063478	14.41	0.000	.0790429	.1039259
AGE	-.0331743	.0262951	-1.26	0.207	-.0847118	.0183631
Agesq	.0011305	.0002178	5.19	0.000	.0007037	.0015573
SEX	.0028778	.012929	0.22	0.824	-.0224625	.0282181
PC1	-.0013244	.0001205	-10.99	0.000	-.0015606	-.0010881
PC2	-.0006008	.0002706	-2.22	0.026	-.0011311	-.0000705
PC3	.0032866	.0005009	6.56	0.000	.002305	.0042683
PC4	.0019101	.0006141	3.11	0.002	.0007064	.0031137
PC5	-.002127	.0008486	-2.51	0.012	-.0037901	-.0004638
PC6	-.0023271	.00156	-1.49	0.136	-.0053846	.0007304
PC7	-.0016696	.0013049	-1.28	0.201	-.0042272	.0008879
PC8	-.0032906	.001463	-2.25	0.025	-.0061581	-.0004231
PC9	-.0012968	.001446	-0.90	0.370	-.0041309	.0015373
PC10	.0023841	.0016164	1.47	0.140	-.0007841	.0055522
PC11	.0001837	.0015919	0.12	0.908	-.0029365	.0033038
PC12	.0029307	.0017403	1.68	0.092	-.0004801	.0063416
PC13	.0026752	.0022511	1.19	0.235	-.0017368	.0070872
PC14	.0027046	.0019174	1.41	0.158	-.0010536	.0064627
PC15	-.0019242	.001953	-0.99	0.325	-.005752	.0019037
PC16	-.0043815	.0020194	-2.17	0.030	-.0083394	-.0004236
PC17	.004127	.0024486	1.69	0.092	-.0006723	.0089262
PC18	-.0028435	.0022425	-1.27	0.205	-.0072388	.0015517
PC19	-.0009608	.0022749	-0.42	0.673	-.0054194	.0034979
PC20	.0015969	.0022892	0.70	0.485	-.0028899	.0060836
_cons	-2.214411	.788743	-2.81	0.005	-3.760319	-.6685036
sigma2						
_cons	1.429261	.0108706	131.48	0.000	1.407956	1.450567

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.7538103	.0494337	15.25	0.000	.6569221	.8506984
ereri_cde	.6092454	.0492222	12.38	0.000	.5127716	.7057191
ereri_intref	.0805542	.0121829	6.61	0.000	.0566761	.1044323
ereri_intmed	.0271277	.0030611	8.86	0.000	.0211281	.0331272
ereri_pie	.036883	.0035816	10.30	0.000	.0298632	.0439028
terira	1.75381	.0494337	35.48	0.000	1.656922	1.850698
p_cde	.8082211	.0226018	35.76	0.000	.7639224	.8525198
p_intref	.1068627	.0171647	6.23	0.000	.0732205	.140505
p_intmed	.0359874	.0038456	9.36	0.000	.0284502	.0435246
p_pie	.0489287	.0051347	9.53	0.000	.0388648	.0589926
op_m	.0849162	.0080742	10.52	0.000	.0690911	.1007412
op_ati	.1428501	.0202391	7.06	0.000	.1031822	.1825181
op_e	.1917789	.0226018	8.49	0.000	.1474802	.2360776

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intre
to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk
interaction; p_intmed=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall pro
proportion eliminated.

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC
> e mean.

-> Summary

Outcome (yvar): Age_dementia
Exposure (avar): AD_PGS
Mediator (mvar): mediator3
Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17

Model for the outcome (yreg): cox
Model for the mediator (mreg): linear

Referent exposure level (a0): 0
Actual exposure level (a1): 1
Mediator level for the decomposition (m): 0
Fixed values of the covariates (c): 60.85 3733 1.537 -1.822 1.441 -.153 .09108 -.06076 -.1461 .04663 -.1

-> Model for the outcome

Failure _d: dem_diag==1
Analysis time _t: Age_dementia
Enter on or after: time AGE
ID variable: n_eid

Iteration 0: Log likelihood = -9439.9782
Iteration 1: Log likelihood = -9235.4972
Iteration 2: Log likelihood = -9154.6354
Iteration 3: Log likelihood = -9148.3831
Iteration 4: Log likelihood = -9148.3282
Iteration 5: Log likelihood = -9148.3282
Refining estimates:
Iteration 0: Log likelihood = -9148.3282

Cox regression with Breslow method for ties

No. of subjects = 34,574 Number of obs = 34,574
No. of failures = 1,010
Time at risk = 419,155.479
Log likelihood = -9148.3282
LR chi2(26) = 583.30
Prob > chi2 = 0.0000

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.741032	.0472345	20.44	0.000	1.650872	1.836116
mediator3	1.189947	.0414078	5.00	0.000	1.111495	1.273937
_AD_PGSXmediator3_000	1.011129	.0235341	0.48	0.634	.9660396	1.058324
AGE	.6898879	.1524649	-1.68	0.093	.4473664	1.063883
Agesq	1.003197	.0017388	1.84	0.066	.9997947	1.006611
SEX	.7434099	.047535	-4.64	0.000	.6558446	.8426665
PC1	1.001216	.0007953	1.53	0.126	.9996582	1.002776
PC2	1.006304	.0038143	1.66	0.097	.9988562	1.013808
PC3	1.006524	.0064094	1.02	0.307	.9940403	1.019165
PC4	1.004618	.0036569	1.27	0.206	.9974756	1.011811
PC5	1.007084	.0038941	1.83	0.068	.9994802	1.014745
PC6	1.001023	.0109051	0.09	0.925	.9798762	1.022627

PC7	1.00061	.0077527	0.08	0.937	.9855302	1.015921
PC8	.9980904	.009451	-0.20	0.840	.9797376	1.016787
PC9	1.001159	.0070685	0.16	0.870	.9874008	1.01511
PC10	1.002322	.0091092	0.26	0.799	.9846264	1.020336
PC11	1.02324	.0079059	2.97	0.003	1.007862	1.038853
PC12	.9802775	.0090788	-2.15	0.031	.962644	.9982341
PC13	1.00037	.0178995	0.02	0.984	.9658952	1.036074
PC14	.989034	.0090543	-1.20	0.228	.9714462	1.00694
PC15	.9990198	.0103474	-0.09	0.925	.9789436	1.019508
PC16	1.00164	.0096496	0.17	0.865	.9829042	1.020732
PC17	.9993455	.0129909	-0.05	0.960	.9742055	1.025134
PC18	.9953521	.0104996	-0.44	0.659	.9749845	1.016145
PC19	1.008811	.011172	0.79	0.428	.9871503	1.030947
PC20	1.015529	.0114184	1.37	0.171	.9933939	1.038157

-> Model for the mediator

Iteration 0: Log likelihood = -50877.537

Iteration 1: Log likelihood = -50877.537

Linear regression (Maximum Likelihood)

Number of obs = 34,574

Wald chi2(24) = 1576.26

Log likelihood = -50877.537

Prob > chi2 = 0.0000

mediator3	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	.0578658	.0055966	10.34	0.000	.0468968	.0688349
AGE	-.126934	.023183	-5.48	0.000	-.1723719	-.0814961
Agesq	.0012965	.000192	6.75	0.000	.0009202	.0016728
SEX	.2406618	.0113988	21.11	0.000	.2183206	.263003
PC1	-.0010748	.0001063	-10.12	0.000	-.0012831	-.0008665
PC2	.0000273	.0002385	0.11	0.909	-.0004403	.0004948
PC3	.0010692	.0004416	2.42	0.015	.0002037	.0019347
PC4	.0019969	.0005414	3.69	0.000	.0009357	.0030581
PC5	-.0010262	.0007481	-1.37	0.170	-.0024926	.0004401
PC6	.0001064	.0013754	0.08	0.938	-.0025893	.002802
PC7	.0012995	.0011505	1.13	0.259	-.0009554	.0035544
PC8	.0044578	.0012899	3.46	0.001	.0019297	.0069859
PC9	.0029173	.0012749	2.29	0.022	.0004186	.005416
PC10	-.0001303	.0014251	-0.09	0.927	-.0029235	.0026629
PC11	-.0035759	.0014035	-2.55	0.011	-.0063268	-.000825
PC12	.0013198	.0015343	0.86	0.390	-.0016874	.004327
PC13	.0031969	.0019847	1.61	0.107	-.000693	.0070868
PC14	-.0042335	.0016905	-2.50	0.012	-.0075468	-.0009201
PC15	.0041585	.0017219	2.42	0.016	.0007837	.0075334
PC16	-.0032594	.0017804	-1.83	0.067	-.0067489	.0002301
PC17	-.0002422	.0021588	-0.11	0.911	-.0044734	.0039891
PC18	-.0011056	.0019771	-0.56	0.576	-.0049807	.0027694
PC19	-.0001397	.0020056	-0.07	0.944	-.0040706	.0037913
PC20	-.0003426	.0020183	-0.17	0.865	-.0042984	.0036131
_cons	2.508426	.6953935	3.61	0.000	1.14548	3.871373
sigma2						
_cons	1.110969	.0084497	131.48	0.000	1.094408	1.12753

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.763577	.0454264	16.81	0.000	.6745428	.8526112
ereri_cde	.7291923	.04617	15.79	0.000	.6387008	.8196838
ereri_intref	.0156083	.0068691	2.27	0.023	.0021452	.0290715
ereri_intmed	.0086622	.0021616	4.01	0.000	.0044255	.0128988
ereri_pie	.0101142	.0022591	4.48	0.000	.0056864	.014542
terira	1.763577	.0454264	38.82	0.000	1.674543	1.852611
p_cde	.9549689	.0127574	74.86	0.000	.9299648	.979973
p_intref	.0204411	.0091096	2.24	0.025	.0025865	.0382956
p_intmed	.0113442	.002845	3.99	0.000	.005768	.0169204
p_pie	.0132458	.0029831	4.44	0.000	.007399	.0190926
op_m	.02459	.0046901	5.24	0.000	.0153977	.0337824
op_ati	.0317853	.0117623	2.70	0.007	.0087316	.054839
op_e	.0450311	.0127574	3.53	0.000	.020027	.0700352

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intref to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk interaction; p_intmed=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall proportion eliminated.

```

40 .
41 .
42 . **MEN*****
43 .
44 .
45 . forval x=1(1)3 {
46 .   med4way AD_PGS mediator`x' AGE Agesq SEX PC1-PC20 if sample_final==1 & SEX==1 , a0(0) a1(1) m(0) yreg(cox) mreg
47 .   3.
48 . }

```

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20
> e mean.

-> Summary

```

Outcome (yvar): Age_dementia
Exposure (avar): AD_PGS
Mediator (mvar): mediator1
Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17

```

```

Model for the outcome (yreg): cox
Model for the mediator (mreg): linear

```

```

Referent exposure level (a0): 0
Actual exposure level (a1): 1
Mediator level for the decomposition (m): 0
Fixed values of the covariates (c): 61.14 3769 1 -2.457 1.486 .2042 .06001 -.07538 -.2236 .2024 -.1186

```

-> Model for the outcome

```

Failure _d: dem_diag==1
Analysis time _t: Age_dementia
Enter on or after: time AGE
ID variable: n_eid

```

No. of subjects = 16,011
No. of failures = 541
Time at risk = 191,142.002

```
LR chi2(25)    = 233.04
Prob > chi2    = 0.0000
```

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.586476	.0576188	12.71	0.000	1.477471	1.703523
mediator1	.9045443	.0340308	-2.67	0.008	.8402449	.9737641
_AD_PGSXmediator1_000	.9446498	.0256123	-2.10	0.036	.8957611	.9962068
AGE	.7370589	.238093	-0.94	0.345	.3913251	1.388247
Agesq	1.002793	.0025313	1.11	0.269	.9978445	1.007767
SEX	1	(omitted)				
PC1	1.000385	.0011961	0.32	0.747	.9980436	1.002732
PC2	1.007488	.0055463	1.36	0.175	.9966759	1.018417
PC3	1.007914	.0090637	0.88	0.381	.9903053	1.025836
PC4	1.007306	.0054352	1.35	0.177	.9967093	1.018015
PC5	1.008736	.0055452	1.58	0.114	.997926	1.019663
PC6	.9920752	.0227394	-0.35	0.729	.9484931	1.03766
PC7	1.011154	.0123803	0.91	0.365	.9871774	1.035712
PC8	.9996391	.016855	-0.02	0.983	.9671438	1.033226
PC9	1.004792	.0095493	0.50	0.615	.9862488	1.023684
PC10	1.020613	.0128855	1.62	0.106	.995668	1.046183
PC11	1.012347	.012245	1.01	0.310	.9886294	1.036633
PC12	.9769702	.0143467	-1.59	0.113	.949252	1.005498
PC13	.991051	.0251451	-0.35	0.723	.9429728	1.041581
PC14	.9836374	.0123586	-1.31	0.189	.9597108	1.008161
PC15	.9993657	.0162877	-0.04	0.969	.9679468	1.031804
PC16	1.007635	.0131997	0.58	0.562	.982093	1.033841
PC17	1.008766	.0168219	0.52	0.601	.9763291	1.042281
PC18	.9971195	.0143667	-0.20	0.841	.9693552	1.025679
PC19	1.00599	.0151155	0.40	0.691	.9767963	1.036056
PC20	1.008859	.0154991	0.57	0.566	.9789337	1.039698

```
Iteration 0: Log likelihood = -27866.393
Iteration 1: Log likelihood = -27866.393
```

```
Prob > chi2    = 0.0000
```

mediator1	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	-.0259556	.010689	-2.43	0.015	-.0469057	-.0050054
AGE	.0108421	.0445003	0.24	0.808	-.0763768	.098061
Agesq	-.0001827	.0003678	-0.50	0.619	-.0009035	.0005381
SEX	0 (omitted)					
PC1	-.0009779	.0002163	-4.52	0.000	-.0014019	-.0005539
PC2	-.0011025	.0005139	-2.15	0.032	-.0021098	-.0000953
PC3	.0041733	.0009213	4.53	0.000	.0023676	.005979
PC4	.0010923	.0010346	1.06	0.291	-.0009356	.0031201
PC5	.0005138	.0014538	0.35	0.724	-.0023356	.0033632
PC6	.0009042	.0032916	0.27	0.784	-.0055471	.0073556
PC7	.0024612	.0022537	1.09	0.275	-.001956	.0068784
PC8	.0001759	.0027541	0.06	0.949	-.005222	.0055738
PC9	-.0042446	.0024407	-1.74	0.082	-.0090282	.000539
PC10	.0005994	.0026148	0.23	0.819	-.0045255	.0057244
PC11	.0011588	.0026131	0.44	0.657	-.0039627	.0062803
PC12	.000865	.0028415	0.30	0.761	-.0047041	.0064342
PC13	.0043789	.00467	0.94	0.348	-.0047742	.013532
PC14	-.0064549	.0032537	-1.98	0.047	-.012832	-.0000778
PC15	-.0007319	.0034705	-0.21	0.833	-.0075339	.0060701
PC16	-.0090675	.0033992	-2.67	0.008	-.0157299	-.0024051
PC17	-.0063799	.0043137	-1.48	0.139	-.0148345	.0020747
PC18	.0047917	.003799	1.26	0.207	-.0026542	.0122375
PC19	-.0023878	.0038547	-0.62	0.536	-.0099428	.0051673
PC20	.0064716	.0038906	1.66	0.096	-.0011539	.0140971
_cons	.0531657	1.337606	0.04	0.968	-2.568494	2.674826
sigma2						
_cons	1.902234	.0212603	89.47	0.000	1.860564	1.943903

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.6126232	.0570589	10.74	0.000	.5007898	.7244566
ereri_cde	.5826155	.0572787	10.17	0.000	.4703514	.6948796
ereri_intref	.0234385	.0113376	2.07	0.039	.0012172	.0456599
ereri_intmed	.0039618	.0019278	2.06	0.040	.0001834	.0077402
ereri_pie	.0026074	.0014541	1.79	0.073	-.0002427	.0054574
terira	1.612623	.0570589	28.26	0.000	1.50079	1.724457
p_cde	.9510177	.0212019	44.86	0.000	.9094627	.9925727
p_intref	.0382593	.0185734	2.06	0.039	.001856	.0746626
p_intmed	.0064669	.0031217	2.07	0.038	.0003485	.0125854
p_pie	.0042561	.0023773	1.79	0.073	-.0004034	.0089156
op_m	.010723	.0050107	2.14	0.032	.0009023	.0205437
op_ati	.0447263	.0202497	2.21	0.027	.0050375	.084415
op_e	.0489823	.0212019	2.31	0.021	.0074273	.0905373

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intref=excess relative risk due to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk; p_cde=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall proportion eliminated.

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20
> e mean.

-> Summary

```

Outcome (yvar): Age_dementia
Exposure (avar): AD_PGS
Mediator (mvar): mediator2
Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17

Model for the outcome (yreg): cox
Model for the mediator (mreg): linear

Referent exposure level (a0): 0
Actual exposure level (a1): 1
Mediator level for the decomposition (m): 0
Fixed values of the covariates (c): 61.14 3769 1 -2.457 1.486 .2042 .06001 -.07538 -.2236 .2024 -.1186 .

```

-> Model for the outcome

```

Failure _d: dem_diag==1
Analysis time _t: Age_dementia
Enter on or after: time AGE
ID variable: n_eid

```

note: **SEX** omitted because of collinearity.
Iteration 0: Log likelihood = -4658.1515
Iteration 1: Log likelihood = -4654.4101
Iteration 2: Log likelihood = -4505.7642
Iteration 3: Log likelihood = -4485.083
Iteration 4: Log likelihood = -4484.3949
Iteration 5: Log likelihood = -4484.3939
Refining estimates:
Iteration 0: Log likelihood = -4484.3939

Cox regression with Breslow method for ties

```

No. of subjects = 16,011
No. of failures = 541
Time at risk = 191,142.002

Number of obs = 16,011

LR chi2(25) = 347.52
Prob > chi2 = 0.0000

Log likelihood = -4484.3939

```

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.533662	.0707626	9.27	0.000	1.401056	1.678818
mediator2	1.442496	.0476428	11.09	0.000	1.352076	1.538963
_AD_PGSXmediator2_000	1.014717	.0237538	0.62	0.533	.9692124	1.062358
AGE	.7680282	.2472086	-0.82	0.412	.408693	1.443302
Agesq	1.002118	.0025219	0.84	0.400	.9971877	1.007073
SEX	1 (omitted)					
PC1	1.001087	.0013045	0.83	0.404	.9985338	1.003647
PC2	1.007604	.0063779	1.20	0.231	.9951811	1.020183
PC3	1.005956	.0103837	0.58	0.565	.9858088	1.026515
PC4	1.006655	.005502	1.21	0.225	.9959284	1.017496
PC5	1.00933	.005573	1.68	0.093	.9984663	1.020312
PC6	.9962641	.0226028	-0.16	0.869	.952934	1.041564
PC7	1.010434	.0124366	0.84	0.399	.9863503	1.035106
PC8	1.001556	.0168499	0.09	0.926	.9690693	1.035132
PC9	1.0035	.0094392	0.37	0.710	.9851693	1.022172
PC10	1.02138	.0132251	1.63	0.102	.9957854	1.047632
PC11	1.008391	.0125415	0.67	0.502	.9841077	1.033274
PC12	.9731863	.0151002	-1.75	0.080	.9440359	1.003237
PC13	.9898442	.0253239	-0.40	0.690	.9414342	1.040744

PC14	.9828087	.0125322	-1.36	0.174	.9585504	1.007681
PC15	.9965754	.0161462	-0.21	0.832	.9654266	1.028729
PC16	1.009908	.0131989	0.75	0.451	.9843675	1.036112
PC17	1.005948	.0178863	0.33	0.739	.9714953	1.041623
PC18	1.002891	.0144458	0.20	0.841	.974974	1.031608
PC19	1.01282	.0152675	0.85	0.398	.9833344	1.043191
PC20	1.001683	.0154376	0.11	0.913	.9718781	1.032402

-> Model for the mediator
note: **SEX** omitted because of collinearity.

Iteration 0: Log likelihood = -25957.714

Iteration 1: Log likelihood = -25957.714

Linear regression (Maximum Likelihood)

Number of obs = 16,011

Wald chi2(23) = 3618.52

Log likelihood = -25957.714

Prob > chi2 = 0.0000

mediator2	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	.092286	.0094878	9.73	0.000	.0736902	.1108818
AGE	-.1195497	.0394994	-3.03	0.002	-.196967	-.0421324
Agesq	.0018172	.0003264	5.57	0.000	.0011774	.002457
SEX	0 (omitted)					
PC1	-.0013606	.000192	-7.09	0.000	-.0017369	-.0009842
PC2	.0000975	.0004562	0.21	0.831	-.0007966	.0009915
PC3	.0045059	.0008178	5.51	0.000	.0029031	.0061086
PC4	.0016655	.0009184	1.81	0.070	-.0001345	.0034655
PC5	-.0032232	.0012904	-2.50	0.012	-.0057524	-.000694
PC6	-.0019713	.0029217	-0.67	0.500	-.0076977	.0037551
PC7	-.0020215	.0020005	-1.01	0.312	-.0059423	.0018993
PC8	-.0021652	.0024446	-0.89	0.376	-.0069565	.0026261
PC9	.0017257	.0021664	0.80	0.426	-.0025204	.0059717
PC10	.0033595	.002321	1.45	0.148	-.0011895	.0079085
PC11	.0032743	.0023194	1.41	0.158	-.0012717	.0078202
PC12	.0036831	.0025221	1.46	0.144	-.0012602	.0086264
PC13	-.0027923	.0041452	-0.67	0.501	-.0109168	.0053322
PC14	.0002636	.002888	0.09	0.927	-.0053969	.005924
PC15	.0005175	.0030805	0.17	0.867	-.0055201	.0065551
PC16	-.0040157	.0030172	-1.33	0.183	-.0099294	.001898
PC17	.0035478	.0038289	0.93	0.354	-.0039567	.0110523
PC18	-.007907	.003372	-2.34	0.019	-.0145161	-.0012979
PC19	.0022911	.0034215	0.67	0.503	-.0044149	.0089971
PC20	.0021761	.0034534	0.63	0.529	-.0045925	.0089447
_cons	.4793964	1.187287	0.40	0.686	-1.847644	2.806437
sigma2						
_cons	1.498715	.0167504	89.47	0.000	1.465885	1.531545

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.6021826	.0615189	9.79	0.000	.4816077	.7227575
ereri_cde	.4781715	.0622315	7.68	0.000	.3562	.6001429
ereri_intref	.0686579	.016592	4.14	0.000	.0361381	.1011777
ereri_intmed	.0209639	.003788	5.53	0.000	.0135395	.0283882
ereri_pie	.0343894	.0047822	7.19	0.000	.0250165	.0437622
terira	1.602183	.0615189	26.04	0.000	1.481608	1.722757
p_cde	.7940639	.0384146	20.67	0.000	.7187727	.8693551
p_intref	.1140151	.0294088	3.88	0.000	.0563749	.1716553
p_intmed	.0348131	.0061103	5.70	0.000	.0228371	.0467891
p_pie	.0571079	.0089285	6.40	0.000	.0396083	.0746074
op_m	.091921	.0133451	6.89	0.000	.0657652	.1180768
op_ati	.1488282	.0345394	4.31	0.000	.0811322	.2165242
op_e	.2059361	.0384146	5.36	0.000	.1306449	.2812273

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intref=excess relative risk due to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk due to interaction; p_intmed=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall proportion eliminated.

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20 PC21 PC22 PC23 PC24 PC25 PC26 PC27 PC28 PC29 PC30 PC31 PC32 PC33 PC34 PC35 PC36 PC37 PC38 PC39 PC40 PC41 PC42 PC43 PC44 PC45 PC46 PC47 PC48 PC49 PC50 PC51 PC52 PC53 PC54 PC55 PC56 PC57 PC58 PC59 PC60 PC61 PC62 PC63 PC64 PC65 PC66 PC67 PC68 PC69 PC70 PC71 PC72 PC73 PC74 PC75 PC76 PC77 PC78 PC79 PC80 PC81 PC82 PC83 PC84 PC85 PC86 PC87 PC88 PC89 PC90 PC91 PC92 PC93 PC94 PC95 PC96 PC97 PC98 PC99 PC100 PC101 PC102 PC103 PC104 PC105 PC106 PC107 PC108 PC109 PC110 PC111 PC112 PC113 PC114 PC115 PC116 PC117 PC118 PC119 PC120 PC121 PC122 PC123 PC124 PC125 PC126 PC127 PC128 PC129 PC130 PC131 PC132 PC133 PC134 PC135 PC136 PC137 PC138 PC139 PC140 PC141 PC142 PC143 PC144 PC145 PC146 PC147 PC148 PC149 PC150 PC151 PC152 PC153 PC154 PC155 PC156 PC157 PC158 PC159 PC160 PC161 PC162 PC163 PC164 PC165 PC166 PC167 PC168 PC169 PC170 PC171 PC172 PC173 PC174 PC175 PC176 PC177 PC178 PC179 PC180 PC181 PC182 PC183 PC184 PC185 PC186 PC187 PC188 PC189 PC190 PC191 PC192 PC193 PC194 PC195 PC196 PC197 PC198 PC199 PC200 PC201 PC202 PC203 PC204 PC205 PC206 PC207 PC208 PC209 PC210 PC211 PC212 PC213 PC214 PC215 PC216 PC217 PC218 PC219 PC220 PC221 PC222 PC223 PC224 PC225 PC226 PC227 PC228 PC229 PC230 PC231 PC232 PC233 PC234 PC235 PC236 PC237 PC238 PC239 PC240 PC241 PC242 PC243 PC244 PC245 PC246 PC247 PC248 PC249 PC250 PC251 PC252 PC253 PC254 PC255 PC256 PC257 PC258 PC259 PC260 PC261 PC262 PC263 PC264 PC265 PC266 PC267 PC268 PC269 PC270 PC271 PC272 PC273 PC274 PC275 PC276 PC277 PC278 PC279 PC280 PC281 PC282 PC283 PC284 PC285 PC286 PC287 PC288 PC289 PC290 PC291 PC292 PC293 PC294 PC295 PC296 PC297 PC298 PC299 PC300 PC301 PC302 PC303 PC304 PC305 PC306 PC307 PC308 PC309 PC310 PC311 PC312 PC313 PC314 PC315 PC316 PC317 PC318 PC319 PC320 PC321 PC322 PC323 PC324 PC325 PC326 PC327 PC328 PC329 PC330 PC331 PC332 PC333 PC334 PC335 PC336 PC337 PC338 PC339 PC340 PC341 PC342 PC343 PC344 PC345 PC346 PC347 PC348 PC349 PC350 PC351 PC352 PC353 PC354 PC355 PC356 PC357 PC358 PC359 PC360 PC361 PC362 PC363 PC364 PC365 PC366 PC367 PC368 PC369 PC370 PC371 PC372 PC373 PC374 PC375 PC376 PC377 PC378 PC379 PC380 PC381 PC382 PC383 PC384 PC385 PC386 PC387 PC388 PC389 PC390 PC391 PC392 PC393 PC394 PC395 PC396 PC397 PC398 PC399 PC400 PC401 PC402 PC403 PC404 PC405 PC406 PC407 PC408 PC409 PC410 PC411 PC412 PC413 PC414 PC415 PC416 PC417 PC418 PC419 PC420 PC421 PC422 PC423 PC424 PC425 PC426 PC427 PC428 PC429 PC430 PC431 PC432 PC433 PC434 PC435 PC436 PC437 PC438 PC439 PC440 PC441 PC442 PC443 PC444 PC445 PC446 PC447 PC448 PC449 PC450 PC451 PC452 PC453 PC454 PC455 PC456 PC457 PC458 PC459 PC460 PC461 PC462 PC463 PC464 PC465 PC466 PC467 PC468 PC469 PC470 PC471 PC472 PC473 PC474 PC475 PC476 PC477 PC478 PC479 PC480 PC481 PC482 PC483 PC484 PC485 PC486 PC487 PC488 PC489 PC490 PC491 PC492 PC493 PC494 PC495 PC496 PC497 PC498 PC499 PC500 PC501 PC502 PC503 PC504 PC505 PC506 PC507 PC508 PC509 PC510 PC511 PC512 PC513 PC514 PC515 PC516 PC517 PC518 PC519 PC520 PC521 PC522 PC523 PC524 PC525 PC526 PC527 PC528 PC529 PC530 PC531 PC532 PC533 PC534 PC535 PC536 PC537 PC538 PC539 PC540 PC541 PC542 PC543 PC544 PC545 PC546 PC547 PC548 PC549 PC550 PC551 PC552 PC553 PC554 PC555 PC556 PC557 PC558 PC559 PC560 PC561 PC562 PC563 PC564 PC565 PC566 PC567 PC568 PC569 PC570 PC571 PC572 PC573 PC574 PC575 PC576 PC577 PC578 PC579 PC580 PC581 PC582 PC583 PC584 PC585 PC586 PC587 PC588 PC589 PC590 PC591 PC592 PC593 PC594 PC595 PC596 PC597 PC598 PC599 PC600 PC601 PC602 PC603 PC604 PC605 PC606 PC607 PC608 PC609 PC610 PC611 PC612 PC613 PC614 PC615 PC616 PC617 PC618 PC619 PC620 PC621 PC622 PC623 PC624 PC625 PC626 PC627 PC628 PC629 PC630 PC631 PC632 PC633 PC634 PC635 PC636 PC637 PC638 PC639 PC640 PC641 PC642 PC643 PC644 PC645 PC646 PC647 PC648 PC649 PC650 PC651 PC652 PC653 PC654 PC655 PC656 PC657 PC658 PC659 PC660 PC661 PC662 PC663 PC664 PC665 PC666 PC667 PC668 PC669 PC670 PC671 PC672 PC673 PC674 PC675 PC676 PC677 PC678 PC679 PC680 PC681 PC682 PC683 PC684 PC685 PC686 PC687 PC688 PC689 PC690 PC691 PC692 PC693 PC694 PC695 PC696 PC697 PC698 PC699 PC700 PC701 PC702 PC703 PC704 PC705 PC706 PC707 PC708 PC709 PC710 PC711 PC712 PC713 PC714 PC715 PC716 PC717 PC718 PC719 PC720 PC721 PC722 PC723 PC724 PC725 PC726 PC727 PC728 PC729 PC730 PC731 PC732 PC733 PC734 PC735 PC736 PC737 PC738 PC739 PC740 PC741 PC742 PC743 PC744 PC745 PC746 PC747 PC748 PC749 PC750 PC751 PC752 PC753 PC754 PC755 PC756 PC757 PC758 PC759 PC760 PC761 PC762 PC763 PC764 PC765 PC766 PC767 PC768 PC769 PC770 PC771 PC772 PC773 PC774 PC775 PC776 PC777 PC778 PC779 PC780 PC781 PC782 PC783 PC784 PC785 PC786 PC787 PC788 PC789 PC790 PC791 PC792 PC793 PC794 PC795 PC796 PC797 PC798 PC799 PC800 PC801 PC802 PC803 PC804 PC805 PC806 PC807 PC808 PC809 PC810 PC811 PC812 PC813 PC814 PC815 PC816 PC817 PC818 PC819 PC820 PC821 PC822 PC823 PC824 PC825 PC826 PC827 PC828 PC829 PC830 PC831 PC832 PC833 PC834 PC835 PC836 PC837 PC838 PC839 PC840 PC841 PC842 PC843 PC844 PC845 PC846 PC847 PC848 PC849 PC850 PC851 PC852 PC853 PC854 PC855 PC856 PC857 PC858 PC859 PC860 PC861 PC862 PC863 PC864 PC865 PC866 PC867 PC868 PC869 PC870 PC871 PC872 PC873 PC874 PC875 PC876 PC877 PC878 PC879 PC880 PC881 PC882 PC883 PC884 PC885 PC886 PC887 PC888 PC889 PC890 PC891 PC892 PC893 PC894 PC895 PC896 PC897 PC898 PC899 PC900 PC901 PC902 PC903 PC904 PC905 PC906 PC907 PC908 PC909 PC910 PC911 PC912 PC913 PC914 PC915 PC916 PC917 PC918 PC919 PC920 PC921 PC922 PC923 PC924 PC925 PC926 PC927 PC928 PC929 PC930 PC931 PC932 PC933 PC934 PC935 PC936 PC937 PC938 PC939 PC940 PC941 PC942 PC943 PC944 PC945 PC946 PC947 PC948 PC949 PC950 PC951 PC952 PC953 PC954 PC955 PC956 PC957 PC958 PC959 PC960 PC961 PC962 PC963 PC964 PC965 PC966 PC967 PC968 PC969 PC970 PC971 PC972 PC973 PC974 PC975 PC976 PC977 PC978 PC979 PC980 PC981 PC982 PC983 PC984 PC985 PC986 PC987 PC988 PC989 PC990 PC991 PC992 PC993 PC994 PC995 PC996 PC997 PC998 PC999

-> Summary

Outcome (yvar): Age_dementia
 Exposure (avar): AD_PGS
 Mediator (mvar): mediator3
 Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20 PC21 PC22 PC23 PC24 PC25 PC26 PC27 PC28 PC29 PC30 PC31 PC32 PC33 PC34 PC35 PC36 PC37 PC38 PC39 PC40 PC41 PC42 PC43 PC44 PC45 PC46 PC47 PC48 PC49 PC50 PC51 PC52 PC53 PC54 PC55 PC56 PC57 PC58 PC59 PC60 PC61 PC62 PC63 PC64 PC65 PC66 PC67 PC68 PC69 PC70 PC71 PC72 PC73 PC74 PC75 PC76 PC77 PC78 PC79 PC80 PC81 PC82 PC83 PC84 PC85 PC86 PC87 PC88 PC89 PC90 PC91 PC92 PC93 PC94 PC95 PC96 PC97 PC98 PC99 PC100 PC101 PC102 PC103 PC104 PC105 PC106 PC107 PC108 PC109 PC110 PC111 PC112 PC113 PC114 PC115 PC116 PC117 PC118 PC119 PC120 PC121 PC122 PC123 PC124 PC125 PC126 PC127 PC128 PC129 PC130 PC131 PC132 PC133 PC134 PC135 PC136 PC137 PC138 PC139 PC140 PC141 PC142 PC143 PC144 PC145 PC146 PC147 PC148 PC149 PC150 PC151 PC152 PC153 PC154 PC155 PC156 PC157 PC158 PC159 PC160 PC161 PC162 PC163 PC164 PC165 PC166 PC167 PC168 PC169 PC170 PC171 PC172 PC173 PC174 PC175 PC176 PC177 PC178 PC179 PC180 PC181 PC182 PC183 PC184 PC185 PC186 PC187 PC188 PC189 PC190 PC191 PC192 PC193 PC194 PC195 PC196 PC197 PC198 PC199 PC200 PC201 PC202 PC203 PC204 PC205 PC206 PC207 PC208 PC209 PC210 PC211 PC212 PC213 PC214 PC215 PC216 PC217 PC218 PC219 PC220 PC221 PC222 PC223 PC224 PC225 PC226 PC227 PC228 PC229 PC230 PC231 PC232 PC233 PC234 PC235 PC236 PC237 PC238 PC239 PC240 PC241 PC242 PC243 PC244 PC245 PC246 PC247 PC248 PC249 PC250 PC251 PC252 PC253 PC254 PC255 PC256 PC257 PC258 PC259 PC260 PC261 PC262 PC263 PC264 PC265 PC266 PC267 PC268 PC269 PC270 PC271 PC272 PC273 PC274 PC275 PC276 PC277 PC278 PC279 PC280 PC281 PC282 PC283 PC284 PC285 PC286 PC287 PC288 PC289 PC290 PC291 PC292 PC293 PC294 PC295 PC296 PC297 PC298 PC299 PC300 PC301 PC302 PC303 PC304 PC305 PC306 PC307 PC308 PC309 PC310 PC311 PC312 PC313 PC314 PC315 PC316 PC317 PC318 PC319 PC320 PC321 PC322 PC323 PC324 PC325 PC326 PC327 PC328 PC329 PC330 PC331 PC332 PC333 PC334 PC335 PC336 PC337 PC338 PC339 PC340 PC341 PC342 PC343 PC344 PC345 PC346 PC347 PC348 PC349 PC350 PC351 PC352 PC353 PC354 PC355 PC356 PC357 PC358 PC359 PC360 PC361 PC362 PC363 PC364 PC365 PC366 PC367 PC368 PC369 PC370 PC371 PC372 PC373 PC374 PC375 PC376 PC377 PC378 PC379 PC380 PC381 PC382 PC383 PC384 PC385 PC386 PC387 PC388 PC389 PC390 PC391 PC392 PC393 PC394 PC395 PC396 PC397 PC398 PC399 PC400 PC401 PC402 PC403 PC404 PC405 PC406 PC407 PC408 PC409 PC410 PC411 PC412 PC413 PC414 PC415 PC416 PC417 PC418 PC419 PC420 PC421 PC422 PC423 PC424 PC425 PC426 PC427 PC428 PC429 PC430 PC431 PC432 PC433 PC434 PC435 PC436 PC437 PC438 PC439 PC440 PC441 PC442 PC443 PC444 PC445 PC446 PC447 PC448 PC449 PC450 PC451 PC452 PC453 PC454 PC455 PC456 PC457 PC458 PC459 PC460 PC461 PC462 PC463 PC464 PC465 PC466 PC467 PC468 PC469 PC470 PC471 PC472 PC473 PC474 PC475 PC476 PC477 PC478 PC479 PC480 PC481 PC482 PC483 PC484 PC485 PC486 PC487 PC488 PC489 PC490 PC491 PC492 PC493 PC494 PC495 PC496 PC497 PC498 PC499 PC500 PC501 PC502 PC503 PC504 PC505 PC506 PC507 PC508 PC509 PC510 PC511 PC512 PC513 PC514 PC515 PC516 PC517 PC518 PC519 PC520 PC521 PC522 PC523 PC524 PC525 PC526 PC527 PC528 PC529 PC530 PC531 PC532 PC533 PC534 PC535 PC536 PC537 PC538 PC539 PC540 PC541 PC542 PC543 PC544 PC545 PC546 PC547 PC548 PC549 PC550 PC551 PC552 PC553 PC554 PC555 PC556 PC557 PC558 PC559 PC560 PC561 PC562 PC563 PC564 PC565 PC566 PC567 PC568 PC569 PC570 PC571 PC572 PC573 PC574 PC575 PC576 PC577 PC578 PC579 PC580 PC581 PC582 PC583 PC584 PC585 PC586 PC587 PC588 PC589 PC590 PC591 PC592 PC593 PC594 PC595 PC596 PC597 PC598 PC599 PC600 PC601 PC602 PC603 PC604 PC605 PC606 PC607 PC608 PC609 PC610 PC611 PC612 PC613 PC614 PC615 PC616 PC617 PC618 PC619 PC620 PC621 PC622 PC623 PC624 PC625 PC626 PC627 PC628 PC629 PC630 PC631 PC632 PC633 PC634 PC635 PC636 PC637 PC638 PC639 PC640 PC641 PC642 PC643 PC644 PC645 PC646 PC647 PC648 PC649 PC650 PC651 PC652 PC653 PC654 PC655 PC656 PC657 PC658 PC659 PC660 PC661 PC662 PC663 PC664 PC665 PC666 PC667 PC668 PC669 PC670 PC671 PC672 PC673 PC674 PC675 PC676 PC677 PC678 PC679 PC680 PC681 PC682 PC683 PC684 PC685 PC686 PC687 PC688 PC689 PC690 PC691 PC692 PC693 PC694 PC695 PC696 PC697 PC698 PC699 PC700 PC701 PC702 PC703 PC704 PC705 PC706 PC707 PC708 PC709 PC710 PC711 PC712 PC713 PC714 PC715 PC716 PC717 PC718 PC719 PC720 PC721 PC722 PC723 PC724 PC725 PC726 PC727 PC728 PC729 PC730 PC731 PC732 PC733 PC734 PC735 PC736 PC737 PC738 PC739 PC740 PC741 PC742 PC743 PC744 PC745 PC746 PC747 PC748 PC749 PC750 PC751 PC752 PC753 PC754 PC755 PC756 PC757 PC758 PC759 PC760 PC761 PC762 PC763 PC764 PC765 PC766 PC767 PC768 PC769 PC770 PC771 PC772 PC773 PC774 PC775 PC776 PC777 PC778 PC779 PC780 PC781 PC782 PC783 PC784 PC785 PC786 PC787 PC788 PC789 PC790 PC791 PC792 PC793 PC794 PC795 PC796 PC797 PC798 PC799 PC800 PC801 PC802 PC803 PC804 PC805 PC806 PC807 PC808 PC809 PC810 PC811 PC812 PC813 PC814 PC815 PC816 PC817 PC818 PC819 PC820 PC821 PC822 PC823 PC824 PC825 PC826 PC827 PC828 PC829 PC830 PC831 PC832 PC833 PC834 PC835 PC836 PC837 PC838 PC839 PC840 PC841 PC842 PC843 PC844 PC845 PC846 PC847 PC848 PC849 PC850 PC851 PC852 PC853 PC854 PC855 PC856 PC857 PC858 PC859 PC860 PC861 PC862 PC863 PC864 PC865 PC866 PC867 PC868 PC869 PC870 PC871 PC872 PC873 PC874 PC875 PC876 PC877 PC878 PC879 PC880 PC881 PC882 PC883 PC884 PC885 PC886 PC887 PC888 PC889 PC890 PC891 PC892 PC893 PC894 PC895 PC896 PC897 PC898 PC899 PC900 PC901 PC902 PC903 PC904 PC905 PC906 PC907 PC908 PC909 PC910 PC911 PC912 PC913 PC914 PC915 PC916 PC917 PC918 PC919 PC920 PC921 PC922 PC923 PC924 PC925 PC926 PC927 PC928 PC929 PC930 PC931 PC932 PC933 PC934 PC935 PC936 PC937 PC938 PC939 PC940 PC941 PC942 PC943 PC944 PC945 PC946 PC947 PC948 PC949 PC950 PC951 PC952 PC953 PC954 PC955 PC956 PC957 PC958 PC959 PC960 PC961 PC962 PC963 PC964 PC965 PC966 PC967 PC968 PC969 PC970 PC971 PC972 PC973 PC974 PC975 PC976 PC977 PC978 PC979 PC980 PC981 PC982 PC983 PC984 PC985 PC986 PC987 PC988 PC989 PC990 PC991 PC992 PC993 PC994 PC995 PC996 PC997 PC998 PC999

Model for the outcome (yreg): cox
 Model for the mediator (mreg): linear

Referent exposure level (a0): 0
 Actual exposure level (a1): 1
 Mediator level for the decomposition (m): 0
 Fixed values of the covariates (c): 61.14 3769 1 -2.457 1.486 .2042 .06001 -.07538 -.2236 .2024 -.1186

-> Model for the outcome

Failure _d: dem_diag==1
 Analysis time _t: Age_dementia
 Enter on or after: time AGE
 ID variable: n_eid

note: SEX omitted because of collinearity.

Iteration 0: Log likelihood = -4658.1515

Iteration 1: Log likelihood = -4560.5809

Iteration 2: Log likelihood = -4541.7738

Iteration 3: Log likelihood = -4541.0663

Iteration 4: Log likelihood = -4541.0625

Iteration 5: Log likelihood = -4541.0625

Refining estimates:

Iteration 0: Log likelihood = -4541.0625

Cox regression with Breslow method for ties

No. of subjects = **16,011**
 No. of failures = **541**
 Time at risk = **191,142.002**

Number of obs = **16,011**

Log likelihood = **-4541.0625**

LR chi2(25) = **234.18**
 Prob > chi2 = **0.0000**

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.604314	.0581012	13.05	0.000	1.494385	1.722329
mediator3	1.231319	.0559557	4.58	0.000	1.12639	1.346023
_AD_PGSXmediator3_000	.9758161	.0319907	-0.75	0.455	.9150874	1.040575
AGE	.7364582	.2373831	-0.95	0.343	.3915432	1.385213
Agesq	1.00276	.0025261	1.09	0.274	.9978216	1.007724
SEX	1	(omitted)				
PC1	1.000826	.001269	0.65	0.515	.9983416	1.003316
PC2	1.007772	.0061563	1.27	0.205	.9957776	1.01991
PC3	1.007869	.0100545	0.79	0.432	.988354	1.02777
PC4	1.007181	.0055601	1.30	0.195	.9963426	1.018138
PC5	1.008648	.0055637	1.56	0.119	.9978016	1.019611
PC6	.9922455	.0224659	-0.34	0.731	.9491759	1.037269
PC7	1.010569	.012464	0.85	0.394	.9864325	1.035295
PC8	.9976734	.0168421	-0.14	0.890	.9652036	1.031236
PC9	1.004605	.0095606	0.48	0.629	.9860404	1.023519
PC10	1.020624	.0129827	1.60	0.109	.9954931	1.04639
PC11	1.011832	.0122323	0.97	0.331	.9881391	1.036093
PC12	.9775886	.0144521	-1.53	0.125	.9496694	1.006329
PC13	.9864169	.0252382	-0.53	0.593	.9381707	1.037144
PC14	.9861257	.0124246	-1.11	0.267	.9620722	1.010781
PC15	.9975361	.0165065	-0.15	0.881	.9657029	1.030419
PC16	1.009837	.0132839	0.74	0.457	.9841342	1.036212
PC17	1.00823	.018042	0.46	0.647	.9734816	1.04422
PC18	.9971553	.0143157	-0.20	0.843	.9694881	1.025612
PC19	1.009007	.0151403	0.60	0.550	.9797643	1.039122
PC20	1.006179	.0154644	0.40	0.689	.9763213	1.03695

-> Model for the mediator
 note: **SEX** omitted because of collinearity.

Iteration 0: Log likelihood = **-23704.403**
 Iteration 1: Log likelihood = **-23704.403**

Linear regression (Maximum Likelihood)

Number of obs = **16,011**
 Wald chi2(23) = **515.39**
 Prob > chi2 = **0.0000**

Log likelihood = **-23704.403**

mediator3	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	.0573357	.0082423	6.96	0.000	.0411811	.0734902
AGE	-.1327812	.0343139	-3.87	0.000	-.2000351	-.0655273
Agesq	.0013115	.0002836	4.62	0.000	.0007557	.0018673
SEX	0	(omitted)				
PC1	-.0014665	.0001668	-8.79	0.000	-.0017934	-.0011395
PC2	.000385	.0003963	0.97	0.331	-.0003917	.0011617
PC3	.0008644	.0007104	1.22	0.224	-.0005279	.0022568
PC4	.0025334	.0007978	3.18	0.001	.0009698	.0040971
PC5	-.0009371	.001121	-0.84	0.403	-.0031343	.00126
PC6	.0048723	.0025381	1.92	0.055	-.0001023	.0098469
PC7	.0011894	.0017378	0.68	0.494	-.0022167	.0045955

PC8	.0061856	.0021237	2.91	0.004	.0020234	.0103479
PC9	.003308	.001882	1.76	0.079	-.0003806	.0069967
PC10	.0005327	.0020163	0.26	0.792	-.0034191	.0044846
PC11	-.0011964	.0020149	-0.59	0.553	-.0051455	.0027528
PC12	.001106	.002191	0.50	0.614	-.0031883	.0054004
PC13	.0007199	.003601	0.20	0.842	-.006338	.0077778
PC14	-.0043055	.0025089	-1.72	0.086	-.0092228	.0006119
PC15	.0079019	.0026761	2.95	0.003	.0026569	.0131468
PC16	-.0046907	.0026211	-1.79	0.074	-.009828	.0004466
PC17	-6.10e-06	.0033262	-0.00	0.999	-.0065254	.0065132
PC18	-.0061327	.0029294	-2.09	0.036	-.0118741	-.0003913
PC19	-.0034196	.0029723	-1.15	0.250	-.0092452	.0024061
PC20	-.001434	.0030001	-0.48	0.633	-.007314	.004446
_cons	3.049587	1.03142	2.96	0.003	1.028042	5.071132
<hr/>						
sigma2						
_cons	1.13104	.0126411	89.47	0.000	1.106264	1.155816

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.6173622	.0573249	10.77	0.000	.5050075	.7297169
ereri_cde	.6049062	.0580078	10.43	0.000	.4912131	.7185993
ereri_intref	-.0044809	.0042102	-1.06	0.287	-.0127327	.0037709
ereri_intmed	.0049346	.0027683	1.78	0.075	-.0004911	.0103604
ereri_pie	.0120022	.0031568	3.80	0.000	.005815	.0181894
terira	1.617362	.0573249	28.21	0.000	1.505008	1.729717
p_cde	.9798239	.0120841	81.08	0.000	.9561396	1.003508
p_intref	-.0072581	.006732	-1.08	0.281	-.0204527	.0059364
p_intmed	.0079931	.0044631	1.79	0.073	-.0007545	.0167407
p_pie	.0194411	.0052989	3.67	0.000	.0090555	.0298267
op_m	.0274342	.0075822	3.62	0.000	.0125733	.0422951
op_ati	.0007349	.0109493	0.07	0.946	-.0207252	.0221951
op_e	.0201761	.0120841	1.67	0.095	-.0035083	.0438604

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intref=excess relative risk due to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk; p_cde=proportion mediated interaction; p_intmed=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall proportion eliminated.

49 .
50 .
51 .
52 .
53 .
54 . **WOMEN*****

```

55 .
56 .
57 . forval x=1(1)3 {
      2.
58 . med4way AD_PGS mediator`x' AGE Agesq SEX PC1-PC20 if sample_final==1 & SEX==2 , a0(0) a1(1) m(0) yreg(cox) mre
      3.
59 .
60 . }

```

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20
> e mean.

-> Summary

```

Outcome (yvar): Age_dementia
Exposure (avar): AD_PGS
Mediator (mvar): mediator1
Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20

```

```

Model for the outcome (yreg): cox
Model for the mediator (mreg): linear

```

```

Referent exposure level (a0): 0
Actual exposure level (a1): 1
Mediator level for the decomposition (m): 0
Fixed values of the covariates (c): 60.6 3702 2 -1.274 1.402 -.4611 .1179 -.04816 -.07928 -.08769 -.0875

```

-> Model for the outcome

```

Failure _d: dem_diag==1
Analysis time _t: Age_dementia
Enter on or after: time AGE
ID variable: n_eid

```

```

note: SEX omitted because of collinearity.
Iteration 0: Log likelihood = -4076.6137
Iteration 1: Log likelihood = -3936.1874
Iteration 2: Log likelihood = -3902.0811
Iteration 3: Log likelihood = -3900.6517
Iteration 4: Log likelihood = -3900.6407
Iteration 5: Log likelihood = -3900.6407
Refining estimates:
Iteration 0: Log likelihood = -3900.6407

```

Cox regression with Breslow method for ties

```

No. of subjects = 18,563
No. of failures = 469
Time at risk = 228,013.477

```

Log likelihood = -3900.6407

Number of obs = 18,563

```

LR chi2(25) = 351.95
Prob > chi2 = 0.0000

```

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.967632	.0727545	18.30	0.000	1.830081	2.115523
mediator1	.8993593	.0390488	-2.44	0.015	.8259912	.9792444
_AD_PGSXmediator1_000	1.009557	.0277402	0.35	0.729	.9566248	1.065417
AGE	.6556567	.1999758	-1.38	0.166	.3606279	1.192048
Agesq	1.003595	.0024092	1.49	0.135	.9988842	1.008328
SEX	1	(omitted)				
PC1	1.000814	.0011073	0.74	0.462	.9986462	1.002987
PC2	1.007464	.0054202	1.38	0.167	.9968961	1.018143
PC3	1.005248	.0094416	0.56	0.577	.9869125	1.023925
PC4	1.003709	.0051915	0.72	0.474	.9935854	1.013936
PC5	1.005024	.0055111	0.91	0.361	.9942799	1.015883
PC6	1.003714	.0120023	0.31	0.757	.9804635	1.027516
PC7	.9918248	.0104254	-0.78	0.435	.9716003	1.01247
PC8	.9945205	.0117838	-0.46	0.643	.9716908	1.017887
PC9	.9949544	.0105829	-0.48	0.634	.9744269	1.015914
PC10	.9770842	.0151219	-1.50	0.134	.9478909	1.007177
PC11	1.034779	.0112686	3.14	0.002	1.012927	1.057102
PC12	.9792754	.0131576	-1.56	0.119	.9538236	1.005406
PC13	1.022062	.0252523	0.88	0.377	.9737473	1.072773
PC14	.9917307	.0132612	-0.62	0.535	.9660768	1.018066
PC15	1.00143	.0137993	0.10	0.917	.974746	1.028845
PC16	.9887627	.0142534	-0.78	0.433	.9612175	1.017097
PC17	.9927914	.0194556	-0.37	0.712	.9553822	1.031666
PC18	.9916462	.015486	-0.54	0.591	.9617539	1.022468
PC19	1.012045	.016664	0.73	0.467	.9799052	1.045238
PC20	1.027522	.0170517	1.64	0.102	.9946392	1.061492

-> Model for the mediator
note: **SEX** omitted because of collinearity.

Iteration 0: Log likelihood = -32665.285
Iteration 1: Log likelihood = -32665.285

Linear regression (Maximum Likelihood)

Number of obs = 18,563

Wald chi2(23) = 614.15

Log likelihood = -32665.285

Prob > chi2 = 0.0000

mediator1	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	-.0139266	.0102514	-1.36	0.174	-.034019	.0061658
AGE	.33663	.0423559	7.95	0.000	.253614	.4196459
Agesq	-.0024679	.0003514	-7.02	0.000	-.0031567	-.0017792
SEX	0	(omitted)				
PC1	-.0002906	.000187	-1.55	0.120	-.0006572	.000076
PC2	-.0018119	.0004129	-4.39	0.000	-.0026212	-.0010027
PC3	.0056851	.0007862	7.23	0.000	.0041442	.007226
PC4	.0023954	.001007	2.38	0.017	.0004218	.004369
PC5	-.0017449	.0013524	-1.29	0.197	-.0043957	.0009058
PC6	.0014927	.0022068	0.68	0.499	-.0028325	.0058178
PC7	.0052466	.0021365	2.46	0.014	.0010591	.009434
PC8	-.0042461	.0022273	-1.91	0.057	-.0086116	.0001193
PC9	.0011756	.0023341	0.50	0.615	-.0033992	.0057503
PC10	.0060394	.0027952	2.16	0.031	.0005609	.0115179
PC11	.0000332	.0027706	0.01	0.990	-.005397	.0054635
PC12	-.0016505	.00311	-0.53	0.596	-.0077459	.0044449
PC13	.0102352	.003222	3.18	0.001	.0039202	.0165502

PC14	-.00594	.0030792	-1.93	0.054	-.0119751	.0000951
PC15	-.0086302	.0031651	-2.73	0.006	-.0148336	-.0024268
PC16	-.0055421	.0032806	-1.69	0.091	-.0119719	.0008876
PC17	.0033995	.0038163	0.89	0.373	-.0040803	.0108794
PC18	-.0030874	.0036034	-0.86	0.392	-.0101499	.0039751
PC19	.0044296	.0036545	1.21	0.225	-.002733	.0115923
PC20	.0066774	.0036685	1.82	0.069	-.0005127	.0138675
_cons	-11.28091	1.268409	-8.89	0.000	-13.76695	-8.794872
sigma2						
_cons	1.97688	.0205197	96.34	0.000	1.936663	2.017098

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.9661007	.0727295	13.28	0.000	.8235535	1.108648
ereri_cde	.9546021	.0720631	13.25	0.000	.8133609	1.095843
ereri_intref	.0088564	.0093315	0.95	0.343	-.0094329	.0271458
ereri_intmed	.0011639	.0010627	1.10	0.273	-.000919	.0032467
ereri_pie	.0014783	.001246	1.19	0.235	-.0009639	.0039205
terira	1.966101	.0727295	27.03	0.000	1.823553	2.108648
p_cde	.9880979	.0105025	94.08	0.000	.9675133	1.008682
p_intref	.0091672	.0095909	0.96	0.339	-.0096307	.0279651
p_intmed	.0012047	.0010913	1.10	0.270	-.0009342	.0033436
p_pie	.0015302	.001296	1.18	0.238	-.00101	.0040704
op_m	.0027349	.0022411	1.22	0.222	-.0016576	.0071274
op_ati	.0103719	.0102567	1.01	0.312	-.0097309	.0304747
op_e	.0119021	.0105025	1.13	0.257	-.0086825	.0324867

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intref=excess relative risk due to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk; op_m=overall proportion mediated interaction; p_intmed=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall proportion eliminated.

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20
> e mean.

-> Summary

Outcome (yvar): Age_dementia
Exposure (avar): AD_PGS
Mediator (mvar): mediator2
Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17 PC18 PC19 PC20

Model for the outcome (yreg): cox
Model for the mediator (mreg): linear

Referent exposure level (a0): 0
Actual exposure level (a1): 1
Mediator level for the decomposition (m): 0
Fixed values of the covariates (c): 60.6 3702 2 -1.274 1.402 -.4611 .1179 -.04816 -.07928 -.08769 -.0875

-> Model for the outcome

Failure _d: dem_diag==1
 Analysis time _t: Age_dementia
 Enter on or after: time AGE
 ID variable: n_eid

note: **SEX** omitted because of collinearity.
 Iteration 0: Log likelihood = -4076.6137
 Iteration 1: Log likelihood = -3878.8245
 Iteration 2: Log likelihood = -3833.631
 Iteration 3: Log likelihood = -3831.3402
 Iteration 4: Log likelihood = -3831.3141
 Iteration 5: Log likelihood = -3831.3141
 Refining estimates:
 Iteration 0: Log likelihood = -3831.3141

Cox regression with Breslow method for ties

No. of subjects = 18,563 Number of obs = 18,563
 No. of failures = 469
 Time at risk = 228,013.477
 LR chi2(25) = 490.60
 Prob > chi2 = 0.0000
 Log likelihood = -3831.3141

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.877984	.0927713	12.76	0.000	1.704681	2.068906
mediator2	1.549507	.0650871	10.43	0.000	1.427049	1.682474
_AD_PGSXmediator2_000	1.00117	.0246338	0.05	0.962	.9540342	1.050635
AGE	.6846653	.2108334	-1.23	0.219	.3744228	1.251971
Agesq	1.00279	.0024312	1.15	0.250	.9980362	1.007566
SEX	1	(omitted)				
PC1	1.001609	.0010946	1.47	0.141	.9994659	1.003757
PC2	1.007331	.0052183	1.41	0.159	.9971546	1.01761
PC3	1.003541	.0090448	0.39	0.695	.9859696	1.021426
PC4	1.002801	.0052509	0.53	0.593	.9925616	1.013145
PC5	1.005289	.0054844	0.97	0.334	.9945968	1.016096
PC6	.9993924	.0122613	-0.05	0.960	.9756474	1.023715
PC7	.9913958	.010757	-0.80	0.426	.9705351	1.012705
PC8	.9995343	.0120922	-0.04	0.969	.9761127	1.023518
PC9	.99912	.0107383	-0.08	0.935	.9782935	1.02039
PC10	.9790175	.0150768	-1.38	0.169	.949909	1.009018
PC11	1.03207	.0112745	2.89	0.004	1.010207	1.054406
PC12	.9809578	.0132153	-1.43	0.154	.9553953	1.007204
PC13	1.016747	.0252718	0.67	0.504	.9684027	1.067506
PC14	.9859199	.0132313	-1.06	0.291	.9603251	1.012197
PC15	1.000618	.0142177	0.04	0.965	.9731361	1.028876
PC16	.9959161	.0146236	-0.28	0.780	.9676628	1.024994
PC17	.9929413	.0149426	-0.47	0.638	.964082	1.022664
PC18	.9887945	.0154336	-0.72	0.470	.9590032	1.019511
PC19	1.015347	.016827	0.92	0.358	.9828967	1.048869
PC20	1.019748	.0170553	1.17	0.242	.9868625	1.05373

-> Model for the mediator
 note: **SEX** omitted because of collinearity.

Iteration 0: Log likelihood = -29232.661
 Iteration 1: Log likelihood = -29232.661

Linear regression (Maximum Likelihood)

Number of obs = 18,563

Wald chi2(23) = 4999.27

Log likelihood = -29232.661

Prob > chi2 = 0.0000

mediator2	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	.0910912	.0085207	10.69	0.000	.074391	.1077915
AGE	.0369456	.035205	1.05	0.294	-.032055	.1059462
Agesq	.0005731	.0002921	1.96	0.050	6.88e-07	.0011456
SEX	0 (omitted)					
PC1	-.0013696	.0001555	-8.81	0.000	-.0016743	-.0010649
PC2	-.0009058	.0003432	-2.64	0.008	-.0015785	-.0002332
PC3	.0026127	.0006535	4.00	0.000	.0013319	.0038935
PC4	.0025405	.000837	3.04	0.002	.0009001	.0041809
PC5	-.0013183	.0011241	-1.17	0.241	-.0035215	.0008849
PC6	-.0025235	.0018342	-1.38	0.169	-.0061185	.0010715
PC7	-.0026083	.0017758	-1.47	0.142	-.0060888	.0008722
PC8	-.0045926	.0018513	-2.48	0.013	-.0082211	-.0009641
PC9	-.0041688	.0019401	-2.15	0.032	-.0079712	-.0003664
PC10	.0023368	.0023233	1.01	0.314	-.0022167	.0068904
PC11	-.0042336	.0023028	-1.84	0.066	-.0087471	.0002799
PC12	.0006059	.0025849	0.23	0.815	-.0044605	.0056722
PC13	.0040891	.002678	1.53	0.127	-.0011598	.0093379
PC14	.0049689	.0025593	1.94	0.052	-.0000473	.0099851
PC15	-.0057213	.0026307	-2.17	0.030	-.0108774	-.0005652
PC16	-.0043095	.0027267	-1.58	0.114	-.0096538	.0010347
PC17	.0045282	.003172	1.43	0.153	-.0016889	.0107452
PC18	.0017166	.0029951	0.57	0.567	-.0041536	.0075868
PC19	-.0038093	.0030375	-1.25	0.210	-.0097627	.0021441
PC20	.0010819	.0030491	0.35	0.723	-.0048943	.0070581
_cons	-4.394415	1.054268	-4.17	0.000	-6.460741	-2.328088
sigma2						
_cons	1.365725	.014176	96.34	0.000	1.33794	1.393509

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.9559163	.0811365	11.78	0.000	.7968917	1.114941
ereri_cde	.7815752	.0787933	9.92	0.000	.6271433	.9360072
ereri_intref	.0976509	.0189401	5.16	0.000	.0605289	.1347729
ereri_intmed	.0359916	.0052386	6.87	0.000	.025724	.0462591
ereri_pie	.0406986	.0055621	7.32	0.000	.029797	.0516001
terira	1.955916	.0811365	24.11	0.000	1.796892	2.114941
p_cde	.8176189	.0272503	30.00	0.000	.7642093	.8710285
p_intref	.1021542	.0205086	4.98	0.000	.061958	.1423504
p_intmed	.0376514	.0049521	7.60	0.000	.0279453	.0473574
p_pie	.0425755	.0060665	7.02	0.000	.0306854	.0544655
op_m	.0802268	.0100448	7.99	0.000	.0605394	.0999143
op_ati	.1398056	.0242436	5.77	0.000	.0922889	.1873223
op_e	.1823811	.0272503	6.69	0.000	.1289715	.2357907

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intre
to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk
interaction; p_intmed=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall pro
proportion eliminated.

Warning: this analysis assumes a rare outcome.

Warning: fixed values for the covariates AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17
> e mean.

-> Summary

Outcome (yvar): Age_dementia
Exposure (avar): AD_PGS
Mediator (mvar): mediator3
Covariates (cvars): AGE Agesq SEX PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15 PC16 PC17

Model for the outcome (yreg): cox
Model for the mediator (mreg): linear

Referent exposure level (a0): 0
Actual exposure level (a1): 1
Mediator level for the decomposition (m): 0
Fixed values of the covariates (c): 60.6 3702 2 -1.274 1.402 -.4611 .1179 -.04816 -.07928 -.08769 -.0875

-> Model for the outcome

Failure _d: dem_diag==1
Analysis time _t: Age_dementia
Enter on or after: time AGE
ID variable: n_eid

note: SEX omitted because of collinearity.

Iteration 0: Log likelihood = -4076.6137
Iteration 1: Log likelihood = -3997.4371
Iteration 2: Log likelihood = -3907.3662
Iteration 3: Log likelihood = -3896.8206
Iteration 4: Log likelihood = -3896.5425
Iteration 5: Log likelihood = -3896.5421
Iteration 6: Log likelihood = -3896.5421
Refining estimates:
Iteration 0: Log likelihood = -3896.5421

Cox regression with Breslow method for ties

No. of subjects = 18,563 Number of obs = 18,563
No. of failures = 469
Time at risk = 228,013.477
Log likelihood = -3896.5421
LR chi2(25) = 360.14
Prob > chi2 = 0.0000

_t	Haz. ratio	Std. err.	z	P> z	[95% conf. interval]	
AD_PGS	1.919532	.0795917	15.73	0.000	1.769706	2.082043
mediator3	1.155477	.0622393	2.68	0.007	1.039709	1.284136
_AD_PGSXmediator3_000	1.029175	.034941	0.85	0.397	.9629203	1.099988
AGE	.6586016	.2013048	-1.37	0.172	.3617836	1.198938
Agesq	1.003474	.0024145	1.44	0.150	.9987527	1.008218
SEX	1 (omitted)					
PC1	1.001094	.0010988	1.00	0.319	.9989424	1.00325
PC2	1.00741	.0053303	1.40	0.163	.9970171	1.017912
PC3	1.004632	.0093253	0.50	0.619	.9865201	1.023077
PC4	1.003108	.0051792	0.60	0.548	.9930083	1.013311

PC5	1.004544	.0055436	0.82	0.411	.9937373	1.015468
PC6	1.000111	.0123746	0.01	0.993	.9761487	1.024661
PC7	.9897799	.0104074	-0.98	0.329	.9695904	1.01039
PC8	.9956247	.0119029	-0.37	0.714	.9725666	1.01923
PC9	.9948438	.0106214	-0.48	0.628	.9742426	1.015881
PC10	.9771	.0150447	-1.50	0.132	.9480535	1.007037
PC11	1.034689	.0112724	3.13	0.002	1.01283	1.05702
PC12	.979082	.0131692	-1.57	0.116	.9536081	1.005236
PC13	1.016886	.0251153	0.68	0.498	.9688336	1.067322
PC14	.9933434	.0133373	-0.50	0.619	.9675437	1.019831
PC15	1.001841	.0138946	0.13	0.895	.9749745	1.029447
PC16	.9919749	.0144013	-0.56	0.579	.9641468	1.020606
PC17	.9926544	.0190793	-0.38	0.701	.9559552	1.030762
PC18	.9910344	.0155135	-0.58	0.565	.9610902	1.021911
PC19	1.010682	.0166935	0.64	0.520	.9784873	1.043936
PC20	1.02664	.0169898	1.59	0.112	.9938753	1.060486

-> Model for the mediator
note: **SEX** omitted because of collinearity.

Iteration 0: Log likelihood = -27145.322

Iteration 1: Log likelihood = -27145.322

Linear regression (Maximum Likelihood)

Number of obs = 18,563

Wald chi2(23) = 740.41

Log likelihood = -27145.322

Prob > chi2 = 0.0000

mediator3	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
mu						
AD_PGS	.0588809	.0076145	7.73	0.000	.0439568	.073805
AGE	-.1282243	.0314608	-4.08	0.000	-.1898864	-.0665622
Agesq	.0013367	.000261	5.12	0.000	.0008251	.0018483
SEX	0 (omitted)					
PC1	-.0008015	.0001389	-5.77	0.000	-.0010738	-.0005292
PC2	-.0002662	.0003067	-0.87	0.385	-.0008673	.0003348
PC3	.0014678	.000584	2.51	0.012	.0003232	.0026123
PC4	.0017771	.0007479	2.38	0.018	.0003112	.003243
PC5	-.001227	.0010046	-1.22	0.222	-.0031959	.0007419
PC6	-.002227	.0016391	-1.36	0.174	-.0054396	.0009856
PC7	.0007119	.0015869	0.45	0.654	-.0023984	.0038222
PC8	.0027257	.0016544	1.65	0.099	-.0005169	.0059683
PC9	.0024149	.0017337	1.39	0.164	-.0009831	.005813
PC10	-.0003606	.0020762	-0.17	0.862	-.0044299	.0037086
PC11	-.0063942	.0020579	-3.11	0.002	-.0104276	-.0023607
PC12	.0005644	.00231	0.24	0.807	-.0039631	.0050919
PC13	.0035823	.0023932	1.50	0.134	-.0011083	.0082729
PC14	-.0038304	.0022871	-1.67	0.094	-.0083131	.0006523
PC15	.0010066	.0023509	0.43	0.669	-.0036011	.0056143
PC16	-.001879	.0024367	-0.77	0.441	-.0066549	.0028969
PC17	-.0006408	.0028347	-0.23	0.821	-.0061966	.0049151
PC18	.0034057	.0026765	1.27	0.203	-.0018402	.0086516
PC19	.0025857	.0027145	0.95	0.341	-.0027345	.007906
PC20	.0006796	.0027249	0.25	0.803	-.004661	.0060202
_cons	2.919653	.9421413	3.10	0.002	1.07309	4.766216
sigma2						
_cons	1.090671	.011321	96.34	0.000	1.068482	1.112859

-> 4-way decomposition: delta method

	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
tereri	.9544102	.0744475	12.82	0.000	.8084959	1.100325
ereri_cde	.8963221	.0761658	11.77	0.000	.7470399	1.045604
ereri_intref	.03825	.0150616	2.54	0.011	.0087298	.0677701
ereri_intmed	.0112928	.0034452	3.28	0.001	.0045404	.0180452
ereri_pie	.0085454	.0033858	2.52	0.012	.0019094	.0151813
terira	1.95441	.0744475	26.25	0.000	1.808496	2.100325
p_cde	.9391371	.0208122	45.12	0.000	.8983459	.9799283
p_intref	.0400771	.0160783	2.49	0.013	.0085642	.0715899
p_intmed	.0118322	.0036612	3.23	0.001	.0046564	.019008
p_pie	.0089536	.0035065	2.55	0.011	.0020809	.0158262
op_m	.0207858	.0058624	3.55	0.000	.0092956	.032276
op_ati	.0519093	.0194318	2.67	0.008	.0138236	.0899949
op_e	.0608629	.0208122	2.92	0.003	.0200717	.1016541

tereri=total excess relative risk; ereri_cde=excess relative risk due to controlled direct effect; ereri_intref=excess relative risk due to mediated interaction; ereri_pie=excess relative risk due to pure indirect effect; terira=total effect risk; p_cde=proportion controlled direct effect; p_intref=proportion mediated interaction; p_pie=proportion pure indirect effect; op_m=overall proportion mediated; op_ati=overall proportion attributable to interaction; op_e=overall proportion eliminated.

61 .

62 .

63 . save, replace

file E:\16GBBACKUPUSB\BACKUP_USB_SEPTEMBER2014\May Baydoun_folder\UK_BIOBANK_PROJECT\UKB_PAPER8E_ADPRSPROTDEM\DATA

64 .

65 .

66 . capture log close