

EAN Fact Sheet

Country profile of Turkey

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The EAN is pleased to present this fact sheet to each and every national neurological society, offering key insights into the latest epidemiological, economic, and demographic trends. This data aims to support informed decision-making and enhance understanding of neurological conditions on both national and European level with information provided by three EAN projects: the [“Burden of Neurological Disease in Europe”](#) study, the EAN [“COst of Illness in Neurology in EUrope \(COIN-EU\)”](#) project, the EAN NNS 2021-2022 survey.

Burden of Disease in Europe – Collaboration with IHME

Neurological disorders are the second most common cause of disability and premature death in the European Region and their prevalence and burden will likely increase with the progressive ageing of the European population. Greater attention to neurological diseases must be paid by health authorities for prevention and care. For this reason, the European Academy of Neurology is conducting research on gaining and analysing reliable data on the number of patients with neurological diseases.

These data are obtained from the currently most developed data base, the [Global Burden of Disease \(GBD\)](#) study of the Institute for Health Metrics and Evaluation (IHME), University of Washington, Seattle. The burden of neurological disorders in Europe was calculated for the year 2021 as prevalence, mortality, disability-adjusted life-years (DALYs), years of life lost (YLLs), and years lived with disability (YLDs) for the countries in the EU and the WHO European region for a total of 26 neurological disorders.

The study in Europe is run by the EAN and led by Prof. Dr. Günther Deuschl, Dr. Maurizio Leone and Maria Konti, M.Sc., in close collaboration with the leading scientists of the IHME Institute.

In the table below, you will find the national total counts for DALYs, YLDs, YLLs, prevalence, and deaths, the age-standardised rates by neurological disorder category for the years 1990 and 2021, and the percentage change for both of your country and the WHO Europe.

Diseases with counts less than one have been excluded and the number of decimal points has been adjusted individually for each disease.

	Counts	Age-standardized rate		Percentage change, 1990-2021	
	(thousands)	(per 100 000 people)		Turkey	WHO Europe
	2021	1990	2021		
All Neurological Disorders					
DALYs	3,291,315	5,759	3,751	-34.9%	-29.0%
Deaths	92,870	197	114	-42.0%	-43.2%
Prevalence	33,202,562	36,428	37,357	2.6%	0.3%
YLDs	1,574,264	1,598	1,748	9.3%	2.9%
YLLs	1,716,867	4,160	2,003	-51.8%	-44.4%
Alzheimer's disease and other dementias					
DALYs	401,906	551	492	-10.8%	-2.5%
Deaths	20,001	30	26	-13.0%	-2.8%
Prevalence	688,425	873	819	-6.2%	-2.1%
YLDs	139,484	180	167	-7.0%	-2.6%
YLLs	262,422	372	325	-12.6%	-2.5%
Chromosomal abnormalities					
DALYs	2,885	3.81	4.07	6.8%	-12.3%
Prevalence	32,105	43	46	7.0%	-12.8%
YLDs	2,885	3.81	4.07	6.9%	-12.4%
Covid-19 (neurological)					
DALYs	27,848	-	31	-	-
Prevalence	282,393	-	311	-	-
YLDs	27,848	-	31	-	-
Cystic echinococcosis					
DALYs	68	0.09	0.08	-20.0%	-18.3%
Prevalence	251	0.26	0.27	4.8%	-9.0%
YLDs	68	0.09	0.08	-20.1%	-18.4%
Diabetic neuropathy					
DALYs	423,826	188	440	134.7%	98.1%
Prevalence	3,368,281	1,487	3,502	135.6%	97.9%
YLDs	423,826	188	440	134.7%	98.1%

Down syndrome					
DALYs	1,661	2	2	17.3%	-19.6%
Prevalence	18,500	22	26	17.3%	-20.7%
YLDs	1,661	2	2	17.2%	-19.8%
Encephalitis					
DALYs	12,851	33	17	-48.9%	-30.1%
Deaths	243	0.56	0.29	-47.3%	-15.9%
Prevalence	17,138	25	19	-23.2%	-13.6%
YLDs	1,884	2.73	2.12	-22.5%	-12.0%
YLLs	10,967	30	15	-51.3%	-31.0%
Epilepsy					
DALYs	159,384	363	200	-44.9%	-12.6%
Deaths	1,479	3.72	1.78	-52.1%	3.9%
Prevalence	327,648	416	406	-2.4%	3.3%
YLDs	92,810	157	115	-26.7%	-11.3%
YLLs	66,573	206	85	-58.8%	-14.3%
Guillain-Barre Syndrome					
DALYs	483	0.53	0.54	2.5%	12.4%
Prevalence	1,632	1.79	1.84	2.7%	12.4%
YLDs	483	0.53	0.54	2.6%	12.4%
Idiopathic intellectual disability					
DALYs	26,162	47	32	-31.3%	-19.7%
Prevalence	652,560	1,253	807	-35.6%	-21.2%
YLDs	26,162	47	32	-31.3%	-19.7%
Klinefelter syndrome					
DALYs	27	0.02	0.02	-7.9%	5.7%
Prevalence	2,066	2.86	2.72	-4.9%	5.5%
YLDs	27	0.02	0.02	-7.6%	5.5%

	Counts	Age-standardized rate		Percentage change, 1990-2021	
	(thousands)	1990	2021	Turkey	WHO Europe
Meningitis					
DALYs	13,993	206	20	-90.5%	-80.5%
Deaths	299	2.89	0.38	-86.8%	-75.4%
Prevalence	10,755	58	12	-78.9%	-66.7%
YLDs	938	4.74	1.09	-77.1%	-64.6%
YLLs	13,055	202	18	-90.9%	-81.3%
Migraine					
DALYs	527,555	592	591	-0.1%	0.04%
Prevalence	13,291,384	14,919	14,935	0.1%	0.3%
YLDs	527,555	592	591	-0.1%	0.04%
Motor neuron disease					
DALYs	23,198	17.97	29.07	61.7%	37.5%
Deaths	616	0.32	0.70	115.4%	54.1%
Prevalence	3,548	3.64	4.06	11.4%	19.8%
YLDs	755	0.77	0.86	11.4%	19.5%
YLLs	22,444	17.20	28.20	64.0%	38.5%
Multiple sclerosis					
DALYs	18,647	18	19	10.3%	-5.0%
Deaths	196	0.15	0.21	32.9%	-12.5%
Prevalence	46,303	47	48	2.7%	26.4%
YLDs	11,808	12	12	3.1%	25.5%
YLLs	6,839	5.63	7.07	25.6%	-22.2%
Nervous system cancer					
DALYs	178,749	248	200	-19.6%	-3.3%
Deaths	5,396	6.65	5.90	-11.3%	10.8%
Prevalence	14,610	13	19	43.5%	35.9%
YLDs	2,002	2.11	2.37	12.0%	25.3%
YLLs	176,747	246	198	-19.8%	-3.7%

Neurocysticercosis					
DALYs	131	0.40	0.14	-64.9%	-42.5%
Prevalence	456	0.89	0.48	-45.5%	-32.8%
YLDs	124	0.32	0.13	-58.6%	-42.5%
YLLs	7	0.08	0.01	-90.8%	-70.7%
Neurosyphilis					
DALYs	25	0.13	0.03	-79.2%	-43.6%
Prevalence	1,583	2.79	1.78	-36.2%	-11.7%
YLDs	25	0.13	0.03	-79.3%	-43.4%
Other neurological disorders					
DALYs	67,487	73	85	16.1%	25.8%
Deaths	1,071	0.82	1.29	57.9%	45.0%
YLDs	25,033	23	31	31.9%	62.9%
YLLs	42,270	50	54	8.7%	14.2%
Parkinson's disease					
DALYs	73,257	102	87	-14.9%	5.6%
Deaths	4,174	7	5	-19.7%	4.0%
Prevalence	87,404	63	99	56.6%	21.9%
YLDs	12,373	9	14	55.0%	21.4%
YLLs	60,884	93	73	-21.6%	2.0%
Rabies					
DALYs	65	0.47	0.08	-83.5%	-59.7%
Prevalence	2	0.01	0.00	-82.2%	-57.2%
YLDs	65	0.47	0.08	-83.5%	-59.7%
Spinal cord injury					
DALYs	35,939	44	39	-12.7%	-26.9%
Prevalence	127,958	127	138	8.1%	-21.9%
YLDs	35,939	44	39	-12.7%	-26.9%

	Counts (thousands)		Age-standardized rate (per 100 000 people)		Percentage change, 1990-2021	
	2021	1990	2021	Turkey	WHO Europe	
Stroke						
DALYs	1,185,231	3,116	1,343	-56.9%	-52.6%	
Deaths	59,381	145	72	-50.2%	-55.6%	
Prevalence	926,990	1,430	999	-30.1%	-19.2%	
YLDs	131,056	204	143	-30.0%	-18.9%	
YLLs	1,054,175	2,913	1,200	-58.8%	-55.3%	
Tension-type headache						
DALYs	61,026	66	67	0.8%	-1.6%	
Prevalence	19,195,886	21,409	21,659	1.2%	-0.8%	
YLDs	61,026	66	67	0.8%	-1.6%	
Tetanus						
DALYs	453.97	26.09	0.59	-97.7%	-97.3%	
Deaths	10.99	0.36	0.01	-96.4%	-95.8%	
Prevalence	123.42	0.21	0.15	-28.5%	-32.0%	
YLDs	35.44	0.05	0.04	-10.3%	-6.8%	
YLLs	418.53	26.04	0.55	-97.9%	-97.5%	
Traumatic Brain Injury						
DALYs	48,459	59	52	-11.6%	-28.2%	
Prevalence	330,300	397	356	-10.4%	-28.0%	
YLDs	48,459	59	52	-11.6%	-28.2%	

Table 1: National total counts for DALYs, YLDs, YLLs, prevalence, and deaths, age-standardised rates by neurological disorder category for 1990 and 2021, and percentage change of 1990-2021. Diseases with counts less than one have been excluded and the number of decimal points has been adjusted individually for each disease.

Neurological conditions

In figure 1 below, the top 20 neurological disorders are ranked based on the national age-standardised rate of DALYs per 100 000 population in 2021 for all age groups.

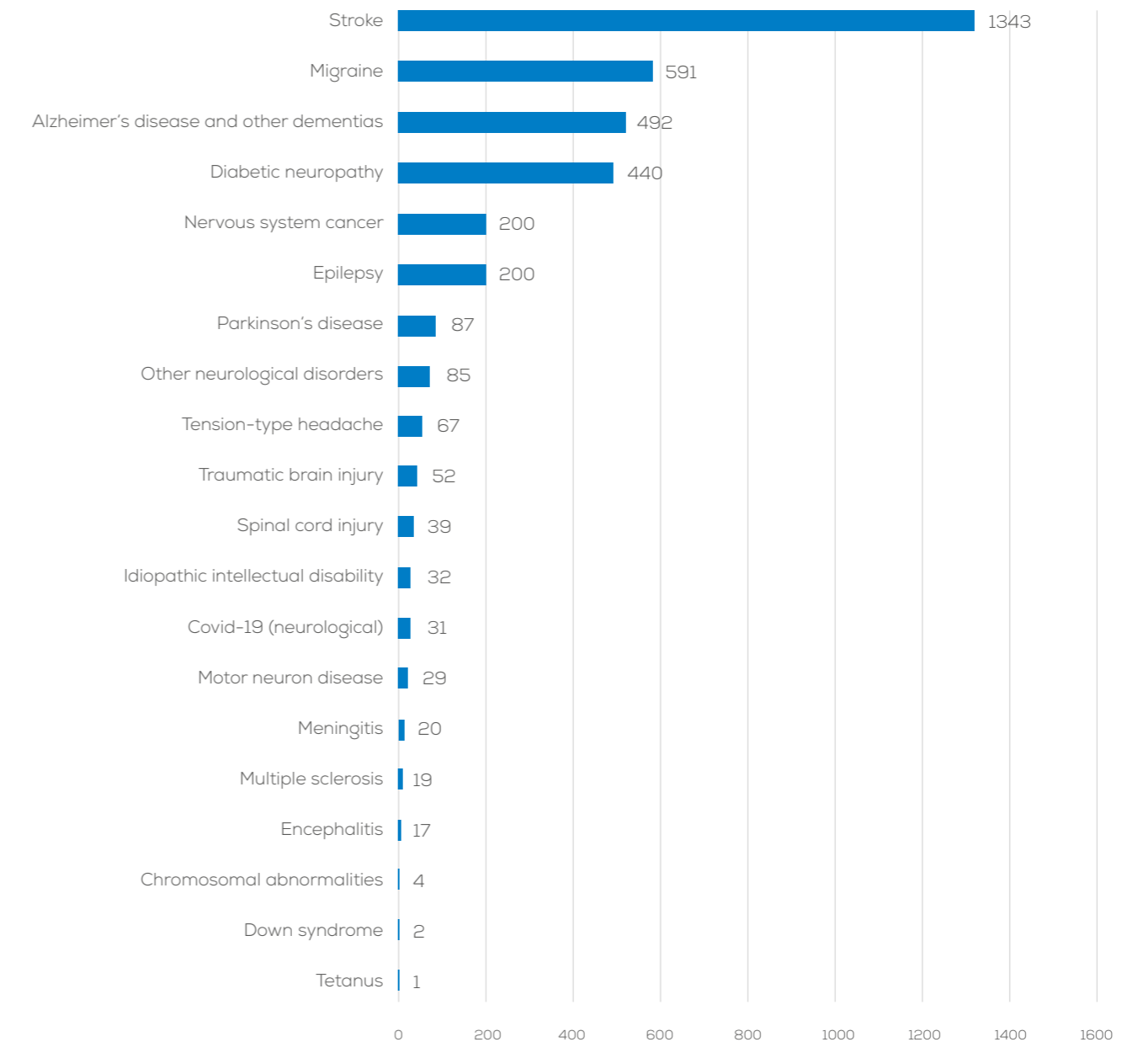


Figure 1: National age-standardised DALYs per 100 000 population by neurological disorder in 2021.

DALYs per 100 000 population

In order to show how the diseases are evolving both in **Turkey** and the European Region, we present the temporal pattern of DALYs per 100 000 population over the last three decades in the figure below:

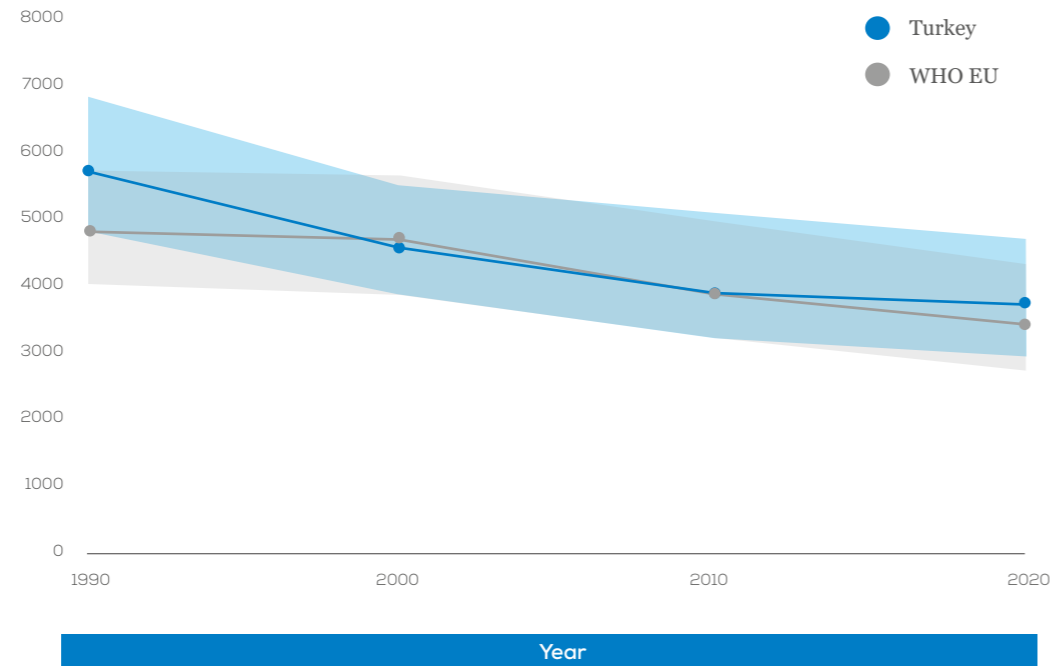


Figure 2: Age-Standardized DALYs per 100 000 population over the last 3 decades.

In figure 3 we show the distribution of DALYs rate per 100 000 population by age group divided in female and male:

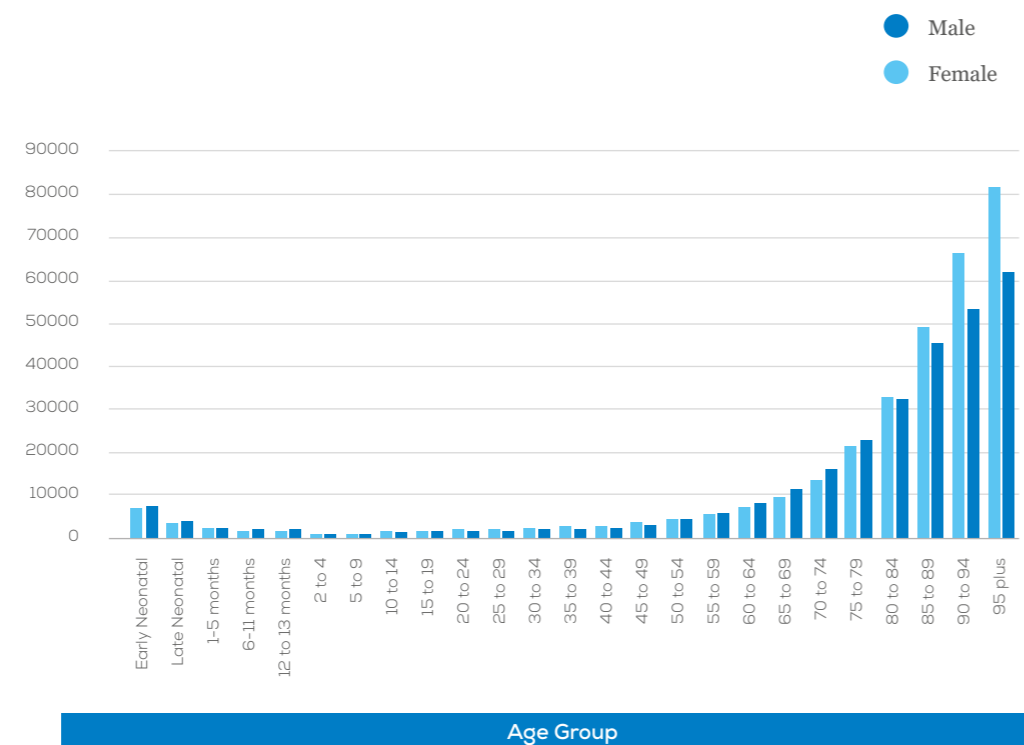


Figure 3: National DALYs per 100 000 population by age group and sex in 2021.

Extensive data and analyses are provided in the published paper and it will be communicated to the National Neurological societies.

COIN-EU (Cost of Illness in Neurology in Europe)

The Cost of Illness in Neurology in Europe (COIN-EU) project, which was launched in 2021, is run by EAN and led by Prof. Richard Dodel, Prof. Uwe Siebert and Prof. Günther Deuschl. This project is overseen at the EAN by Prof. Paul Boon, Prof. Claudio Bassetti and Prof. Thomas Berger.

The aim of the study is to assess disease- and country-specific annual costs for 12 categories of neurological diseases in Europe with a focus on the prevalent adult patient population. Costs have been calculated in three main categories: a) direct health care costs (i.e., all goods and services related to the prevention, diagnosis and treatment of a disorder; e.g. physician visits, hospitalizations and pharmaceuticals), b) informal care costs (i.e. other goods and services related to the disorder; e.g. social services, special accommodation and informal care), and c) indirect costs (i.e., lost productivity due to work absence or early retirement).

As the literature review revealed many gaps in research for many diseases and many countries, the group has developed a method to provide estimations of the above cost categories for the cases where no data are available. Data are imputed for those countries which belong to the same GNI category with countries that do present data. In case none of the countries which belong to the same GNI category present data, then an imputation is not possible.

In the table below, costs for **Turkey** have been calculated for the diseases with available data, in three main categories where the numbers represent millions € PPP 2019.

million € PPP
2019

Informal Care

Neurological Disorder	Total Costs	Direct Costs	Informal Care Costs	Indirect Costs
Stroke	4,785.0	1,569.4	322.3	2,893.3
Multiple sclerosis	653.2	585.8	43.0	24.5
Traumatic brain injury	620.4	620.4	-	-
Idiopathic epilepsy	357.0	311.3	-	45.7
Parkinson's disease	267.3	150.9	82.1	34.3
Total Costs:	6,682.9	3,237.7	447.3	2,997.9

Table 2: Total, direct, informal care and indirect costs per neurological disorder. Number of diseases depends on the availability of original studies and imputation of data.

NNS Survey 2021

In December 2021, the EAN conducted a survey among the national neurological societies. By combining the data from the Burden of Disease in Europe study across all European Region countries, we can provide demographic data regarding the workforce of neurologists in Europe for the 37 countries who took part in the survey.

The figure below represents the number of neurologists, fully specialised and in training per 100 000 population.

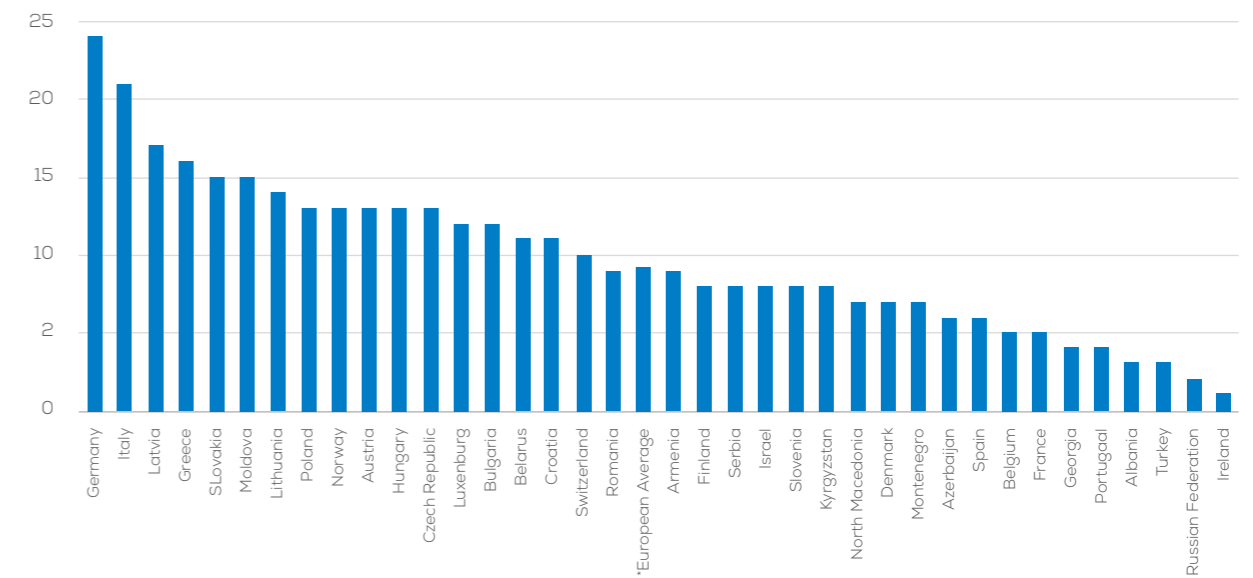


Figure 4: Number of neurologists (fully specialised and in training) per 100 000 population.

In the last figure the number of patients per neurologist is displayed:

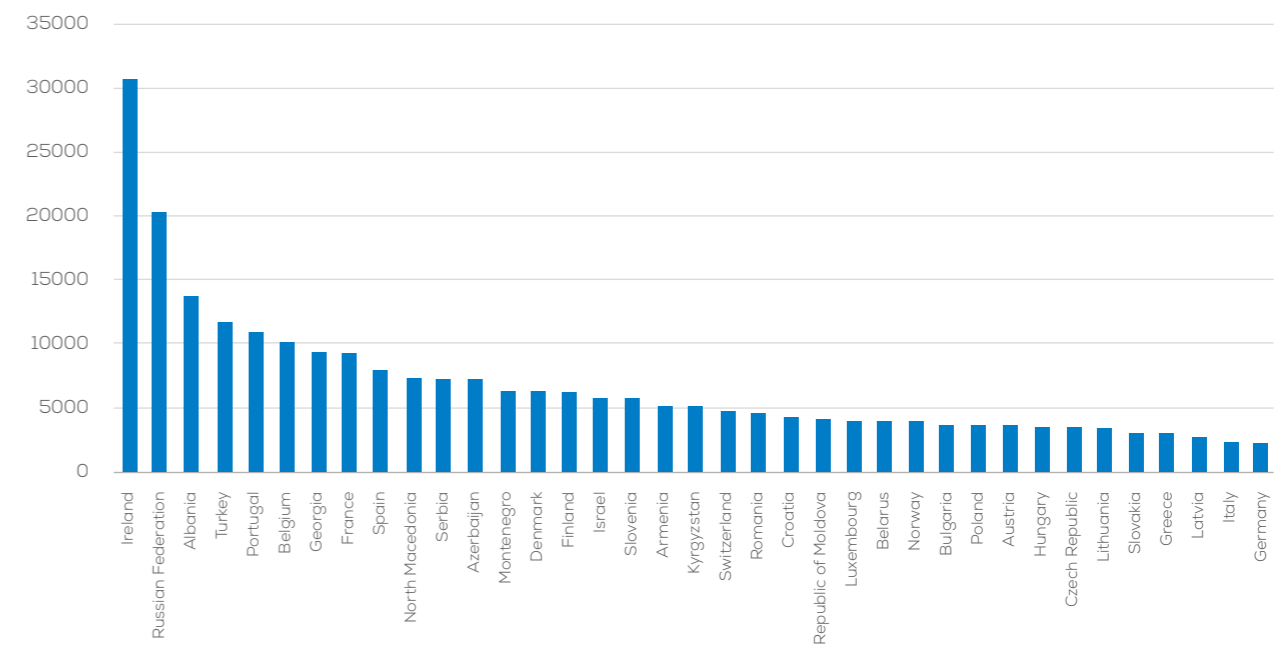
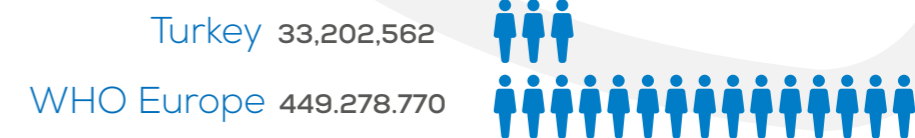
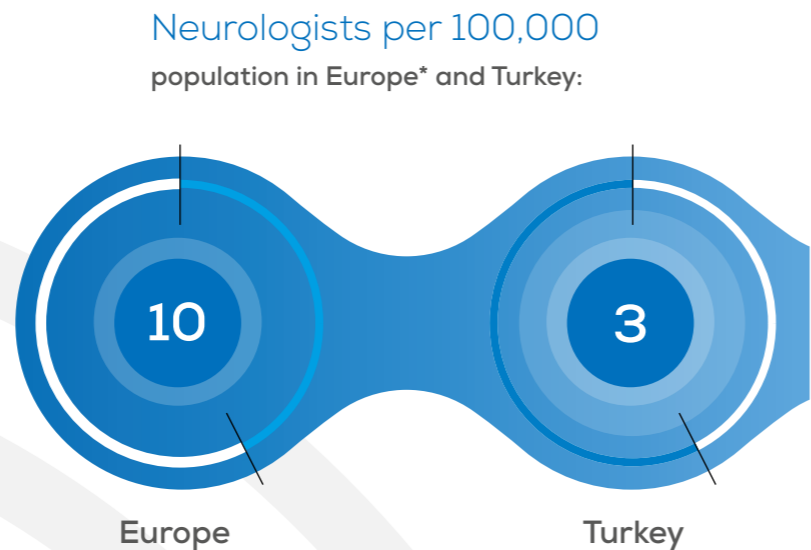
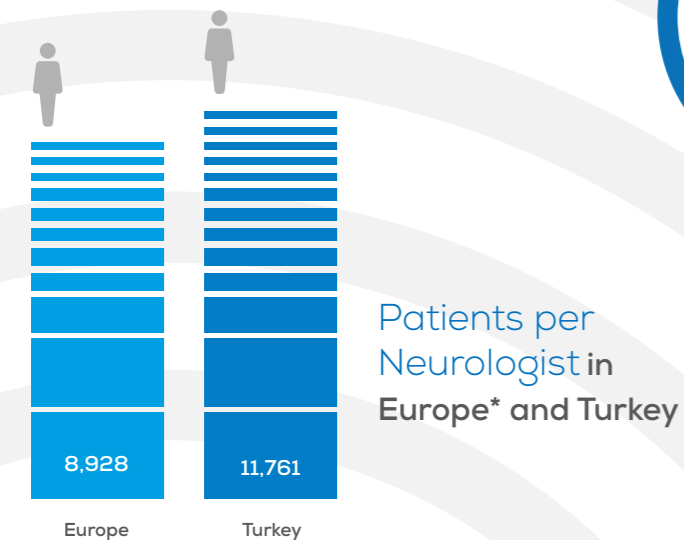


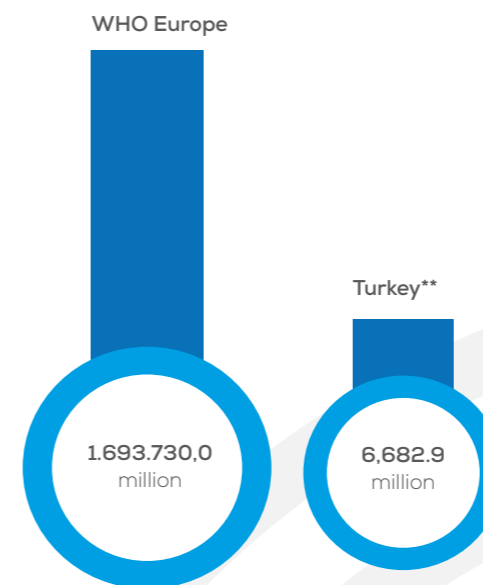
Figure 5: Number of patients per neurologist (fully specialised and in training).

Neurological Diseases in Europe and Turkey:

Key Data and Trends from 2021



Number of patients with a neurological disease in 2021 in the WHO Europe and in Turkey.



Annual total costs (in million € PPP 2019) for 12 major neurological diseases:

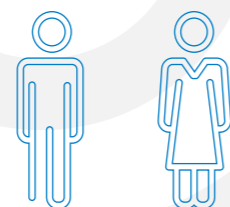
Most prevalent neurological diseases in Turkey in 2021

2021

- 1 Tension-type headache
- 2 Migraine
- 3 Diabetic neuropathy
- 4 Stroke
- 5 Alzheimer's disease and other dementias

Percentage change of age-standardised DALYs, Deaths and prevalence from 1990 to 2021:

	WHO Europe	vs	Turkey
DALYs	-28.98%		-34.86%
Deaths	-43.19%		-42.03%
Prevalence	0.34%		2.55%



Age-standardised DALYs rate per 100,000 population in 2021 by sex

Sex	WHO Europe	Turkey
Male	3,513	3,351
Female	3,719	3,777

Age-standardised DALYs rate per 100,000 population in 2021 by sex

Leading neurological diseases in Turkey by total deaths in 2021:

1. Stroke
2. Alzheimer's disease and other dementias
3. Nervous system cancer
4. Parkinson's disease
5. Epilepsy

*Based on data from 37 countries of the WHO European region
 **Cost estimates are derived from country-specific data available for specific diseases.

