The burden of noncommunicable and injury-related nervous system disorders in the Americas, 1990–2023: an analysis of the Global Burden of Disease Study 2023

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Summary

Background Noncommunicable and injury-related nervous system disorders (NINSDs)—including cerebrovascular and neurodegenerative diseases, neurodevelopmental disorders, neuromuscular conditions, brain cancers, and traumatic brain injuries—are major contributors to morbidity, disability, and premature mortality in the Americas. However, comprehensive regional and national assessments remain limited. We assessed the burden of NINSDs and their attributable risk factors in the Americas from 1990 to 2023.

Methods We analysed prevalence, mortality, and disability-adjusted life years (DALYs), with 95% uncertainty intervals (UIs), for 19 NINSDs by age and sex across 38 countries and territories, using estimates from the Global Burden of Disease Study 2023. Temporal trends were assessed using annual percentage change (APC) estimated through log-linear regression. Burden attributable to modifiable risk factors was also examined.

Findings In 2023, an estimated 470 million (95% UI 418–523) people in the Americas were living with at least one NINSD. These conditions caused 1·1 million (0·8–1·7) deaths and 37·5 million (27·9–51·8) DALYs, representing 12% of the total burden from noncommunicable diseases in the region. Migraine, Alzheimer's disease and other dementias, ischaemic stroke, and intracerebral haemorrhage were the leading contributors to DALYs. From 1990 to 2023, age-standardised DALY rates declined for ischaemic stroke, haemorrhagic stroke, and neural tube defects, but increased for neurodegenerative disorders, including multiple sclerosis and motor neuron diseases. High systolic blood pressure was the leading risk factor for stroke subtypes, high fasting plasma glucose for dementias, and lead exposure accounted for nearly 60% of DALYs from idiopathic intellectual disability.

Interpretation NINSDs impose a substantial and persistent burden in the Americas, with disability increasingly outweighing premature mortality. Strengthening prevention of modifiable risk factors, integrating neurological health into noncommunicable disease strategies, and expanding long-term care, rehabilitation, and disability support are essential to address this growing challenge.

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Introduction

Neurological disorders or nervous system conditions, including congenital and neurodevelopmental disorders, cerebrovascular and neurodegenerative diseases, neurological infections, neuro–immunological disorders, neuromuscular or peripheral nervous system disorders, traumatic brain injuries, and cancers of the nervous system, may affect individuals across the life course by altering brain development, injuring the brain, spinal cord, or peripheral nerves, and impairing cognitive, sensory, socioemotional, motor, and behavioural functions. More than two in five people worldwide live with at least one nervous system condition, which collectively accounted for 11·1 million deaths and

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Research in context

Evidence before this study

We searched PubMed for studies published between Jan 1, 1990, and Dec 31, 2025, that assessed the burden of disorders affecting the nervous system globally and in the Americas, using the terms ("nervous system" OR "neurological") AND ("prevalen*" OR "inciden*" OR "death*" OR "burden") AND ("global" OR "international" OR "Region of the Americas" OR "Americas"). Previous studies have quantified the burden of neurological disorders, typically covering around 15 conditions, with a focus on stroke, the cluster of neurological disorders, and selected mental health conditions. More recently, a comprehensive analysis estimated the global, regional, and national burden of disorders affecting the nervous system from 1990 to 2021, expanding the scope to 37 conditions, including neurodevelopmental disorders and neurological consequences of non-neurological diseases. A similar study has assessed this burden in the United States. However, no previous study has comprehensively examined the burden of noncommunicable disorders affecting the nervous system across countries in the Americas. Evidence comparing national-level trends and risk factor contributions within the Region of the Americas remains limited, hindering a comprehensive understanding of the impact of these conditions in the Americas.

Added value of this study

This study provides a comprehensive assessment of the burden of noncommunicable disorders and injury-related nervous system disorders (NINSDs) across the Americas, integrating condition-specific, life-course, and risk-attributable analyses to inform regional public health policy and planning. We show substantial heterogeneity across conditions, age groups, sexes, and countries. By jointly examining levels and trends, we identify diverging epidemiological trajectories, with declining burden from vascular and congenital conditions and increasing burden from neurodegenerative and developmental disorders. These findings highlight a shift from premature mortality to chronic disability. We also quantify the proportion of the NINSD burden attributable to modifiable risk factors, particularly metabolic, behavioural, and environmental exposures, providing actionable evidence to inform prevention strategies and health system planning in the region.

Implications of all the available evidence

The available evidence indicates that noncommunicable disorders affecting the nervous system are a leading contributor to health loss in the Americas. Our findings extend this evidence by showing that, although age-standardised DALY rates for several vascular and congenital conditions have declined, the overall burden remains high and is increasingly likely influenced by neurodegenerative and developmental disorders. This shift reflects population ageing, improved survival, and enhanced detection, suggesting a transition from premature mortality to chronic disability. A substantial proportion of this burden is attributable to modifiable risk factors, highlighting important opportunities for prevention.

These findings have important implications for health systems in the Americas. Persistent inequities in access to neurological care—including shortages of trained personnel, limited availability of diagnostics and treatments, and insufficient rehabilitation services—continue to contribute to the burden. As long-term disability increases, strengthening rehabilitation, follow-up care, and integrated service delivery across the life course will be essential. Expanding access to specialised services and addressing modifiable risk factors through coordinated, regionally tailored policies will be critical to reducing the future impact of neurological disorders in the Americas.

443 million disability-adjusted life years (DALYs) in 2021.[1] Population growth and ageing have accelerated the burden of nervous system illness since 1990.

Neurological disorders are increasingly recognised within the broader noncommunicable diseases (NCDs) agenda because many share common, modifiable risk factors, including behavioural risks such as tobacco use, harmful alcohol consumption, unhealthy diet, and physical inactivity, along with metabolic risks such as hypertension, obesity, and hyperglycaemia.[2,3] These risk factors similarly drive several neurological disorders.[4,5] Within the GBD framework, noncommunicable diseases and injury-related nervous system disorders (NINSDs) account for substantial morbidity and disability,[6] with stroke remains the single most important contributor to neurological mortality and dementias contributing prominently to years lived with disability (YLDs), underscoring the chronic, resource-intensive nature of NINSDs.[7] The global rise of NINSDs is linked to population ageing, with dementia prevalence projected to triple by 2050 without disease-modifying therapies.[8]

NINSDs impose a substantial socioeconomic burden through lost productivity, long-term disability, and labour-intensive informal caregiving, responsibilities that disproportionately fall on women.[9,10] In some settings, the growing burden of NINSDs occurs alongside persistent neurological infections, further straining already limited neurological services.[11]

Global initiatives—including the WHO Global Action Plan for the Prevention and Control of NCDs 2023–2030,[12] the UN Sustainable Development Goals 2030 Agenda,[13] and the Intersectoral Global Action Plan on Epilepsy and Other Neurological Disorders

2022–2031 (IGAP)[14]—recognise the growing burden of neurological disorders and call for integrated prevention, treatment, rehabilitation, and care strategies. The Political Declaration of the Fourth High-Level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases and the Promotion of Mental Health and Well-Being, adopted in December 2025,[15] further reinforces these commitments.

In the Region of the Americas, home to more than 1 billion people (12·5% of the global population) and with a life expectancy of 77·1 (76·9–77·3) years, advanced epidemiological transition coexists with persistent inequities in access to neurological care, making assessment of the burden of NINSDs essential for informing national policies and programmes. Although global analyses[1,16–22] and several condition-specific or national studies have been published,[23–31] no study has comprehensively assessed the burden, temporal trends, and risk-attributable burden of NINSDs across the Americas at regional, and national levels using a consistent analytical framework.

This study aims to comprehensively assess the burden of NINSDs in the Region of the Americas from 1990 to 2023, examining temporal trends, geographical variations, life-course patterns, sex differences, and burden attributable to modifiable risk factors. By providing comparable estimates across countries and territories, the study seeks to inform policies and strategies to improve neurological health in the Region.

Methods

Study design, setting, and definitions

We conducted a secondary analysis using time-series estimates from the GBD 2023[32] to evaluate the prevalence, mortality, and disease burden from NINSDs by age and sex in 38 countries and territories of the Americas from 1990 to 2023. The GBD estimates are reported by biological sex (female and male), based on sex information available in the underlying data sources; no gender-related variables were analysed in this study. The study reporting followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement, and the completed checklist is provided in the Appendix.

The analysis focused on a set of 19 noncommunicable and injury conditions impacting the nervous system reported in the GBD study and for which estimates are publicly available. The selected conditions were aligned with the WHO Intersectoral Global Action Plan on Epilepsy and Other Neurological Disorders, 2022–2031,[14] and included the following: brain and central nervous system cancers; neuroblastoma and other peripheral nervous cell tumours; ischaemic stroke; intracerebral haemorrhage; subarachnoid haemorrhage; migraine; tension-type headache; multiple sclerosis; Alzheimer's disease and other dementias; Parkinson's disease; epilepsy; motor neuron diseases; other neurological disorders; autism spectrum disorders; attention-deficit/hyperactivity disorder (ADHD); idiopathic developmental intellectual disability; neural tube defects; spinal cord injury; and traumatic brain injury. The full list of conditions, case definitions, and ICD-9 and ICD-10 codes are available in the Appendix (pp 4–9).

The study period from 1990 to 2023 corresponds with the full time series from GBD 2023, allowing us to assess long-term trends in the burden of NINSDs. This period includes the COVID pandemic years, and because GBD assigns deaths to mutually exclusive underlying causes, COVID-19 is modelled as a separate cause, COVID-19 deaths are not counted as deaths from NINSDs analysed in this study. This study focused on the WHO Region of the Americas, six GBD-defined regions, and 38 countries and territories, which are listed in the Appendix (p 11).

Primary outcomes

Prevalence, deaths, years of life lost (YLLs), years lived with disability (YLDs), and disability-adjusted life years (DALYs) were the primary outcomes of our study. They were quantified for all NINSDs combined and specific NINSD, stratified by age, sex, geographic location, and year. These burden outcomes were reported as counts and rates per 100,000 population, including age-standardised rates, with 95% uncertainty intervals (UIs). Age-standardised rates were calculated by the direct method using the standard GBD population age weights. We also reported the population attributable fraction (PAF) for specific risk-outcome pairs, and joint/combined PAF for clusters of risks–outcome pairs, which accounts for risk overlapping.

Data source

We used the GBD Results Tool[33] to extract estimates of the primary burden outcomes in absolute numbers and rates per 100,000 population, including age-standardised rates, for each NINSD. Data were obtained for males, females, and both sexes combined, and across multiple age groups for each geographic location from 1990 to 2023. Age categories included standard GBD age groups, age-standardised estimates, and custom groups (<5 years, 5–14 years, 15–49 years, 50–74 years, and 75–84 years, and 85+ years). In addition, we extracted annual estimates of population size stratified by sex, age, and country in the Region of the Americas from 1990 to 2023.

Overview of the GBD estimation process for neurological conditions

The GBD 2023 estimation methods and data sources have been described in detail elsewhere.[34–36] The estimation processes of disease burden for conditions impacting the nervous system and their risk factors

have been extensively described previously,[1,16] and details are provided in the Appendix (p 13). Briefly, non-fatal burden estimates were derived from surveys, censuses, hospital records, and insurance claims, and other epidemiological data sources using Bayesian meta-regression models (DisMod-MR 2·1) to estimate incidence and prevalence by age, sex, time, and location. Models incorporated predictive covariates and remission rates according to case definitions and prevalence estimates were corrected for comorbidities to avoid double-counting. Prevalence was divided into sequelae (severity categories), which were weighted by disability weights to calculate YLDs. Fatal burden was estimated using vital registration, verbal autopsy, surveillance, hospital, and registry data using the Cause of Death Ensemble Model (CODEm). YLLs were calculated by multiplying deaths by remaining standard life expectancy, and DALYs were the sum of YLDs and YLLs; for non-lethal conditions (e.g., headaches), DALYs equalled YLDs.

Risk-attributable burden was estimated using the GBD comparative risk assessment (CRA) framework.[35] Analyses were performed for eight of the 19 NINSDs (ischaemic stroke, intracerebral haemorrhage, subarachnoid haemorrhage, Alzheimer's disease and other dementias, multiple sclerosis, Parkinson's disease, idiopathic epilepsy, and idiopathic developmental intellectual disability) with stablished risk–outcome relationships.[1] Of note, the number of risk factors assessed by the GBD study varies by condition. Exposure distributions were estimated by age, sex, location, and year, and relative risks were derived from pooled epidemiological studies. PAFs were calculated to estimate the attributable burden as the proportion of deaths and DALYs preventable under minimum-risk exposure. The joint PAFs for clusters of risk–outcome pairs were estimated accounting for overlapping exposures and mediation between correlated risk factors using a hierarchical and multiplicative modelling approach, ensuring that the combined attributable burden does not exceed the total and avoids double counting across risks. The PAF represents the share of risk eliminated in a specific year if past exposure to a risk factor were reduced to an optimal scenario. Deaths and DALYs attributable to a risk factor are defined as the expected decrease in deaths and disease burden if risk exposure had equalled the theoretical minimum risk exposure level (TMREL).

The GBD estimation process applies sample weights obtained from national surveys primarily to adjust raw data input, so they accurately represent a target population, correcting for complex sampling designs and/or non-response. For missing data, GBD leverages Bayesian meta-regression tools like DisMod-MR and Spatial–Temporal Gaussian Process Regression (ST-GPR) to synthesise available evidence, correct biases, and generate prediction of any missing data across demography, geography and years. All estimates are derived from GBD modelling frameworks and should be interpreted in the context of data sparsity, modelling assumptions, and variability in data quality across countries.

Statistical analysis

We conducted descriptive analyses to compare the number, rates, and age-standardised rates of prevalence, deaths, YLLs, YLDs, and DALYs, from NINSDs, stratified by sex, and age across 38 countries from 1990 to 2023.

A comorbidity correction was used to calculate the prevalence of all NINSD combined, assuming comorbidity independence or overlapping between conditions, using the following formula: total prevalence = 1 − [(1 − prevalence of condition 1) × (1 − prevalence of condition 2) × … (1 − prevalence of condition 19)]. This approach does not incorporate joint comorbidity-adjusted draws from the GBD framework. The total number of people with any NINSD was then calculated by multiplying the prevalence by the population size.

Temporal trends of primary outcomes were assessed using the annual percentage change (APC). We applied regression analysis to estimate the APC and its 95% UI separately for overall NINSDs and each NINSD-related burden outcome (age-standardised and age-specific rates) by age, sex, and location (region, and country) for the period 1990–2023. The APC was estimated using a log-linear regression model of rates over the calendar year based on annual GBD point estimates. Model assumptions were assessed through residual diagnostics. The APC was obtained by transforming the slope coefficient (β) of the fitted model using the formula: (EXP(β) − 1) * 100. The 95% UIs were derived using non-parametric bootstrap resampling (1000 iterations), taking the 2·5th and 97·5th percentiles of the APC distribution. These intervals should be interpreted as reflecting variability in the fitted trends rather than full propagation of underlying model uncertainty. Trends were classified as increasing, decreasing, or stable according to whether the APC 95% UI excluded or included zero.

Ethical considerations

This study used publicly available de-identified and aggregated data from the GBD study. No ethical approval was required for this study because no personal identifying information was used in the analyses.

Role of the funding source

This study received no specific funding.

Results

Regional burden

In 2023, an estimated 470 million (95% UI 418–523) individuals in the Americas were living with at least one

of the 19 NINSDs, representing 43·5% of the total population of the Region of the Americas (Table 1). All NINSDs combined accounted for 1·1 million (0·76–1·74) deaths (14·1% of total deaths) and contributed 17·5 million (11·6–24·8) YLDs (11·6% of total YLDs) and 20·0 million (15·3–27·8) YLLs (10·4% of total YLLs), totalling 37·5 million (27·8–51·8) DALYs (10·9% of all-cause DALYs).

Between 1990 and 2023, the absolute numbers of prevalent cases, deaths, and DALYs increased, whereas age-standardised rates declined (Supplementary Figure S1). The age-standardised prevalence rate decreased by 0·10% per year (95% UI –0·11 to –0·09), reaching 43,348·7 (38,254·6–48,550·0) per 100,000 population in 2023 (Table 1). Prevalence was 1·2 times (1·0–1·4) higher in females than in males. The age-standardised mortality rate declined by 1·07% annually (–1·15 to –0·99), reaching 78·9 (54·1–120·8) deaths per 100,000 population. Similarly, age-standardised DALY rates decreased by 0·71% per year (–0·77 to –0·66) to 3036·7 DALYs (2249·5–4193·4) per 100,000 population. Declines were steeper for YLL rates (–1·22% per year [–1·33 to –1·12]) than for YLD rates (–0·13% per year [–0·15 to –0·11]). No meaningful sex differences were observed in age-standardised mortality, DALY, YLD, or YLL rates.

Burden across conditions

Fig. 1 illustrates substantial variations in age-standardised DALY rates in 2023 and APC from 1990 to 2023 across the 19 NINSDs. DALY rates varied 81-fold, from 523·0 years per 100,000 population for migraine to 6·5 for neuroblastoma and other peripheral nervous system tumours. And APCs ranged from a decline of 2·5% for neural tube defects to an increase of 2·3% for other neurological disorders.

The joint examination of levels and trends in DALYs highlights distinct epidemiological trajectories across conditions (Fig. 1). Vascular neurological conditions—including ischaemic stroke, intracerebral haemorrhage, and subarachnoid haemorrhage—clustered in the high-burden and decliningtrend quadrant (rate ≥107·8 DALYs per 100,000; APC <0), reflecting sustained reductions in age-standardised DALY rates over time. In contrast, several neurodegenerative disorders, such as Parkinson's disease, multiple sclerosis, and motor neuron disease, were located in the low-burden and increasing-trend quadrant, indicating rising DALY rates despite comparatively lower overall burden. Autism spectrum disorders was the only condition positioned in the high-burden and increasing-trends, representing the most concerning trajectory. Four conditions (tension-type headache, neural tube defects, idiopathic developmental intellectual disability, and neuroblastoma and other peripheral nervous cell tumours) clustered in the low-burden and declining-trend quadrant, reflecting the most favourable pattern. Migraine and Alzheimer's disease and other dementias continue to contribute substantially to overall DALYs, with high burden levels across most settings, whereas other neurological disorders showed the fastest increases over time. Overall, these patterns suggest an epidemiological transition from vascular and congenital neurological conditions, whose burden has generally declined, towards chronic, progressive, and age-related neurological disorders with increasing health impacts. Tension-type headache and migraine—represented with the largest circles—accounted for the largest numbers of prevalent cases. Variations in disease burden and trends across conditions for males and females are shown in Supplementary Figure S2.

Sex and age patterns

Sex-related differences in DALY burden varied across conditions (Table 1). The highest female-to-male DALY ratios were observed for migraine (2·6 [1·6–4·3]), multiple sclerosis (1·8 [1·4–2·3]), tension-type headache (1·5 [0·8–2·6]), and subarachnoid haemorrhage (1·2 [1·1–1·4]). By contrast, ratios below 1 were observed for for ADHD (0·4 [0·2–0·9]), autism spectrum disorders (0·4 [0·1–1·3]), Parkinson's disease (0·5 [0·5–0·6]), and head injuries (0·5 [0·3–0·7]).

DALY rates per 100,000 population from all NINSDs combined increase steeply with age but with different predominance of conditions across the life course (Supplementary Figure S3, Appendix p 18). DALY rates were minimum (1077·90 [781·14–1689·31]) among children under 5 years and maximum (37,330·02 [22,468 to 62,304·51]) among older adults aged 85+ years. Supplementary Figure S3 shows the distribution of DALYs across ages breakdown by specific conditions.

Fig. 2 depicts the ranking of NINSDs by DALY rates across age groups in 2023 and their corresponding APCs (1990–2023) in the Americas. Both burden levels and trends varied substantially by age. Among children younger than 5 years, neural tube defects, autism spectrum disorders, and idiopathic epilepsy were the three leading contributors, and autism is the only condition with increasing DALY rates (1·2% per year). Among children and early adolescents aged 5–14 years, migraine emerged as the leading health loss contributor, followed by autism spectrum disorders, and idiopathic epilepsy. DALY rates increased (APC ~1·0% per year) for autism, other neurological disorders, and motor neuron disease. Among adolescents and young adults aged 15–49 years, migraine, idiopathic epilepsy are the top two contributors, and intracerebral haemorrhage emerged as third cause of DALYs. In this age group, DALY rates increased for other neurological disorders, motor neuron disease, Parkinson's disease,

	Counts (thousands)		Age-standardised rates per 100,000 population				
	2023	Annual percentage change (%), 1990–2023	2023	Annual percentage change (%), 1990–2023	Female	Male	Female-to-male ratio, 2023
All noncommunicable neurological disorders							
Prevalence	470,020 (417,746–522,540)	1·21 (1·17 to 1·25)	43,348·69 (38,254·57–48550·02)	−0·1 (−0·11 to −0·09)	46,451·18 (41,346·72–51511·73)	40,195·19 (35,336·65–45551·95)	1·2 (1·0 to 1·4)
Deaths	1124 (760–1740)	1·67 (1·59 to 1·75)	78·93 (54·14–120·78)	−1·07 (−1·15 to −0·99)	75·03 (47·65–120·55)	82·71 (60·50–122·23)	0·9 (0·4 to 1·6)
DALYs	37,543 (27,880–51799)	1·28 (1·24 to 1·32)	3036·69 (2249·48–4193·39)	−0·71 (−0·77 to −0·66)	2997·09 (2156·15–4202·98)	3077·77 (2322·57–4216·42)	1·0 (0·6 to 1·6)
YLDs	17,529 (11,630–24811)	1·47 (1·43 to 1·5)	1524·02 (999·12–2198·54)	−0·13 (−0·15 to −0·11)	1612·59 (1069·06–2282·40)	1429·58 (926·13–2104·73)	1·1 (0·6 to 1·9)
YLLs	20,015 (15,334–27880)	1·11 (1·01 to 1·22)	1512·68 (1182·69–2060·11)	−1·22 (−1·33 to −1·12)	1384·5 (1014·03–2007·21)	1648·18 (1330·36–2188·79)	0·8 (0·5 to 1·3)
Alzheimer's disease and other dementias							
Prevalence	10,489 (8999–12020)	2·65 (2·64 to 2·66)	722·55 (619·75–828·54)	−0·14 (−0·16 to −0·13)	779·66 (672·24–898·72)	646·35 (547·41–739·83)	1·2 (1·0 to 1·5)
Deaths	380 (94–942)	2·94 (2·9 to 2·98)	25·78 (6·37–63·81)	−0·14 (−0·16 to −0·12)	28·25 (7·08–68·90)	22·09 (5·32–56·54)	1·3 (0·0 to 1·7)
DALYs	6743 (3043–13768)	2·74 (2·72 to 2·76)	461·57 (209·24–942·03)	−0·16 (−0·18 to −0·15)	510·27 (233·21–1029·89)	394·5 (176·5–822·71)	1·3 (0·2 to 6·7)
YLDs	2071 (1461–2655)	2·62 (2·6 to 2·64)	142·52 (100·5–182·75)	−0·2 (−0·22 to −0·18)	158·75 (111·67–204·66)	120·76 (85·21–154·75)	1·3 (0·9 to 2·0)
YLLs	4673 (1176–11550)	2·79 (2·76 to 2·82)	319·06 (80·35–788·22)	−0·15 (−0·17 to −0·12)	351·51 (89·71–864·41)	273·74 (67·31–693·89)	1·3 (0·0 to 1·6)
Attention-deficit/hyperactivity disorder							
Prevalence	13,579 (9578–18665)	0·72 (0·65 to 0·79)	1479·31 (1042·8–2022·30)	0·17 (0·15 to 0·19)	869·79 (606·63–1182·36)	2076·90 (1463·5–2855·77)	0·4 (0·3 to 0·7)
DALYs	586 (348–881)	0·71 (0·64 to 0·79)	63·85 (37·85–95·89)	0·17 (0·15 to 0·19)	37·32 (21·35–56·29)	89·87 (53·75–135·28)	0·4 (0·2 to 0·9)
YLDs	586 (348–881)	0·71 (0·64 to 0·79)	63·85 (37·85–95·89)	0·17 (0·15 to 0·19)	37·32 (21·35–56·29)	89·87 (53·75–135·28)	0·4 (0·2 to 0·8)
Autism spectrum disorders							
Prevalence	7993 (4383–13494)	1·47 (1·44 to 1·5)	824·37 (440·88–1416·63)	0·58 (0·54 to 0·62)	45 (235·91–797·28)	1199·86 (647·46–2043·39)	0·4 (0·1 to 0·9)
DALYs	1488 (744–2646)	1·47 (1·44 to 1·5)	154·93 (76·18–291·55)	0·62 (0·58 to 0·66)	84·31 (40·39–163·69)	225·78 (112·13–418·13)	0·4 (0·1 to 1·3)
YLDs	1488 (744–2646)	1·47 (1·44 to 1·5)	154·93 (76·18–291·55)	0·62 (0·58 to 0·66)	84·31 (40·39–163·69)	225·78 (112·13–418·13)	0·4 (0·1 to 1·5)
Brain and central nervous system cancer							
Prevalence	202 (130–309)	1·61 (1·5 to 1·71)	17·92 (11·55–27·53)	0·06 (−0·03 to 0·16)	17·39 (10·36–28·73)	18·46 (12·77–26·21)	0·9 (0·5 to 1·7)
Deaths	51 (48–53)	2·32 (2·28 to 2·36)	3·87 (3·68–4·00)	0·1 (0·05 to 0·15)	3·31 (3·10–3·49)	4·51 (4·32–4·67)	0·7 (0·7 to 0·8)
DALYs	1598 (1534–1648)	1·67 (1·6 to 1·74)	137·22 (131·55–141·93)	−0·08 (−0·14 to −0·01)	117·83 (110·88–125·37)	158·09 (151·13–16)	0·7 (0·7 to 0·8)
YLDs	26 (17–38)	1·88 (1·8 to 1·96)	2·08 (1·35–3·12)	0·01 (−0·07 to 0·09)	1·91 (1·18–3)	2·28 (1·53–3·29)	0·8 (0·4 to 1·6)
YLLs	1573 (1510–1618)	1·67 (1·59 to 1·74)	135·13 (129·41–139·47)	−0·08 (−0·14 to −0·01)	115·91 (108·73–123·23)	155·81 (149·05–162·58)	0·7 (0·7 to 0·8)
Head Injuries							
Prevalence	9795 (9336–10241)	1·62 (1·57 to 1·67)	780·55 (746·52–81)	−0·36 (−0·41 to −0·31)	517·38 (488·75–547·27)	1061·53 (1016·71–1105·17)	0·5 (0·5 to 0·5)
DALYs	1343 (939–1819)	1·6 (1·54 to 1·65)	107·83 (75·39–146·09)	−0·34 (−0·39 to −0·3)	69·34 (48·71–93·85)	148·80 (104·39–202·09)	0·5 (0·3 to 0·7)
YLDs	1343 (939–1819)	1·6 (1·54 to 1·65)	107·83 (75·39–146·09)	−0·34 (−0·39 to −0·3)	69·34 (48·71–93·85)	148·80 (104·39–202·09)	0·5 (0·3 to 0·7)
Idiopathic developmental intellectual disability							
Prevalence	5123 (1969–10029)	0·44 (0·38 to 0·5)	509·44 (197·18–1012·25)	−0·55 (−0·59 to −0·52)	437·14 (186·66–830·84)	582·78 (204·38–1194·55)	0·8 (0·2 to 4·1)
DALYs	275 (117–537)	0·46 (0·39 to 0·53)	27·27 (11·5–53·93)	−0·55 (−0·6 to −0·49)	22·80 (10·03–43·17)	31·80 (12·85–64·29)	0·7 (0·2 to 3·4)
YLDs	275 (117–537)	0·46 (0·39 to 0·53)	27·27 (11·5–53·93)	−0·55 (−0·6 to −0·49)	22·80 (10·03–43·17)	31·80 (12·85–64·29)	0·7 (0·2 to 4·0)
Idiopathic epilepsy							
Prevalence	4873 (3527–6269)	1·43 (1·41 to 1·45)	457·92 (332·58–595·46)	0·23 (0·2 to 0·26)	451·16 (326·60–582·11)	465·54 (339·10–604·5)	1·0 (0·6 to 1·5)
Deaths	19 (18–21)	2·13 (1·82 to 2·44)	1·64 (1·54–1·78)	0·6 (0·28 to 0·92)	1·31 (1·15–1·49)	2·00 (1·83–2·21)	0·7 (0·6 to 0·8)
DALYs	2045 (1578–2801)	0·97 (0·85 to 1·09)	197·13 (152·31–269·44)	−0·12 (−0·27 to 0·03)	179·96 (131·65–248·65)	215·03 (166·90–291·22)	0·8 (0·5 to 1·3)
YLDs	1229 (740–1958)	0·79 (0·74 to 0·84)	117·56 (70·34–189·59)	−0·31 (−0·39 to −0·24)	115·54 (69·37–183·31)	119·77 (71–195·78)	1·0 (0·5 to 2·3)
YLLs	817 (765–881)	1·28 (1·01 to 1·56)	79·56 (74·40–85·84)	0·22 (−0·08 to 0·52)	64·42 (56·25–72·26)	95·26 (87·31–104·78)	0·7 (0·6 to 0·8)
Intracerebral haemorrhage							
Prevalence	1781 (1652–1907)	1·17 (1·05 to 1·29)	145·90 (135·61–156·5)	−0·76 (−0·86 to −0·66)	136·74 (127·06–147·41)	156·24 (144·55–167·72)	0·9 (0·8 to 1·0)
Deaths	182 (167–193)	0·54 (0·46 to 0·61)	12·96 (11·94–13·73)	−2·02 (−2·1 to −1·95)	10·83 (9·66–11·85)	15·36 (14·14–16·76)	0·7 (0·6 to 0·8)
DALYs	4437 (4141–4687)	0·18 (0·09 to 0·26)	334·67 (312·56–353·82)	−2·16 (−2·26 to −2·07)	274·64 (250·96–300·79)	401·02 (372·37–435·02)	0·7 (0·6 to 0·8)

(Table 1 continues on next page)

	Counts (thousands)		Age-standardised rates per 100,000 population				
	2023	Annual percentage change (%), 1990–2023	2023	Annual percentage change (%), 1990–2023	Female	Male	Female-to-male ratio, 2023
(Continued from previous page)							
YLDs	204 (149–255)	1·22 (1·08 to 1·35)	16·41 (11·97–20·73)	−0·79 (−0·91 to −0·67)	16·48 (12·06–20·91)	16·37 (12·02–20·62)	1·0 (0·7 to 1·5)
YLLs	4233 (3957–4470)	0·13 (0·04 to 0·22)	318·25 (297·97–335·56)	−2·22 (−2·33 to −2·12)	258·16 (235·21–282·94)	384·64 (357·44–417·39)	0·7 (0·6 to 0·8)
Ischaemic stroke							
Prevalence	11,934 (11,144–12814)	1·95 (1·9 to 2)	881·74 (823·02–943·98)	−0·47 (−0·54 to −0·4)	788·63 (731·95–849·30)	994·66 (929·80–1067·33)	0·8 (0·7 to 0·9)
Deaths	299 (260–323)	0·62 (0·46 to 0·78)	20·5 (17·82–22·12)	−2·19 (−2·35 to −2·04)	18·98 (15·78–20·91)	22·03 (19·87–23·87)	0·9 (0·7 to 1·0)
DALYs	5778 (5205–6290)	0·66 (0·49 to 0·82)	407·88 (366·11–445·75)	−1·95 (−2·1 to −1·8)	365·56 (321·33–40)	455·44 (412·01–495·49)	0·8 (0·7 to 0·9)
YLDs	1423 (1057–1833)	1·87 (1·8 to 1·93)	104·47 (77·64–134·13)	−0·58 (−0·65 to −0·5)	99·90 (73·59–128·27)	110·61 (82·82–141·81)	0·9 (0·6 to 1·3)
YLLs	4356 (3917–4658)	0·33 (0·12 to 0·55)	303·42 (273·48–324·07)	−2·32 (−2·51 to −2·12)	265·64 (231·03–292·39)	344·82 (315·06–376·82)	0·8 (0·7 to 0·9)
Migraine							
Prevalence	162,318 (139,309–183,601)	1·19 (1·13 to 1·25)	15,142·4 (12,963·18–17178·93)	−0·05 (−0·06 to −0·03)	20,081·49 (17,325·70–22606·31)	10,080·32 (8544·67–11627·15)	2·0 (1·7 to 2·4)
DALYs	5708 (3811–7943)	1·28 (1·22 to 1·35)	523·02 (350·62–726·40)	−0·05 (−0·07 to −0·04)	755·02 (504·95–1044·7)	285·14 (193·47–398·74)	2·6 (1·6 to 4·3)
YLDs	5708 (3811–7943)	1·28 (1·22 to 1·35)	523·02 (350·62–726·40)	−0·05 (−0·07 to −0·04)	755·02 (504·95–1044·7)	285·14 (193·47–398·74)	2·6 (1·5 to 4·5)
Motor neuron disease							
Prevalence	70 (63–77)	2·46 (2·31 to 2·61)	5·66 (5·08–6·25)	0·6 (0·45 to 0·75)	4·99 (4·42–5·51)	6·44 (5·79–7·07)	0·8 (0·7 to 0·9)
Deaths	15 (14–16)	3·34 (3·09 to 3·58)	1·02 (0·93–1·09)	0·81 (0·53 to 1·08)	0·84 (0·75–0·93)	1·22 (1·10–1·33)	0·7 (0·6 to 0·8)
DALYs	377 (350–403)	2·92 (2·7 to 3·13)	29·10 (26·98–31·21)	0·67 (0·43 to 0·91)	24·12 (21·41–26·60)	34·61 (31·37–38·18)	0·7 (0·6 to 0·8)
YLDs	15 (11–19)	2·46 (2·31 to 2·61)	1·2 (0·87–1·53)	0·6 (0·45 to 0·75)	1·06 (0·77–1·35)	1·37 (0·98–1·74)	0·8 (0·5 to 1·2)
YLLs	362 (337–387)	2·94 (2·72 to 3·16)	27·89 (25·94–29·85)	0·68 (0·43 to 0·92)	23·05 (20·53–25·44)	33·25 (30·25–36·67)	0·7 (0·6 to 0·8)
Multiple sclerosis							
Prevalence	602 (567–641)	2·13 (1·96 to 2·3)	48·60 (45·64–51·75)	0·13 (0–0·26)	67·65 (63·49–72·34)	28·10 (26·14–30·02)	2·4 (2·2 to 2·7)
Deaths	7 (6–8)	3·17 (2·89 to 3·45)	0·48 (0·42–0·55)	0·64 (0·36 to 0·92)	0·57 (0·51–0·67)	0·38 (0·32–0·44)	1·6 (1·3 to 2·0)
DALYs	329 (282–380)	2·29 (2·05 to 2·53)	25·69 (21·87–29·87)	0·12 (−0·09 to 0·34)	32·88 (27·73–38·35)	17·87 (15·42–21·03)	1·8 (1·4 to 2·3)
YLDs	149 (110–191)	2·08 (1·91 to 2·25)	12·09 (8·91–15·6)	0·11 (−0·02 to 0·24)	16·73 (12·36–21·52)	7·11 (5·20–9·22)	2·4 (1·6 to 3·5)
YLLs	180 (162–202)	2·47 (2·16 to 2·78)	13·6 (12·24–15·31)	0·13 (−0·15 to 0·42)	16·14 (14·1–18·68)	10·75 (9·13–12·72)	1·5 (1·2 to 1·9)
Neural tube defects							
Prevalence	110 (94–128)	0·77 (0·65 to 0·89)	11·69 (9·99–13·64)	0·12 (−0·03 to 0·27)	12·64 (10·88–14·75)	10·72 (9·05–12·46)	1·2 (1·0 to 1·5)
Deaths	3 (3–4)	−2·78 (−2·9 to −2·66)	0·40 (0·35–0·46)	−2·59 (−2·72 to −2·45)	0·46 (0·38–0·56)	0·37 (0·31–0·45)	1·2 (0·9 to 1·7)
DALYs	272 (242–311)	−2·67 (−2·79 to −2·55)	38·96 (34·85–44·35)	−2·49 (−2·63 to −2·36)	43·24 (36·45–52·61)	34·85 (29·94–42·50)	1·2 (1·0 to 1·6)
YLDs	32 (22–43)	0·75 (0·64 to 0·87)	3·39 (2·35–4·62)	0·15 (0–0·29)	3·64 (2·54–4·95)	3·12 (2·16–4·25)	1·2 (0·7 to 1·9)
YLLs	241 (212–277)	−2·91 (−3·03 to −2·79)	35·57 (31·14–40·75)	−2·65 (−2·79 to −2·52)	39·57 (32·78–48·77)	31·71 (26·48–38·68)	1·2 (0·9 to 1·6)
Neuroblastoma and other peripheral nervous cell tumors							
Prevalence	25 (13–45)	−0·24 (−0·57 to 0·1)	3·45 (1·71–6·25)	−0·09 (−0·41 to 0·23)	3·21 (1·40–6)	3·66 (1·72–7·04)	0·9 (0·2 to 3·4)
Deaths	1 (1–2)	1·06 (0·75 to 1·37)	0·10 (0·08–0·11)	0·05 (−0·26 to 0·36)	0·08 (0·08–0·11)	0·11 (0·08–0·13)	0·8 (0·7 to 1·0)
DALYs	56 (49–63)	0·22 (−0·1 to 0·54)	6·51 (5·62–7·45)	−0·2 (−0·51 to 0·1)	5·96 (5·12–7·00)	7·05 (5·76–8·53)	0·8 (0·7 to 1·1)
YLDs	3 (2–5)	0·16 (−0·15 to 0·47)	0·32 (0·14–0·57)	0·1 (−0·19 to 0·4)	0·29 (0·13–0·56)	0·34 (0·16–0·62)	0·8 (0·2 to 2·7)
YLLs	53 (47–61)	0·23 (−0·1 to 0·55)	6·20 (5·40–7·11)	−0·22 (−0·52 to 0·09)	5·67 (4·88–6·67)	6·71 (5·57–8·08)	0·8 (0·7 to 1·1)
Other neurological disorders							
Prevalence	4 (3–5)	0·62 (0·22 to 1·01)	0·32 (0·23–0·40)	−0·99 (−1·35 to −0·62)	0·28 (0·20–0·37)	0·35 (0·28–0·46)	0·8 (0·5 to 1·2)
Deaths	34 (31–37)	4·85 (4·65 to 5·05)	2·49 (2·28–2·71)	2·48 (2·3 to 2·67)	2·16 (1·93–2·46)	2·85 (2·54–3·16)	0·8 (0·6 to 0·9)
DALYs	1253 (1114–1424)	3·99 (3·87 to 4·11)	106·52 (94·37–121·55)	2·26 (2·14 to 2·38)	96·85 (84·53–111·76)	116·66 (102·94–133·40)	0·8 (0·7 to 1·0)
YLDs	392 (266–561)	4·7 (4·6 to 4·79)	33·71 (22·69–49·35)	3·01 (2·93 to 3·1)	34·93 (23·60–50·60)	32·28 (21·32–47·78)	1·1 (0·6 to 2·0)
YLLs	862 (804–920)	3·68 (3·5 to 3·87)	72·79 (67·76–77·59)	1·93 (1·75 to 2·12)	61·93 (55·78–67·76)	84·35 (76·79–91·06)	0·7 (0·7 to 0·8)

(Table 1 continues on next page)

	Counts (thousands)		Age-standardised rates per 100,000 population				
	2023	Annual percentage change (%), 1990–2023	2023	Annual percentage change (%), 1990–2023	Female	Male	Female-to-male ratio, 2023
(Continued from previous page)							
Parkinson's disease							
Prevalence	2596 (2305–2951)	2·9 (2·77 to 3·03)	178·72 (158·53–202·86)	0·23 (0·14 to 0·33)	141·06 (123·52–163·06)	226·86 (201·84–254·27)	0·6 (0·5 to 0·7)
Deaths	81 (72–87)	3·75 (3·68 to 3·82)	5·57 (4·91–5·93)	0·97 (0·91 to 1·03)	3·87 (3·33–4·24)	7·91 (7·16–8·36)	0·5 (0·4 to 0·6)
DALYs	1504 (1359–1640)	3·4 (3·33 to 3·46)	103·48 (93·48–112·81)	0·71 (0·66 to 0·76)	73·70 (65·45–81·85)	142·47 (130·41–153·19)	0·5 (0·5 to 0·6)
YLDs	353 (261–466)	2·87 (2·74 to 2·99)	24·30 (17·96–32·00)	0·2 (0·11 to 0·3)	19·09 (14·02–25·26)	30·94 (22·78–40·52)	0·6 (0·4 to 0·9)
YLLs	1151 (1047–1215)	3·57 (3·5 to 3·65)	79·18 (71·96–83·53)	0·88 (0·81 to 0·94)	54·60 (48·36–58·93)	111·53 (102·52–117·34)	0·5 (0·4 to 0·5)
Spinal Injuries							
Prevalence	4798 (4379–5257)	0·93 (0·85 to 1·02)	397·75 (363·97–431·76)	−0·83 (−0·91 to −0·76)	302·72 (270·76–337·77)	497·56 (458·94–539·54)	0·6 (0·5 to 0·7)
DALYs	1356 (974–1740)	0·75 (0·65 to 0·84)	113·76 (81·09–146·47)	−0·96 (−1·04 to −0·88)	83·65 (59·75–108·05)	145·36 (104·12–185·87)	0·6 (0·4 to 0·9)
YLDs	1356 (974–1740)	0·75 (0·65 to 0·84)	113·76 (81·09–146·47)	−0·96 (−1·04 to −0·88)	83·65 (59·75–108·05)	145·36 (104·12–185·87)	0·6 (0·4 to 0·8)
Subarachnoid haemorrhage							
Prevalence	2123 (1949–2323)	1·96 (1·92 to 1·99)	165·46 (152·22–181·88)	−0·23 (−0·27 to −0·18)	198·18 (181·75–218·72)	129·78 (119·22–141·52)	1·5 (1·3 to 1·7)
Deaths	55 (51–60)	1·59 (1·53 to 1·65)	4·08 (3·75–4·45)	−0·82 (−0·87 to −0·77)	4·30 (3·87–4·91)	3·85 (3·46–4·28)	1·1 (0·9 to 1·3)
DALYs	1738 (1603–1883)	1·02 (0·97 to 1·06)	138·97 (128·13–150·58)	−1·06 (−1·1 to −1·01)	149·11 (134·83–168·69)	127·73 (115·61–141·80)	1·2 (1·1 to 1·4)
YLDs	220 (155–284)	1·88 (1·83 to 1·93)	16·96 (11·99–21·98)	−0·32 (−0·37 to −0·27)	21·30 (15·15–27·60)	12·19 (8·73–15·99)	1·7 (1·2 to 2·9)
YLLs	1519 (1405–1648)	0·91 (0·86 to 0·96)	122·01 (112·59–132·78)	−1·14 (−1·19 to −1·1)	127·81 (116·62–145·65)	115·54 (103·43–128·72)	1·1 (0·9 to 1·3)
Tension-type headache							
Prevalence	313,981 (279,234–350,887)	1·21 (1·17 to 1·25)	28,642·59 (25,343·66–32)	−0·15 (−0·17 to −0·13)	29,422·91 (26,121·00–33001·52)	27,841·74 (24,806·61–31303·00)	1·1 (0·9 to 1·2)
DALYs	667 (456–944)	1·5 (1·47 to 1·54)	58·27 (39·71–82·17)	−0·09 (−0·11 to −0·07)	70·45 (47·39–100·61)	45·63 (31·44–63·88)	1·5 (0·8 to 2·6)
YLDs	667 (456–944)	1·5 (1·47 to 1·54)	58·27 (39·71–82·17)	−0·09 (−0·11 to −0·07)	70·45 (47·39–100·61)	45·63 (31·44–63·88)	1·5 (0·9 to 2·5)

Table 1: Regional prevalence, deaths, DALYs, YLDs, and YLLs per 100,000 people and age-standardised rates by noncommunicable neurological disorder category, 1990–2023.

and neuroblastoma and other peripheral nervous cell tumours, but they have low DALY rates.

In adults aged 50–74 years, intracerebral haemorrhage, ischaemic stroke, and Alzheimer's disease and other dementias accounted for the largest share of DALYs, with rates ranging from 1010·8 to 746·3 DALYs per 100,000 population (Fig. 2). Among adults, other neurological disorders saw the largest increase (2·3% [2·3 to 2·4] per year), while slight increases were observed in motor neuron disease, Parkinson's disease, and neuroblastoma and peripheral nervous cell tumours. Among older adults aged 75+ years, Alzheimer's disease and other dementias, ischaemic stroke, intracerebral haemorrhage, and Parkinson's disease dominated the burden, and of them, only Parkinson's disease saw upward trend in DALY rate. The largest increases in DALY rates at these ages were observed for other neurological disorders and neural tube defects. The sex-specific ranking of NINSDs across ages is illustrated in Supplementary Figure S4.

Geographical variations

In 2023, age-standardised DALY rates for all NINSDs combined across countries varied nearly fourfold, from 8192 (5549–12,104) per 100,000 population in Haiti to 2201 (1504–3225) in Puerto Rico (Fig. 3). The highest rates were observed in the Caribbean and Tropical Latin America regions, prominently in Haiti, Guyana, Suriname, Saint Kitts and Nevis, Dominican Republic, and Paraguay. The lowest rates were observed in Andean Latin America (2716 [1949–3851]) and Southern Latin America (2595 [1879–3628]). From 1990 to 2023, age-standardised NINSD-related DALY rates declined in all regions and countries, except in the Dominican Republic and Haiti, where rates remained stable. The lowest declines were observed in Caribbean (–0·21% [–0·31 to –0·10]) and high-income North America regions, and across countries, in Jamaica, Cuba and the United States. Southern Latin America (APC –1·34% [–1·42 to –1·26]) and Tropical Latin America (–1·31% [–1·37 to –1·25]) saw the largest reductions, with particularly pronounced declines in Brazil, Grenada, Argentina, Saint Lucia, Guyana, and Saint Kitts and Nevis. To complement the DALY patterns shown in Fig. 3, regional and country/territory-level estimates for prevalence, mortality, YLDs, and YLLs from all NINSDs combined are provided in Supplementary Figure S5.

Variation across conditions and locations

Fig. 4 illustrates the ranking of NINSDs by age-standardised DALY rate across regions and countries in 2023, showing broadly consistent patterns, with some regional heterogeneity. Migraine, Alzheimer's disease and other dementias, ischaemic stroke, and intracerebral haemorrhage were the four leading contributors to the NINSD burden in most settings, each

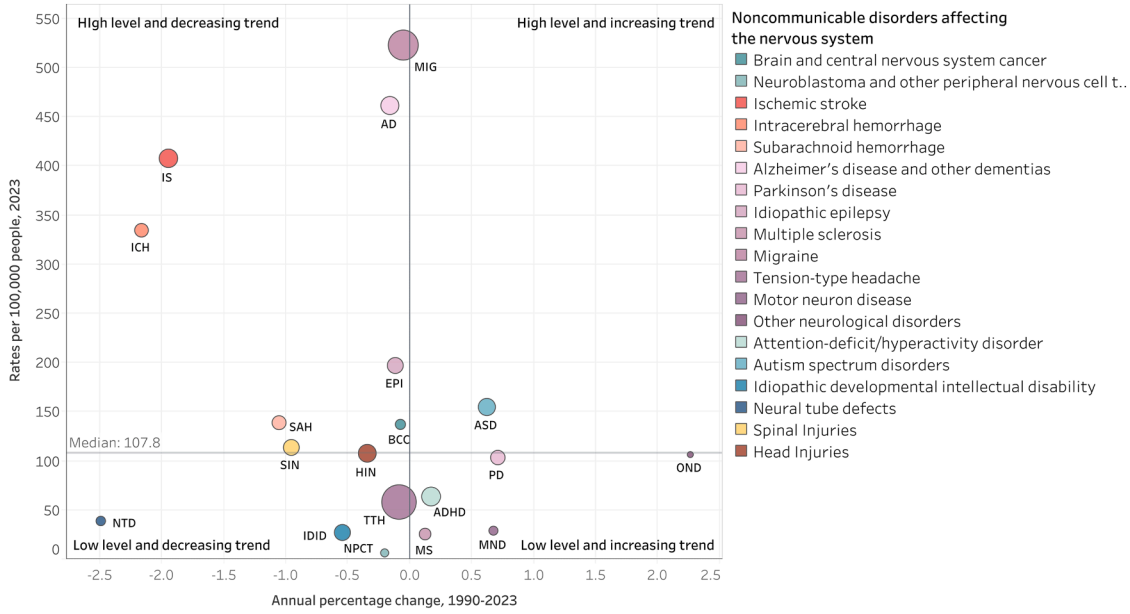


Fig. 1: Age-standardised DALY rates per 100,000 people from noncommunicable conditions affecting the nervous system in 2023 against the annual percentage change (1990–2023) across specific conditions in the Americas. This two-dimensional scatter plot shows the DALY rates in 2023 on the Y-axis and the annual percentage change (APC) from 1990 to 2023 on the X-axis. The circles represent the 19 noncommunicable neurological conditions, whose size is graduated by the number of prevalent cases. The individual conditions are colour-coded, and the colour legend is shown on the right side of the chart. The horizontal line shows the median DALY rate, and the vertical line represents the APC equal to zero, distinguishing four quadrants: 1) high level and decreasing trend, 2) high level and increasing trend, 3) low level and decreasing trend, and 4) low level and increasing trend.

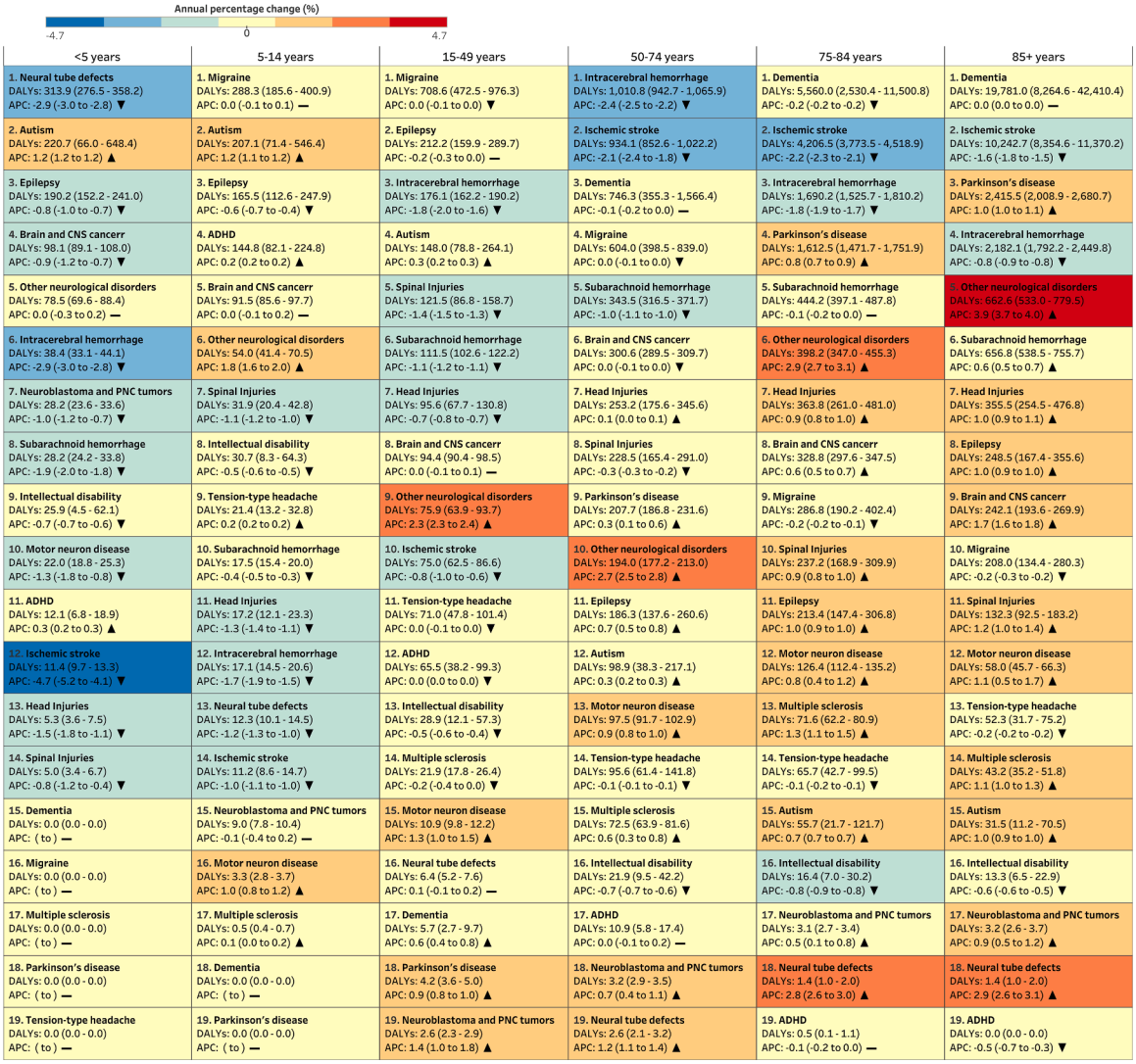
exceeding 302·7 DALYs per 100,000 population in 2023. In Caribbean countries, ischaemic stroke and intracerebral haemorrhage ranked first and second, with rates exceeding 460·6 per 100,000 population. Idiopathic epilepsy ranked fifth regionally but was lower (ninth) in Argentina, Canada, and Cuba. ADHD-related DALY rates were higher in several Caribbean countries compared to the regional average, whereas autism spectrum disorder rates were generally lower. Sex-specific rankings are presented in Supplementary Figure S6.

From 1990 to 2023, declines in age-standardised DALY rates from all NINSDs combined across regions and countries coincided with declines in age-standardised DALY rates for ischaemic stroke, intracerebral haemorrhage, subarachnoid haemorrhage, Alzheimer's disease and other dementias, idiopathic epilepsy, idiopathic developmental intellectual disability, and neural tube defects. These conditions showed decreasing trends (APC <0) in at least 32 countries (Supplementary Figure S7). Conversely, increasing trends were observed for motor neuron disease, multiple sclerosis, Parkinson's disease, brain and central nervous system cancers, and neuroblastoma and other peripheral nervous system tumours. Motor neuron disease showed the steepest increases (APC >4%) in most countries, although its burden level remained relatively low (5–38 DALYs per 100,000 population) in 2023.

Burden attributable to risk factors

The NINSDs with greatest contribution to attributable burden regionally were ischaemic stroke (84·2% [76·7–90·7]), intracerebral haemorrhage (73·4% [64·3–80·8]), subarachnoid haemorrhage (63·3% [51·8–73·6]), and idiopathic developmental intellectual disability (53·8% [25·9–73·6]) (Supplementary Table S1, Appendix p 18). Metabolic risks accounted for the largest share of NINSD-related attributable DALYs. For example, high systolic blood pressure was the leading contributor to DALYs from ischaemic stroke (55·9% [39·7–68·6]), intracerebral haemorrhage (55·6% [39·8–68·6]), and subarachnoid haemorrhage (51·1% [35·7–64·2]) (Fig. 5). High LDL cholesterol accounted for 29·8% (10·8–48·1) of ischaemic stroke DALYs. High fasting plasma glucose contributed substantially to Alzheimer's disease and other dementias (19·7% [14·9–26·1]).

Lead exposure was strongly associated with DALYs from idiopathic intellectual disability (55·1% [27·0–75·0]). High body mass index and tobacco use contributed to increased DALYs for stroke subtypes and Alzheimer's disease and dementia, while tobacco was also associated with multiple sclerosis and alcohol use with idiopathic epilepsy.



<5 years	5-14 years	15-49 years	50-74 years	75-84 years	85+ years
1. Neural tube defects DALYs: 313.9 (276.5 - 358.2) APC: -2.9 (-3.0 to -2.8) ▼	1. Migraine DALYs: 288.3 (185.6 - 400.9) APC: 0.0 (-0.1 to 0.1) —	1. Migraine DALYs: 708.6 (472.5 - 976.3) APC: 0.0 (-0.1 to 0.0) ▼	1. Intracerebral hemorrhage DALYs: 1,010.8 (942.7 - 1,065.9) APC: -2.4 (-2.5 to -2.2) ▼	1. Dementia DALYs: 5,560.0 (2,530.4 - 11,500.8) APC: -0.2 (-0.2 to -0.2) ▼	1. Dementia DALYs: 19,781.0 (8,264.6 - 42,410.4) APC: 0.0 (0.0 to 0.0) —
2. Autism DALYs: 220.7 (66.0 - 648.4) APC: 1.2 (1.2 to 1.2) ▲	2. Autism DALYs: 207.1 (71.4 - 546.4) APC: 1.2 (1.1 to 1.2) ▲	2. Epilepsy DALYs: 212.2 (159.9 - 289.7) APC: -0.2 (-0.3 to 0.0) —	2. Ischemic stroke DALYs: 934.1 (852.6 - 1,022.2) APC: -2.1 (-2.4 to -1.8) ▼	2. Ischemic stroke DALYs: 4,206.5 (3,773.5 - 4,518.9) APC: -2.2 (-2.3 to -2.1) ▼	2. Ischemic stroke DALYs: 10,242.7 (8,354.6 - 11,370.2) APC: -1.6 (-1.8 to -1.5) ▼
3. Epilepsy DALYs: 190.2 (152.2 - 241.0) APC: -0.8 (-1.0 to -0.7) ▼	3. Epilepsy DALYs: 165.5 (112.6 - 247.9) APC: -0.6 (-0.7 to -0.4) ▼	3. Intracerebral hemorrhage DALYs: 176.1 (162.2 - 190.2) APC: -1.8 (-2.0 to -1.6) ▼	3. Dementia DALYs: 746.3 (355.3 - 1,566.4) APC: -0.1 (-0.2 to 0.0) —	3. Intracerebral hemorrhage DALYs: 1,690.2 (1,525.7 - 1,810.2) APC: -1.8 (-1.9 to -1.7) ▼	3. Parkinson's disease DALYs: 2,415.5 (2,008.9 - 2,680.7) APC: 1.0 (1.0 to 1.1) ▲
4. Brain and CNS cancerr DALYs: 98.1 (89.1 - 108.0) APC: -0.9 (-1.2 to -0.7) ▼	4. ADHD DALYs: 144.8 (82.1 - 224.8) APC: 0.2 (0.2 to 0.2) ▲	4. Autism DALYs: 148.0 (78.8 - 264.1) APC: 0.3 (0.2 to 0.3) ▲	4. Migraine DALYs: 604.0 (398.5 - 839.0) APC: 0.0 (-0.1 to 0.0) ▼	4. Parkinson's disease DALYs: 1,612.5 (1,471.7 - 1,751.9) APC: 0.8 (0.7 to 0.9) ▲	4. Intracerebral hemorrhage DALYs: 2,182.1 (1,792.2 - 2,449.8) APC: -0.8 (-0.9 to -0.8) ▼
5. Other neurological disorders DALYs: 78.5 (69.6 - 88.4) APC: 0.0 (-0.3 to 0.2) —	5. Brain and CNS cancerr DALYs: 91.5 (85.6 - 97.7) APC: 0.0 (-0.1 to 0.2) —	5. Spinal Injuries DALYs: 121.5 (86.8 - 158.7) APC: -1.4 (-1.5 to -1.3) ▼	5. Subarachnoid hemorrhage DALYs: 343.5 (316.5 - 371.7) APC: -1.0 (-1.1 to -1.0) ▼	5. Subarachnoid hemorrhage DALYs: 444.2 (397.1 - 487.8) APC: -0.1 (-0.2 to 0.0) —	5. Other neurological disorders DALYs: 662.6 (533.0 - 779.5) APC: 3.9 (3.7 to 4.0) ▲
6. Intracerebral hemorrhage DALYs: 38.4 (33.1 - 44.1) APC: -2.9 (-3.0 to -2.8) ▼	6. Other neurological disorders DALYs: 54.0 (41.4 - 70.5) APC: 1.8 (1.6 to 2.0) ▲	6. Subarachnoid hemorrhage DALYs: 111.5 (102.6 - 122.2) APC: -1.1 (-1.2 to -1.1) ▼	6. Brain and CNS cancerr DALYs: 300.6 (289.5 - 309.7) APC: 0.0 (-0.1 to 0.0) ▼	6. Other neurological disorders DALYs: 398.2 (347.0 - 455.3) APC: 2.9 (2.7 to 3.1) ▲	6. Subarachnoid hemorrhage DALYs: 656.8 (538.5 - 755.7) APC: 0.6 (0.5 to 0.7) ▲
7. Neuroblastoma and PNC tumors DALYs: 28.2 (23.6 - 33.6) APC: -1.0 (-1.2 to -0.7) ▼	7. Spinal Injuries DALYs: 31.9 (20.4 - 42.8) APC: -1.1 (-1.2 to -1.0) ▼	7. Head Injuries DALYs: 95.6 (67.7 - 130.8) APC: -0.7 (-0.8 to -0.7) ▼	7. Head Injuries DALYs: 253.2 (175.6 - 345.6) APC: 0.1 (0.0 to 0.1) ▲	7. Head Injuries DALYs: 363.8 (261.0 - 481.0) APC: 0.9 (0.8 to 1.0) ▲	7. Head Injuries DALYs: 355.5 (254.5 - 476.8) APC: 1.0 (0.9 to 1.1) ▲
8. Subarachnoid hemorrhage DALYs: 28.2 (24.2 - 33.8) APC: -1.9 (-2.0 to -1.8) ▼	8. Intellectual disability DALYs: 30.7 (8.3 - 64.3) APC: -0.5 (-0.6 to -0.5) ▼	8. Brain and CNS cancerr DALYs: 94.4 (90.4 - 98.5) APC: 0.0 (-0.1 to 0.1) —	8. Spinal Injuries DALYs: 228.5 (165.4 - 291.0) APC: -0.3 (-0.3 to -0.2) ▼	8. Brain and CNS cancerr DALYs: 328.8 (297.6 - 347.5) APC: 0.6 (0.5 to 0.7) ▲	8. Epilepsy DALYs: 248.5 (167.4 - 355.6) APC: 1.0 (0.9 to 1.0) ▲
9. Intellectual disability DALYs: 25.9 (4.5 - 62.1) APC: -0.7 (-0.7 to -0.6) ▼	9. Tension-type headache DALYs: 21.4 (13.2 - 32.8) APC: 0.2 (0.2 to 0.2) ▲	9. Other neurological disorders DALYs: 75.9 (63.9 - 93.7) APC: 2.3 (2.3 to 2.4) ▲	9. Parkinson's disease DALYs: 207.7 (186.8 - 231.6) APC: 0.3 (0.1 to 0.6) ▲	9. Migraine DALYs: 286.8 (190.2 - 402.4) APC: -0.2 (-0.2 to -0.1) ▼	9. Brain and CNS cancerr DALYs: 242.1 (193.6 - 269.9) APC: 1.7 (1.6 to 1.8) ▲
10. Motor neuron disease DALYs: 22.0 (18.8 - 25.3) APC: -1.3 (-1.8 to -0.8) ▼	10. Subarachnoid hemorrhage DALYs: 17.5 (15.4 - 20.0) APC: -0.4 (-0.5 to -0.3) ▼	10. Ischemic stroke DALYs: 75.0 (62.5 - 86.6) APC: -0.8 (-1.0 to -0.6) ▼	10. Other neurological disorders DALYs: 194.0 (177.2 - 213.0) APC: 2.7 (2.5 to 2.8) ▲	10. Spinal Injuries DALYs: 237.2 (168.9 - 309.9) APC: 0.9 (0.8 to 1.0) ▲	10. Migraine DALYs: 208.0 (134.4 - 280.3) APC: -0.2 (-0.3 to -0.2) ▼
11. ADHD DALYs: 12.1 (6.8 - 18.9) APC: 0.3 (0.2 to 0.3) ▲	11. Head Injuries DALYs: 17.2 (12.1 - 23.3) APC: -1.3 (-1.4 to -1.1) ▼	11. Tension-type headache DALYs: 71.0 (47.8 - 101.4) APC: 0.0 (-0.1 to 0.0) ▼	11. Epilepsy DALYs: 186.3 (137.6 - 260.6) APC: 0.7 (0.5 to 0.8) ▲	11. Epilepsy DALYs: 213.4 (147.4 - 306.8) APC: 1.0 (0.9 to 1.0) ▲	11. Spinal Injuries DALYs: 132.3 (92.5 - 183.2) APC: 1.2 (1.0 to 1.4) ▲
12. Ischemic stroke DALYs: 11.4 (9.7 - 13.3) APC: -4.7 (-5.2 to -4.1) ▼	12. Intracerebral hemorrhage DALYs: 17.1 (14.5 - 20.6) APC: -1.7 (-1.9 to -1.5) ▼	12. ADHD DALYs: 65.5 (38.2 - 99.3) APC: 0.0 (0.0 to 0.0) ▼	12. Autism DALYs: 98.9 (38.3 - 217.1) APC: 0.3 (0.2 to 0.3) ▲	12. Motor neuron disease DALYs: 126.4 (112.4 - 135.2) APC: 0.8 (0.4 to 1.2) ▲	12. Motor neuron disease DALYs: 58.0 (45.7 - 66.3) APC: 1.1 (0.5 to 1.7) ▲
13. Head Injuries DALYs: 5.3 (3.6 - 7.5) APC: -1.5 (-1.8 to -1.1) ▼	13. Neural tube defects DALYs: 12.3 (10.1 - 14.5) APC: -1.2 (-1.3 to -1.0) ▼	13. Intellectual disability DALYs: 28.9 (12.1 - 57.3) APC: -0.5 (-0.6 to -0.4) ▼	13. Motor neuron disease DALYs: 97.5 (91.7 - 102.9) APC: 0.9 (0.8 to 1.0) ▲	13. Multiple sclerosis DALYs: 71.6 (62.2 - 80.9) APC: 1.3 (1.1 to 1.5) ▲	13. Tension-type headache DALYs: 52.3 (31.7 - 75.2) APC: -0.2 (-0.2 to -0.2) ▼
14. Spinal Injuries DALYs: 5.0 (3.4 - 6.7) APC: -0.8 (-1.2 to -0.4) ▼	14. Ischemic stroke DALYs: 11.2 (8.6 - 14.7) APC: -1.0 (-1.1 to -1.0) ▼	14. Multiple sclerosis DALYs: 21.9 (17.8 - 26.4) APC: -0.2 (-0.4 to 0.0) ▼	14. Tension-type headache DALYs: 95.6 (61.4 - 141.8) APC: -0.1 (-0.1 to -0.1) ▼	14. Tension-type headache DALYs: 65.7 (42.7 - 99.5) APC: -0.1 (-0.2 to -0.1) ▼	14. Multiple sclerosis DALYs: 43.2 (35.2 - 51.8) APC: 1.1 (1.0 to 1.3) ▲
15. Dementia DALYs: 0.0 (0.0 - 0.0) APC: (to) —	15. Neuroblastoma and PNC tumors DALYs: 9.0 (7.8 - 10.4) APC: -0.1 (-0.4 to 0.2) —	15. Motor neuron disease DALYs: 10.9 (9.8 - 12.2) APC: 1.3 (1.0 to 1.5) ▲	15. Multiple sclerosis DALYs: 72.5 (63.9 - 81.6) APC: 0.6 (0.3 to 0.8) ▲	15. Autism DALYs: 55.7 (21.7 - 121.7) APC: 0.7 (0.7 to 0.7) ▲	15. Autism DALYs: 31.5 (11.2 - 70.5) APC: 1.0 (0.9 to 1.0) ▲
16. Migraine DALYs: 0.0 (0.0 - 0.0) APC: (to) —	16. Motor neuron disease DALYs: 3.3 (2.8 - 3.7) APC: 1.0 (0.8 to 1.2) ▲	16. Neural tube defects DALYs: 6.4 (5.2 - 7.6) APC: 0.1 (-0.1 to 0.2) —	16. Intellectual disability DALYs: 21.9 (9.5 - 42.2) APC: -0.7 (-0.7 to -0.6) ▼	16. Intellectual disability DALYs: 16.4 (7.0 - 30.2) APC: -0.8 (-0.9 to -0.8) ▼	16. Intellectual disability DALYs: 13.3 (6.5 - 22.9) APC: -0.6 (-0.6 to -0.5) ▼
17. Multiple sclerosis DALYs: 0.0 (0.0 - 0.0) APC: (to) —	17. Multiple sclerosis DALYs: 0.5 (0.4 - 0.7) APC: 0.1 (0.0 to 0.2) ▲	17. Dementia DALYs: 5.7 (2.7 - 9.7) APC: 0.6 (0.4 to 0.8) ▲	17. ADHD DALYs: 10.9 (5.8 - 17.4) APC: 0.0 (-0.1 to 0.2) —	17. Neuroblastoma and PNC tumors DALYs: 3.1 (2.7 - 3.4) APC: 0.5 (0.1 to 0.8) ▲	17. Neuroblastoma and PNC tumors DALYs: 3.2 (2.6 - 3.7) APC: 0.9 (0.5 to 1.2) ▲
18. Parkinson's disease DALYs: 0.0 (0.0 - 0.0) APC: (to) —	18. Dementia DALYs: 0.0 (0.0 - 0.0) APC: (to) —	18. Parkinson's disease DALYs: 4.2 (3.6 - 5.0) APC: 0.9 (0.8 to 1.0) ▲	18. Neuroblastoma and PNC tumors DALYs: 3.2 (2.9 - 3.5) APC: 0.7 (0.4 to 1.1) ▲	18. Neural tube defects DALYs: 1.4 (1.0 - 2.0) APC: 2.8 (2.6 to 3.0) ▲	18. Neural tube defects DALYs: 1.4 (1.0 - 2.0) APC: 2.9 (2.6 to 3.1) ▲
19. Tension-type headache DALYs: 0.0 (0.0 - 0.0) APC: (to) —	19. Parkinson's disease DALYs: 0.0 (0.0 - 0.0) APC: (to) —	19. Neuroblastoma and PNC tumors DALYs: 2.6 (2.3 - 2.9) APC: 1.4 (1.0 to 1.8) ▲	19. Neural tube defects DALYs: 2.6 (2.1 - 3.2) APC: 1.2 (1.1 to 1.4) ▲	19. ADHD DALYs: 0.5 (0.1 - 1.1) APC: -0.1 (-0.2 to 0.0) —	19. ADHD DALYs: 0.0 (0.0 - 0.0) APC: -0.5 (-0.7 to -0.3) ▼

Fig. 2: Ranking of noncommunicable disorders affecting the nervous system by DALY rate per 100,000 population in 2023 across age and their corresponding annual percentage change (1990–2023) in the Region of the Americas, 2023. Label presents DALY rates in 2023 and the annual percentage change (APC) from 1990 to 2023 (and 95% uncertainty interval). The cells are colour-coded according to the APC value as reflected in the legend, and the symbol represents: ▲ increasing trend, ▼ decreasing trends, and ▬ stable/no change.

Discussion

This analysis provides a comprehensive assessment of the burden of NINSDs in the Americas over more than three decades and yields important implications for health systems and policy. NINSDs are major contributor to health loss in the region, affecting nearly two in five people and accounting for 12% of total NCD- and injury-related DALYs in 2023. Although the absolute number of cases, deaths and DALYs increased between 1990 and 2023, age-standardised rates declined, reflecting demographic changes alongside improvements in population health.[36] The burden remains highly heterogeneous across conditions, with diverging epidemiological trajectories that indicate a transition from premature mortality towards chronic neurological disability. While age-standardised DALY rates declined for several vascular and congenital conditions, migraine, Alzheimer's disease and other dementias, ischaemic stroke, and intracerebral haemorrhage remained the leading contributors to NINSD burden, consistent with previous reports.[37] Sustained increases were observed for several neurodevelopmental and neurodegenerative disorders, including autism spectrum disorders, Parkinson's disease, multiple sclerosis, ADHD, and motor neuron disease. These trends highlight a growing mismatch between health systems

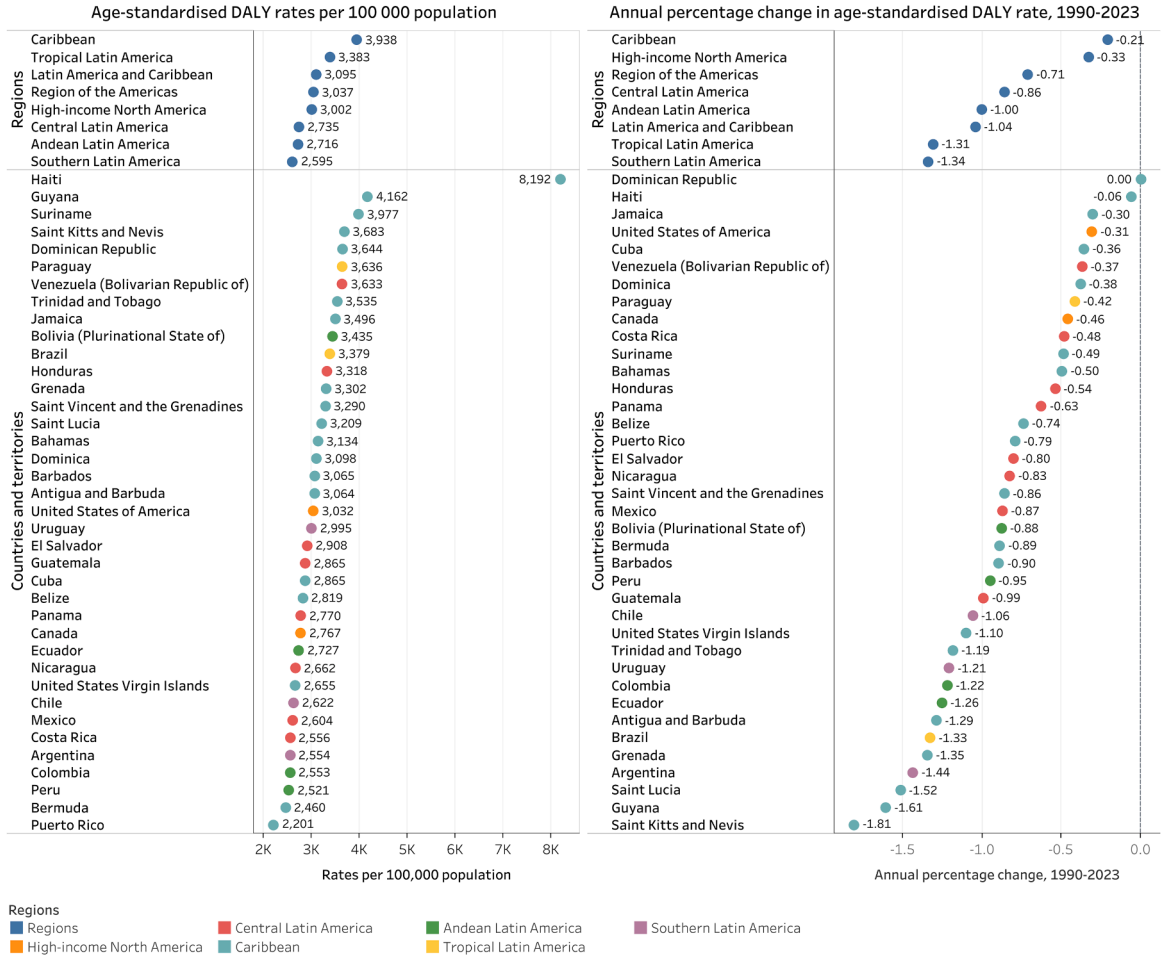


Fig. 3: Age-standardised DALY rates per 100,000 population from all neurological conditions combined in 2023 and the annual percentage change from 1990 to 2023 across regions and countries of the Americas. Each dot is colour-coded by region. The vertical black line represents APC equal to zero, distinguishing decreasing trends on the left side and increasing trends on the right side of the line.

historically oriented towards acute care and mortality reduction and the increasing demand for long-term management of chronic neurological conditions. Many of these disorders require early diagnosis, long-term treatment, rehabilitation, and social support, yet services across the region remain fragmented, constrained by workforce shortages and limited capacity beyond acute care. Together, these findings underscore the growing need for health system to complement acute neurological care with long-term management, rehabilitation, and social support.

Substantial reductions in DALY rates from neural tube defects, ischaemic stroke and intracerebral haemorrhage, consistent with other reports,[24,38] likely reflect the impact of public health interventions such as folic acid supplementation during pregnancy,[39] hypertension control,[24] and improved stroke management. These successes suggest that sustained public health action can reduce neurological burden.[40]

The NINSD burden follows a pronounced life-course pattern, with different conditions dominating at successive stages of life. In children younger than 5 years, the neural tube defects, autism spectrum disorders, and idiopathic epilepsy accounted for the largest burden, consistent with global patterns but at lower magnitude,[1] exemplified by neural tube defects DALY rates in the Americas being half the global average (313·9 [276·5–358·2] vs 722·6 [580·8–899·4] per 100,000 population). The marked decline in neural tube defects (–2·9% [–3·0 to –2·8] per year) supports the effectiveness of folic acid supplementation policies,[39] whereas increasing burden from autism spectrum disorders highlights growing needs for maternal, prenatal, and early childhood health services.

During late childhood and adolescence, the persistence of neurodevelopmental disorders alongside the emergence of migraine signals a transition towards chronic, non-fatal conditions, with patterns similar in

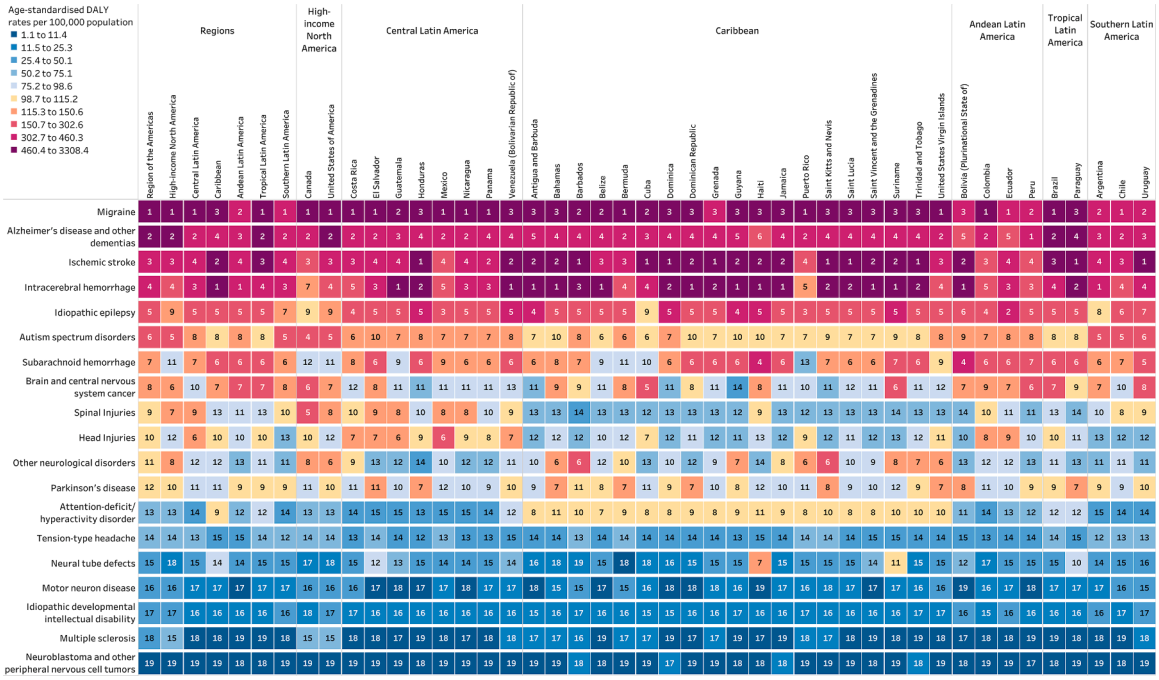


Fig. 4: Ranking of noncommunicable conditions affecting the nervous system by age-standardised DALY rates across GBD regions and countries of the Americas in 2023. Specific conditions are ordered by regional ranking from the highest to the lowest age-standardised DALY rates. Cells are colour-coded by decile interval of the age-standardised DALY rates per 100,000 population. DALY = disability-adjusted life years. GBD = Global Burden of Diseases, Injury, and Risk Factors.

magnitude to those observed globally.[1] Those conditions affects education and highlights the need for early diagnosis, specialised services, and multidisciplinary care, particularly for autism, requiring closer integration of health, education, and social support systems to mitigate long-term educational, social, and economic disadvantage. In late adolescence and mid-adulthood (15–49 years), the high burden of migraine, idiopathic epilepsy, and intracerebral haemorrhage reflects the convergence of chronic neurological disorders with early expression of vascular risk. Migraine and epilepsy contribute substantial disability during the most socially and economically productive years, with implications for education, employment, and quality of life.[41] This burden is especially pronounced in regions with greater disparities in health care access, treatment opportunities, and drug availability.[42] Contributing factors include the shortage of neurologists and insufficient training of primary care physicians in the diagnosis and management of headache disorders.[43] The prominence of intracerebral haemorrhage in this age group is concerning, pointing to premature exposure to modifiable risks—particularly high blood pressure and harmful alcohol use—and missed opportunities for early prevention.

In adults aged 50 years and older, the burden increasingly shifted towards stroke, Alzheimer's disease and other dementias, and Parkinson's disease. This pattern reflects the cumulative effects of vascular risk factors, population ageing, and longer survival with disability, highlighting the importance of effective risk-factor control, rehabilitation, long-term care, and social support systems, particularly in ageing populations.[44]

Beyond these life-course patterns, marked sex differences were observed across several conditions, with higher DALY rates among women for migraine, dementias, and subarachnoid haemorrhage, and among men for ischaemic stroke and intracerebral haemorrhage, consistent with previous analyses.[1] These findings highlight the importance of sex- and age-responsive approaches that combine prevention, treatment, rehabilitation, and long-term support across the life course.

Besides these age-specific patterns, the burden of NCNDs was unevenly distributed across the Americas, with the highest burden concentrated in Caribbean and Tropical Latin American countries. These disparities are consistent with differences in socioeconomic conditions, risk factor exposure, and access to prevention and care. High exposure to metabolic risks, mainly hypertension,[45,46] obesity,[47] high fasting plasma glucose,[48] alongside persistent gaps in primary prevention and stroke care,[49,50] likely contribute to the disproportionate burden observed in these settings. Reducing these disparities will require strengthening primary

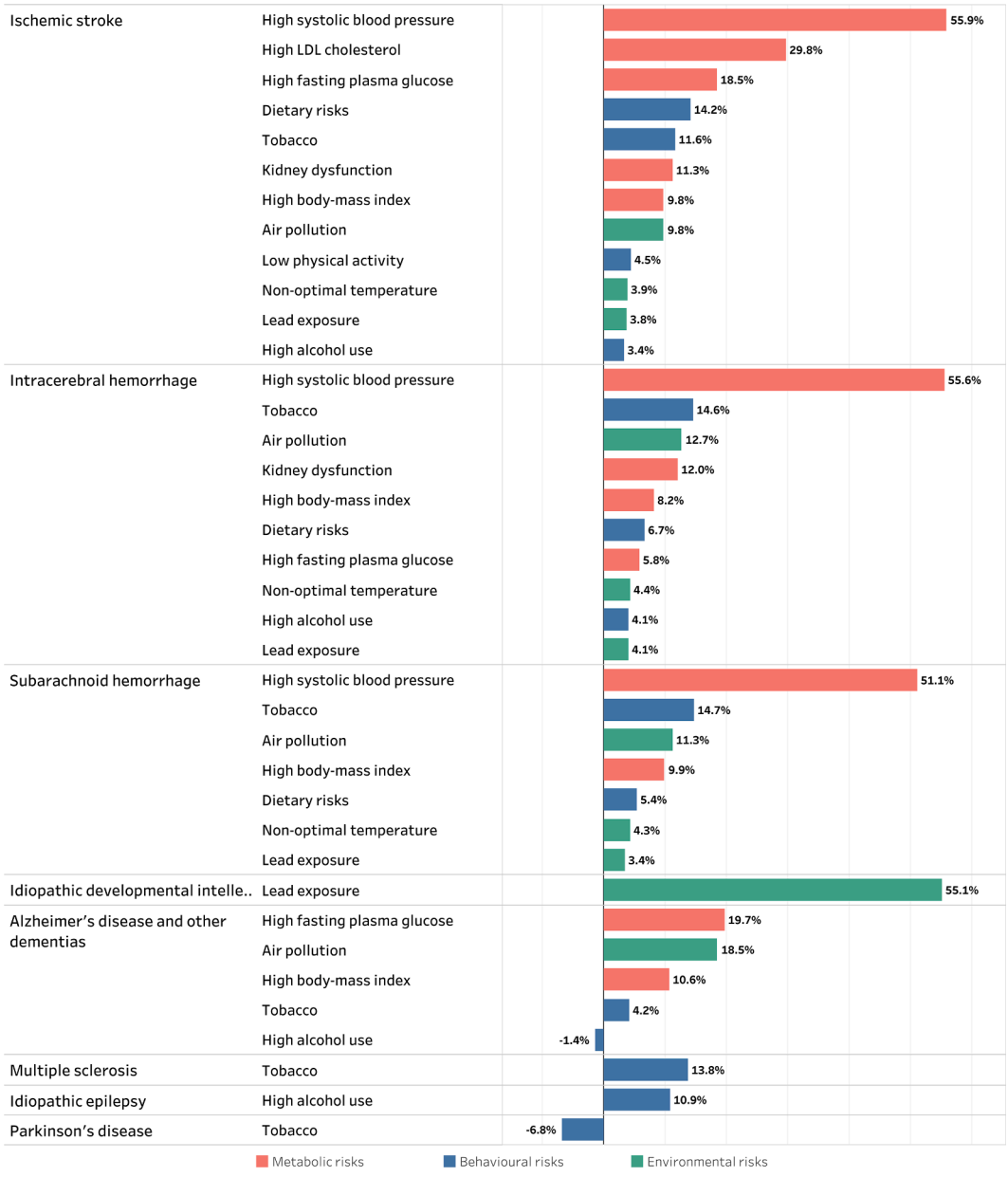


Fig. 5: Proportion of DALYs from specific neurological conditions attributable to risk factors in the Region of the Americas, 2023. Bars show the estimated population attributable fraction (PAF) expressed as a percentage, which is also presented in labels. Risk factors are colour-coded according to the GBD Level 1 risk factor clusters: Environmental risks, Behavioural risks, and Metabolic risks. GBD = Global Burden of Disease Study.

health care, improving access to essential medicines and technologies, and expanding capacity for neurological preventions, treatment, and care.[49,50]

In many middle-income settings, inequities in neurological outcomes are compounded by a well-documented shortage of trained health-care professionals,[43] alongside insufficiently trained primary-care physicians.[51] Interventions that could address these factors include strengthening training programs focused on neurological disorders, promoting access to specialised neurological care in remote areas, and advocating for initiatives that ensure the availability and affordability of essential neurological medications, particularly in low-income settings.[52,53] Telehealth and teleneurology provide important opportunities to extend specialist input through remote consultation, mentorship, and collaborative care between frontline teams and specialists.[54] Strengthening

primary health care systems—particularly through integrated, team-based models of care—together with improved access to essential medicine and technologies will be essential to improve detection and control of hypertension, diabetes, and hyperlipidaemia. Regional initiatives such as the HEARTS in the Americas,[55] and the Better Care for NCDs provide a scalable framework to address these gaps.

The observed geographical disparities are mirrored by substantial variation in exposure to modifiable risk factors. Across the Americas, a large proportion of the NINSD burden is attributable to modifiable risk factors, highlighting important opportunities for population-level and health-system interventions. Consistent with previous studies,[1,26] nearly four-fifths of stroke-related DALYs were attributable to identified risk factors, with high systolic blood pressure representing the dominant contributor across all major stroke subtypes. Persistently low levels of hypertension detection, treatment, and control across the Americas highlight substantial opportunities for prevention through population-based and primary-care interventions.[45]

Moreover, cardiometabolic and behavioural risks contributed substantially to the high burden of other NINSDs. Reducing exposure to high fasting plasma glucose, elevated body-mass index, air pollution, and tobacco use is estimated to account for up to 40% of the burden of Alzheimer's disease and other dementias under theoretical minimum-risk exposure scenarios, while eliminating tobacco use and harmful alcohol consumption could reduce DALYs from multiple sclerosis and idiopathic epilepsy, respectively. These findings reinforce the importance of integrated prevention strategies targeting cardio-renal-metabolic risks alongside effective tobacco and alcohol control policies. Environmental exposures also remain critical. Nearly 60% of the burden of idiopathic intellectual disability was attributable to lead exposure, underscoring the need to enforce environmental regulations, remediate legacy contamination, and prevent ongoing industrial pollution.

Altogether, these key findings support three priority areas: (1) integration of neurological care into primary health systems, (2) expansion of rehabilitation and long-term care capacity, and (3) scaling population-level interventions targeting cardiometabolic risk factors. Implementation of the WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2023–2030[12] provides a timely framework for integrating neurological health into broader NCD prevention and control strategies. Strengthening regional surveillance and targeted interventions can accelerate progress towards reducing the avoidable neurological disease burden in the Americas.

The findings of this study should be interpreted considering several limitations. Estimates are subject to uncertainty arising from differences in the availability, completeness, and quality of underlying data sources across countries and territories, which may affect the precision of country-specific estimates. Some conditions may be underdiagnosed or misclassified, leading to potential underestimation of burden. In addition, GBD 2023 does not provide estimates disaggregated by ethnicity or other population subgroups within countries, limiting the assessment of health inequities among historically underserved populations. Although COVID-19 deaths are classified separately from NINSD deaths in the GBD framework, the indirect effects of the pandemic on neurological disease diagnosis, care, and survival, cannot be fully disentangled from observed temporal trends. Estimates of risk-attributable burden are based on modelled counterfactual scenarios and available risk–outcome pairs and may not capture all relevant exposures or interactions. The combined prevalence of NINSDs was estimated using an independence-based approximation rather than joint comorbidity-adjusted draws, which may overestimate or underestimate prevalence where conditions co-occur. Finally, uncertainty intervals for APC estimates were derived from bootstrap resampling of annual point estimates and did not fully propagate uncertainty from the GBD posterior draws.

In conclusion, NINSDs impose a large, evolving, and increasingly disability-driven burden across the Americas. Population growth and ageing are driving increases in absolute health loss, while epidemiological shifts towards chronic, disabling neurological conditions are placing growing demands on health systems. Persistent geographical disparities, distinct life-course patterns, and the substantial contribution of modifiable risk factors underscore the need for integrated, equitable, and sustained strategies spanning prevention, early detection, treatment, rehabilitation, and long-term care. Strengthening neurological health within broader noncommunicable disease and primary healthcare agendas will be essential to reduce avoidable disability and improve population health across the Americas.

Contributors

ROS, KTT, and RM conceived the idea of the study. RM prepared the datasets, conducted the data analyses, and prepared the results, tables, and figures. RM, KTT, and WMG have access to and verified the underlying data. RM and KTT drafted the manuscript with contributions from LFA, WMG, and FJV. The manuscript was critically reviewed by ROS and AJMH. All authors contributed important intellectual content to the study and the manuscript. RM and KTT contributed equally as the first authors. AJMH and ROS contributed equally as senior authors. All authors have full access to the data, accept accountability for the overall work, read and approved the final version of the manuscript. The corresponding author has the final responsibility for submitting the manuscript for publication.

Data sharing statement

All GBD data used in this study are publicly available through the GBD Results Tool (https://vizhub.healthdata.org/gbd-results/) and the GBD Compare tool (https://vizhub.healthdata.org/gbd-compare/). In

addition, all data input sources used by GBD to produce GBD 2023 estimates are publicly available via the GBD 2023 Sources (https://sources.healthdata.org/collection/sources-2023). All results generated by this study are included in this paper and the Appendix (pp 18–27).

Declaration of interests

RM, AJMH, and ROS are staff members of the Pan American Health Organization. The authors alone are responsible for the views expressed in this publication, and they do not necessarily represent the decisions or policies of the Pan American Health Organization. KTT was an external consultant from the Pan America Health Organization. There is not any additional conflict of interest to declare.

Acknowledgements

This study used estimates from the Global Burden of Disease Study and it was conducted according to the GBD Protocol. We acknowledge the support of the GBD Secretariat and the Institute for Health Metrics and Evaluation (IHME) for facilitating access to the GBD 2023 estimates.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lana.2026.101581.

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