european academy of neurology

# EAN Fact Sheet

## Country profile of Montenegro

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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 (thousands) | Age-standardized rate (per 100 000 people) | | Percentage change, 1990-2021 | |
|---|---|---|---|---|---|
| | 2021 | 1990 | 2021 | Montenegro | WHO Europe |
| **All Neurological Disorders** | | | | | |
| DALYs | 49,979 | 5,642 | 5,796 | 2.7% | -29.0% |
| Deaths | 2,204 | 220 | 263 | 19.4% | -43.2% |
| Prevalence | 291,476 | 41,980 | 42,736 | 1.8% | 0.3% |
| YLDs | 13,855 | 1,589 | 1,739 | 9.4% | 2.9% |
| YLLs | 36,123 | 4,052 | 4,057 | 0.1% | -44.4% |
| **Alzheimer's disease and other dementias** | | | | | |
| DALYs | 3,259 | 392 | 384 | -2.2% | -2.5% |
| Deaths | 152 | 20.59 | 20.47 | -0.6% | -2.8% |
| Prevalence | 5,755 | 657 | 639 | -2.7% | -2.1% |
| YLDs | 1,167 | 136 | 131 | -3.5% | -2.6% |
| YLLs | 2,092 | 256 | 252 | -1.5% | -2.5% |
| **Chromosomal abnormalities** | | | | | |
| DALYs | 29 | 6.80 | 6.35 | -6.6% | -12.3% |
| Prevalence | 322 | 76 | 71 | -6.3% | -12.8% |
| YLDs | 29 | 6.80 | 6.35 | -6.6% | -12.4% |
| **Covid-19 (neurological)** | | | | | |
| DALYs | 537 | - | 73 | - | - |
| Prevalence | 5,328 | - | 743 | - | - |
| YLDs | 537 | - | 73 | - | - |
| **Diabetic neuropathy** | | | | | |
| DALYs | 4,056 | 261 | 415 | 59.2% | 98.1% |
| Prevalence | 31,931 | 2,041 | 3,267 | 60.1% | 97.9% |
| YLDs | 4,056 | 261 | 415 | 59.2% | 98.1% |
| **Down syndrome** | | | | | |
| DALYs | 19 | 4.59 | 4.10 | -10.7% | -19.6% |
| Prevalence | 207 | 52 | 46 | -11.3% | -20.7% |
| YLDs | 19 | 4.59 | 4.10 | -10.6% | -19.8% |
| **Encephalitis** | | | | | |
| DALYs | 17 | 5 | 3 | -46.9% | -30.1% |
| Prevalence | 95 | 16 | 13 | -17.3% | -13.6% |
| YLDs | 9 | 1.66 | 1.38 | -16.6% | -12.0% |
| YLLs | 7 | 4 | 1 | -60.6% | -31.0% |
| **Epilepsy** | | | | | |
| DALYs | 748 | 142 | 119 | -16.1% | -12.6% |
| Deaths | 5 | 0.91 | 0.73 | -19.6% | 3.9% |
| Prevalence | 2,071 | 350 | 333 | -4.7% | 3.3% |
| YLDs | 532 | 97 | 86 | -11.7% | -11.3% |
| YLLs | 216 | 45 | 33 | -25.9% | -14.3% |
| **Guillain-Barre Syndrome** | | | | | |
| DALYs | 2 | 0.44 | 0.37 | -14.7% | 12.4% |
| Prevalence | 8 | 1.47 | 1.25 | -14.6% | 12.4% |
| YLDs | 2 | 0.43 | 0.37 | -14.6% | 12.4% |
| **Idiopathic intellectual disability** | | | | | |
| DALYs | 89 | 18 | 16 | -14.5% | -19.7% |
| Prevalence | 1,952 | 406 | 345 | -14.8% | -21.2% |
| YLDs | 89 | 18 | 16 | -14.5% | -19.7% |
| **Klinefelter syndrome** | | | | | |
| Prevalence | 14 | 2.57 | 2.85 | 10.6% | 5.5% |
| **Meningitis** | | | | | |
| DALYs | 57 | 36 | 9 | -74.2% | -80.5% |
| Deaths | 1 | 0.46 | 0.15 | -67.5% | -75.4% |
| Prevalence | 194 | 55 | 28 | -48.7% | -66.7% |
| YLDs | 16 | 5 | 2 | -48.1% | -64.6% |
| YLLs | 42 | 31 | 7 | -78.2% | -81.3% |

| | Counts (thousands) | Age-standardized rate (per 100 000 people) | | Percentage change, 1990-2021 | |
|---|---|---|---|---|---|
| | 2021 | 1990 | 2021 | Montenegro | WHO Europe |
| **Migraine** | | | | | |
| DALYs | 3,483 | 519 | 516 | -0.6% | 0.04% |
| Prevalence | 90,944 | 13,654 | 13,632 | -0.2% | 0.3% |
| YLDs | 3,483 | 519 | 516 | -0.6% | 0.04% |
| **Motor neuron disease** | | | | | |
| DALYs | 8 | 1.19 | 1.20 | 0.8% | 37.5% |
| Deaths | 21 | 3.45 | 3.38 | -2.1% | 19.8% |
| Prevalence | 4 | 0.73 | 0.72 | -2.1% | 19.5% |
| YLDs | 4 | 0.46 | 0.48 | 4.8% | 38.5% |
| YLLs | 331 | 0.13 | 7.54 | 5715.2% | 38.5% |
| **Multiple sclerosis** | | | | | |
| DALYs | 289 | 35 | 35 | 1.3% | -5.0% |
| Deaths | 6 | 0.66 | 0.65 | -1.2% | -12.5% |
| Prevalence | 405 | 42 | 51 | 22.6% | 26.4% |
| YLDs | 103 | 11 | 13 | 21.5% | 25.5% |
| YLLs | 186 | 24 | 22 | -7.6% | -22.2% |
| **Nervous system cancer** | | | | | |
| DALYs | 2,199 | 314 | 279 | -11.3% | -3.3% |
| Deaths | 69 | 7.98 | 7.82 | -2.0% | 10.8% |
| Prevalence | 166 | 24 | 25 | 5.1% | 35.9% |
| YLDs | 25 | 3.18 | 3.26 | 2.5% | 25.3% |
| YLLs | 2,174 | 311 | 276 | -11.5% | -3.7% |
| **Neurocysticercosis** | | | | | |
| DALYs | 117 | 18.84 | 13.37 | -29.0% | -42.5% |
| Prevalence | 540 | 78.56 | 61.15 | -22.2% | -32.8% |
| YLDs | 117 | 18.82 | 13.36 | -29.0% | -42.5% |
| **Neurosyphilis** | | | | | |
| Prevalence | 25 | 1.58 | 3.64 | 130.2% | -11.7% |
| **Other neurological disorders** | | | | | |
| DALYs | 256 | 32 | 39 | 23.2% | 25.8% |
| Deaths | 3 | 0.32 | 0.39 | 22.1% | 45.0% |
| YLDs | 153 | 14 | 24 | 65.5% | 62.9% |
| YLLs | 103 | 17 | 15 | -12.0% | 14.2% |
| **Parkinson's disease** | | | | | |
| DALYs | 1,005 | 85 | 107 | 26.4% | 5.6% |
| Deaths | 59 | 5 | 7 | 40.0% | 4.0% |
| Prevalence | 1,005 | 98 | 101 | 2.7% | 21.9% |
| YLDs | 142 | 13.99 | 14.21 | 1.6% | 21.4% |
| YLLs | 864 | 71 | 93 | 31.3% | 2.0% |
| **Spinal cord injury** | | | | | |
| DALYs | 545 | 92 | 74 | -19.2% | -26.9% |
| Prevalence | 2,081 | 326 | 279 | -14.4% | -21.9% |
| YLDs | 545 | 92 | 74 | -19.2% | -26.9% |
| **Stroke** | | | | | |
| DALYs | 31,862 | 3,472 | 3,517 | 1.3% | -52.6% |
| Deaths | 1,908 | 184 | 226 | 22.6% | -55.6% |
| Prevalence | 7,803 | 978 | 874 | -10.7% | -19.2% |
| YLDs | 1,428 | 180 | 160 | -10.9% | -18.9% |
| YLLs | 30,434 | 3,293 | 3,357 | 2.0% | -55.3% |

| | Counts (thousands) | Age-standardized rate (per 100 000 people) | | Percentage change, 1990-2021 | |
|---|---|---|---|---|---|
| | 2021 | 1990 | 2021 | Montenegro | WHO Europe |
| **Tension-type headache** | | | | | |
| DALYs | 520 | 73.18 | 73.04 | -0.2% | -1.6% |
| Prevalence | 198,592 | 29,967 | 29,955 | -0.04% | -0.8% |
| YLDs | 520 | 73.18 | 73.04 | -0.2% | -1.6% |
| **Traumatic Brain Injury** | | | | | |
| DALYs | 878 | 132 | 110 | -16.6% | -28.2% |
| Prevalence | 6,023 | 898 | 750 | -16.4% | -28.0% |
| YLDs | 878 | 132 | 110 | -16.6% | -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.

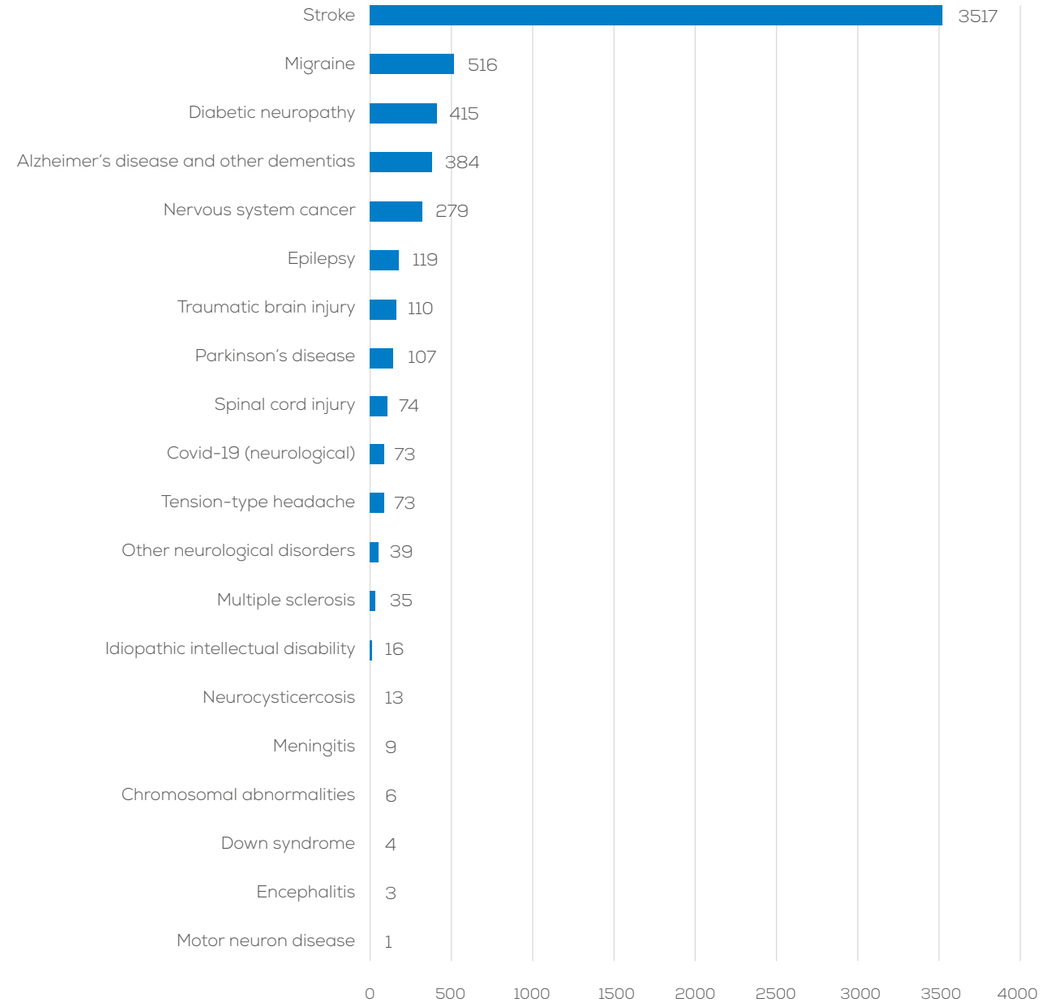



*Figure 1: National age-standardised DALYs per 100 000 population by neurological disorder in 2021.*

## DALYs per 100 000 population

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

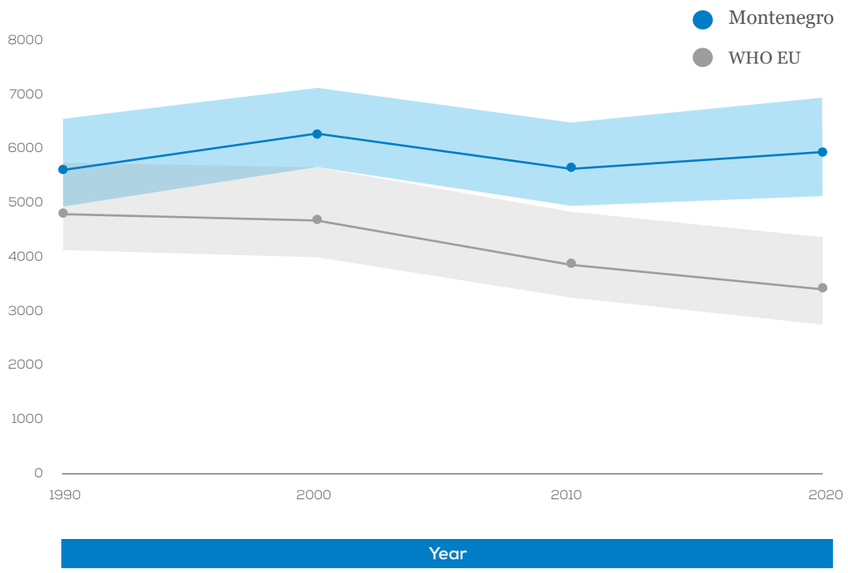



*Figure 2: Age-Standardized DALYs per 100 000 population over the last 3 decades.*

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

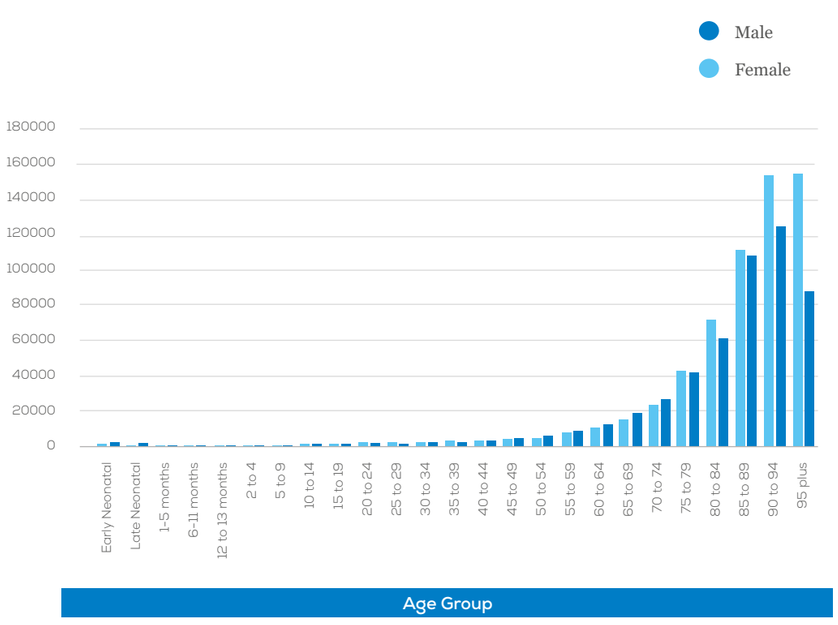



*Figure 3: National DALYs per 100 000 population by age group and sex in 2021.*

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 be 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 **Montenegro** 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 | | | |
|---|---|---|---|---|
| | **Total Costs** | **Direct Costs** | **Informal Care Costs** | **Indirect Costs** |
| **Neurological Disorder** | | | | |
| Stroke | 28.4 | 12.2 | 5.6 | 10.7 |
| Traumatic brain injury | 16.1 | 16.1 | - | - |
| Multiple sclerosis | 9.1 | 7.5 | 0.7 | 0.9 |
| Parkinson's disease | 5.7 | 3.5 | 1.9 | 0.3 |
| Idiopathic epilepsy | 2.3 | 2.0 | - | 0.3 |
| **Total Costs:** | **61.7** | **41.3** | **8.2** | **12.1** |

*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.

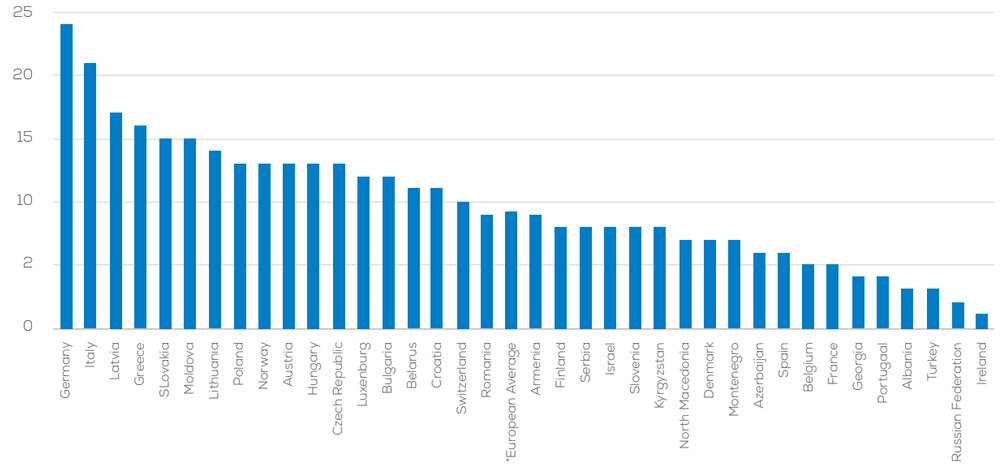



*Figure 4: Number of neurologists (fully specialised and in training) per 100 000 population.*

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

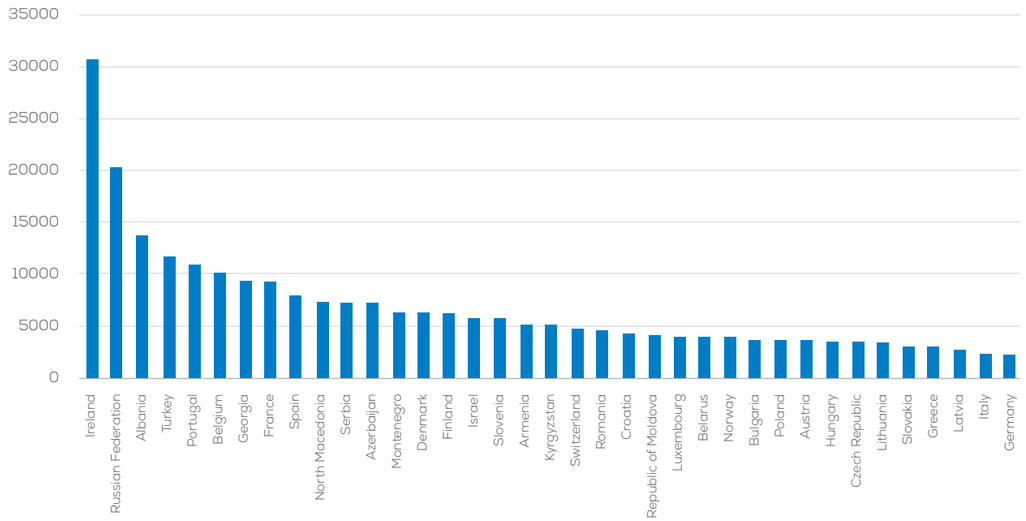
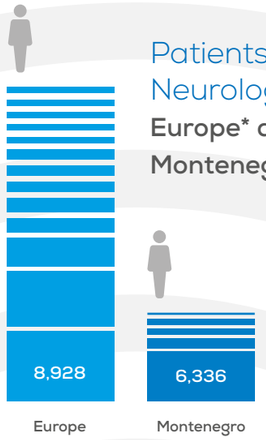



*Figure 5: Number of patients per neurologist (fully specialised and in training).*

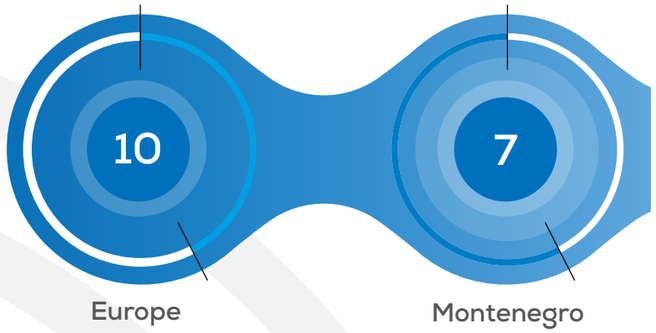
# Neurological Diseases in Europe and Montenegro:

Key Data and Trends from 2021

## Patients per Neurologist in Europe* and Montenegro



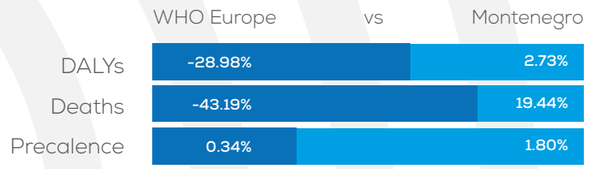

## Neurologists per 100,000 population in Europe* and Montenegro:

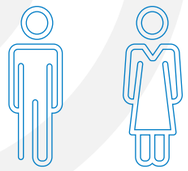



## Most prevalent neurological diseases in Montenegro in 2021

1. Tension-type headache
2. Migraine
3. Diabetic neuropathy
4. Stroke
5. Traumatic brain injury

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



| | | |
|---|---|---|
| WHO Europe | 3.513 | 3.351 |
| Montenegro | 5,750 | 5,793 |

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

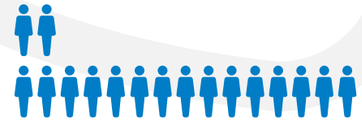
*Based on data from 37 countries of the WHO European region
**Cost estimates are derived from country-specific data available for specific diseases.





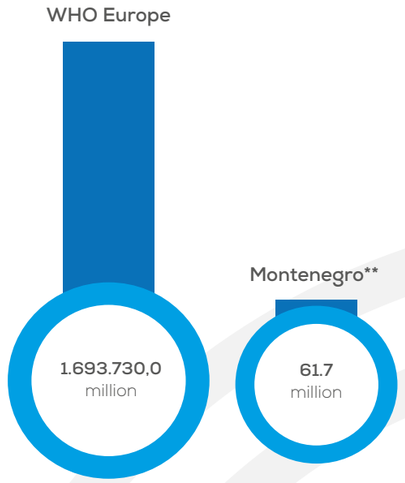
Montenegro 291,476

WHO Europe 449.278.770

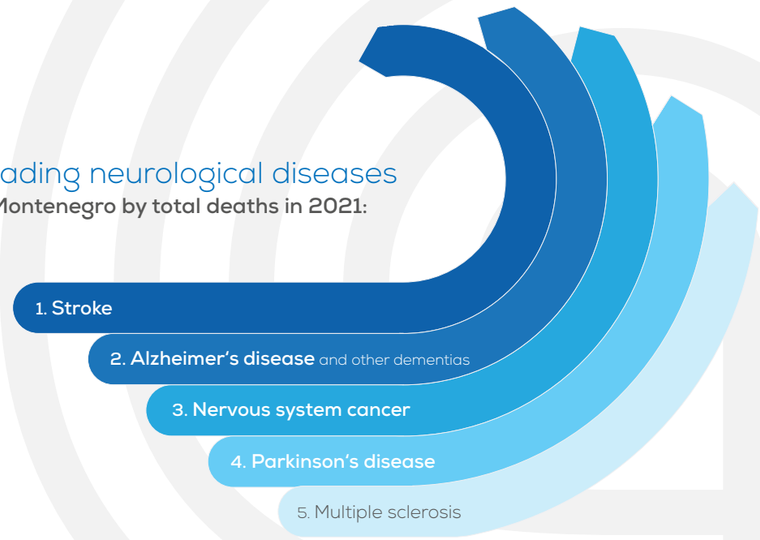


**Number of patients** with a neurological disease in 2021 in the WHO Europe and in Montenegro.

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




## Leading neurological diseases in Montenegro by total deaths in 2021:



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