

Burden of migraine

Mattias Linde MD, PhD, Professor

*Norwegian Advisory Unit on Headaches, Institute of Neuroscience
Norwegian University of Science and Technology (NTNU), Trondheim*

Director of Tjörn Headache Clinic, Sweden

Nordic Migraine Symposium
Stockholm Nov 27, 2021



 NTNU – Trondheim
Norwegian University of
Science and Technology

AJO-DK-00022

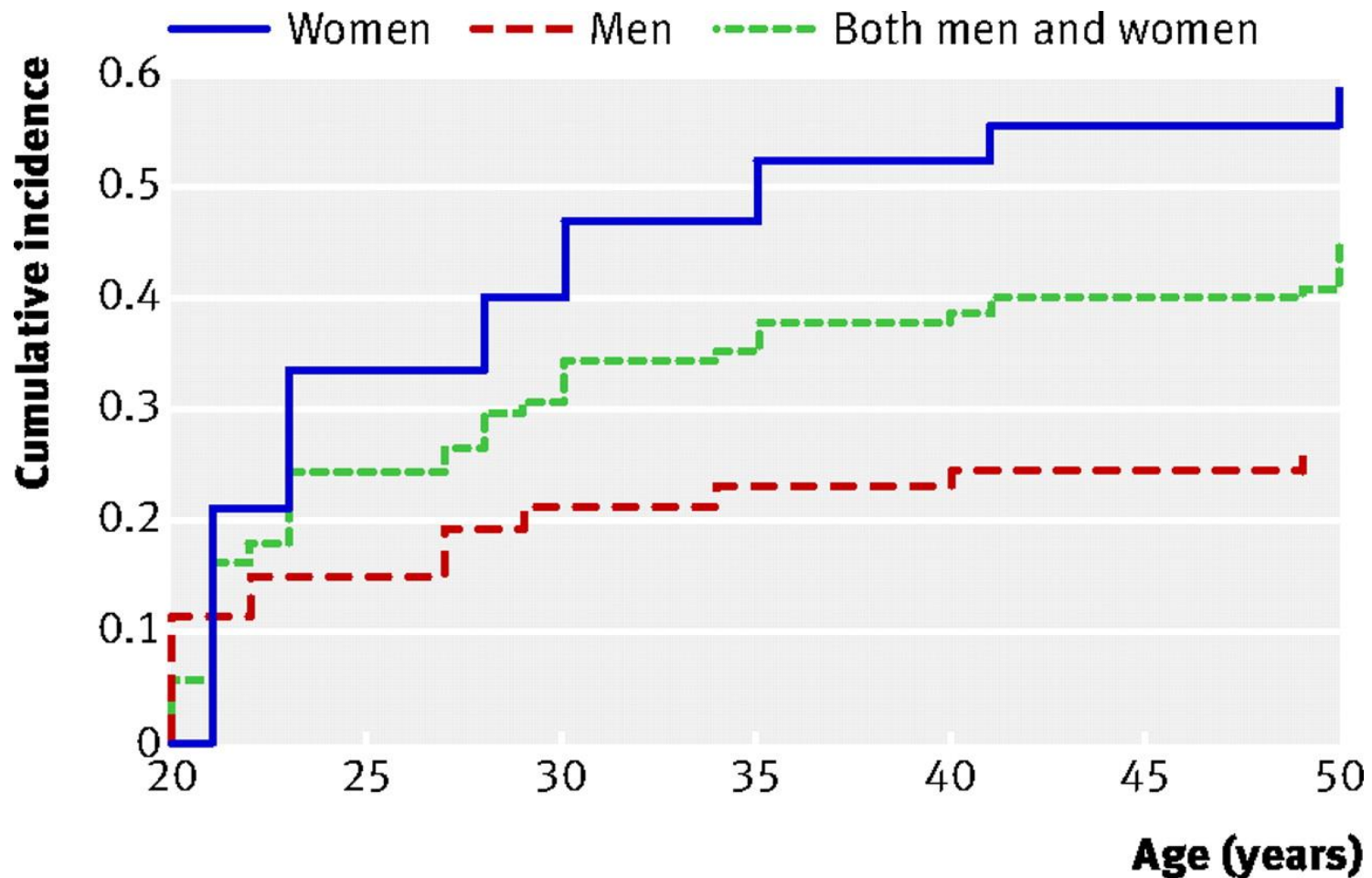
mattias.linde@ntnu.no

Disclosures

- Abbvie: Advisory board and lectures
- Lilly: Advisory board
- Lundbeck: Advisory board and lectures
- Novartis: Advisory board and lectures
- TEVA: Advisory board and lecture
- Tjörn Headache Clinic: Owner

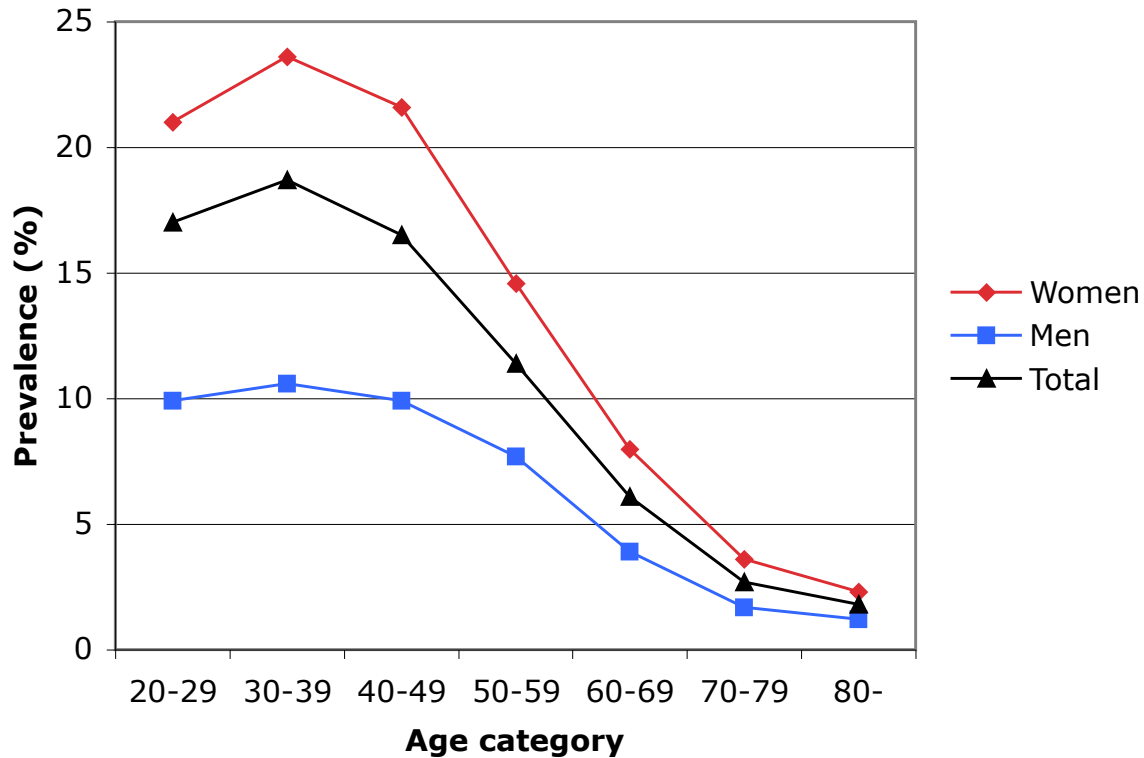


Migraine incidence



Kathleen R Merikangas et al. BMJ 2011;343:bmj.d5076

Migraine demographics – sex and age



Linde M, Stovner LJ, Zwart JA, and Hagen K "Time trends in the prevalence of headache disorders. The Nord-Trøndelag Health Studies (HUNT 2 and 3). Cephalalgia 2011 Apr;31(5):585-96



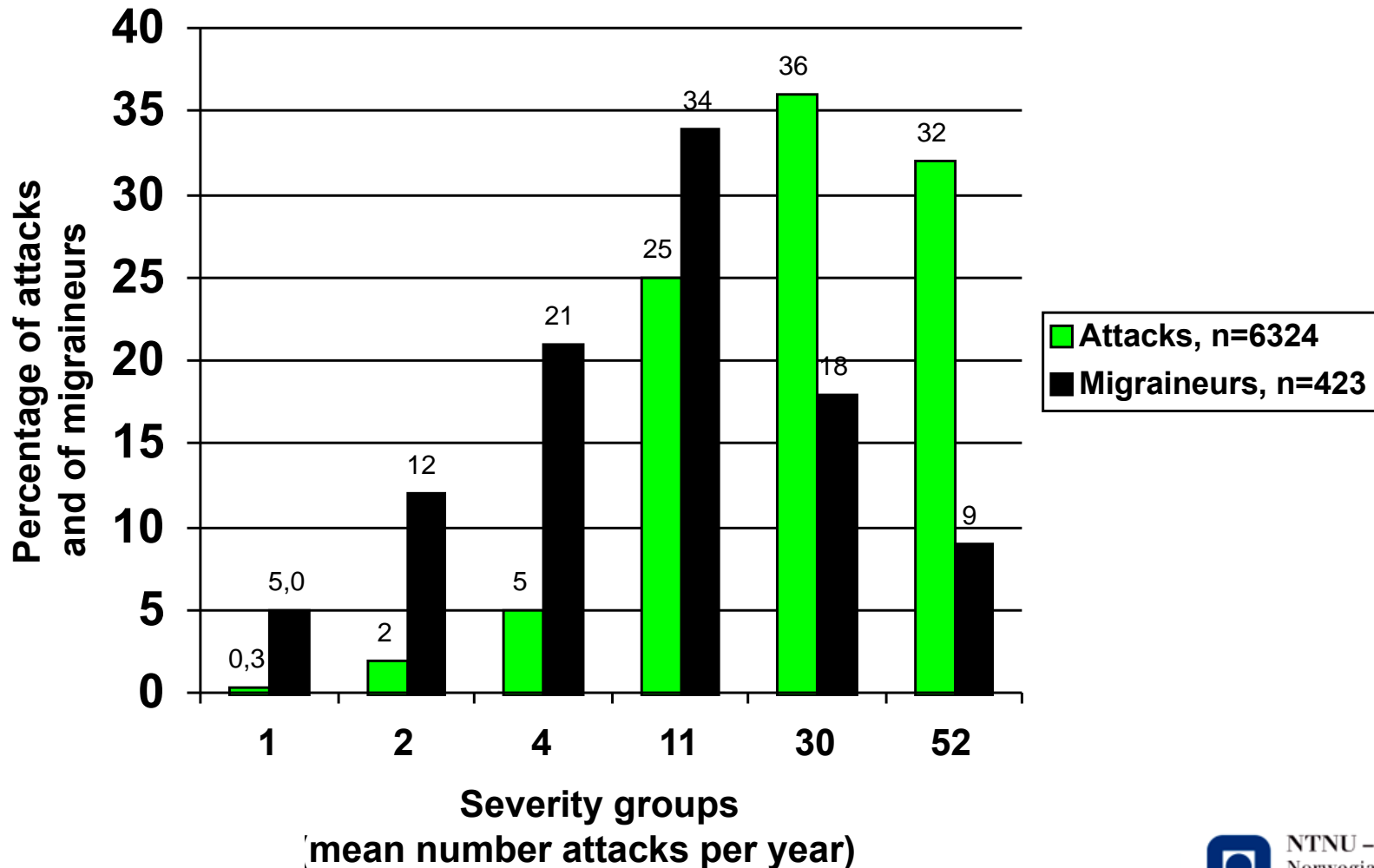
Increasing occurrence - adults

	HUNT 2				HUNT 3					
	n, crude	Preval total %	Preval. total 95% C.I.	Sex-ratio	n, crude	Preval. total	95% C.I.	Preval women %	Preval men %	Sex-ratio
Headache suffering	19 842	37.7	37.2-38.1	1.54	14 220	37.4 (p=0.36)	36.9-37.9	42.6	29.6	1.44
Self-considered migraine	4 279	8.3	8.1-8.3	2.23	3 059	8.0 (p=0.10)	7.7-8.2	10.2	4.6	2.22
Migraine ('liberal')	6 209	12.1	11.8-12.4	2.08	4 891	13.2 (p<0.001)	12.8-13.5	16.5	8.0	2.05
Frequent* migraine ('liberal')	1 475	2.9	2.7-3.0	2.73	1 078	2.9 (p=0.08)	2.8-3.1	3.9	1.5	2.65
Non-migrainous headache	13 633	26.0	25.7-26.4	1.36	9 329	24.2 (p<0.001)	23.8-24.7	26.1	21.6	1.21
Frequent* non-migr. headache	2 680	4.8	4.6-4.9	1.39	1 625	4.1 (p<0.001)	3.9-4.3	4.8	3.2	1.50

Linde M, Stovner LJ, Zwart JA, and Hagen K "Time trends in the prevalence of headache disorders. The Nord-Trøndelag Health Studies (HUNT 2 and 3). Cephalalgia 2011 Apr;31(5):585-96

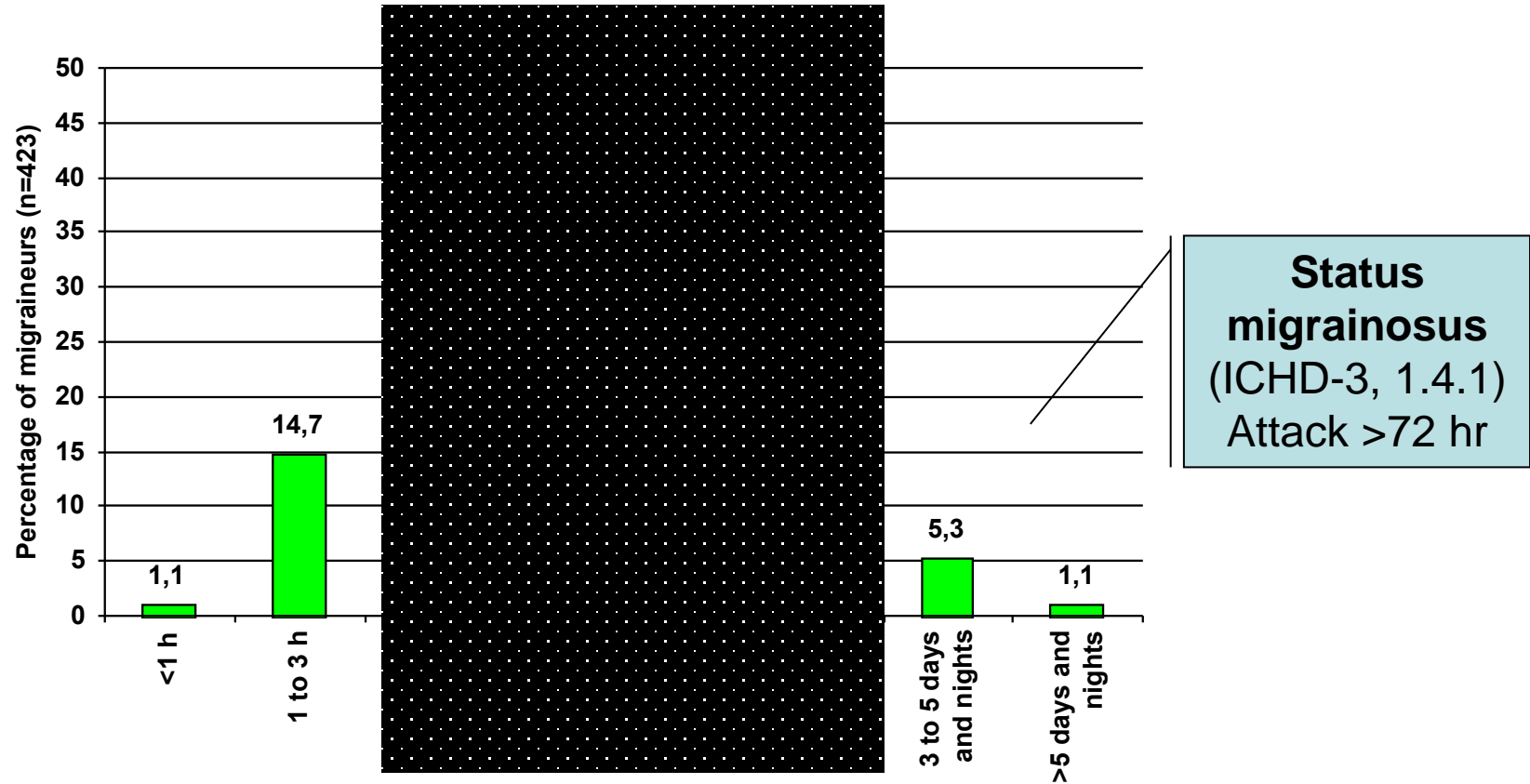


Migraine severity varies



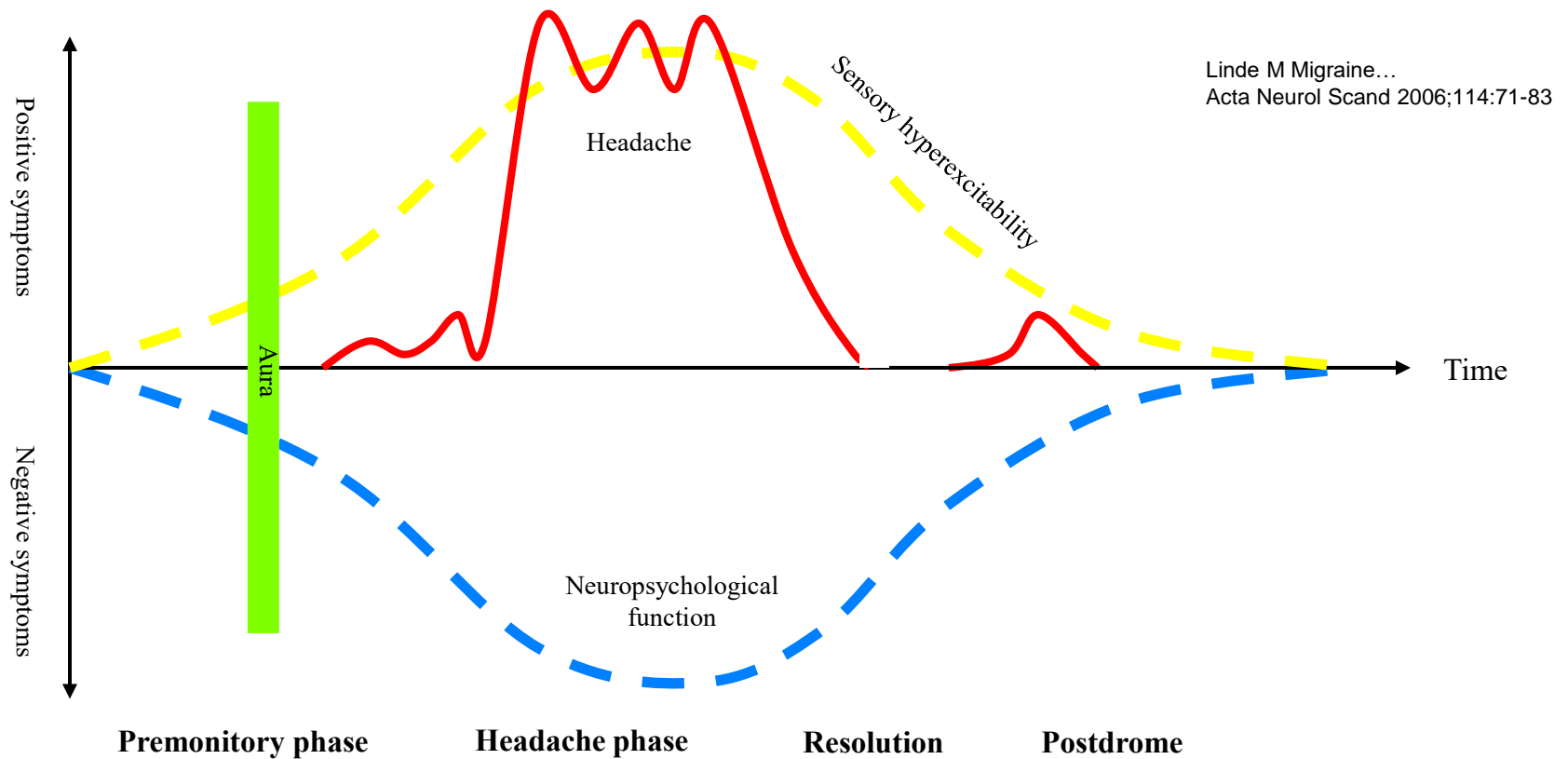
Linde M and Dahlöf C Attitudes and burden of disease among self-considered migraineurs. A nation-wide, population-based survey in Sweden Cephalalgia 2004;24:455-65

Attack duration mean 19 hr



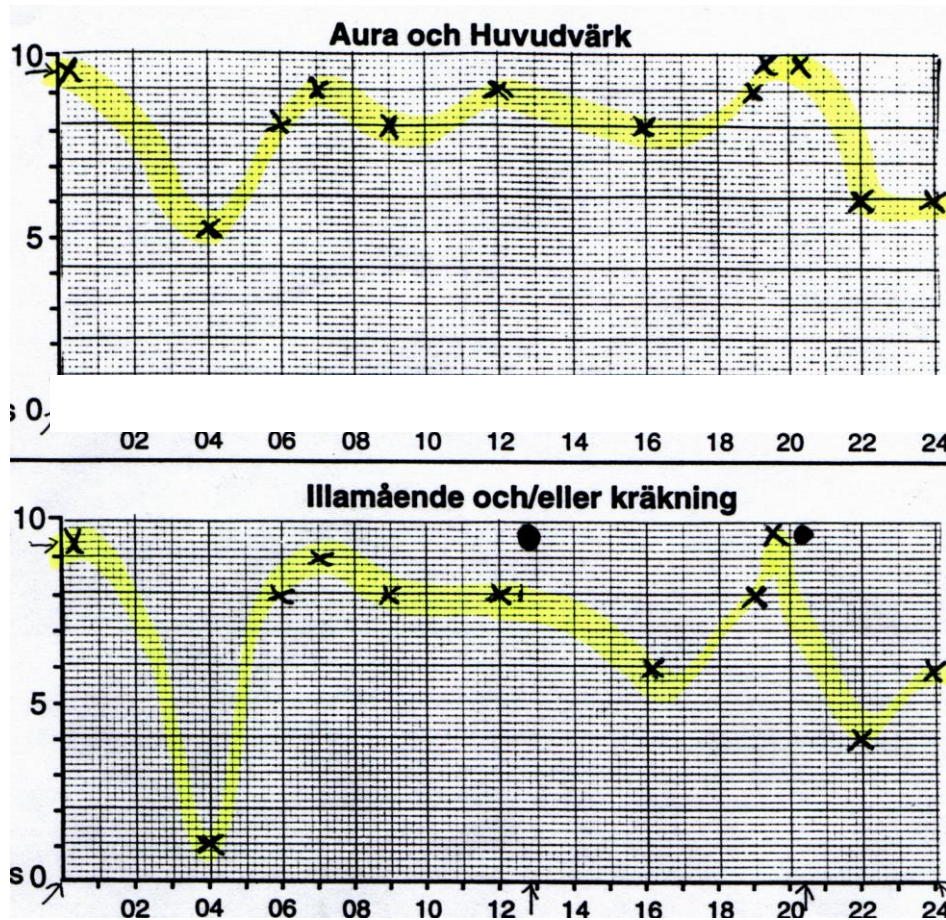
Linde M and Dahlöf C
Cephalalgia 2004;24:455-65

Dynamics of the migraine attack



Natural course of untreated attacks

Untreated attack (day 2)

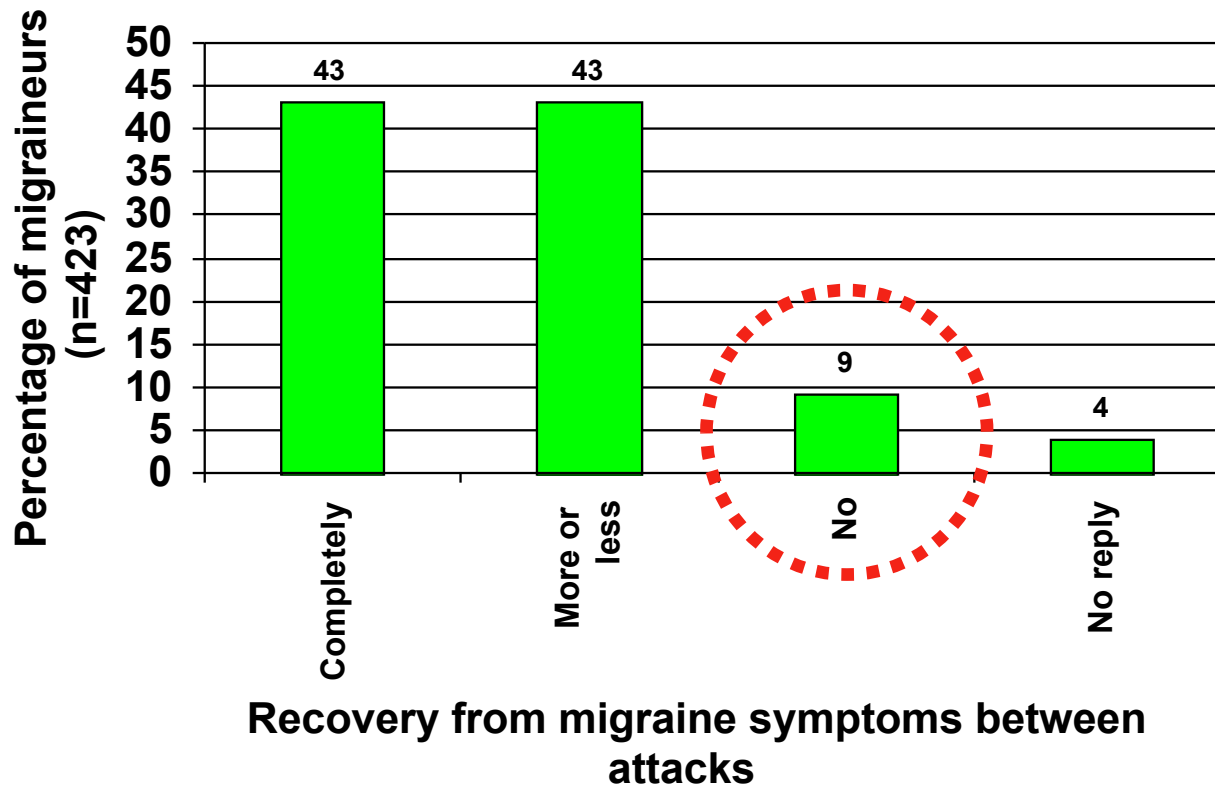


x = Pain

x = Nausea
● = Vomiting

Linde M, Mellberg A and Dahlöf C
The natural course of migraine attacks
Cephalalgia 2006;26:712-21

Some do not recover between attacks



Linde M and Dahlöf C
Cephalalgia 2004;24:455-65

0.5% prevalence of chronic migraine without medication overuse in the very large HUNT survey

	n, crude	Total prevalence %	Total prevalence 95% C.I.	Preval women %	Preval men %	Sex-ratio
<u>Migraine</u> ('restrictive')	4 404	12.0	11.7-12.3	14.9	7.4	2.00
Migraine with aura	2 186	5.8	5.6-6.1	7.4	3.4	2.19
Frequent migraine (1-14 days/month)	3 417	9.3	9.1-9.6	11.8	5.5	2.17
Probable migraine	2 279	5.9	5.7-6.1	6.7	4.7	1.42
Chronic migraine (CM)	182	0.5	0.42-0.56	0.6	0.3	2.36
<u>TTH</u>	6 276	16.5	16.2-16.9	17.2	15.3	1.12
Episodic TTH (<15 days/month)	5 895	15.6	15.2-15.9	16.2	14.5	1.12
Infrequent episodic TTH (<1 day/month)	1 671	4.5	4.3-4.7	4.2	4.9	0.88
Frequent episodic TTH (1-14 days/month)	4 224	11.0	10.7-11.4	11.9	9.6	1.24
Chronic TTH (>14 days/month)	236	0.6	0.53-0.69	0.6	0.6	1.14

Linde M, Stovner LJ, Zwart JA, and Hagen K "Time trends in the prevalence of headache disorders. The Nord-Trøndelag Health Studies (HUNT 2 and 3). Cephalalgia 2011 Apr;31(5):585-96

Global, regional, and national burden of neurological disorders during 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015



GBD 2015 Neurological Disorders Collaborator Group*

Findings Neurological disorders ranked as the leading cause group of DALYs in 2015 (250·7 [95% uncertainty interval (UI) 229·1 to 274·7] million, comprising 10·2% of global DALYs) and the second-leading cause group of deaths (9·4 [9·1 to 9·7] million), comprising 16·8% of global deaths). The most prevalent neurological disorders were tension-type headache (1505·9 [UI 1337·3 to 1681·6 million cases]), migraine (958·8 [872·1 to 1055·6] million), medication overuse headache (58·5 [50·8 to 67·4 million]), and Alzheimer's disease and other dementias (46·0



Lancet Neurol 2017; 16: 877–97

Published Online
September 17, 2017
[http://dx.doi.org/10.1016/S1474-4422\(17\)30299-5](http://dx.doi.org/10.1016/S1474-4422(17)30299-5)
See [Comment](#) page 858

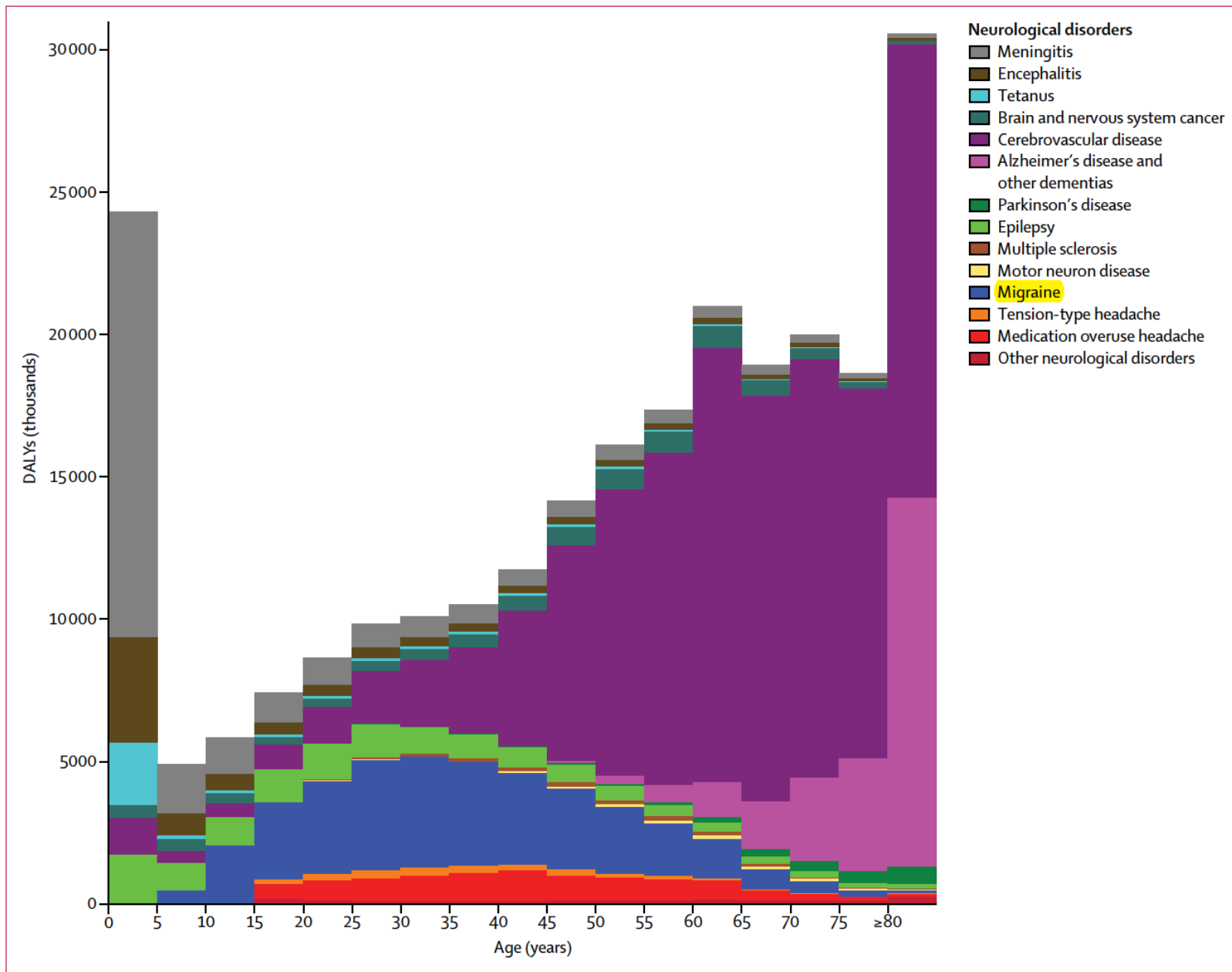



Figure 1: Global DALYs by age and neurological disorder in 2015
 DALYs=disability-adjusted life-years.

	Global	East Asia	Southeast Asia	Oceania	Central Asia	Central Europe	Eastern Europe	High-income Asia Pacific	Australasia	Western Europe	Southern Latin America	High-income North America	Caribbean	Andean Latin America	Central Latin America	Tropical Latin America	North Africa and Middle East	South Asia	Central sub-Saharan Africa	Eastern sub-Saharan Africa	Southern sub-Saharan Africa	Western sub-Saharan Africa	
Stroke	1	1	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1
Migraine	2	3	2	4	2	2	2	2	1	1	2	3	2	2	3	2	3	2	4	4	3	3	3
Alzheimer's disease and other dementias	3	2	3	3	3	3	3	3	3	3	3	1	3	3	2	3	2	4	3	5	5	4	4
Meningitis	4	7	4	2	7	11	7	11	12	12	7	12	4	7	7	7	5	3	2	2	2	4	2
Epilepsy	5	5	5	5	4	6	6	5	6	6	5	6	5	5	4	6	4	6	5	3	2	5	5
Medication overuse headache	6	6	8	7	6	5	4	4	5	4	4	4	6	4	5	5	6	7	6	7	6	6	6
Encephalitis	7	8	6	6	8	12	8	12	13	13	11	13	10	8	9	12	8	5	9	8	9	8	8
Brain and nervous system cancer	8	4	7	8	5	4	5	6	4	5	6	5	7	6	6	4	7	9	8	9	7	7	7
Tetanus	9	14	10	14	14	14	14	14	14	14	14	14	12	14	14	14	12	8	7	6	14	9	9
Other neurological disorders	10	10	11	9	9	7	9	7	9	8	9	9	9	11	8	8	10	11	10	10	8	10	10
Parkinson's disease	11	11	12	10	11	9	12	8	7	7	8	8	8	10	11	9	11	12	11	12	10	11	11
Tension-type headache	12	9	9	11	10	10	10	9	11	11	10	11	11	9	10	10	9	10	12	11	11	12	12
Multiple sclerosis	13	13	14	13	12	8	11	13	10	9	13	7	13	13	12	13	13	13	13	13	12	13	13
Motor neuron disease	14	12	13	12	13	13	13	10	8	10	12	10	14	12	13	11	14	14	14	14	13	14	14

Figure 4: Ranking of age-standardised DALY rates for all neurological disorders by GBD region in 2015

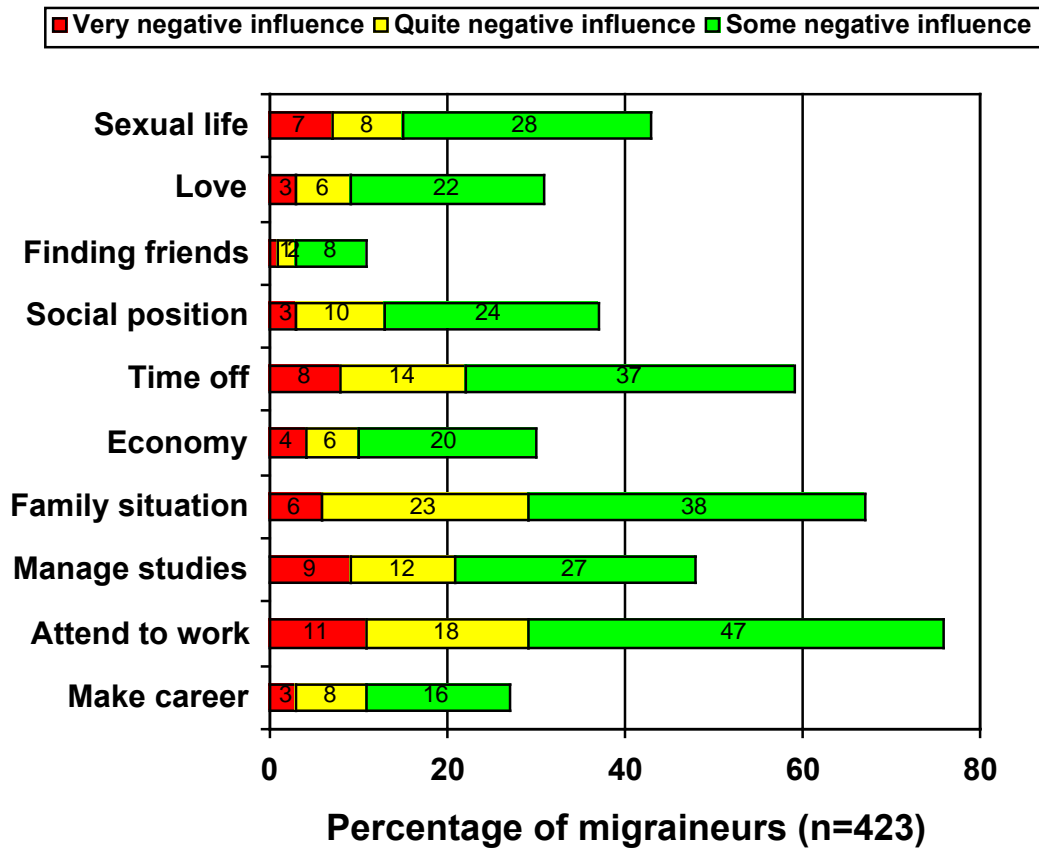
Data are for both sexes. DALYs=disability-adjusted life-years.

2											
2	A	B	C	D	E	F	G	FF	FG	FH	
1			World Health Organization								
2	Department of Information, Evidence and Res										
3	December 2016										
4											
5	Estimated DALYs ('000) by cause, sex										
6	and WHO Member State (1), 2015										
							Member State (See Notes for explanation of colour codes)	Suriname	Swaziland	Sweden	Switz
7	Sex	GHE code	GHE cause								
8							ISO-3 Code	SUR	SWZ	SWE	C
9											
137	Persons	920						0.5	1.0	3.0	
138	Persons	930		11.	Other mental and behaviou			0.7	1.3	14.5	
139	Persons	940	F.		Neurological conditions			6.2	12.4	215.9	
140	Persons	950		1.	Alzheimer disease and othe			1.9	1.1	129.5	
141	Persons	960		2.	Parkinson disease			0.1	0.2	11.0	
142	Persons	970		3.	Epilepsy			1.3	6.5	8.1	
143	Persons	980		4.	Multiple sclerosis			0.0	0.1	6.2	
144	Persons	990		5.	Migraine			2.1	3.5	34.8	
145	Persons	1000		6.	Non-migraine headache			0.4	0.5	5.6	
146	Persons	1010		7.	Other neurological conditio			0.4	0.6	20.8	
147	Persons	1020	G.		Sense organ diseases			4.5	6.3	52.1	
148	Persons	1030		1.	Glaucoma			0.2	0.2	1.2	

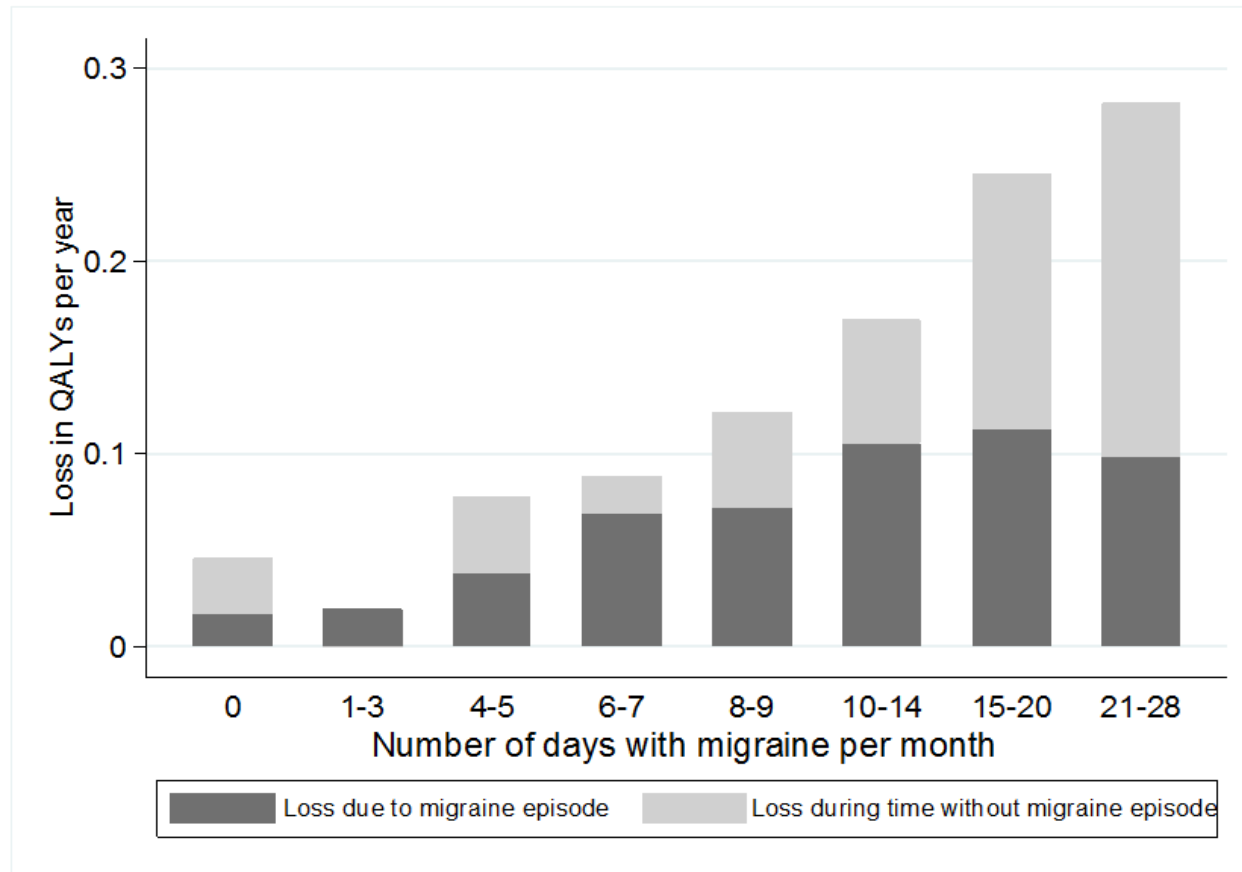
http://www.who.int/healthinfo/global_burden_disease/estimates/en/index2.html. Accessed January 29, 2018.

Consequences in daily life

Linde M and Dahlöf C
Cephalalgia 2004;24:455-65



QALY loss increases with migraine frequency



$p=0.023$



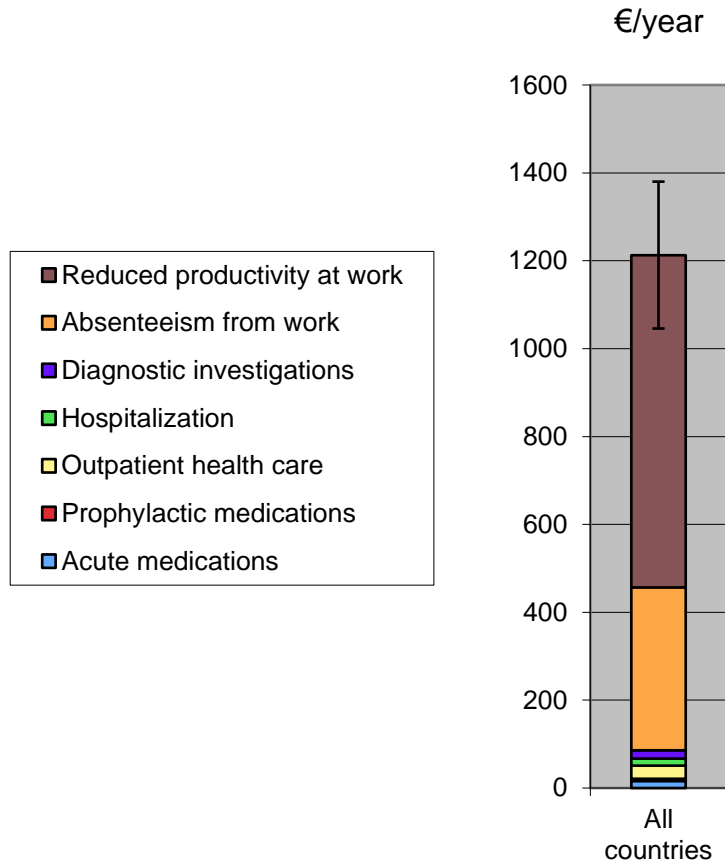
The cost of headache disorders in Europe: the Eurolight project

M. Linde^{a,b}, A. Gustavsson^c, L. J. Stovner^{a,b}, T. J. Steiner^{a,d}, J. Barré^e, Z. Katsarava^f, J. M. Lainez^g, C. Lampl^h, M. Lantéri-Minetⁱ, D. Rastenyte^j, E. Ruiz de la Torre^k, C. Tassorelli^l and C. Andree^{d,m}

^aDepartment of Neuroscience, Norwegian University of Science and Technology, Trondheim; ^bNorwegian National Headache Centre, St. Olavs University Hospital, Trondheim, Norway; ^ci3Innovus, Stockholm, Sweden; ^dDepartment of Neuroscience, Imperial College London, London, UK; ^eCenter of Public Health Research, CRP-Santé, Strassen, Luxembourg; ^fDepartment of Neurology, University of Essen, Essen, Germany; ^gDepartment of Neurology, Hospital Clínico Universitario, University of Valencia, Valencia, Spain; ^hDepartment of Neurology and Pain Medicine, Konventhospital Barmherzige Brüder, Linz, Austria; ⁱDepartement d'Evaluation et Traitement de la Douleur, Centre Hospitalo-Universitaire de Nice, Nice, France; ^jLithuanian University of Health Sciences, Kaunas, Lithuania; ^kAsociacion Española de Pacientes con Cefalea, Valencia, Spain; ^lCentro Italiano di Ricerche Neurologiche Applicate (CIRNA) and Headache Science Centre, National Neurological Research Institute C. Mondino Foundation and University of Pavia, Pavia, Italy; and ^mDepartment of Pharmaceutical Sciences, University of Basel, Basel, Switzerland



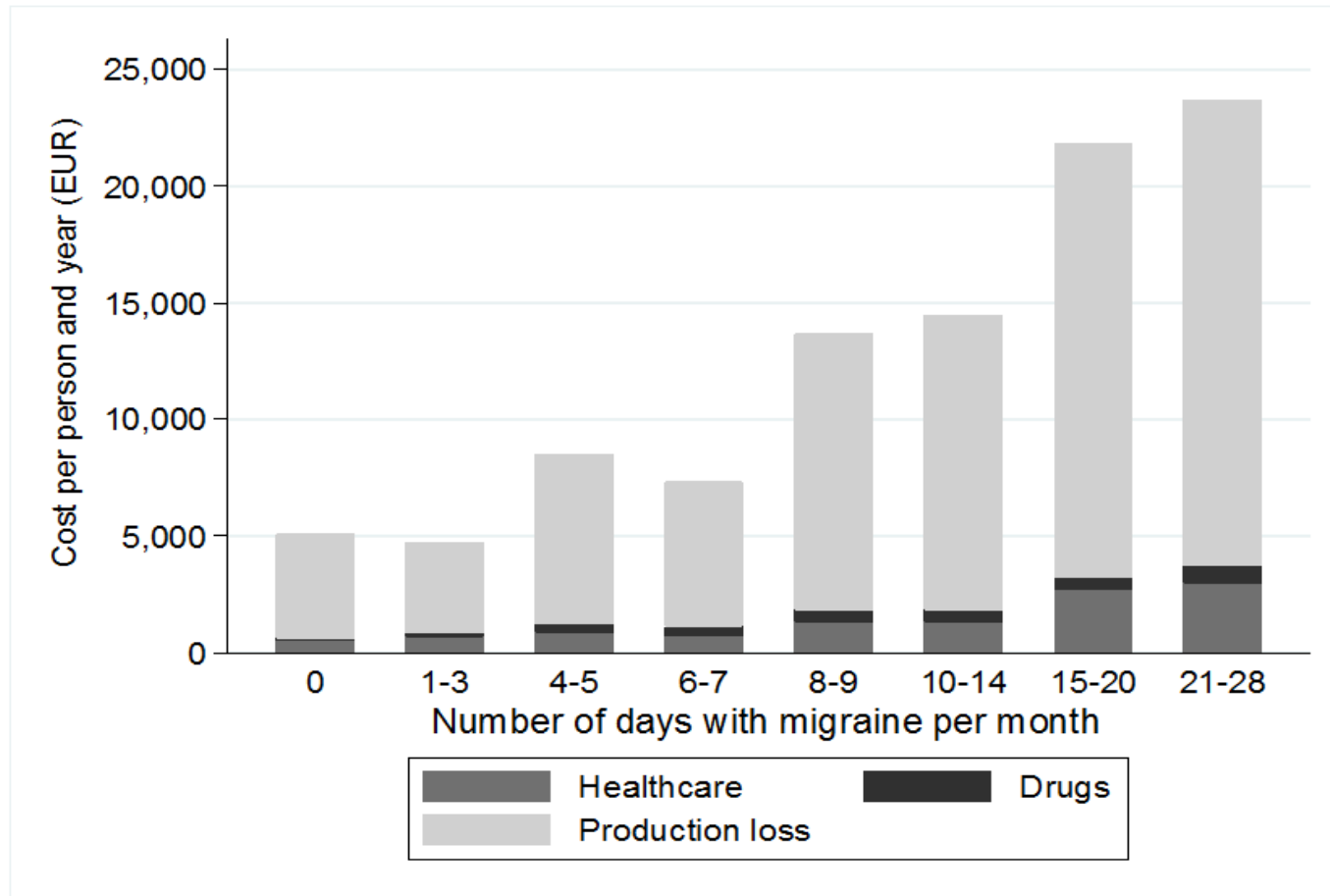
Mean cost of migraine per sufferer



- Per-person cost: €1 222 / sufferer / year
- 93% indirect costs
- Top contributory category among direct costs: outpatient care (€30)

Linde M, Gustavsson A, Stovner LJ, et al.
The cost of headache disorders in Europe.
Eur J Neurol 2012 May;19(5):703-11

Societal cost increases with migraine frequency

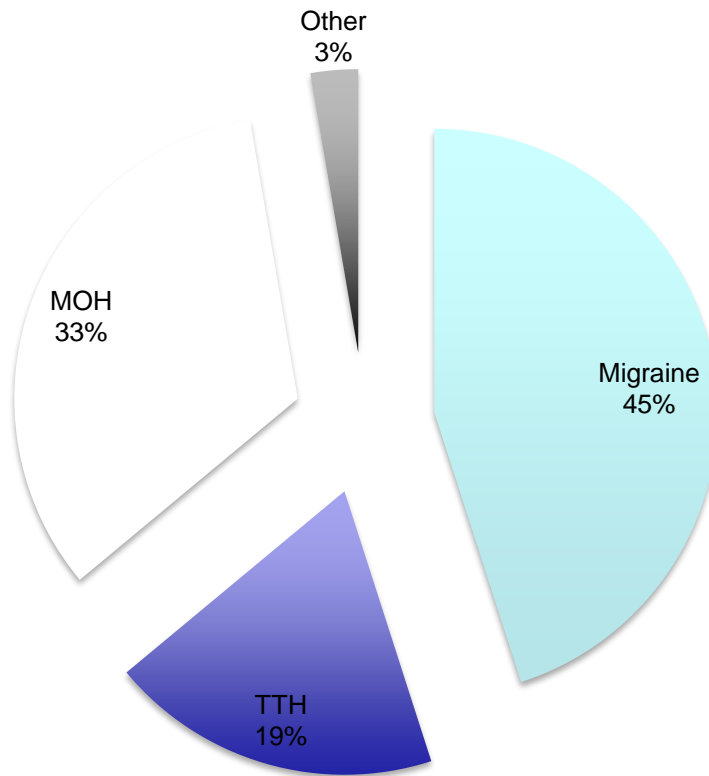


$p < 0.001$



Hjalte F, Olofsson S, Persson U, Linde M Burden and costs of migraine in a defined Swedish population. J Headache Pain 2019;20(1):65

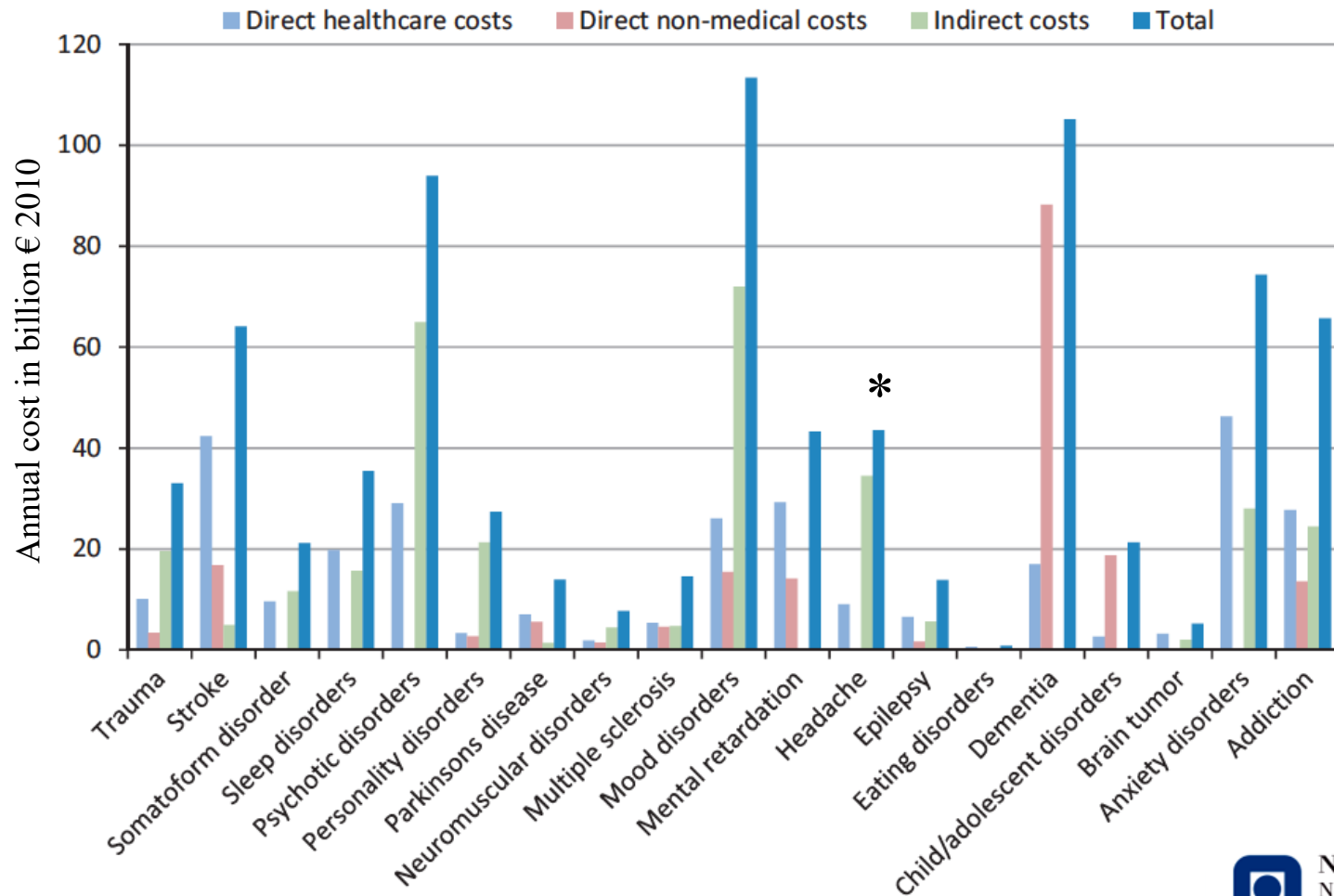
Total costs (EU27) €112 billion each year



- ① Migraine €50 billion
- ② MOH €37 billion
- ③ TTH €21 billion
- ④ Other €3 billion

Linde M, Gustavsson A, Stovner LJ, et al.
The cost of headache disorders in Europe.
Eur J Neurol 2012 May;19(5):703-11

Context



Burden of migraine

Mattias Linde MD, PhD, Professor

*Norwegian Advisory Unit on Headaches, Institute of Neuroscience
Norwegian University of Science and Technology (NTNU), Trondheim*

Director of Tjörn Headache Clinic, Sweden

Nordic Migraine Symposium

Stockholm Nov 27, 2021

