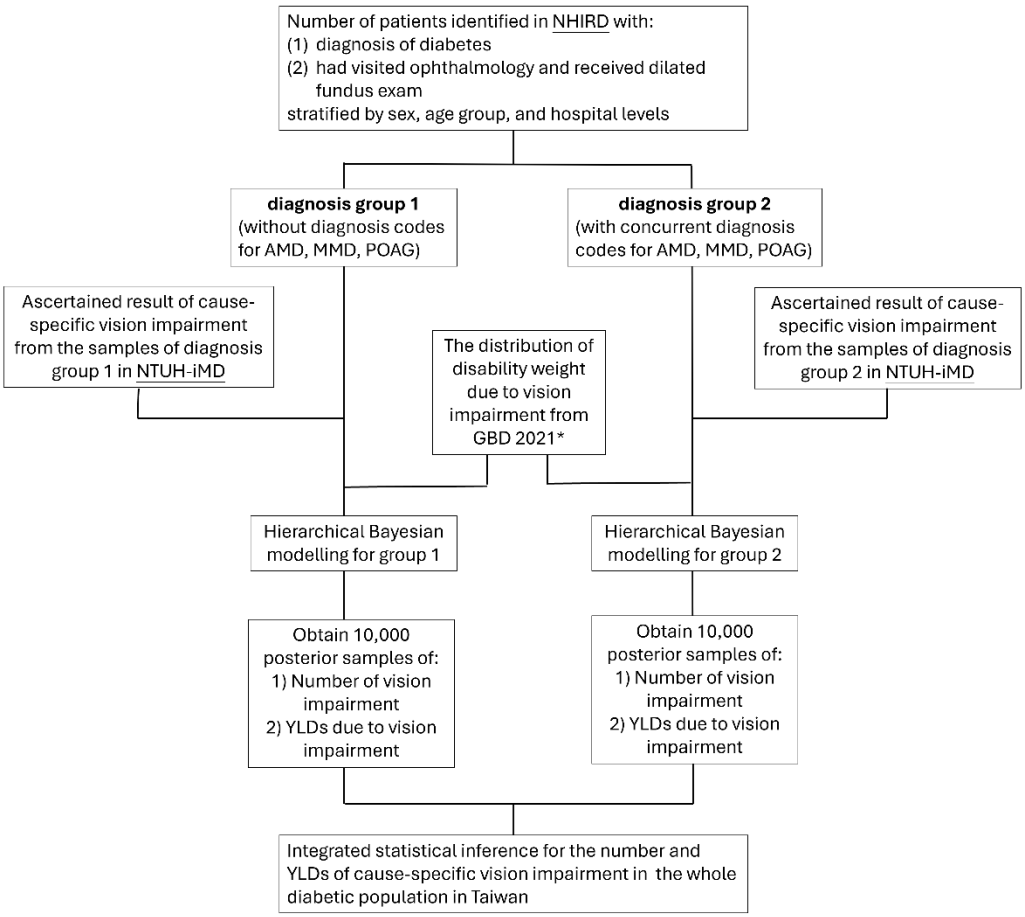
Supplement 4. Data integration process for information from NTUH-iMD and NHIRD.



*GBD 2021 disability weight due to vision impairment			
Severity levels	**Mean**	**Lower**	**Upper**
Mild	0	0	0
Moderate	0.030842126399999965	0.018822	0.048710372499999995
Severe	0.184048487800000027	0.125125	0.258286182499999996
Blindness	0.187365	0.124429	0.260217

NHIRD: National health insurance research database
NTUH-iMD: National Taiwan University Hospital- integrated medical database
AMD: age-related macular degeneration
MMD: myopic macular degeneration
POAG: primary open angle glaucoma
GBD: Global burden of disease study
YLDs: years lived with disability

This estimation method relies on several assumptions. First, given the high coverage of National Health Insurance (NHI), most diabetic patients with vision problems will seek or be referred to eye care services, allowing identification through ophthalmic visit records in the health insurance database. Second, under the hospital tiered payment and evaluation system mandated by the NHI, the disease severity of patients in medical institutions at the same level is similar. Therefore, conditions observed in different hospital levels within the NTUH healthcare system can be extrapolated to other medical institutions of the same level. Based on these

assumptions, integrating NHIRD and NTUH-iMD data allows us to estimate vision impairment in the diabetic population at the national level.

In the diabetic population, the distribution of vision impairment is assumed to differ between individuals diagnosed with other major eye diseases (diagnosis group 2) and those who are not (diagnosis group 1). Therefore, the procedures were performed separately for those with and without major eye diseases.

For each specific cause of vision impairment, including DR, cataract, AMD, MMD, glaucoma and other causes, we constructed dedicated hierarchical Bayesian models to obtain the posterior samples. The model structures were adjusted according to the characteristics of each disease. For instance, when estimating vision impairment due to AMD, we only considered data from individuals aged over 55, as AMD is unlikely to occur in younger populations. We estimated the number of vision impairment caused by DR, cataract, and other causes in diagnosis group 1; DR, cataract, AMD, MMD, POAG and other causes in diagnosis group 2. The outputs were then integrated to construct an overview of cause-specific vision impairment within the diabetic population.

In addition to vision impairment, the sampling data from NTUH-iMD also provided clinically assessed primary information about PDR and DME in the diabetic population. This information was utilized to estimate the nationwide prevalence of PDR and DME through a similar hierarchical Bayesian approach, using conjugate beta-binomial distribution.

We also analyzed the spatial and temporal trends of DR-related vision impairment in Taiwan. Based on region-specific and year-specific data from NHIRD, age-standardized population prevalence for DR-related vision impairment was estimated by region and year. Since Taiwan's health authorities approved anti-vascular endothelial growth factor therapy for DR in 2009, we assumed that the distribution of visual impairment among patients with DR in the NTUH-iMD in 2019 can be generalized to the years following 2010. For inter-regional comparisons, people aged ≥40 years were included because the number of vision impairment cases in the 20–39 age group were few in certain regions.