

Supplemental Table 2. Studies reporting the prevalence of seizure disorders (epilepsy) in multiple sclerosis

Study (Year)	Region/ Sub-Region	Source/ Population	Prevalence Day/Period	Diagnostic Criteria: MS/ Established By	Diagnostic Criteria: Epilepsy/ Established By	Crude Overall Prevalence (95%CI)	Age-Standardized Overall Prevalence (95%CI)	Crude Prevalence (95%CI)		Standardized Prevalence (95%CI)		Quality Score
								Males	Females	Males	Females	
Brichetto ¹⁴ (2003)	Italy/ Genoa	All persons with MS in Genoa	Feb1998-Jun 2000	Poser	Self-report/Medication use	Seizures 8/665 = 1.20%	NR	NR	NR	NR	NR	6/9
Catenoix ¹⁵ (2011)	France/ Lyon City and Rhone-Alpes	EDMUS Lyon MS Cohort, Lyon Neurology Clinic/ all MS patients examined at least once	1976-2007	Neurologist diagnosed: Poser	EDMUS database/recorded as a symptom of MS	At least 1 epileptic seizure 102/5,041 = 2.02% At least 1 epileptic seizure due to cause other than MS 67/5,041 = 1.33%	NR	NR	NR	NR	NR	5/8
Cendrowski ¹⁶ (1972)	Poland	Neurology clinic	NR	Clinical observation: Dissemination of	Clinical observation	Epilepsy 17/500 = 3.4%	NR	4/200 = 2.00%	13/300 = 4.33%	NR	NR	1/9

				foci in space and remittent course of the disease.								
Cheng ¹⁷ (2012)	Taiwan	Chang Gung Memorial Hospital/ identified from medical records	Jan 1,1989- Dec 31, 2008	Neurologist diagnosed: Poser or McDonald 2001	Medical Record Review/ ILAE 1981 classification, EEG, MRI	Epileptic seizures 8/93 = 8.06% MS-related seizures (at time of relapse) 4/93 = 4.30% Recurrent seizures (not related to MS relapse) 4/93 = 4.30%	NR	0/23 = 0%	8/70 = 11.4%	NR	NR	5/8
Durmus ¹⁹ (2013)	Turkey	MS, Demyelinating Disorders and Child Neurology Units/ Definite MS	1998-2008	Neurologist diagnosed: McDonald 2001 Pediatric MS ≤16 years of age at onset	Medical Record Review/ ILAE 1981 classification, EEG	Epilepsy 36/2,300 = 1.57% Epilepsy in pediatric MS 8/146 = 5.48%	NR	NR	NR	NR	NR	5/8
Engelsen ²⁰	Norway/	Department	1958-1988	Neurologist	Medical Record	Epilepsy	NR	6/169 =	11/254 =	NR	NR	7/8

(1997)	Hordaland County	of Neurology		diagnosed: McAlpine	Review/ILAE 1981 classification	16/423 = 3.78%		3.55%	4.33%			
Eriksson ²¹ (2002)	Sweden/ Gothenburg	MS incidence cohort, clinically definite or probable MS	1950-1989	Neurologist diagnosed: Poser	Patient chart review and EEG when available	Epilepsy 19/254 = 3.50%	NR	NR	NR	NR	NR	7/8
Etemadifar ²³ (2012)	Iran/ Isfahan	Isfahan MS Society/ Pediatric onset MS (symptoms ≤16 years old)	Apr 2003-Jul 2010	Neurologist diagnosed: McDonald 2005	Clinical record review/ILAE criteria, EEG and MRI	Pediatric MS: Epilepsy before MS onset 2/117 = 1.71%	NR	Epilepsy EOMS 1/19 = 5.26%	Epilepsy EOMS 9/98 = 9.81%	NR	NR	7/8
Etemadifar ²² (2013)		Adult onset MS				Epilepsy 10/117 = 8.55%		Epilepsy 15/806 = 1.86%	Epilepsy 66/2,716 = 2.43%			
Gambardella ²⁴ (2003)	Italy/ Catanzaro	Institute of Neurology School of Medicine/co	NR	Neurologist diagnosed: Poser	Clinical record review/ILAE 1981 criteria, EEG and MRI	Temporal Lobe Epilepsy 5/350 = 1.43%	NR	NR	NR	NR	NR	6/8

		nsecutive patients with definite or probable MS				Epilepsy lifetime prevalence 16/350 = 4.57%						
Ghezzi ²⁵ (1990)	Italy/ Milano	MS centre/ all patients with MS onset ≥ 1	Jan 1, 1982- Jun 30, 1988	Neurologist diagnosed: McAlpine	ILAE 1981 criteria, EEG, cranial CT scan and MRI in some cases	Epilepsy 40/2,353 = 1.70% Definite MS 34/1,459 = 2.33% Probable MS 3/518 = 0.58% Possible MS 3/376 = 0.80%	NR	NR	NR	NR	NR	6/8
Horton ²⁶ (2010)	Canada/ Manitoba United States/ Ohio	Participants recruited from 2 MS clinics	Oct 2008-Oct 2009	McDonald 2005; diagnosed by neurologist at MS clinic	The Self-Administered Comorbidity Questionnaire (validated questionnaire). Validated by medical records data.	Epilepsy 8/404 = 1.98% by questionnaire 7/404 = 1.73% by medical records	NR	NR	NR	NR	NR	5/8

Kang ²⁷ (2010)	Taiwan	NHIRD population, age ≥ 15 years	2007	ICD-9-CM code 340, at least two consensus MS diagnoses under the care of certified neurologists during 2007	ICD-9-CM 345.0-345.9, one hospital or two ambulatory physician claims	Epilepsy 57/898 = 6.35%	NR	NR	NR	NR	NR	4/8
Kinnunen ²⁸ (1986)	Finland/ Uusimaa	All MS patients in the province of Uusimaa, clinically definite	Jan 1, 1979	Neurologist diagnosed: Schumacher	ILAE criteria, EEG and CSF	Epilepsy lifetime prevalence 21/599 = 3.51% Point prevalence 2.0%	Point prevalence 5.0%	3.3%	3.6%	NR	NR	8/8
Krokki ⁷ (2006)	Finland/ Northern Ostrobothnia	Outpatient Department of Neurology at OUH, all new cases	1990-2010	ICD-9 3400A (1990-1995) ICD-10 G35 (1996-2010) Neurologist established (Poser, McDonald 2001, McDonald 2005)	Medical records review	Epilepsy 23/491 = 4.7%	NR	NR	NR	NR	NR	6/8
Marrie ²⁹	Canada/	Administrati	1984-2005	Administrative	Epilepsy: ≥ 1	NR	Epilepsy	NR	NR	3.76%	4.88%	8/8

(2013)	Manitoba	ve data/ Entire population of Manitoba		case definition, validated against medical records/ICD-9- CM 340 and ICD-10-CA G35/ 1984–2007 all cases with ≥ 3 prescription, hospital or physician claims for MS. After 2004 all cases with ≥ 1 hospital, physician or prescription claims for MS.	hospital or physician claims and ≥ 2 prescription claims over 3 years.		4.12% (3.42–4.82)			(2.73–5.20)	(4.10–5.81)	
Moreau ³¹ (1998)	France/ Dijon	Neurology Service University Hospital of Dijon/conve nience sample	Jan 1, 1986- Mar 7, 1997	Neurologist diagnosed: Poser	ILAE 1993 criteria, EEG	Epileptic seizures 17/402 = 4.23%	NR	7/162 = 4.32%	10/240 = 4.17%	NR	NR	4/9
Nicoletti ⁵	Italy/	MS Centers,	Jan 1, 1995	Neurologist	ILAE 1993	Epilepsy	Epilepsy	NR	NR	NR	NR	8/8

(2003)	Catania	IMSA, private neurologists and family physicians/ patients identified from epidemiological study determining MS prevalence and incidence		diagnosed: Poser	criteria, and treated with antiepileptic drugs	1.54% (0.39-4.12)	7.7/1,000						
Nuyen ³² (2006)	Netherlands	DNSGP	2001	ICPC code N86	Consultation with GP during (1-year period). ICPC N88	Epilepsy 3/241 = 1.24%	NR	NR	NR	NR	NR	NR	5/8
Nyquist ³⁴ (2001)	United States/ Minnesota (Olmsted County)	Mayo Clinic	Jan 1, 1990- Jan 1, 1998	Neurologist diagnosed: Poser	Medical Record Review/ ILAE classification, EEG and MRI	Epileptic seizures lifetime prevalence 51/5,715 = 0.89%	NR	NR	NR	NR	NR	NR	7/8
Olafsson ³⁵ (1999)	Iceland	Neurology clinic/medic	1965-1989	Neurologist diagnosed: Poser	Medical Record Review/	Epilepsy Lifetime	NR	NR	NR	NR	NR	NR	7/8

		al records			ILAE classification	prevalence 5/188 = 2.66%						
Shaygannejad ³⁶ (2013)	Iran/ Isfahan	MS clinic of the Kashani hospital/ all patients with definite MS diagnosis	Mar 2007-Jun 2011	Neurologist diagnosed: McDonald 2005	Medical Record Review/ ILAE classification, EEG, MRI and antiepileptic drug use	Seizures with underlying etiologies other than MS 29/920 = 3.15%	NR	NR	NR	NR	NR	6/8
Sokic ³⁸ (2001)	Serbia	Institute of Neurology, Belgrade School of Medicine/ consecutive hospitalized patients	1996-1997	Neurologist diagnosed: Poser	Medical Record Review/ ILAE 1981 classification, EEG and MRI Chronic Epilepsy/ Spontaneously repeating seizures occurring regardless of clinical phase of MS	Chronic Epilepsy 12/268 = 4.48% Epileptic seizures or epilepsy lifetime prevalence 20/268 = 7.46%	NR	Epileptic seizures or epilepsy 6/83 = 7.23%	Epileptic seizures or epilepsy 14/165 = 8.48%	NR	NR	6/8
Trouillas ⁴⁰ (1971)	France/ Lyon	Neurological Hospital	NR	NR	Clinical records, EEG	Epilepsy 10/132 = 7.58%	NR	NR	NR	NR	NR	0/9
Viveiros ⁴² (2010)	Brazil/ Rio de	SIAPEM database/all	1997-2007	Neurologist diagnosed:	Medical Record Review/	Epileptic seizures	NR	Epileptic seizures	Epileptic seizures	NR	NR	4/8

	Janeiro	patients followed up at a private neurology clinic		McDonald 2001 and 2005	ILAE 1989 classification, EEG and MRI	lifetime prevalence 5/160 = 3.13%		lifetime prevalence 1/40 = 2.5%	lifetime prevalence 4/120 = 3.33%			
--	---------	--	--	------------------------	---------------------------------------	--------------------------------------	--	------------------------------------	--------------------------------------	--	--	--

NR: Not Reported, OUH: Oulu University Hospital, DNSGP: Dutch National Survey of General Practice, EDMUS: European Database for Multiple Sclerosis, ILAE: International League against Epilepsy, IMSS: Isfahan Multiple Sclerosis Society, EOMS: Early Onset Multiple Sclerosis, IMSA: Italian Multiple Sclerosis Association, SIAPEM: Brazilian Software Database for Multiple Sclerosis Research in Tropical Countries, NHIRD: National Health Insurance Research Database.