**Supplemental Table 1:** The distribution of the number of primary open angle glaucoma (POAG) cases and controls in the NEIHBORHOOD

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| NEIHBORHOOD sub-studies | POAG (N) | Controls (N) |
| Nurses’ Health Study Affymetrix 6.0 Platform | 76 | 2488 |
| NHS Illumina Platforms | 259 | 1367 |
| Women’s Genome Health Study | 158 | 22,335 |
| Ocular Hypertension Treatment Study | 44 | 340 |
| Mass Eye & Ear Infirmary | 257 | 185 |
| National Eye Institute Glaucoma Human Genetics Collaboration | 1104 | 1237 |
| Marshfield | 50 | 1104 |
| Iowa | 212 | 54 |

*Nurses Heath Study (NHS) Affymetrix 6.0 Platform*  – POAG cases were identified as previously described.1 POAG cases and controls that were genotyped on the Affymetrix platform included studies of type 2 diabetes (T2D) and coronary heart disease. We applied exclusion criteria to remove expected and unexpected duplicates, controls without an ophthalmic exam between 2004-2010, non-Caucasians, and cases that could not be confirmed by our methods, leaving 76 cases and 2488 controls. Given the strong evidence for a positive association between T2D and POAG,2,3 we controlled for diabetes status in this dataset.

*NHS Illumina Platform* - POAG cases were identified as previously described1 and matched to controls drawn from a longitudinal cohort at risk for glaucoma. These cases and controls were genotyped as part of the GLAUGEN (Glaucoma Genes and Environment) study,4 a subset of genome wide association studies supported by the National Human Genome Research Institute.5 Other POAG cases and controls that were genotyped on various Illumina platforms were added, including genome wide studies of breast cancer, pancreatic cancer and kidney stones (in NHS and NHS2). After applying the same exclusion criteria above plus also excluding cancer cases and all POAG cases with pre-existing cancer, 259 POAG cases and 1367 controls remained.

*Women’s Genome Health Study (WGHS)* – This is a POAG case-cohort study where case identification occurred as previously described.1 The WGHS has been previously described6 and has contributed to the understanding of the genetic architecture for various complex traits.

*Ocular Hypertension Treatment Study (OHTS)* – The OHTS was a multi-center randomized clinical trial (RCT) of patients with elevated intraocular pressure (IOP), normal optic nerves and full visual fields.7 In this National Eye Institute-sponsored study, patients were randomized to glaucoma treatment versus observation. Patients who converted to POAG either had an optic disc change, visual field loss or both as determined at disc reading centers or visual field reading centers that were masked to treatment status.

*Mass Eye & Ear Infirmary* - This is a clinic-based case control dataset collected in the Boston area and were genotyped as part of the GLAUGEN study.4

*National Eye Institute Glaucoma Human Genetics Collaboration (NEIGHBOR)* – The NEIGHBOR dataset consists of case-control sets from 9 academic centers (Duke, Marshfield Clinic, University of Michigan, University of Pittsburgh, University of California San Diego, Stanford University, West Virginia University, Johns Hopkins University and University of Miami) plus cases from 2 glaucoma RCTs (the Advanced Glaucoma intervention Study and the Collaborative Glaucoma Intervention Study).8 The case definition was comparable to the definition used in the NHS except patients could have only one visual field with loss consistent with glaucoma as long as there was cup-disc ratio ≥ 0.7.

*Marshfield* – This is a clinic-based case control group from Marshfield clinic distinct from the case control set genotyped as part of NEIGHBOR. POAG cases had a cup disc ratio ≥ 0.8 or at least one visual field consistent with glaucoma.

*Iowa* - This is a clinic-based case control group from University of Iowa. Cases were defined as described above for NEIGHBOR.

For each dataset details regarding the genotype data cleaning, handling of population stratification and approach to imputation are addressed in the supplemental material of Bailey et al.24 in the man text.

References:

1. Pasquale LR, et al. Anthropometric Measures and their Relation to Incident Primary Open-Angle Glaucoma. Ophthalmology 2010;117:1521-29.

2. Pasquale LR, et al. Prospective study of type 2 diabetes mellitus and risk of primary open-angle glaucoma in women. Ophthalmology. 2006 Jul;113(7):1081-6.

3. Zhao D, et al. Diabetes, fasting glucose and the risk of glaucoma: a meta-analysis. Ophthalmology 2015;122:72-8.

4. Wiggs JL, et al. Common variants near CAV1 and CAV2 are associated with primary open-angle glaucoma in Caucasians from the USA. Hum Mol Genet. 2011;20:4707-13.

5. Cornelis MC, et al. The Gene, Environment Association Studies Consortium (GENEVA): Maximizing the knowledge obtained from GWAS by collaboration across studies of multiple conditions. Genetic Epidemiology, 2010;34:364-72.

6. Ridker PM, et al. Women’s Genome Health Study Working Group. Rationale, design and methodology of the Women’s Genome Hea;th Study: a genome-wide association study of more than 25,000 initially healthy American women. Clin Chem 2008; 54:249-55.

7. Gordon MO, Kass MA. The Ocular Hypertension Treatment Study: design and baseline description of the participants. Arch Ophthalmol. 1999;117:573-83.

8. Wiggs JL, et al. Common variants at 9p21 and 8q22 are associated with increased susceptibility to optic nerve degeneration in glaucoma. PLoS Genet. 2012;8(4):e1002654.