

Supplementary Online Content

Lin H-C, Stein JD, Nan B, et al. Geroprotective drug metformin and reduced risk of open-angle glaucoma in persons with diabetes mellitus. *JAMA Ophthalmol*. Published online May 28, 2015. doi:10.1001/jamaophthalmol.2015.1440.

eFigure. Study Population Flowchart

eTable 1. International Classification of Disease Codes Used in the Analysis

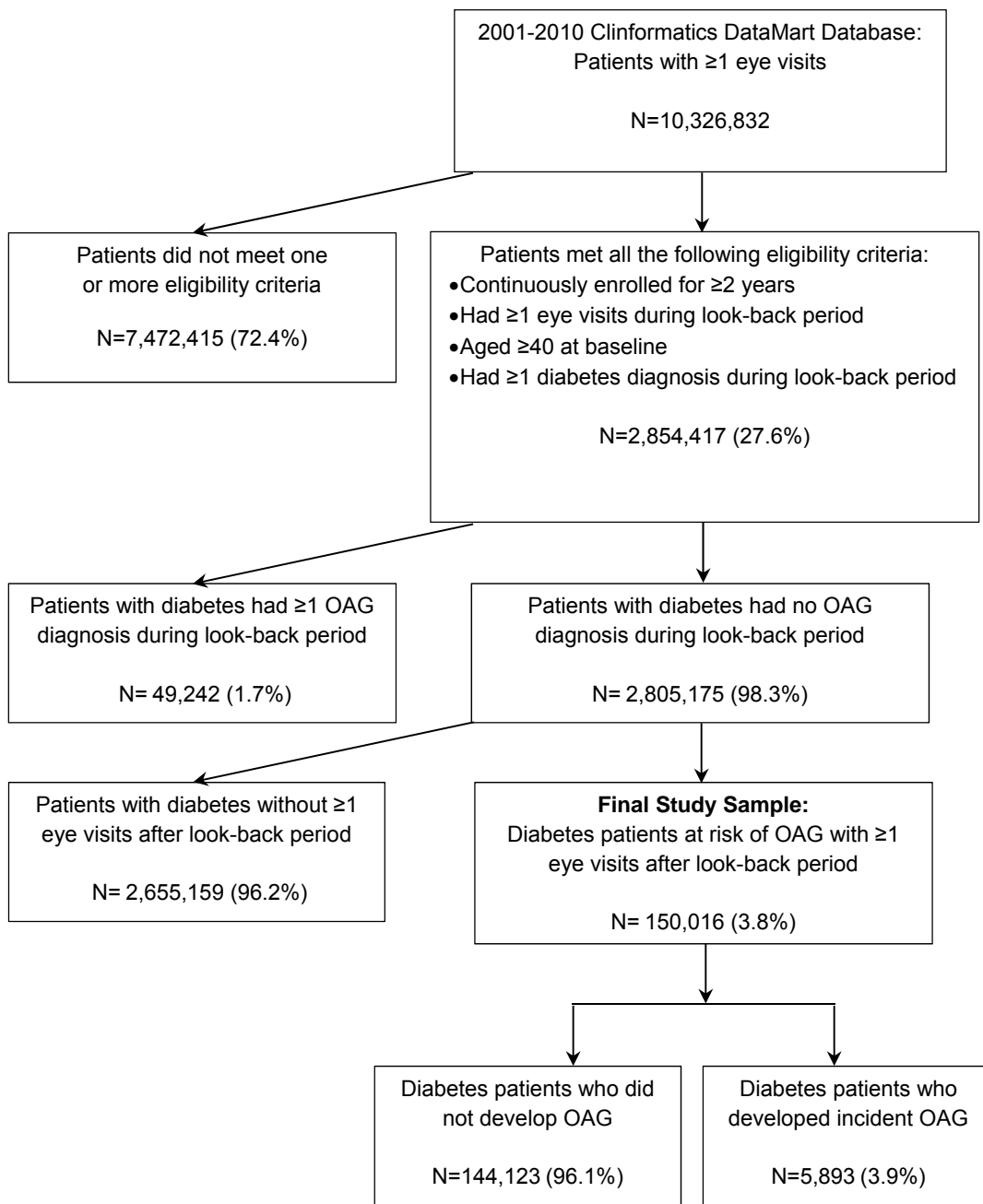
eTable 2. Epidemiology Studies of the Association of Diabetes Mellitus With Open-Angle Glaucoma

eTable 3. Prospective Longitudinal Studies of the Association of Diabetes Mellitus With Open-Angle Glaucoma

This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure. Study Population Flowchart

The application of study criteria during and after a two year look back period resulted in a study population of 150,016 persons with diabetes and without prior OAG who were followed to identify incident OAG.



eTable 1. International Classification of Disease Codes Used in the Analysis

Condition	ICD-9-CM Codes*
Cataract	366, 366.0, 366.00, 366.01, 366.02, 366.03, 366.04, 366.09, 366.1, 366.10, 366.12, 366.13, 366.14, 366.15, 366.16, 366.17, 366.18, 366.19, 366.41, 366.45
Dementia	290, 290.0, 290.1, 290.10, 290.11, 290.12, 290.13, 290.2, 290.20, 290.21, 290.3, 290.4, 290.40, 290.41, 290.42, 290.43, 290.8, 290.9, 294.1, 294.10, 294.11, 331.2
Depression	296, 296.0, 296.00, 296.01, 296.02, 296.03, 296.04, 296.05, 296.06, 296.1, 296.10, 296.11, 296.12, 296.13, 296.14, 296.15, 296.16, 296.2, 296.20, 296.21, 296.22, 296.23, 296.24, 296.25, 296.26, 296.3, 296.30, 296.31, 296.32, 296.33, 296.34, 296.35, 296.36, 296.4, 296.40, 296.41, 296.42, 296.43, 296.44, 296.45, 296.46, 296.5, 296.50, 296.51, 296.52, 296.53, 296.54, 296.55, 296.56, 296.6, 296.60, 296.61, 296.62, 296.63, 296.64, 296.65, 296.66, 296.7, 296.70, 296.71, 296.72, 296.73, 296.74, 296.75, 296.76, 296.8, 296.80, 296.81, 296.82, 296.89, 296.9, 296.90, 296.99
Diabetes mellitus	250.0, 250.00, 250.01, 250.02, 250.03, 250.1, 250.10, 250.11, 250.12, 250.13, 250.2, 250.20, 250.21, 250.22, 250.23, 250.3, 250.30, 250.31, 250.32, 250.33, 250.4, 250.40, 250.41, 250.42, 250.43, 250.5, 250.50, 250.51, 250.52, 250.53, 250.6, 250.60, 250.61, 250.62, 250.63, 250.7, 250.70, 250.71, 250.72, 250.73, 250.8, 250.80, 250.81, 250.82, 250.83, 250.9, 250.90, 250.91, 250.92, 250.93, 362.01, 362.92, 362.03, 362.04, 362.05, 362.06, 362.07
Exudative age-related macular degeneration	362.52
Hyperlipidemia	272, 272.0, 272.1, 272.2, 272.3, 272.4, 272.5, 272.6, 272.7, 272.8, 272.9
Hypertension	401, 401.0, 401.1, 401.9, 405, 405.0, 405.1, 405.01, 405.09, 405.11, 405.19, 405.9, 405.91, 405.99, 362.11, 402, 402.0, 402.01, 402.1, 402.10, 402.11, 402.9, 402.90, 402.91, 403, 403.0, 403.00, 403.01, 403.1, 403.10, 403.11, 403.9, 403.90, 403.91, 404.0, 404.00, 404.01, 404.02, 404.03, 404.1, 404.10, 404.11, 404.12, 404.13, 404.9, 404.90, 404.91, 404.92, 404.93
Non-exudative age-related macular degeneration	362.50, 362.51, 362.57
Non-proliferative diabetic retinopathy	362.01, 362.03, 362.04, 362.05, 362.06, 362.07
Obesity	278.0, 278.00, 278.01, 278.02
Open-angle glaucoma	365.1
Open-angle glaucoma, unspecified	365.10
Primary open-angle glaucoma	365.11
Low tension open-angle glaucoma	365.12
Residual stage of open-angle glaucoma	365.15
Proliferative diabetic retinopathy	362.02
Pseudophakia or aphakia	V43.1, 379.3, 379.31

*ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

eTable 2. Epidemiology Studies of the Association of Diabetes Mellitus With Open-Angle Glaucoma

Study Publication	Association	OR* (95% CI)	Number of Subjects	Covariates**	Country	Population Studied
Kahn et al. 1980 ²³	No	-	2,433	12	USA	Framingham Eye Study
Klein et al. 1994 ²⁴	Yes	1.68 (1.14-2.50)	4,926	1,2	USA	Beaver Dam
Wormald et al. 1994 ²⁵	No	2.2 (0.9-5.6)	873	1, 2, 9, 10	England	African-Caribbean Eye Survey
Leske et al. 1995 ²⁶	No	-	4,314	1, 2	Barbados	Barbados Eye Study
Tielsch et al. 1995 ²⁷	No	1.03 (0.85-1.25)	5,308	1, 11	USA	Baltimore Eye Survey
Dielemans et al. 1996 ²⁸	Yes	3.11 (1.12-8.66)	4,178	1, 2, 7	Netherlands	Rotterdam Eye Study
Kaimbo Wa Kaimbo et al. 1997 ²⁹	No	2.67 (0.05-28.46)	260	12	Congo	Survey of Blindness in Zaire
Mitchell et al. 1997 ³⁰	Yes	2.12 (1.18-3.79)	3,644	1,2	Australia	Blue Mountains Eye Study
Quigley et al. 2001 ³¹	No	1.24 (0.79-1.94)	4,774	1	USA	Proyecto VER
Chopra et al. 2008 ³²	Yes	1.4 (1.03-1.8)	5,894	1,2,3	USA	Los Angeles Latino Eye Study (LALES)
Vijaya et al. 2005 ³³	No	-	3,924	12	India	Chennai Glaucoma Study
Xu et al. 2009 ³⁴	No	1.25 (0.61-2.56)	3,251	12	China	Beijing Eye Study
Tan et al. 2009 ³⁵	No	1.02 (0.58-1.97)	3,280	1, 2, 8, 4, 5, 6	Singapore	Singapore Malay Eye Study

*OR=odds ratio, CI=confidence interval. **1) Age, 2) Sex, 3) Intraocular pressure, 4) Smoking Status, 5) Central corneal thickness, 6) Diabetic treatment, 7) Body mass index, 8) Education, 9) Hypertension, 10) Place of origin, 11) Race, 12) None reported.

eTable 3. Prospective Longitudinal Studies of the Association of Diabetes Mellitus With Open-Angle Glaucoma

Study Publication	Association	Risk measure* (95% CI)	Number of Subjects	Covariates**	Country	Population Studied
Ellis et al. 2000 ³⁶	No	RR=1.57 (0.99-2.48)	172,775	1	Scotland	Diabetes Audit and Research in Tayside Study
Gordon et al. 2002 ³⁷	Yes	HR=0.37 (0.15-0.90)	1,493	1, 4, 8, 9, 10	USA	Ocular Hypertension Treatment Study
Le et al. 2003 ³⁸	No	-	2,415	30	Australia	Melbourne Visual Impairment Project
de Voogd et al. 2006 ³⁹	No	RR=0.65 (0.25-1.64)	3,837	1, 2, 3, 4, 5, 6, 7	Netherlands	Rotterdam Eye Study
Pasquale et al. 2006 ⁴⁰	Yes	OR=1.82 (1.23-2.70)	76,318	6, 7, 11, 25, 26, 28, 29	USA	Nurse's Health Study
Newman-Casey et al. 2011 ¹¹	Yes	HR=1.35 (1.21-1.50)	2,182,315	1, 2, 11-24	USA	Clinformatic Datamart Database
Wise et al. 2011 ⁴¹	Yes	IRR=1.58 (1.17-2.130)	32,570	1, 12, 6, 7, 25-28	USA	Black Women's Health Study

*RR=relative risk, IRR=incidence rate ratio, OR=odds ratio, HR=hazard ratio. CI=confidence interval. ** 1) Age, 2) Sex, 3) Follow up time, 4) intraocular pressure, 5) Intraocular pressure lowering treatment, 6) Body mass index, 7) Hypertension, 8) Visual field pattern standard deviation, 9) Vertical cup-to-disc ratio, 10) Corneal thickness, 11) Race, 12) Education, 13) Household net worth, 14) Region of residence, 15) Pseudophakia 16) Aphakia, 17) Macular degeneration, 18) Diabetic retinopathy, 19) Systemic hypotension, 20) Sleep apnea, 21) Migraine headache, 22) Charlson comorbidity index, 23) Obesity, 24) Dyslipidemia, 25) Alcohol consumption, 26) Vigorous physical activity, 27) Energy intake, 28) Cigarette smoking, 29) use or diabetes medications, and 30) None reported.