The epidemiology of optic neuritis in the United Kingdom and implications for consensus diagnostic criteria for multiple sclerosis

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Disclosures

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Background

- The epidemiology of optic neuritis (ON) has been studied less carefully than the epidemiology of multiple sclerosis (MS). The association of ON with many other diseases poses one of several challenges for inclusion of the ON as a 5th location in consensus diagnostic criteria for MS
- To investigate current trends in ON incidence, prevalence and associations with systemic and neurological diseases in the United Kingdom (UK)

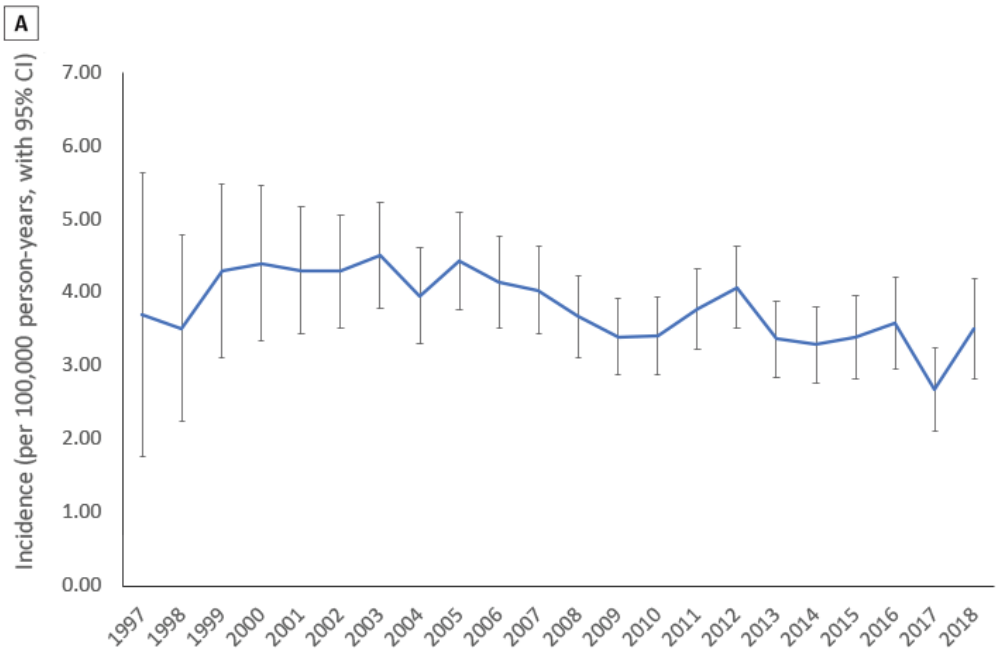
Methods

- Data on 75 million patient-years of follow up *from*
- 11,086,469 UK patients *from*
- The Health Improvement Network (THIN) *for*
- A retrospective cross-sectional and population cohort study for the association of optic neuritis multiple sclerosis (MS) and 66 other immune-mediated inflammatory disease (IMID) https://doi.org/10.1016/B978-0-444-63432-0.00020-7

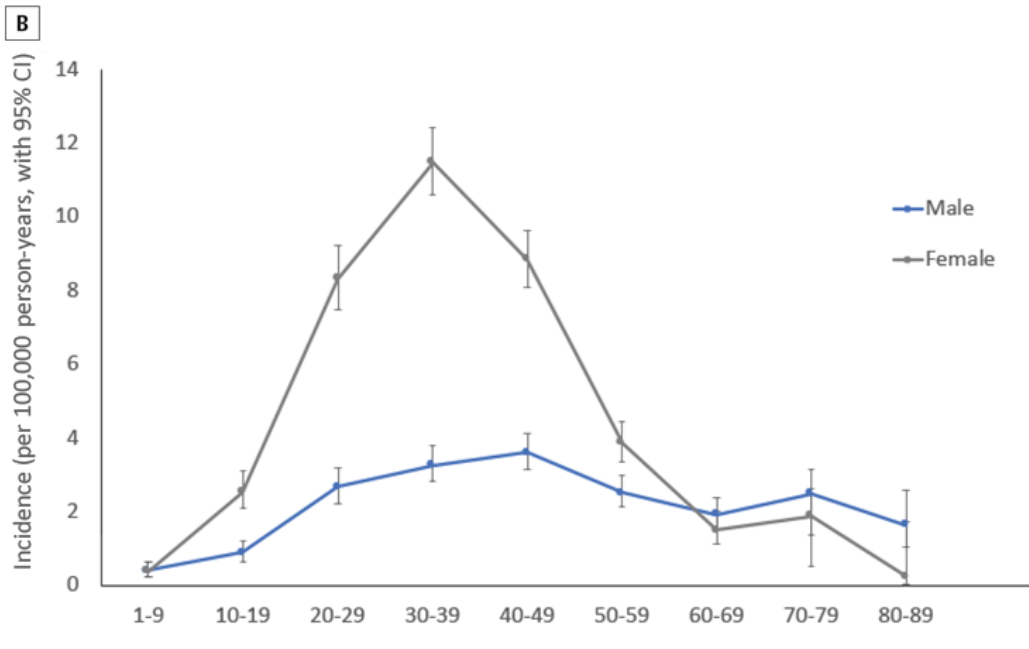
Cohort description

	Characteristic at baseline	ON % (n)	No ON % (n)	Single variable IRR (95% CI), p value	Adjusted IRR (95% CI), p value)
	Total, % (n)	2826	10,934,685		
Gender	Female, % (n)	69.4 (1,962)	50.9 (5,569,320)	2.26 (2.09-2.45), p<0.001	2.26 (2.08-2.45), p<0.001
Age group at cohort entry	1-10 years	4.3 (121)	19.9 (2,070,338)	1	1
	11-20 years	10.1 (284)	9.9 (1,081,405)	4.56 (3.69-5.64), p<0.001	4.53 (3.65-5.63), p<0.001
	21-30 years	24.9 (704)	18.2 (1,984,337)	7.81 (6.44-9.47), p<0.001	6.80 (5.50-8.40), p<0.001
	31-40 years	28.2 (796)	16.6 (1,814,484)	6.98 (5.77-8.45), p<0.001	6.04 (4.89-7.46), p<0.001
	41-50 years	16.7 (473)	12.1 (1,324,681)	4.84 (3.97-5.91), p<0.001	4.15 (3.33-5.16), p<0.001
	51-60 years	8.3 (235)	9.6 (1,045,254)	2.92 (2.35-3.64), p<0.001	2.45 (1.93-3.10), p<0.001
	61-70 years	4.4 (125)	7.0 (765,334)	2.21 (1.72-2.83), p<0.001	1.82 (1.39-2.38), p<0.001
	71-80 years	2.4 (67)	4.8 (526,666)	2.08 (1.55-2.81), p<0.001	1.69 (1.24-2.31), p<0.001
	81-90 years	0.7 (21)	2.5 (270,755)	2.11 (1.33-3.36), p=0.002	1.68 (1.05-2.69), p<0.001
	91-100 years	0	0.5 (50,687)		
	101+ years	0	0.0 (744)		
Nation	England	68.8 (1,943)	71.3 (7,790,740)	1	1
	Scotland	16.0 (452)	14.1(1,538,041)	1.22 (1.10-1.35), p<0.001	1.19 (1.08-1.32), p=0.001
	Wales	10.1 (285)	11.0 (1,203,405)	0.91 (0.81-1.04), p=0.158	0.91 (0.80-1.03), p=0.147
	Northern Ireland	5.2 (146)	3.4 (402,499)	1.07 (0.90-1.26), p=0.437	1.08 (0.91-1.28), p=0.376

Incidence of ON

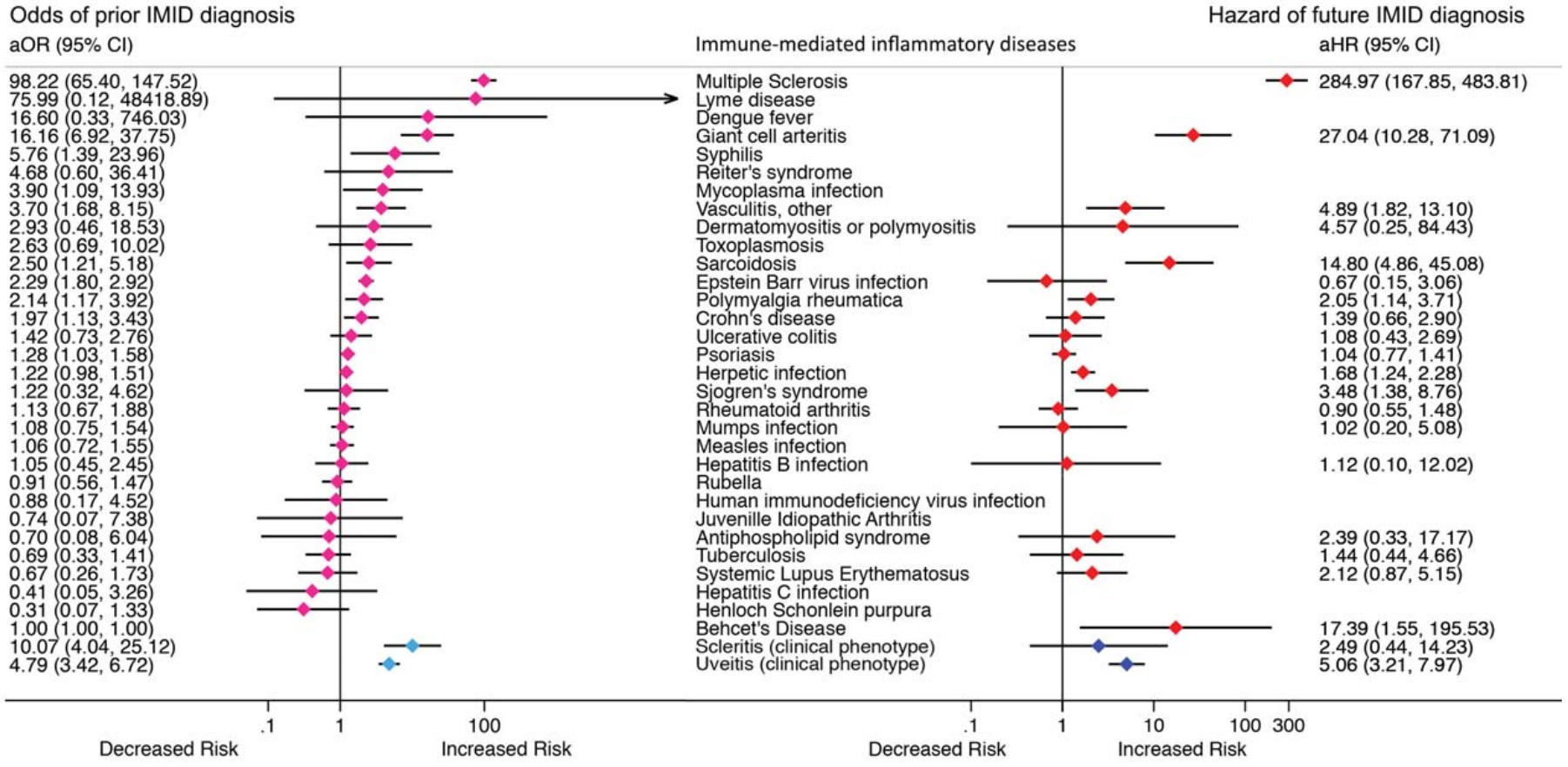


22 year observation period



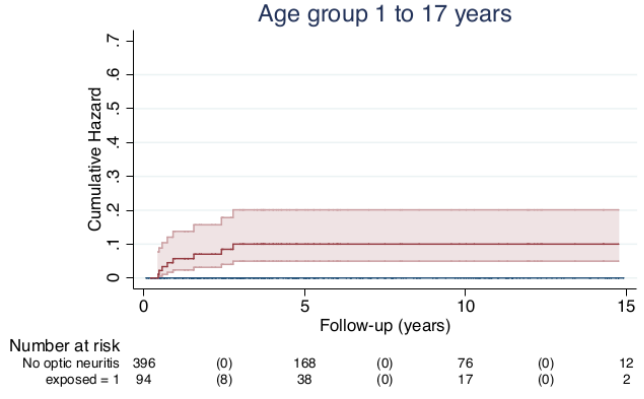
Age

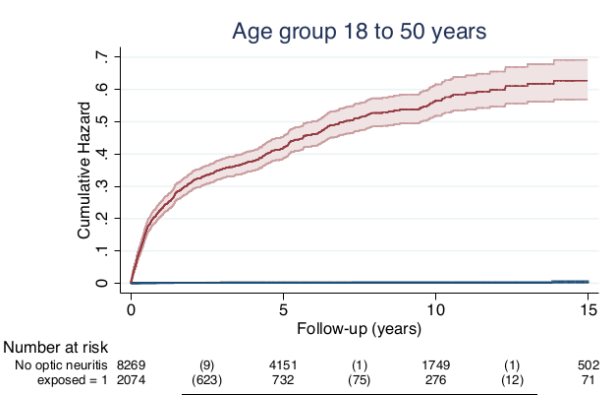
Past (OR) and future (HR) associations with ON

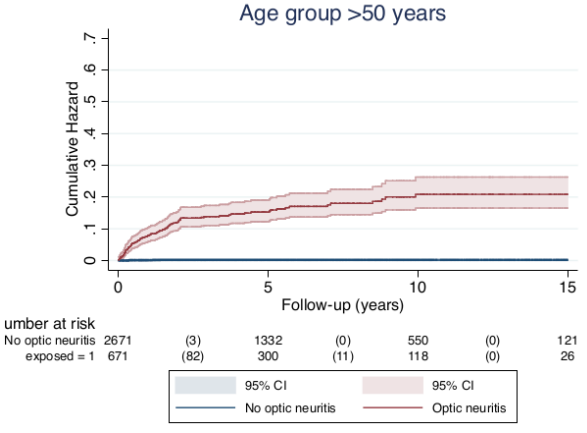


Association of ON with MS

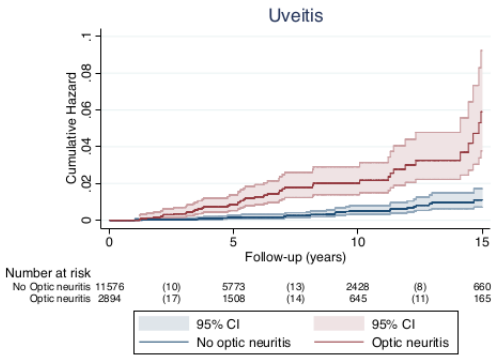
	Case-control analysis			Retrospective matched cohort analysis[a]		
Diagnosed IMIDs[b]	Cases n (%)	Controls n(%)	Adjusted Odds Ratio (95%CI)[c], p value	Optic neuritis n (%)	Controls n(%)	Adjusted Hazard Ratio (95% CI)[c], p value
Neurological immune-mediated inflammatory diseases (IMIDs)						
Multiple Sclerosis	17.31 (501)	0.22 (25)	98.22 (65.40-147.52), p<0.001	22.36 (535)	0.08 (9)	284.97 (167.85-483.81), p<0.001

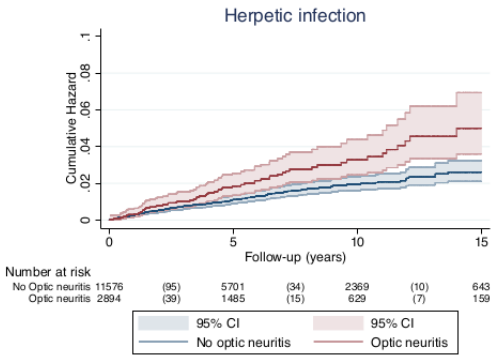


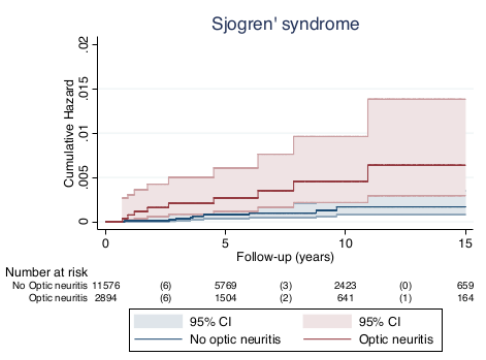


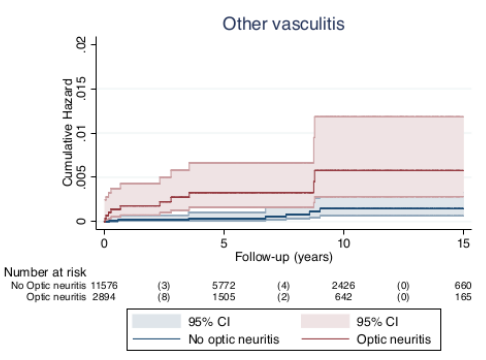


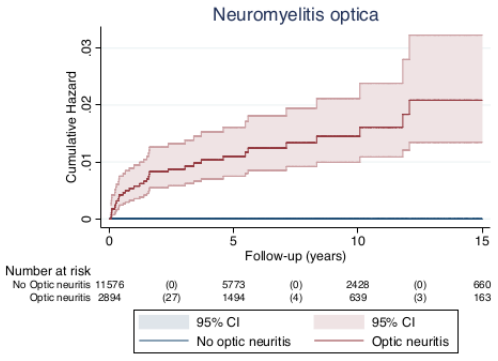
Association of ON with other diseases

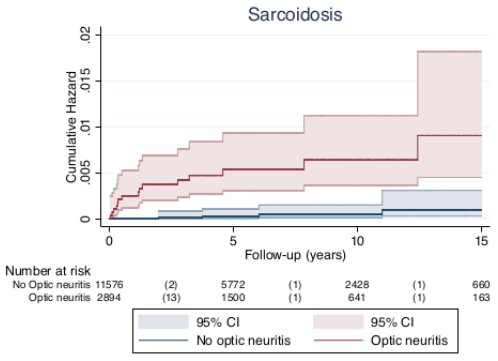


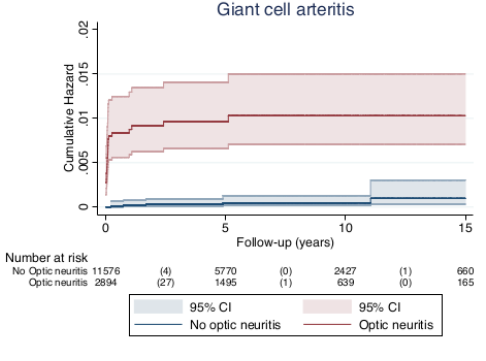


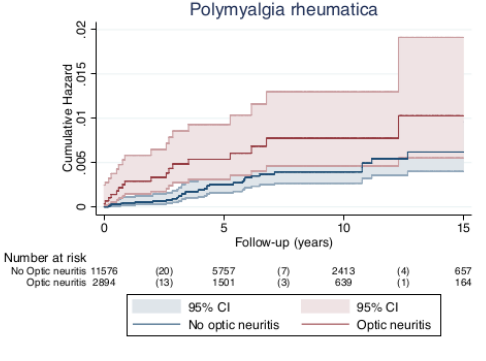












Conclusion

- We describe trends in ON incidence, prevalence and associations with systemic and neurological diseases
- This cohort study of >11 million patients reports ON incidence of 3.74 per 100,000 person-years, affecting 114 per 100,000 population in 2018 (76,279 people)
- The incidence of ON is stable over the 22 year observation period on a UK population based level. The primary differential diagnosis is MS. For patient management it is important to note that the other IMID associated ON cases, paradoxically individually considered as a rare, cumulative outnumber MS-ON cases. This will be relevant for future revision of consensus MS diagnostic criteria, to minimize misdiagnosis