Supplementary Table 1. Reports of POAG, PACG, Secondary glaucoma and All Glaucoma included in the Meta-analysis

Publication No.	Author, Year	Study	Years Conducted	Habitation Type	Geographic Sub-Region	POAG Cases	PACG Cases	SG Cases	Sample Size	Age Group	Response Rate
1	Dandona L, 2001	Andra Pradesh Eye Disease Study	1996-1997	Urban	South Asia	27	NA	NA	1399	30-70+	85%
2	Senthil S, 2010	Andra Pradesh Eye Disease Study	1996-2000	Mixed	South Asia	NA	35	NA	3724	40-70+	88%
3	Ramakrishnan R, 2003	Aravind Comprehensive Eye Survey	1995-1997	Rural	South Asia	64	25	NA	5150	40-70+	93%
4	Vijaya L, 2008	Chennai Glaucoma Study	2001-2004	Urban	South Asia	135	34	NA	3850	40-70+	80%
5	Vijaya L, 2008	Chennai Glaucoma Study	2001-2004	Rural	South Asia	64	34	NA	3924	40-89	82%
6	Raychaudhuri A, 2005	West Bengal Glaucoma Study	1998-1999	Rural	South Asia	38	3	1	1269	50-80+	83%
7	Sia IT, 2010	Kandy Eye Study	2006-2007	Rural	South Asia	30	NA	NA	1244	40-80+	80%
8	Casson RJ, 2009	Kandy Eye Study	2006-2007	Rural	South Asia	NA	7	NA	1230	40-80+	80%
9	Thapa S, 2005	Bhaktapur Glaucoma Study	2007-2009	Rural	South Asia	51	17	7	3991	40-80+	83%
10	Pakravan M, 2013	Yazd Eye Study	2010-2011	Mixed	South Asia	64	7	16	1990	40-80	90%
11	Foster PJ, 2000	Tanjong Pagar Study	1997-1998	Urban	Southeast Asia	22	14	7	1232	40-70+	72%
12	Bourne RA, 2003	Rom Klao	2003	Urban	Southeast Asia	16	6	5	701	50-70+	89%
13	Casson RJ, 2006	Meiktila Eye Study	2005	Rural	Southeast Asia	39	NA	10	2076	40-70+	84%
14	Casson RJ, 2007	Meiktila Eye Study	2005	Rural	Southeast Asia	NA	52	10	2076	40-70+	84%
15	Shen S, 2006	Singapore Malay Eye Study	2004-2006	Urban	Southeast Asia	104	8	7	3280	40-80	79%
16	Narayanaswamy A, 2013	Singapore Indian Eye Study		Urban	Southeast Asia	46	6	8	3400	40-70+	76%

17	Foster PJ, 2000	Hovsgol	1995	Rural	East Asia	5	14	3	942	40-70+	94%
18	Liang Y, 2011	Handan Eye Study	2006	Rural	East Asia	125	51	NA	6716	40-80+	90%
19	He M, 2006	Liwan Eye Study	2003-2004	Urban	East Asia	29	21	2	1372	50-93	75%
20	Sun J, 2011	Bin Study	NA	Rural	East Asia	35	NA	NA	4956	40-70+	86%
21	Qu W, 2011	Bin Study	NA	Rural	East Asia	NA	78	NA	4956	40-70+	86%
22	Wang YX, 2010	Beijing Eye Study	2001	Mixed	East Asia	111	44	3	4315	40-70+	97%
23	Song W, 2011	Kailu Study	2009	Rural	East Asia	73	90	6	5158	40-70+	87%
24	Zhong H, 2012	Yunnan Minority Eye Study	2010	Rural	East Asia	22	20	5	2133	50-80+	78%
25	Kim CS, 2011	Namil Study	2006-2008	Rural	East Asia	55	NA	NA	1532	40-80+	80%
26	Kim YY, 2012	Namil Study	2006-2008	Rural	East Asia	NA	10	NA	1426	40-80+	80%
27	Iwase A, 2004	Tajimi Eye Study	2000-2001	Urban	Northeast Asia	119	NA	NA	3021	40-80+	78%
28	Yamamoto T, 2005	Tajimi Eye Study	2000-2001	Urban	Northeast Asia	NA	19	14	3021	40-80+	78%
29	Sawaguchi S, 2012	Kumejima Eye Study	2005-2006	Rural	Northeast Asia	NA	82	NA	3762	40-80+	81%
30	Al-Mansouri FA, 2011	Qatar Eye Study	2011	Mixed	West Asia	44	14	NA	3149	40-80+	98%

NA: data not available in published study; SG: secondary glaucma.

Supplementary Table 2: List of 44 Excluded Studies and Reasons for Exclusion

Publication Number	Author, Year	Did not meet inclusion criteria[a]	Met exclusion criteria[b]
1	Sarda RP, 1967	2,3,4,5,6,7	2
2	Awasthi, et al., 1975	3,4,6,7	-
3	Jain MR, et al., 1983	2,3,4,5,6	1,2
4	Leydhecker W., 1984	2,3,4,5,6,7	1,2,3
5	Stone DH, et al., 1984	2,3,4,5,6,7	1,2,5
6	David R, et al., 1985	2,3,4,5,6,7	1,2,5
7	Hong C, et al., 1987	1,2,3,4,5,6,7	1,2,3
8	Alsbirk PH, 1988	2,3,4,5,67	3,4
9	Hu CN, et al, 1989	2,3,5,6,7	2,4
10	Zhou YF, et al., 1989	2,3,5,6,7	2,4
11	Zhao JL, 1990	4,5,6,7	4
12	Shiose Y, et al., 1991	1,2,3,4,5,6,7	1,2
13	Song XJ, 1992	2,3,4,5,6,7	2,4
14	Salmon JF, 1993	-	3
15	Elder MJ, 1993	3,4,6,7	1
16	Das BN, et al., 1994	2,4,6,7	1,3
17	Rauf A, et al., 1994	1,2,3,4,5,6,7	2,3
18	Kremkova EV, 1994	1,2,3,4,6,7	1,4
19	Ye T, 1995	1,2,3,4,5,6,7	1,2,3,4
20	Congdon NG, et al., 1995	3,4,6,7	-
21	Gao Z, 1995	4,5,6,7	4
22	Yu Q, et al., 1995	4,5,6,7	4
23	Congdon NG, et al., 1996	3,4,5,6,7	1
24	Nguyen N, et al., 1996	1,2,3,4,6,7	1,2
25	Congdon N, et al., 1997	1,2,3,4,5,6,7	1,2,3
26	Sim DH, et al., 1997	2,3,4,5,6,7	1
27	Sihota R, et al., 1998	1,2,3,7	1,2,3
28	Jacob A, et al., 1998	1,2,3,4,5,7	-
29	Lai JS, et al., 2001	1,2,3,4,5,6,7	1,2,3,4
30	Yoshida M, et al., 2001	2,3,4,5,7	2
31	Zhao J, et al., 2002	4,5,6,7	4
32	Xu L, et al., 2004	7	
33	Khandekar R, et al., 2004	1,2,6,7	1,2
34	Metheetrairut A, et al., 2002	2,3,7	-
35	Yuan HP, et al., 2007	7	4
36	Sah RP, et al., 2007	1,2,3,7	1,2
37	Khandekar R, et al., 2008	3,5,6,7	-
38	Sothomwit, et al., 2008	1,2,3,7	1,2
39	Palimkar A, et al., 2008	2,3,4,7	-
40	Eid TM, et al., 2009	3,5,6,7	1,2
41	Kim JH, et al., 2011	3,6	-
42	Paudyal I, et al., 2011	1,2,3,6,7	1,2
43	Taqi U, et al., 2011	1,2,3,5,6,7	1,2
44	Rauf A, et al., 2013	2,3,5,6,7	1,2

[a]Inclusion Criteria: (1) population-based study of POAG, PACG, or secondary glaucoma from a defined geographic region in Asia; (2) clear definition of random or clustered sampling procedure; (3) response rate ≥70%; (4) visual field testing with automated static perimetry with either the Humphrey visual field analyzer or frequency doubling perimetry at least among glaucoma suspects; (5) optic disc evaluation by an ophthalmologist; (6) anterior chamber angle evaluation by gonioscopy at least among glaucoma suspect individuals; and (7) glaucoma defined using the ISGEO criteria.

[b]Exclusion Criteria: (1) hospital- or clinic-based studies or audits, (2) comprising invited volunteers, self-reported glaucoma diagnosis, or specific groups of individuals, (3) populations of Asian ancestry but not residing in Asia, (4) non-English articles, and (5) studies reporting number of eyes rather than individuals with glaucoma.

1. Sarda RP, Charan H, Khetarpal RC. Screening of 1000 cases for the incidence of simple glaucoma over the age of 35 years. J All-India Ophthalmol Soc 1967;15:222-9.
2. Awasthi P, Sarbhai KP, Banerjee SC, et al. Prevalence study of glaucoma in rural areas. Indian J Ophthalmol 1975;23:1-5.
3. Jain MR, Modi R. Survey of chronic simple glaucoma in the rural population of india (Udaipur) above the age group of 30 years. Indian J Ophthalmol 1983;31:656-7.
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5. Stone DH, Dan Y, David R, et al. Estimated prevalence of glaucomatous blindness in the Negev region of Israel. Int J Epidemiol 1984;12:475-8.
6. David R, Tessler Z, Yassur Y. Epidemiology of acute angle-closure glaucoma: incidence and seasonal variations. Ophthalmologica 1985;191:4-7.
7. Hong C, Joo JH, Shin KH, Song KY. Clinical study of Korean glaucomatous patients. Korean J Ophthalmol 1987;1:41-6.
8. Alsbirk PH. Early detection of primary angle-closure glaucoma. Limbal and axial chamber depth screening in a high risk population (Greenland Eskimos). Acta Ophthalmol (Copenh) 1998;66:556-64.
9. Hu CN. An epidemiologic study of glaucoma in Shunyi county, Beijing. Zhonghua Yan Ke Za Zhi 1989;25:115-9.
10. Zhou YF. An epidemiological survey of blindness and low vision in Chongqing. Zhonghua Yan Ke Za Zhi 1989;25:296-9.
11. Zhao JL. An epidemiological survey of primary angle closure glaucoma in Tibet. Zhonghua Yan Ke Za Zhi 1990;26:47-50.
12. Shiose Y, Kitazawa Y, Tsukahara S, et al. Epidemiology of glaucoma in Japan--a nationwide glaucoma survey. Jpn J Ophthalmol 1991;35:133-55.
13. Song XJ. An epidemiological survey of blindness and low vision in Hebei province. Zhonghua Yan Ke Za Zhi 1992;28:105-7.
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15. Elder MJ. Congenital glaucoma in the West Bank and Gaze Strip. Br J Ophthalmol 1993;77:413-6.
16. Das BN, Thompson JR, Patel R, et al. The prevalence of eye disease in Leicester: a comparison of adults of Asian and European descent. J Roy Soc Med 1994;87:219-22.
17. Rauf A, Ong PS, Pearson RV. A pilot study into the prevalence of ophthalmic disease in the Indian population of Southall. J Roy Soc Med (UK) 1994;87:78-9.
18. Kremkova EV. Prevalence of primary glaucoma in Uzbekistan. Vestn Oftalmol 1994;110:4-6.
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20. Congdon NG, Quigley HA, Hung PT, et al. Impact of age, various forms of cataract, and visual acuity on whole-field scotopic sensitivity screening for glaucoma in rural Taiwan. Arch Ophthalmol 1995;113:1138-43.
21. Gao Z. An epidemiologic study of glaucoma in Tongcheng county, Anhui province. Zhonghua Yan Ke Za Zhi 1995;31:149-51.
22. Yu Q, Xu J, Zhu S, et al. Epidemiological survey of primary angle-closure glaucoma in Doumen. Yan Ke Xue Bao 1995;11:5-8
23. Congdon NG, Quigley HA, Hung PT, et al. Screening techniques for angle-closure glaucoma in rural Taiwan. Acta Ophthalmol Scand 1996;74:113-9.
24. Nguyen N, Mora JS, Gaffney MM, et al. A high prevalence of occludable angles in a Vietnamese population. Ophthalmology 1996;103:1426-31.
25. Congdon NG, Youlin Q, Quigley H, et al. Biometry and angle-closure glaucoma among Chinese, white and black populations. Ophthalmology 1997;104:1489-95.

26. Sim DH, Goh LG, Ho T. Glaucoma pattern amongst the elderly Chinese in Singapore. Ann Acad Med Singapore 1998;27:819-23.
27. Sihota R, Agarwal HC. Profile of the subtypes of angle closure glaucoma in a tertiary hospital in north India. Indian J Ophthalmol 1998;46:25-9.
28. Jacob A, Thomas R, Koshi SP, et al. Prevalence of primary glaucoma in an urban south Indian population. Indian J Ophthalmol 1998;46:81-6.
29. Lai JS, Liu DT, Tham CC, et al. Epidemiology of acute primary angle-closure glaucoma in the Hong Kong Chinese population: prospective study. Hong Kong Med J 2001;7:118-23.
30. Yoshida M, Okada E, Mizuki N, et al. Age-specific prevalence of open-angle glaucoma and its relationship to refraction among more than 60,000 asymptomatic Japanese subjects. J Clin Epidemiol 2001;54:1151-8.
31. Zhao J, Sui R, Jia L, et al. Prevalence of glaucoma and normal intraocular pressure among adults aged 50 years or above in Shunyi county of Beijing. Zhonghua Yan Ke Za Zhi 2002;38:335-9.
32. Xu L, Chen JH, Li JJ, et al. The prevalence and its screening methods of primary open angle glaucoma in defined population-based study of rural and urban in Beiing. Zhonghua Yan Ke Za Zhi 2004;40:726-32.
33. Khandekar R, Zutshi R. Glaucoma among Omani diabetic patients: a cross-sectional descriptive study: (Oman diabetic eye study 2002). Eur J Ophthalmol 2004;14:19-25.
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35. Yuan HP, Yu H, Xiao Z, et al. The prevalence of primary angle-closure glaucoma and its causes in rural area of Shuangyang district in Changchun, Jilin province. Zhonghua Yan Ke Za Zhi 2007;43:775-8.
36. Sah RP, Badhu BP, Pokharel PK, et al. Prevalence of glaucoma in Sunsari district of eastern Nepal. Kathmandu Univ Med J 2007;5:343-8.
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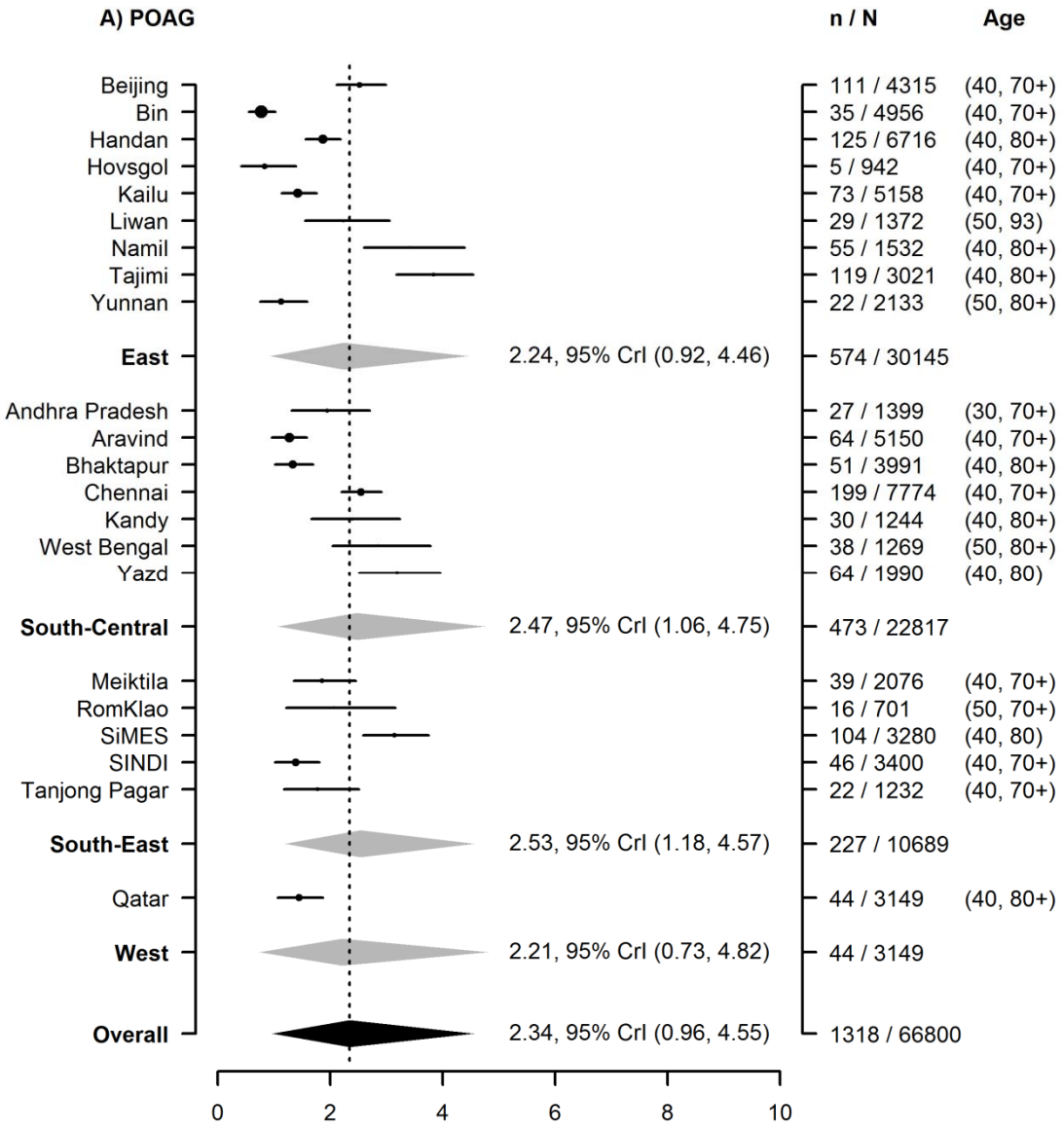
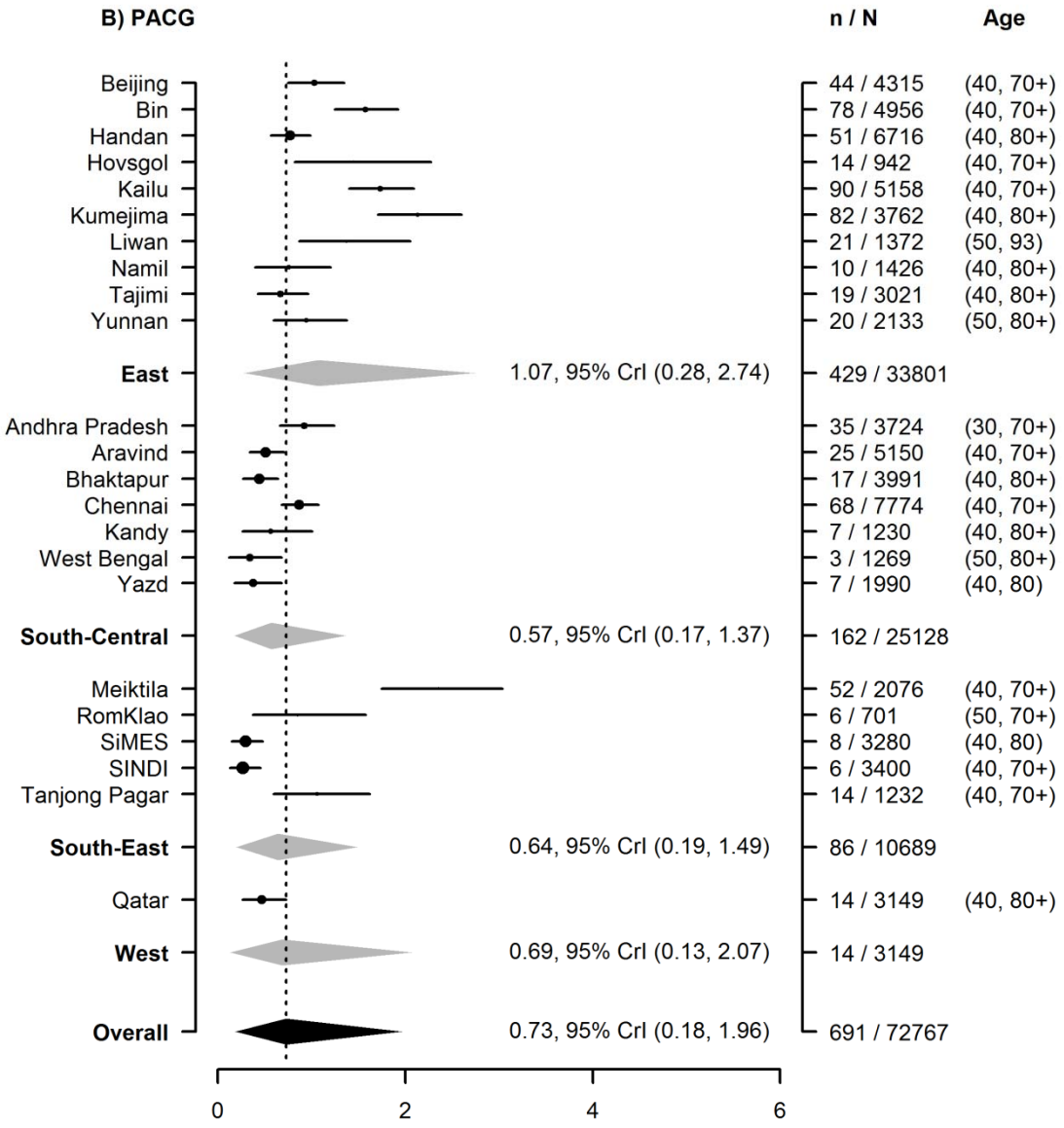
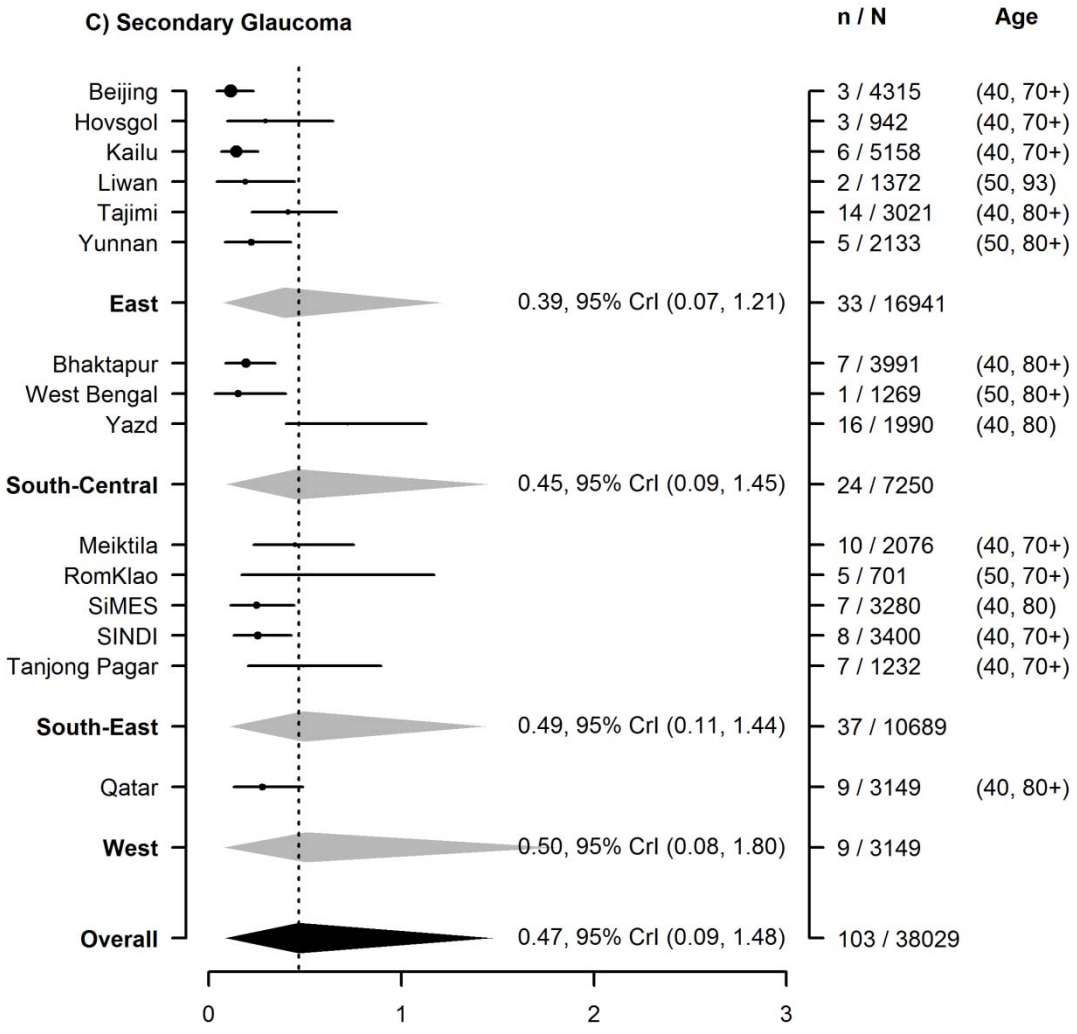
Supplementary Table 3: Number of People (40-80 years) with POAG, PACG, Secondary Glaucoma, and All Glaucoma from 2013 to 2040

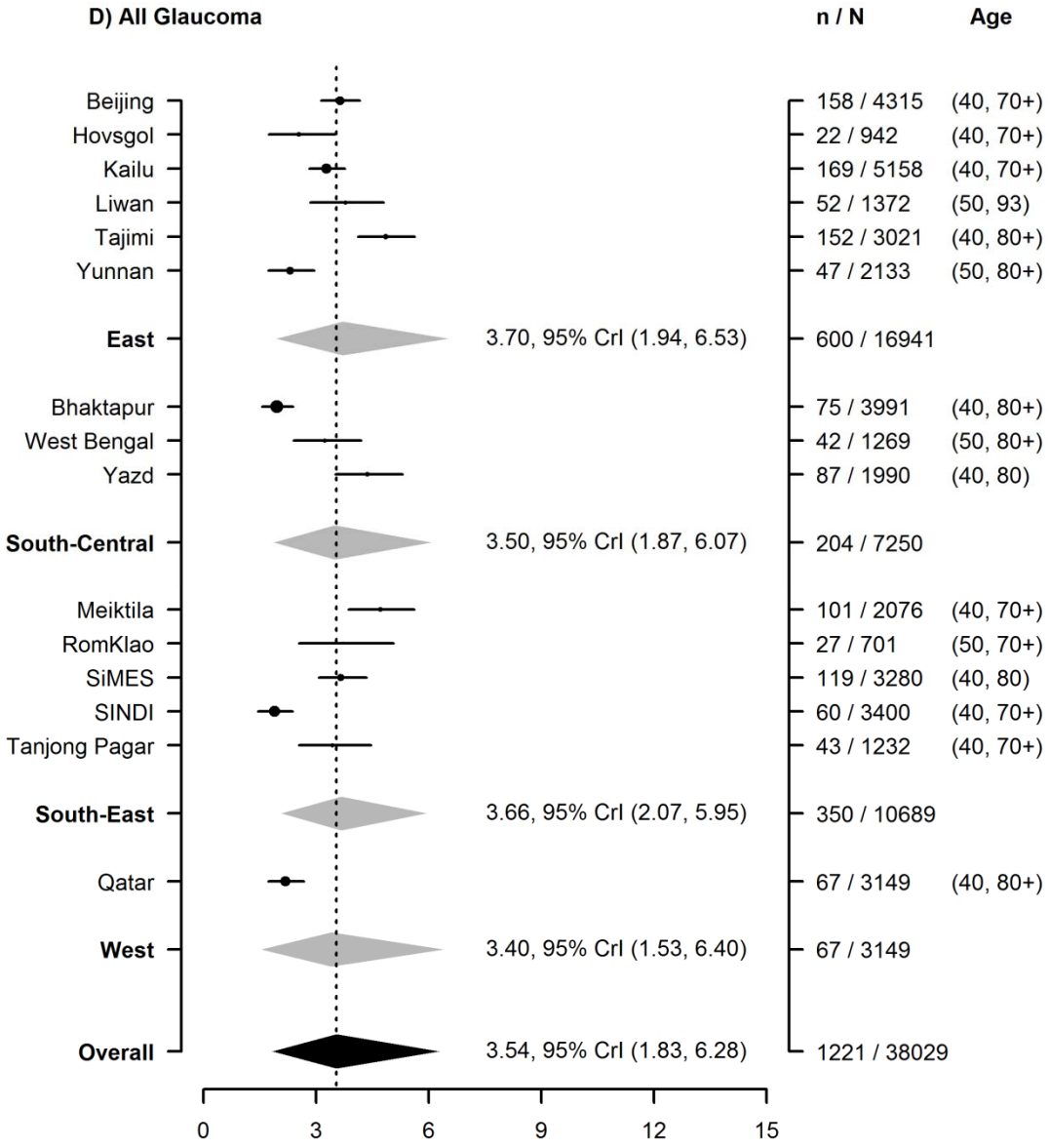
Year	2013	2016	2018	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040
Asia	**POAG (million)**													
Eastern	15.22	16.06	16.40	16.73	17.05	17.43	17.83	18.26	18.63	18.80	18.90	18.98	19.02	19.02
South-Central	12.06	13.11	13.85	14.67	15.48	16.37	17.27	18.19	19.13	19.98	20.85	21.68	22.46	23.25
South-Eastern	4.78	5.19	5.46	5.75	6.03	6.34	6.63	6.91	7.19	7.43	7.67	7.88	8.05	8.22
Western	1.39	1.55	1.66	1.78	1.90	2.04	2.17	2.30	2.42	2.54	2.66	2.77	2.87	2.98
Overall	33.45	35.90	37.36	38.92	40.47	42.17	43.90	45.65	47.37	48.75	50.08	51.30	52.40	53.47
Asia	**PACG (million)**													
Eastern	7.31	7.71	7.87	8.04	8.19	8.37	8.56	8.77	8.95	9.03	9.08	9.11	9.13	9.13
South-Central	2.79	3.03	3.20	3.39	3.58	3.78	3.99	4.20	4.42	4.62	4.82	5.01	5.19	5.37
South-Eastern	1.21	1.31	1.38	1.45	1.53	1.60	1.68	1.75	1.82	1.88	1.94	1.99	2.04	2.08
Western	0.43	0.48	0.51	0.55	0.59	0.63	0.67	0.71	0.75	0.79	0.82	0.86	0.89	0.92
Overall	11.74	12.53	12.97	13.43	13.88	14.39	14.90	15.43	15.94	16.31	16.66	16.98	17.25	17.51
Asia	**Secondary Glaucoma (million)**													
Eastern	2.67	2.81	2.87	2.93	2.99	3.06	3.13	3.20	3.27	3.30	3.31	3.33	3.33	3.33
South-Central	2.22	2.41	2.55	2.70	2.85	3.01	3.18	3.35	3.52	3.68	3.84	3.99	4.13	4.28
South-Eastern	0.93	1.01	1.06	1.12	1.17	1.23	1.29	1.34	1.40	1.44	1.49	1.53	1.56	1.60
Western	0.32	0.35	0.38	0.41	0.43	0.46	0.49	0.52	0.55	0.58	0.61	0.63	0.66	0.68
Overall	6.13	6.59	6.86	7.15	7.44	7.76	8.09	8.41	8.74	9.00	9.25	9.48	9.69	9.89
Asia	**All Glaucoma (million)**													
Eastern	25.20	26.58	27.14	27.70	28.23	28.85	29.52	30.23	30.84	31.12	31.29	31.42	31.48	31.48
South-Central	17.06	18.55	19.60	20.76	21.91	23.16	24.44	25.74	27.07	28.28	29.51	30.68	31.79	32.90
South-Eastern	6.92	7.51	7.90	8.32	8.73	9.17	9.59	10.00	10.41	10.76	11.10	11.40	11.65	11.90
Western	2.14	2.38	2.55	2.73	2.92	3.13	3.33	3.53	3.73	3.91	4.08	4.26	4.42	4.58
Overall	51.32	55.02	57.19	59.51	61.80	64.32	66.89	69.50	72.05	74.06	75.99	77.76	79.34	80.87

Supplementary Figure 1. Hierachical Bayesian analysis of pooled POAG (A), PACG (B), Secondary Glaucoma (C) and All Glaucoma (D) Prevalence Stratified by Studies and Geographic Sub-region

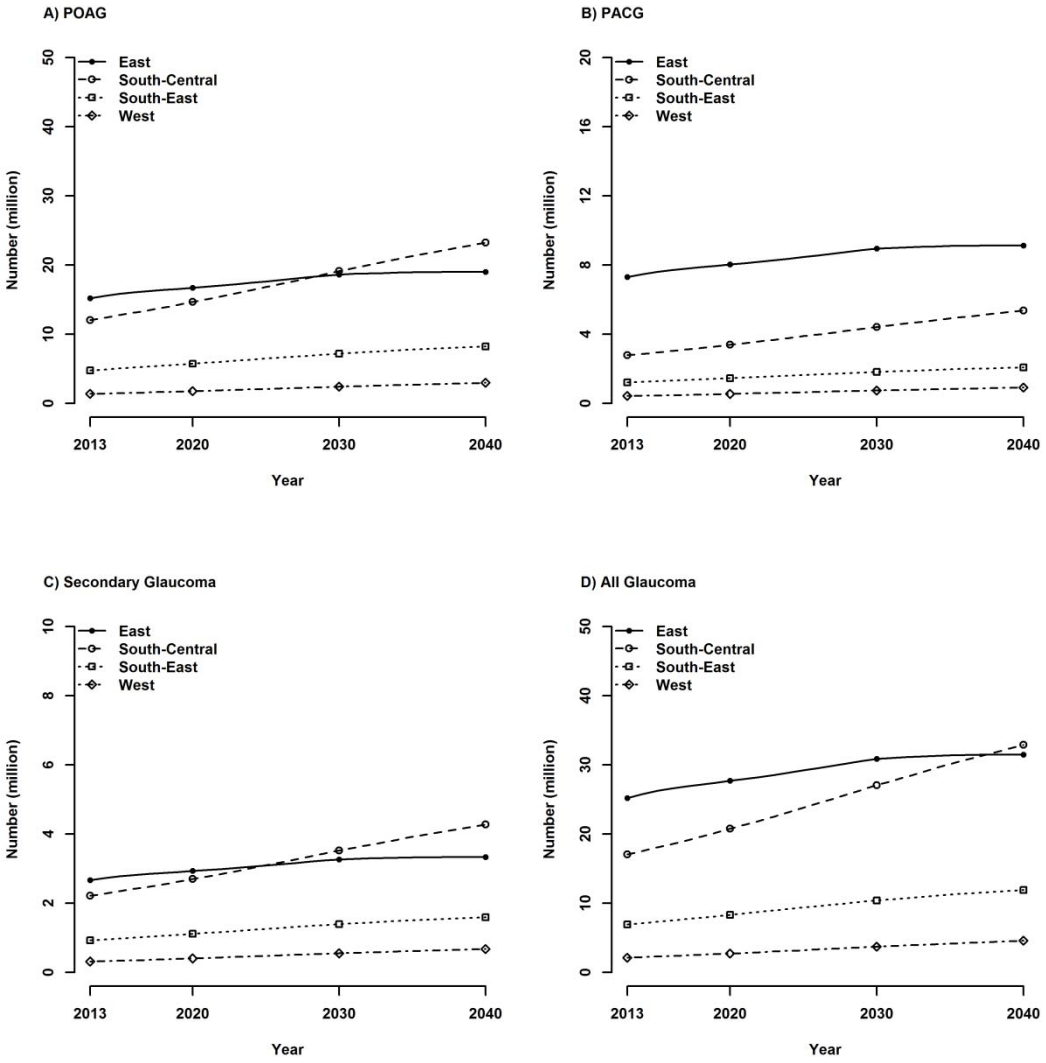



B) PACG
n / N
Age
Beijing
Bin
Handan
Hovsgol
Kailu
Kumejima
Liwan
Namil
Tajimi
Yunnan
East
Andhra Pradesh
Aravind
Bhaktapur
Chennai
Kandy
West Bengal
Yazd
South-Central
Meiktila
RomKlao
SiMES
SINDI
Tanjong Pagar
South-East
Qatar
West
Overall
1.07, 95% CrI (0.28, 2.74)
0.57, 95% CrI (0.17, 1.37)
0.64, 95% CrI (0.19, 1.49)
0.69, 95% CrI (0.13, 2.07)
0.73, 95% CrI (0.18, 1.96)
44 / 4315 (40, 70+)
78 / 4956 (40, 70+)
51 / 6716 (40, 80+)
14 / 942 (40, 70+)
90 / 5158 (40, 70+)
82 / 3762 (40, 80+)
21 / 1372 (50, 93)
10 / 1426 (40, 80+)
19 / 3021 (40, 80+)
20 / 2133 (50, 80+)
429 / 33801
35 / 3724 (30, 70+)
25 / 5150 (40, 70+)
17 / 3991 (40, 80+)
68 / 7774 (40, 70+)
7 / 1230 (40, 80+)
3 / 1269 (50, 80+)
7 / 1990 (40, 80)
162 / 25128
52 / 2076 (40, 70+)
6 / 701 (50, 70+)
8 / 3280 (40, 80)
6 / 3400 (40, 70+)
14 / 1232 (40, 70+)
86 / 10689
14 / 3149 (40, 80+)
14 / 3149
691 / 72767
0
2
4
6


C) Secondary Glaucoma
n / N
Age
Beijing
Hovsgol
Kailu
Liwan
Tajimi
Yunnan
East
Bhaktapur
West Bengal
Yazd
South-Central
Meiktila
RomKlao
SiMES
SINDI
Tanjong Pagar
South-East
Qatar
West
Overall
0.39, 95% CrI (0.07, 1.21)
0.45, 95% CrI (0.09, 1.45)
0.49, 95% CrI (0.11, 1.44)
0.50, 95% CrI (0.08, 1.80)
0.47, 95% CrI (0.09, 1.48)
3 / 4315
3 / 942
6 / 5158
2 / 1372
14 / 3021
5 / 2133
33 / 16941
7 / 3991
1 / 1269
16 / 1990
24 / 7250
10 / 2076
5 / 701
7 / 3280
8 / 3400
7 / 1232
37 / 10689
9 / 3149
9 / 3149
103 / 38029
(40, 70+)
(40, 70+)
(40, 70+)
(50, 93)
(40, 80+)
(50, 80+)
(40, 80+)
(50, 80+)
(40, 80)
(40, 70+)
(50, 70+)
(40, 80)
(40, 70+)
(40, 70+)
(40, 80+)
0
1
2
3


D) All Glaucoma
n / N
Age
Beijing
Hovsgol
Kailu
Liwan
Tajimi
Yunnan
East
Bhaktapur
West Bengal
Yazd
South-Central
Meiktila
RomKlao
SiMES
SINDI
Tanjong Pagar
South-East
Qatar
West
Overall
3.70, 95% CrI (1.94, 6.53)
3.50, 95% CrI (1.87, 6.07)
3.66, 95% CrI (2.07, 5.95)
3.40, 95% CrI (1.53, 6.40)
3.54, 95% CrI (1.83, 6.28)
158 / 4315
22 / 942
169 / 5158
52 / 1372
152 / 3021
47 / 2133
600 / 16941
75 / 3991
42 / 1269
87 / 1990
204 / 7250
101 / 2076
27 / 701
119 / 3280
60 / 3400
43 / 1232
350 / 10689
67 / 3149
67 / 3149
1221 / 38029
(40, 70+)
(40, 70+)
(40, 70+)
(50, 93)
(40, 80+)
(50, 80+)
(40, 80+)
(50, 80+)
(40, 80)
(40, 70+)
(50, 70+)
(40, 80)
(40, 70+)
(40, 70+)
(40, 80+)
0
3
6
9
12
15

Supplementary Figure 2. Number of people (40-80 years) with POAG (**A**), PACG (**B**), Secondary Glaucoma (**C**), and All Glaucoma (**D**) from 2013 to 2040.



Supplementary Text

(a) JAGS codes to estimate pooled prevalence from overall prevalence data

Denote by n1[i] and y1[i] the number of participants and POAG cases in study i respectively, with prevalence of p1[i]. There were N1 studies with available POAG data. The logit of p1[i] was modelled through a normal distribution with mean of a linear combination of covariates and precision of tau1. Let Z1[i,] be the covariates including constant term, the difference between the lower age bound and the defined lower age bound of 40, and vice versa for the upper age bound difference at upper age bound of 80 for study i, and X1[i,] be an indicator matrix, whose columns are dummy variables for sub-region covariate. Zbeta1 and Xbeta1 are the corresponding coefficients of Z1 and X1. Zbeta1 are treated as fixed effects with non-informative prior, i.e. normal distribution with mean of zero and precision of 0.0001. Xbeta1 are treated as random effects with normal distribution of mean of zero and precision of Xtau1. Xtau1 explains the variability of sub-region effects and tau1 is used to model the variability of unexplained effects from the model, i.e. the variability of residual effect. Sigma1 and Xsigma1 are simply the square root of inverse of tau1 and Xtau1 respectively, and they are standard deviations of the normal distributions for u1 and Xbeta1 respectively.

Then, we can estimate the prevalence of POAG in sub-regions through the logit of P1[i] for sub-region i. There are NX1 sub-regions in Asia. And, the overall prevalence of POAG in Asia is estimated by P[1]. Similar procedure is used for estimating PACG and secondary glaucoma by replacing “1” with “2” and “3” respectively. The overall and sub-regional prevalence of total glaucoma are estimated by the sum of corresponding prevalence of POAG, PACG and secondary glaucoma.

```
model{

### POAG ###
for (i in 1:N1){
y1[i]~dbin(p1[i],n1[i])
logit(p1[i])<-u1[i]
u1[i]~dnorm(mu1[i],tau1)
mu1[i]<-inprod(Z1[i,],Zbeta1[])+inprod(X1[i,],Xbeta1[])
}
tau1~dgamma(0.01,0.01);sigma1<-pow(tau1,-1/2)
for(i in 1:NZ1){Zbeta1[i]~dnorm(0,0.0001)}
for(i in 1:NX1){Xbeta1[i]~dnorm(0,Xtau1)}
Xtau1~dgamma(0.01,0.01);Xsigma1<-pow(Xtau1,-1/2)

for(i in 1:NX1){logit(P1[i])<-Zbeta1[1]+Xbeta1[i]}
logit(P[1])<-Zbeta1[1]

### PACG ###
for (i in 1:N2){
y2[i]~dbin(p2[i],n2[i])
logit(p2[i])<-u2[i]
u2[i]~dnorm(mu2[i],tau2)
mu2[i]<-inprod(Z2[i,],Zbeta2[])+inprod(X2[i,],Xbeta2[])
}
tau2~dgamma(0.01,0.01);sigma2<-pow(tau2,-1/2)
for(i in 1:NZ2){Zbeta2[i]~dnorm(0,0.0001)}
for(i in 1:NX2){Xbeta2[i]~dnorm(0,Xtau2)}
Xtau2~dgamma(0.01,0.01);Xsigma2<-pow(Xtau2,-1/2)

for(i in 1:NX2){logit(P2[i])<-Zbeta2[1]+Xbeta2[i]}
logit(P[2])<-Zbeta2[1]

### Secondary ###
for (i in 1:N3){
```

```
y3[i]~dbin(p3[i],n3[i])
logit(p3[i])<-u3[i]
u3[i]~dnorm(mu3[i],tau3)
mu3[i]<-inprod(Z3[i,],Zbeta3[])+inprod(X3[i,],Xbeta3[])
}
tau3~dgamma(0.01,0.01);sigma3<-pow(tau3,-1/3)
for(i in 1:NZ3){Zbeta3[i]~dnorm(0,0.0001)}
for(i in 1:NX3){Xbeta3[i]~dnorm(0,Xtau3)}
Xtau3~dgamma(0.01,0.01);Xsigma3<-pow(Xtau3,-1/3)

for(i in 1:NX3){logit(P3[i])<-Zbeta3[1]+Xbeta3[i]}
logit(P[3])<-Zbeta3[1]

###  Glaucoma  ###
for (i in 1:N4){
y4[i]~dbin(p4[i],n4[i])
logit(p4[i])<-u4[i]
u4[i]~dnorm(mu4[i],tau4)
mu4[i]<-inprod(Z4[i,],Zbeta4[])
}
tau4~dgamma(0.01,0.01);sigma4<-pow(tau4,-1/2)
for(i in 1:NZ4){Zbeta4[i]~dnorm(0,0.0001)}

for(i in 1:NX4){P4[i]<-P1[i]+P2[i]+P3[i]}
P[4]<-P[1]+P[2]+P[3]
}
```

(b) JAGS codes to estimate OR from gender and age specific data

Similar JAGS codes are used to estimate OR. For POAG, denote by S1[i,] an indicator matrix, whose columns are dummy variables for study covariate, and X1[i,] a set of covariates including constant term, dummy variables for sub-regions, age and gender. Sbeta1 are treated as random-effects with normal distribution of mean of zero and precision of Stau1. Ssigma1 is the corresponding standard deviation, the square root of inverse of Stau1. OR1 is the odds ratio comparing sub-regions. Similar procedure is used for estimating OR for PACG by replacing “1” with “2”.

```
model{

###  POAG
for (i in 1:N1){
y1[i]~dbin(p1[i],n1[i])
logit(p1[i])<-u1[i]
u1[i]~dnorm(mu1[i],tau1)
mu1[i]<-inprod(S1[i,],Sbeta1[])+inprod(X1[i,],Xbeta1[])
}
tau1~dgamma(0.01,0.01);sigma1<-pow(tau1,-1/2)

for(i in 1:NS1){Sbeta1[i]~dnorm(0,Stau1)}
Stau1~dgamma(0.01,0.01);Ssigma1<-pow(Stau1,-1/2)
for(i in 1:NX1){Xbeta1[i]~dnorm(0,0.01)}

for(i in 1:NX1){logit(P1[i])<-Xbeta1[1]+(1-equals(i,1))*Xbeta1[i]}
for(i in 1:NX1){OR1[i]<-exp(Xbeta1[i])}

###  PACG
for (i in 1:N2){
y2[i]~dbin(p2[i],n2[i])
logit(p2[i])<-u2[i]
u2[i]~dnorm(mu2[i],tau2)
```

```
mu2[i]<-inprod(S2[i,],Sbeta2[])+inprod(X2[i,],Xbeta2[])
}
tau2~dgamma(0.01,0.01);sigma2<-pow(tau2,-1/2)

for(i in 1:NS2){Sbeta2[i]~dnorm(0,Stau2)}
Stau2~dgamma(0.01,0.01);Ssigma2<-pow(Stau2,-1/2)
for(i in 1:NX2){Xbeta2[i]~dnorm(0,0.01)}

for(i in 1:NX2){logit(P2[i])<-Xbeta2[1]+(1-equals(i,1))*Xbeta2[i]}
for(i in 1:NX2){OR2[i]<-exp(Xbeta2[i])}


### Comparison ###
for(i in 1:NX1){CP[i]<-OR1[i]/OR2[i]}
}
```