

The Burden of Mental Disorders in the Region of the Americas, 2018



Pan American
Health
Organization



World Health
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REGIONAL OFFICE FOR THE
Americas

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Contents

Foreword	vii
Acknowledgments	viii
List of acronyms	ix
Main findings	x
Introduction	1
Disease burden distribution in the Americas	3
Regional disability and mortality: disability-adjusted life years (DALYs)	4
Regional disability: years lived with disability (YLDs)	4
Country-level analysis	5
Country-level disability and mortality (DALYs)	7
Country-level disability (YLDs)	7
Common mental disorders	11
Disability resulting from specific disorders	11
Depressive disorders	12
Anxiety disorders	13
Self-harm and suicide	14
Somatoform disorders/persistent somatoform pain disorder	15
Severe mental disorders	17
Schizophrenia	17
Bipolar disorders	17
Substance use and eating disorders	18
Disorders due to use of alcohol	18
Disorders due to substance use (not alcohol)	19
Eating disorders	20
Disorders with onset usually occurring in childhood and adolescence	21
Neurological disorders	22
Neurocognitive disorders	22
Epilepsy	22
Migraine and tension-type headaches	23
Health system response in the Americas: Government funding for mental health services	25
Mental health spending as a percentage of government health spending	26
Mental health spending allocation	27
Conclusion	31
References	33
Annex 1. Non-Latin Caribbean Subregion Countries and Population	35

List of Figures

Figure 1: Regional disability-adjusted life years (DALYs) distribution tree map (%)	4
Figure 2: Ranked mental, neurological, disorders due to substance use, and suicide DALYs	5
Figure 3: Regional years lived with disability (YLD) distribution (%)	6
Figure 4: Ranked mental, neurological, disorders due to substance use, and suicide years lived with disability (YLDs)	6
Figure 5: Population distribution of the countries in the Americas	7
Figure 6: Disability-adjusted life years (DALYs) distribution by country (%)	8
Figure 7: Years lived with disability (YLDs) by country (% of total YLDs)	9
Figure 8: Mental, neurological, disorders due to substance use and suicide disability tree map (YLDs by country as a percentage of total disability)	10
Figure 9: Depressive disorder disability tree map (YLDs by country as a percentage of total disability)	12
Figure 10: Depressive disorder: years lived with disability by age groups (total of YLDs)	13
Figure 11: Anxiety disorders disability tree map (YLDs by country as a percentage of total disability)	14
Figure 12: Suicide and self-harm burden tree map (DALYs by country as a percentage of total disability)	15
Figure 13: Total years of life lost by age group	16
Figure 14: Schizophrenia disability tree map (YLDs by country as a percentage of total disability)	18
Figure 15: Bipolar affective disorder disability tree map (YLDs by country as a percentage of total disability)	19
Figure 16: Disorders due to use of alcohol disability tree map (YLDs by country as a percentage of total disability)	20
Figure 17: Disorders due to substance use (not alcohol) disability tree map (YLDs by country as a percentage of total disability)	21
Figure 18: Disorders with onset usually occurring in childhood and adolescence disability tree map	22
Figure 19: Dementia disability tree map	23
Figure 20: Epilepsy disability tree map	24
Figure 21: Mental health spending vs. per-capita GDP (PPP)	27
Figure 22: Ratio of % of total DALYs attributable to MNSS to % of health spending allocated to mental health, ordered from smallest to largest	28
Figure 23: MNSS spending allocated to mental hospitals vs. GDP (PPP)	29
Figure 24: Imbalance in spending: ratio of MNSS burden to efficiently allocated spending	30

Foreword

This report aims to improve the assessment of mental health needs in the Americas by providing an updated and nuanced picture of: (a) the disability resulting from mental, substance use, and specific neurological disorders, plus self-harm, alone and in combination with premature mortality; (b) the imbalance between mental health spending and its related disease burden; and (c) the inadequate allocation of the meager mental health spending by countries of the Region.

Consistent with global trends, the epidemiologic transition in the Americas has resulted in a shift from communicable diseases, nutritional deficiencies, and maternal and child health conditions being the major causes of ill health and death, to noncommunicable diseases, which are responsible for increasingly higher levels of disability and premature mortality. A substantial proportion of the health problems in the Americas also arise from mental, neurological, and substance use disorders. Data show that people with mental disorders have high levels of disability as well as high mortality rates.

The Global Burden of Disease (GBD) approach is a systematic, scientific process to quantify the comparative magnitude of health lost due to diseases, injuries, and risk factors by age, sex and geography, for specific time periods. The GBD has had a profound impact on health policy as it is able to reveal the hidden burden of mental illness around the world.

The Burden of Mental Disorders in the Region of Americas, 2018 documents the latest available estimates of the burden of these conditions at the regional level. The data also reveal the consequences of these disorders in terms of lost health. Furthermore, this report provides data that demonstrate the limited resources within countries to adequately meet mental health needs, while underlining the often inequitable distribution and inefficient uses of such resources.

This report seeks to inform governments, civil society, and other stakeholders, and in so doing, raise the level of awareness about mental disorders in the Region, so as to mobilize political will and the necessary resources to combat mental, neurological, and substance use disorders and suicide in the Americas.

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The Mental Health and Substance Use Unit of the Pan American Health Organization (PAHO/WHO) wishes to express its sincere thanks to all who diligently collaborated during the development and implementation of this research. This assessment of mental health needs in the Americas takes into account information from various sources concerning the burden related to mental, neurological, substance use, and suicide as well as government spending. This report would not have been possible without these contributions.

Dr. Daniel Vigo (Centre for Applied Research in Mental Health and Addictions, Simon Fraser University; Department of Global Health and Social Medicine, Harvard Medical School) was responsible for collecting and analyzing data and was the principal author of the text.

Mrs. Dévora Kestel (PAHO) coordinated the production of this report, supervised its content, and was responsible for writing sections of the text.

Dr. Anselm Hennis (PAHO) contributed to the review process of the report.

Dr. Jorge Rodriguez (Consultant) and Dr. Wendel Abel (University of the West Indies) provided valuable peer review comments.

Dr. Matías Irarrázaval (PAHO) participated in the review process of the report and was responsible for writing some sections of the text along with Drs. Andrea Bruni (PAHO), Claudina Cayetano (PAHO), and Carmen Martinez (PAHO).

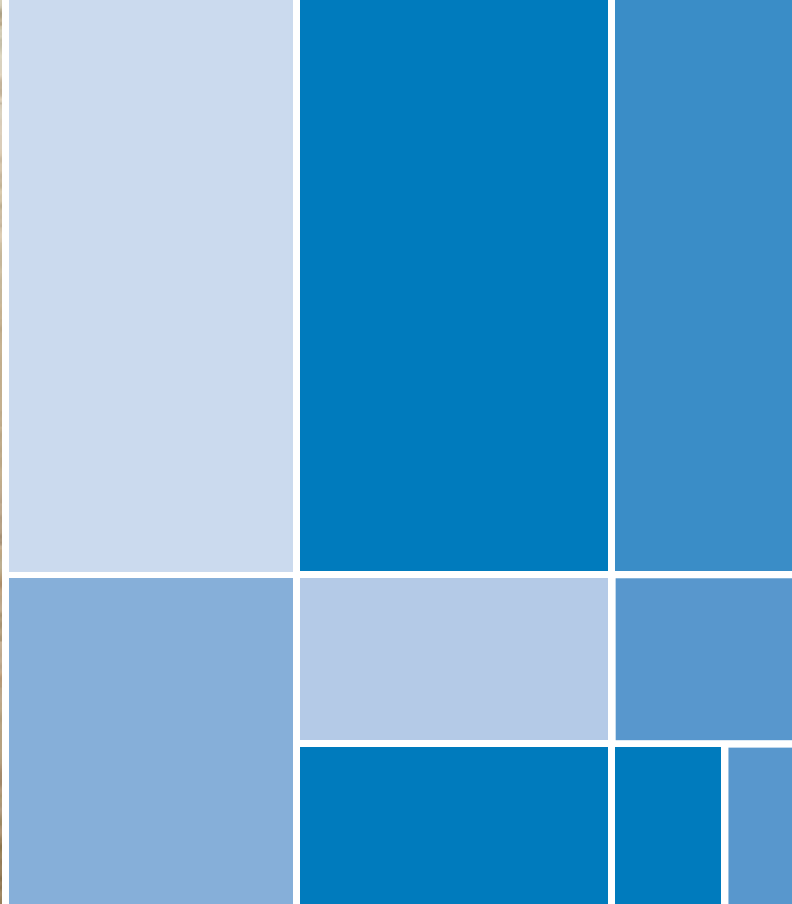
Drs. Arthur Kleinman, Graham Thornicroft, Rifat Atun, and Anne Becker provided invaluable input to the principal author of this report.

List of Acronyms

DALYs	Disability-adjusted life years
DSM	Diagnostic and Statistical Manual of Mental Disorders
GBD	Global Burden of Disease
GDP	Gross domestic product
ICD	International Classification of Diseases
LAMICS	Low- and middle-income countries
mhGAP	Mental Health Gap Action Programme
MNSS	Mental, neurological, substance use, and suicide
NCDs	Noncommunicable diseases
PAHO	Pan American Health Organization
PPP	Purchasing power parity
WHO	World Health Organization
WHO-AIMS	World Health Organization Assessment Instrument for Mental Health Systems
YLDs	Years lived with disability
YLLs	Years of life lost

Main Findings

- Mental, substance use, and specific neurological disorders and suicide form a subgroup of diseases and conditions that are a major cause of disability and mortality, and give rise to a third of total years lived with disability (YLDs) and a fifth of total disability-adjusted life years (DALYs) in the Americas.
- Depressive disorders are the largest cause of disability alone, and combined with mortality, account for 3.4% of total DALYs and 7.8% of total YLDs.
- The second largest subset comprises anxiety disorders, with 2.1% and 4.9%, respectively, of total DALYs and YLDs. Self-harm and somatoform disorders with prominent pain account, respectively, for 1.6% of DALYs and 4.7% of YLDs.
- South America, in general, has higher proportions of disability due to common mental illness. Central America has a larger proportion of disability due to bipolar and childhood onset disorders, as well as due to epilepsy, than other subregions; and the USA and Canada suffer a high toll of disability from schizophrenia and dementia, as well as from devastating rates of opioid-use disorder.
- The health system's response to the challenge of mental illness shows a correlation with national income. Higher-income countries spend a larger share of their health budgets on mental health services, and appear to allocate their spending more efficiently, away from neuropsychiatric hospitals and based on integration of mental health into primary care and community-based resources. Conversely, lower-income settings seem to compound their lack of resources by allocating them to specialized neuropsychiatric hospitals instead of funding community-based mental health services.
- The imbalance between the percentage of the total burden caused by mental disorders, and the percentage of total health expenditures effectively allocated to mental health leads to the burden being three times the spending in the high-income countries to 435 times the spending in lowest-income country, with a regional median of 34.
- Despite the constraints affecting mental health budgets in the Americas, there is significant potential to make meaningful improvements, while prioritizing the funding of community-based mental health services.



Introduction

The global mental health field is rapidly evolving, particularly since the early 2000s, thanks to the collaboration of multilateral organizations, academic partners, patient and user advocates, and mental health workers. This joint effort yielded milestones such as the World Mental Health Report, the mhGAP program, the Lancet Global Mental Health series, the Mental Health Movement, and other initiatives that led to a better understanding of the disease burden of mental illness and of what the evidence-based response to it should be (1–3). Mental illness is increasingly acknowledged as a global health priority, and given its economic burden it is also beginning to be considered a global development priority (4–6). Ultimately, this emergent prioritization led to its inclusion in the Sustainable Development Goals and to a global consensus that the drive for universal health coverage should be inclusive of mental health and well-being (7,8).

The epidemiologic transition is transforming the world: global health needs used to be determined by communicable diseases and early mortality, whereas now they are largely

dominated by noncommunicable diseases (NCDs), multimorbidity, and survival with disability (9,10). Within this landscape, mental illness is proving to be a particularly complex challenge: despite its increasing visibility in the global health and development community, pervasive structural stigma, outdated frameworks and practices, and organizational fragmentation affect the ability to adequately assess, prioritize, invest in, and respond to mental illness in proportion to burden, in parity with physical health, and in keeping with effectiveness and cost-effectiveness evidence.

An adequate needs assessment is the cornerstone of prioritization, sound investment, and appropriate response, and traditional assessments of mental illness burden have methodological constraints that result in an underestimation of mental illness due mainly to five reasons: (i) the arbitrary separation between psychiatric and neurological disorders; (ii) the consideration of suicide and self-injurious behavior as a separate category outside mental illness; (iii) the conflation of painful somatoform disorders with musculoskeletal disorders; (iv) the exclusion of personality disorders; and (v) the inadequate consideration of the contribution of severe mental illness to mortality from associated causes.

Panel 1.

Tree mapping.

Throughout this report, tree maps will be used to convey multidimensional information in a single visualization. Tree maps display data through nested rectangles, with each rectangle having three dimensions: color, size, and position.

The difference in **colors** within each tree map indicates the four PAHO subregions (Latin America, the Non-Latin Caribbean, South America, and Canada and the United States). Figure 5 shows each subregion in a different color, but the other tree maps in this report will use different shades of the same color to identify the four subregions, from lightest to darkest.

The difference in **size** reflects the quantitative difference between each country. Figure 5 shows the difference in the number of people, while the other tree maps reflect the different magnitude of the disease burden for each country.

The **position** depends on the size, with the largest rectangles on the upper-left corner and the smallest in the lower-right corner. It is useful to see all countries with a similar size—hence a similar disease burden—clustered together in the same region of the tree map.

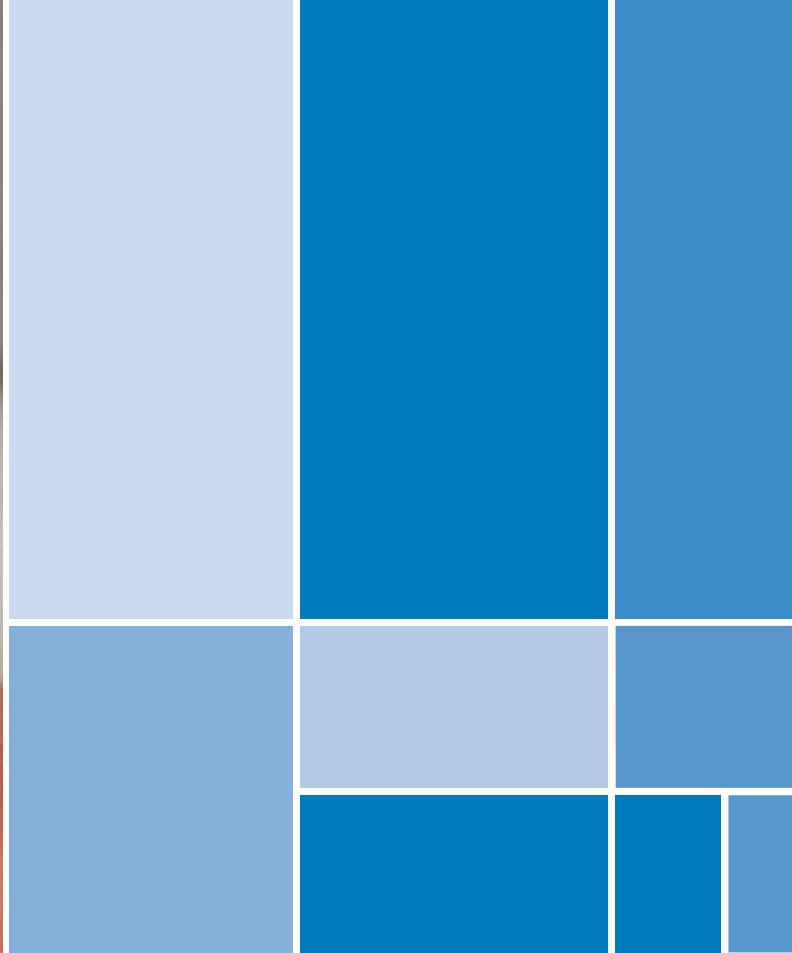
So, at a glance we can see which countries have the largest and the smallest disease burden, by the size of the rectangles; whether countries belong to the same subregion, hence of the same color; whether countries share a similar burden or not, if they are clustered or dispersed in the graph; and whether there are sub-regional gradients, indicated by the existence of well-defined color clusters.

Each tree map will have a color cue and a brief description of its dimensions and what they represent.

An additional caveat is the fact that the disease burden varies regionally and across time, so for burden estimations to be valid they need to be updated. It is a well-established fact that the disease burden profile differs between low-, middle-, and high-income countries; urban and rural populations; low- and high-income households; men and women; and across different age groups. Though it is not scientifically possible to address all these determinants simultaneously, each assessment of need must explicitly define its scope, and its validity limitations, both internal and external.

This report aims at improving the assessment of mental health needs in the Americas by providing an updated and nuanced picture of: (a) the disability resulting from mental, substance use, and specific neurological disorders, plus self-harm, alone and in combination with premature mortality; (b) the imbalance between mental health spending and its related disease burden; and (c) the inadequate allocation of the meager mental health spending. The goal is to present:

1. A regional population-level view of mental disorders in the context of an overall health perspective, understanding how the disease burden varies between subregions and from country to country, particularly in relation to the other NCDs; to the communicable, maternal, nutritional, and neonatal conditions; and to injuries.
2. A detailed analysis of the burden related to mental, neurological, substance use, and suicide (MNSS) at the continental level and by country, specifying the percentage of the total disease burden that is due to the different mental disorders in terms of disability and combined with premature mortality.
3. A mapping of how the most relevant mental disorders are distributed across the Americas, considering how the different countries and subregions are affected.
4. An analysis of how government spending in mental health varies across the Americas in relation to national income, with a focus on mental health spending as a fraction of total government health spending, and on the percentage of mental health spending allocated to psychiatric hospitals.
5. Finally, simple and intuitive metrics are proposed in order to best assess the gap between disease burden and effective government spending on mental health.



Disease burden distribution in the Americas

Since the publication in 1996 of the seminal work on the Global Burden of Disease (GBD), and through the sustained work by the World Health Organization and the Institute of Health Metrics and Evaluation, the disease burden metrics provide actionable, quantitative outcomes to measure and compare the disability and mortality that different illnesses impose upon individuals and communities (11–13). Estimating the local, national, and regional disease burden allows for rational disease prioritization, resource allocation, and health system planning—in conjunction with other criteria such as the broader social and economic burden, ethical considerations, and local resources or preferences.

In gathering and analyzing the data, it is important to understand the following three metrics:

Disability-adjusted life years (DALYs) provide a composite measure of the mortality and disability attributable to any given illness.

Years of life lost (YLLs) provide a measure of cause-specific mortality weighted by life expectancy at time of death.

Years lived with disability (YLDs) provide a measure of a disease’s prevalence weighted by its disabling impact.

We extracted 2015 disaggregated data (country-age-sex-specific absolute numbers, rates, and percentages) from the Global Health Data Exchange for all disease causes and countries in the Americas, and re-estimated the disease burden for MNSS following the framework described by Vigo et al., which includes: (a) self-harm-related disability and mortality; (b) neurological conditions with prominent mental and behavioral syndromes that present frequently at the primary care level (dementia, epilepsy, migraine, and tension-type headache); and (c) a fraction of pain syndromes without anatomic correlation, corresponding to an estimation for DSM-5 somatic symptom disorder with

prominent pain and ICD-10 somatization disorders, which frequently constitute a presentation of mood, anxiety, and personality disorders, particularly in contexts of high stigma towards common mental illness (12,13,15,16).

Regional disability and mortality: disability-adjusted life years (DALYs)

Globally, NCDs accounted for 60% of total DALYs in 2015, of which 12% corresponded to MNSS. Meanwhile in the Americas, NCDs accounted for a much larger 78% of total DALYs, with MNSS taking up a much larger fraction of DALYs at 19%. The remaining 59% of NCD DALYs are distributed among cardiovascular disease; cancer; musculoskeletal disorders; diabetes; neurologic, respiratory, digestive, urinary, gynecologic disorders, and others. Finally, communicable, maternal, child, and nutritional disorders are responsible for 12%, and injuries for 10% of total DALYs. This distribution highlights the fact that MNSS comprise nearly a fifth of total DALYs, constituting the largest

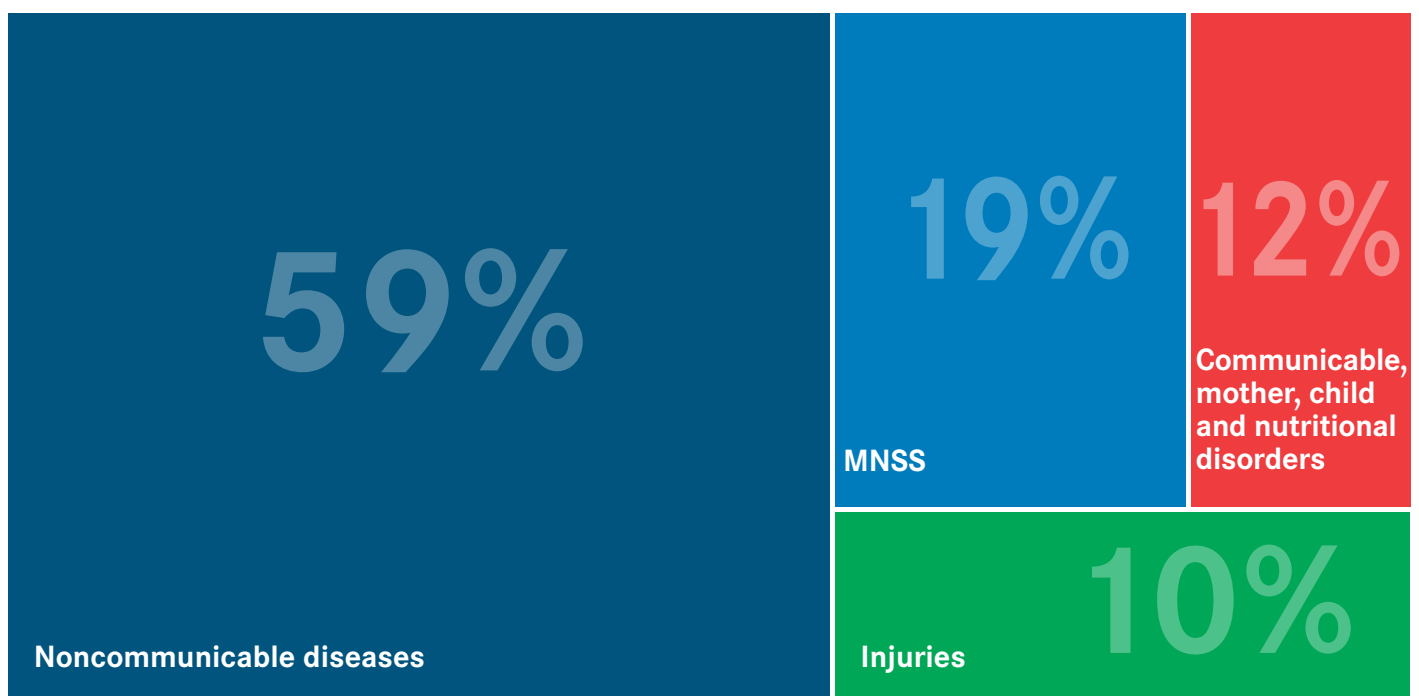
subgroup cause of disease burden in terms of disability and mortality combined, even larger than two higher level groupings: injuries and communicable, maternal, child, and nutritional disorders.

Figure 1 shows the three groups of disorders (NCDs; communicable, maternal, child, and nutritional disorders; and injuries) with MNSS as a separate subgroup of NCDs. The largest mental cause of DALYs is depressive disorders, which account for 3.4% of total DALYs, followed by anxiety disorders with 2.1%. A regional ranking of specific mental disorder DALYs is available in Figure 2.

Regional disability: years lived with disability (YLDs)

Mortality data do not adequately capture the deaths caused by mental illness; therefore, it is useful to compare disability separately, as measured by YLDs. This metric is not affected by the exclusion of mental illness deaths and provides a valid comparison across

Figure 1: Regional disability-adjusted life years (DALYs) distribution tree map (%)



disease groupings. Our analysis shows that MNSS account for more than a third of total disability in the Americas: 34% of total YLDs.

All the other NCD sub-groups combined account for an additional 54% of YLDs; communicable, maternal, child and nutritional for 8% of disability; and injuries for 4%, making MNSS by far the largest subgroup (Figure 3). Figure 4 shows a regional ranking of YLDs attributable to MNSS.

Country-level analysis

In order to complement the regional analysis, a by-country study of the disease burden of mental disorders was conducted. This detailed country-level grounding of the data is important because of two main reasons:

(a) The Americas comprise a vast number of countries and territories—36 of which have been included in this

report—of very dissimilar population numbers. Figure 5 shows a tree map of all countries grouped by subregions, with the size of each square reflecting the population size. It is clearly seen that three countries—the United States, Brazil, and Mexico—comprise two-thirds of the billion people living in the Americas, so the aggregated regional disease burden will be highly determined by the disease profile of these three countries. Furthermore, an exclusively regional perspective would obscure the disease burden of the Non-Latin Caribbean, given their comparatively small populations (the green fraction of Figure 5). Besides the country-specific percentages, average country-level percentages will be provided when meaningfully different from the regional aggregate.

(b) The goal of this report is to provide an actionable needs assessment that can inform mental health prioritization, system planning, and service delivery at the country level, so it is with national-level decision-makers in mind that this report has been conceived.

Figure 2: Ranking of mental, neurological, and substance use disorders, and suicide DALYs

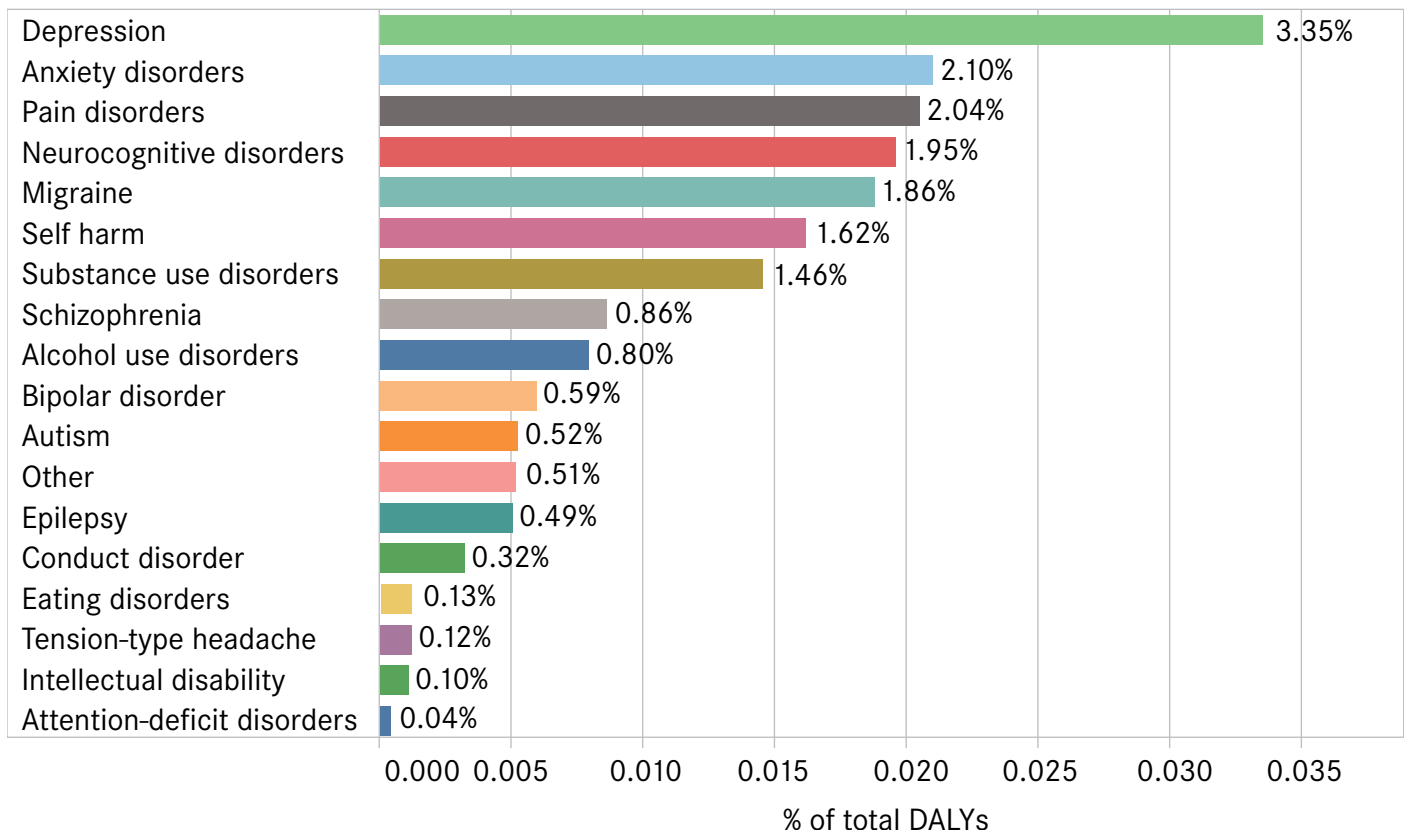


Figure 3: Regional years lived with disability (YLD) distribution (%)

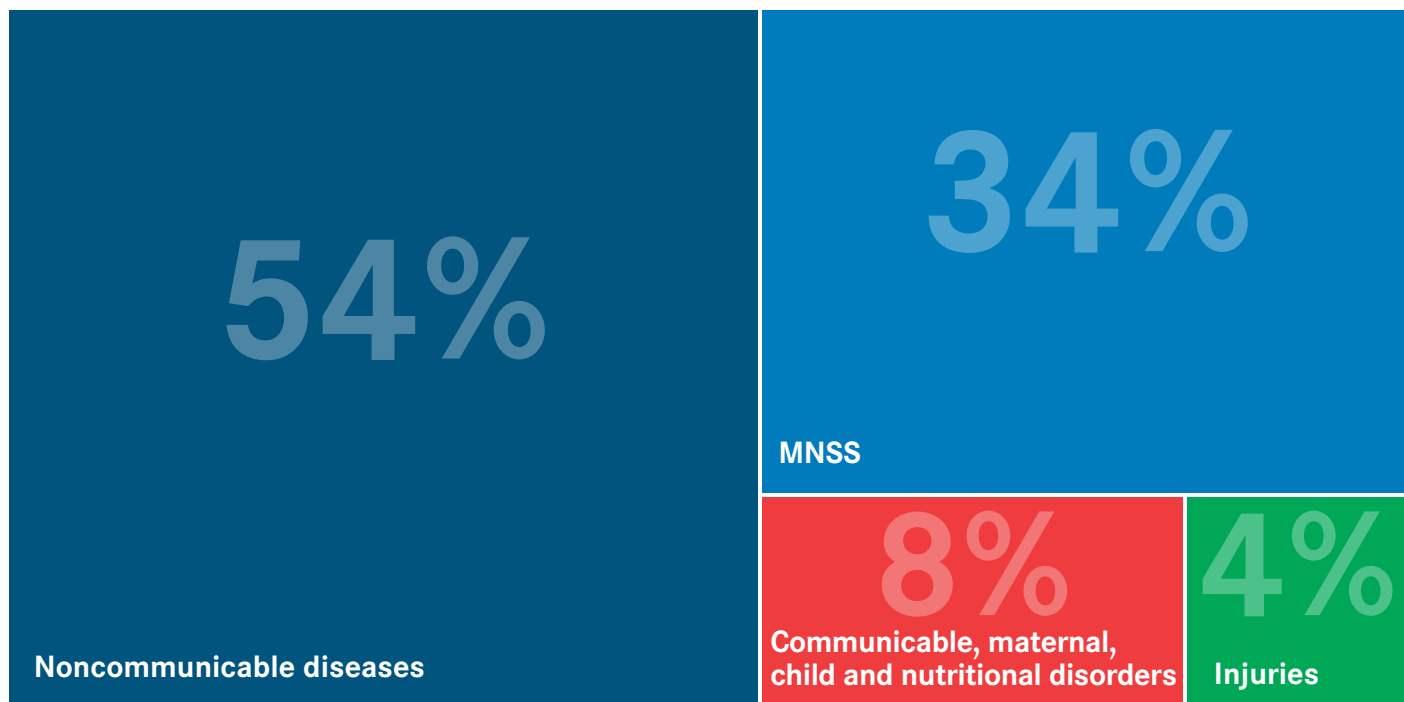


Figure 4: Ranking of mental, neurological, and substance use disorders, and suicide years lived with disability (YLDs)

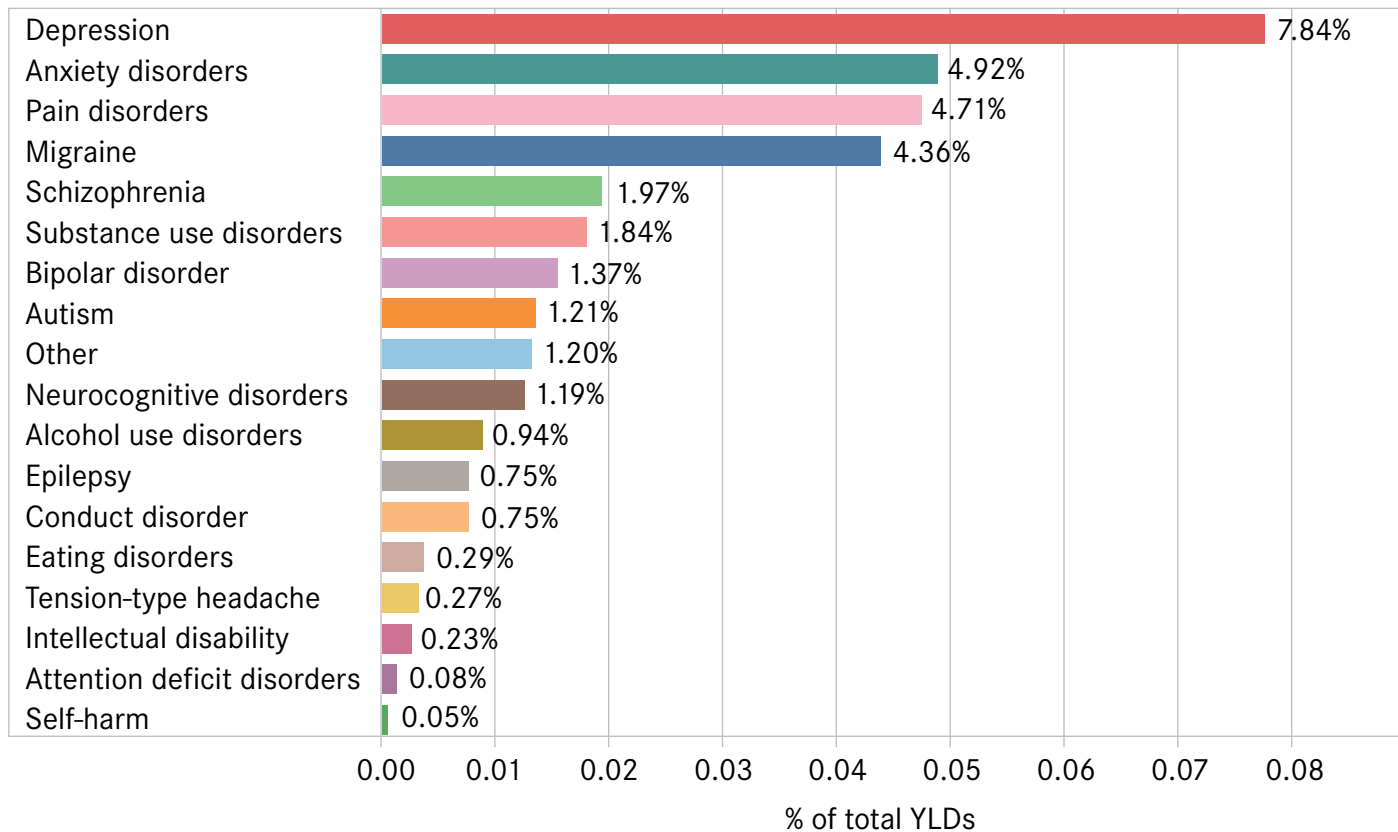
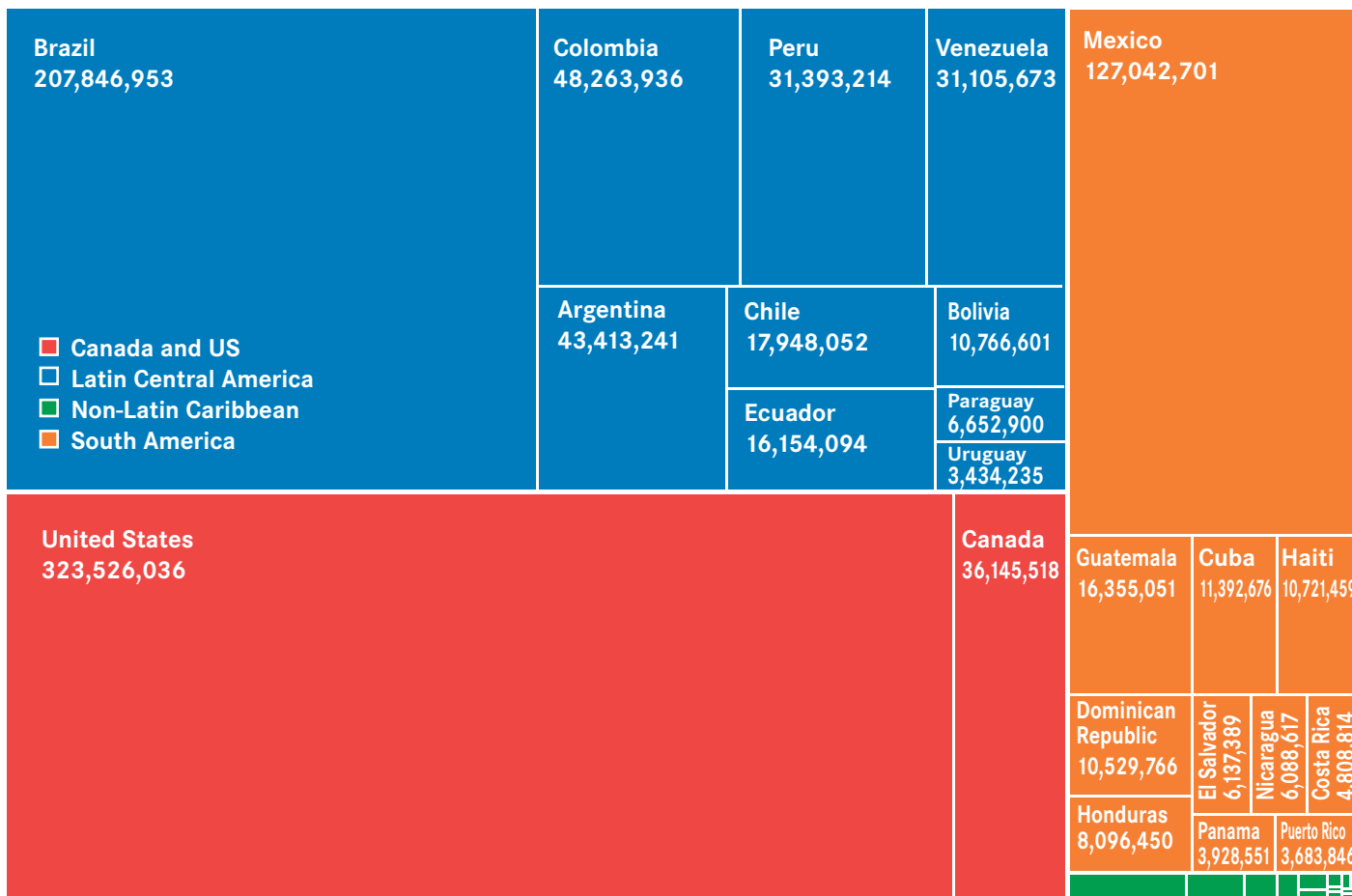


Figure 5: Population distribution of the countries in the Americas



Non-Latin Caribbean countries (those colored green) and their populations are listed in Annex 1.

Country-level disability and mortality (DALYs)

There is significant heterogeneity in the distribution of the main causes of disability combined with mortality in the Americas. DALYs caused by NCDs, including mental illness, are the largest fraction of total burden in every country in the Region of the Americas, ranging from 50% in Haiti to 89% of total burden in Canada. The second regional cause-group of DALYs, comprising communicable, maternal, child, and nutritional disorders, ranges between 5.5% in Canada and the United States and 39% in Haiti. The third regional cause of DALYs is the group of injuries, which ranges from 6% in Canada, Cuba, Barbados and Bermuda, to 20% in El Salvador. Figure 6 highlights that NCDs remain the largest cause of disability and mortality combined across countries

despite large individual variations, whereas the group of communicable, maternal, child, and nutritional disorders and the group of injuries alternate in the second and third rank-order, with a primacy of the former, especially in lower-income countries. The subgroup of MNSS also shows large between-country variation, ranging from 9% of total DALYs in Haiti to 23% in Canada (see Figure 6).

Country-level disability (YLDs)

An analysis of years lived with disability (YLDs) provides a picture that (a) complements the DALY burden analysis and (b) is not biased by the differential exclusion of excess mortality resulting from mental illness. The between-country variation of YLDs as a percentage of total disability is much lower than the DALY variation discussed in the

Figure 6: Disability-adjusted life years (DALYs) distribution by country (%)

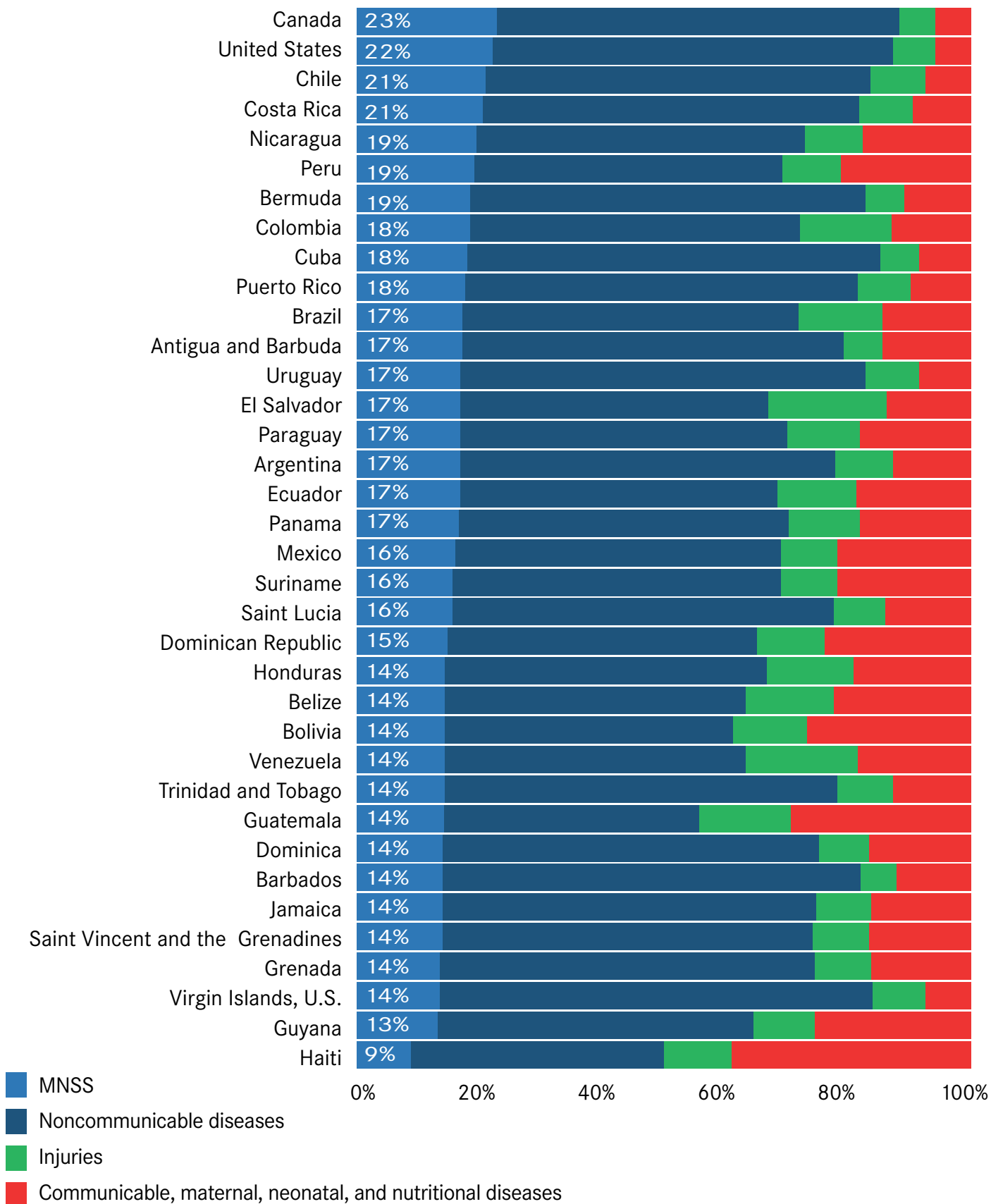
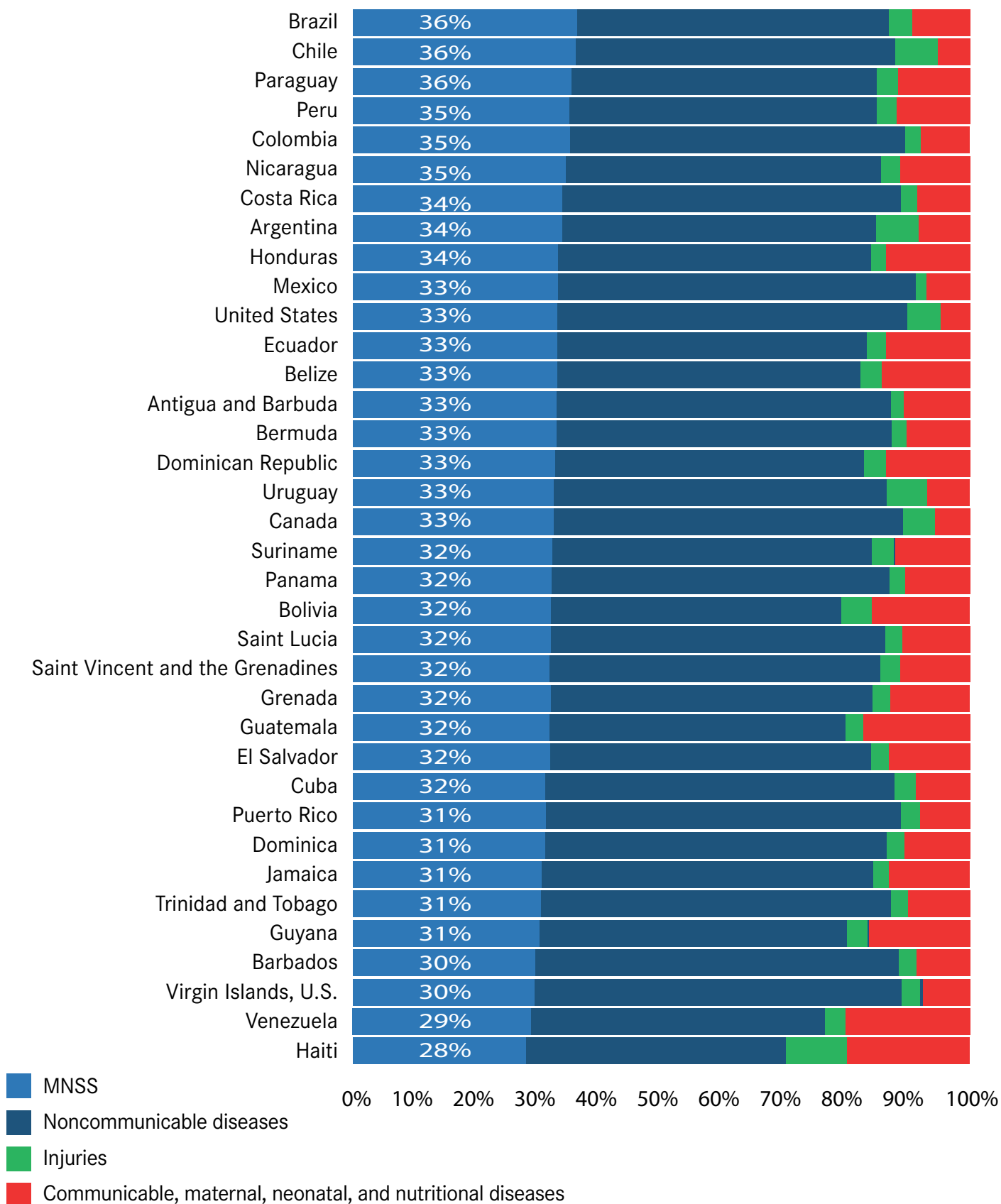


Figure 7: Years lived with disability (YLDs) by country (% of total YLDs)

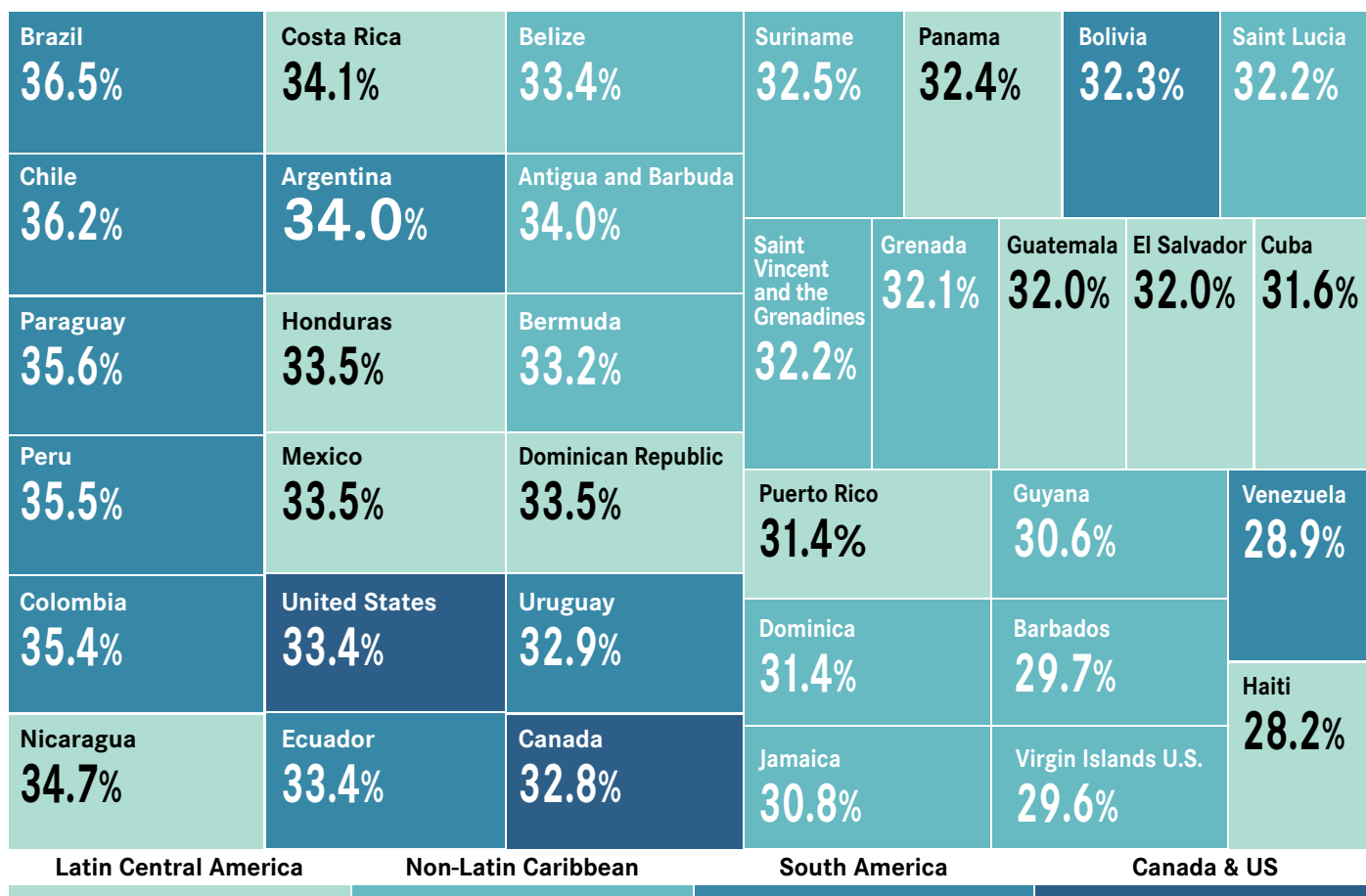


previous section (except for disaster-related disability in Haiti, which drives YLDs caused by injuries up to 10% of total). The overall variation of NCD disability ranges from 70% of total YLDs in Haiti to 91% in Mexico. Focusing on mental illness, the variation ranges between 28% in Haiti to 36% in Brazil, Chile, and Paraguay. Communicable, maternal, child, and nutritional disorders range from 5% of YLDs in the United States and Chile to 20% of YLDs in Venezuela and Haiti (see Figure 7).

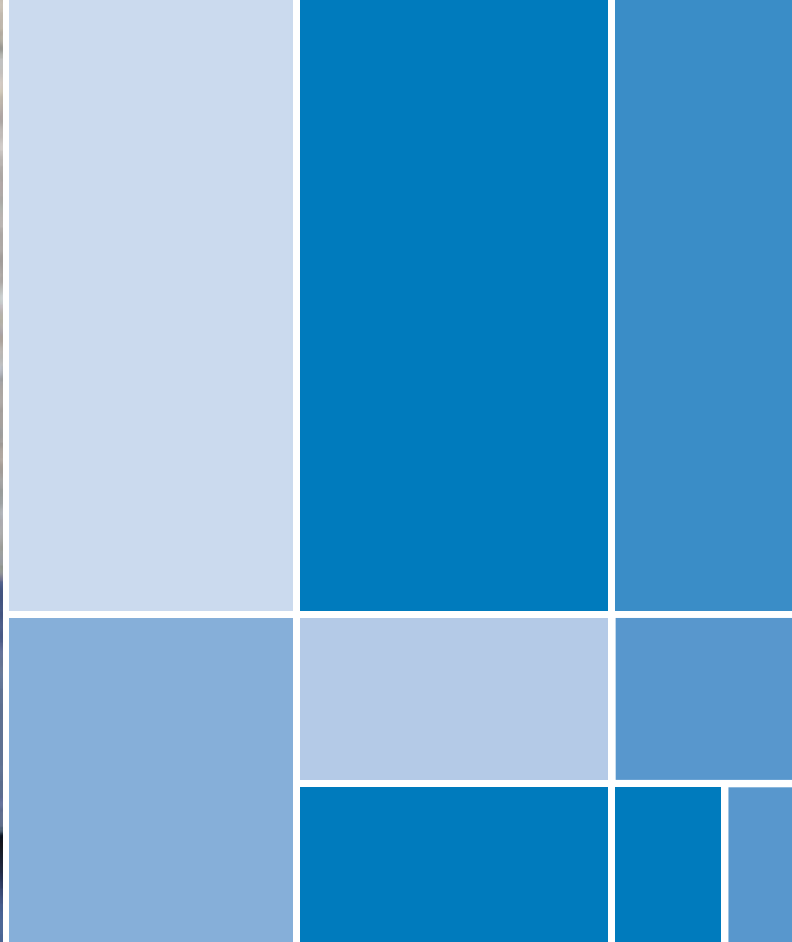
Figure 7 shows that disability resulting from MNSS is remarkably similar (and high) throughout the region. MNSS constitute indisputably, and by a wide margin,

the largest subgroup cause of disability in every country, regardless of income level or subregion. There appears to be a subregional gradient in the disability resulting from aggregated MNSS (see Figure 8), with South American countries occupying the top five positions in terms of YLDs, with most countries above the country-average (33%) and regional aggregate (34%) disability. As we will see in the disorder-specific sections, there is a wide variation across countries in terms of which specific mental disorders cause the largest burden. It is important for decision-makers to consider the specific disease profile that affects their country to adequately prioritize conditions, allocate investments, and plan

Figure 8: Mental, neurological and substance use disorders and suicide disability tree map (YLDs by country as a percentage of total disability)



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.



Disability resulting from specific disorders

service delivery.

Common mental disorders

Common mental disorders generally comprise depressive and anxiety disorders. It is necessary to point out, however, that a number of other very common mental and behavioral syndromes are not considered in typical burden of disease calculations and analyses, despite their significant prevalence, disability, and mortality (15,19). Of note, personality disorders and somatic symptom disorders are excluded due to the lack of consistent cross-country data, and self-harm and suicide are considered under the heading of injuries, despite the well-established fact that mental disorders and sub-threshold syndromes are largely responsible for intentional self-harm (15,20). The result is that somatoform disorders with predominant pain—a psychiatric disorder formerly known as *pain disorder*, which

when properly studied emerges as the single most prevalent mental disorder, affecting 8% of the general population yearly (21)—is systematically and erroneously conflated with musculoskeletal disorders, leading to inflation of that category despite the absence of a causal link of these syndromes to the musculoskeletal system (15,22). Similarly, personality disorders—a group of behavioral and mental syndromes frequently comprising problematic interpersonal functioning, affective and cognitive symptoms, impulsivity, self-harm, and somatic complaints—are not considered at all in burden of disease calculations despite the fact that they are highly prevalent (4 to 15% in community surveys) (23). Following the method described in detail elsewhere (15), this study includes self-harm and an estimation for pain disorders, thus indirectly capturing a fraction of the disability resulting from personality disorders and the excess death from depression and other mental illnesses due to suicide. Given the high prevalence of these mental

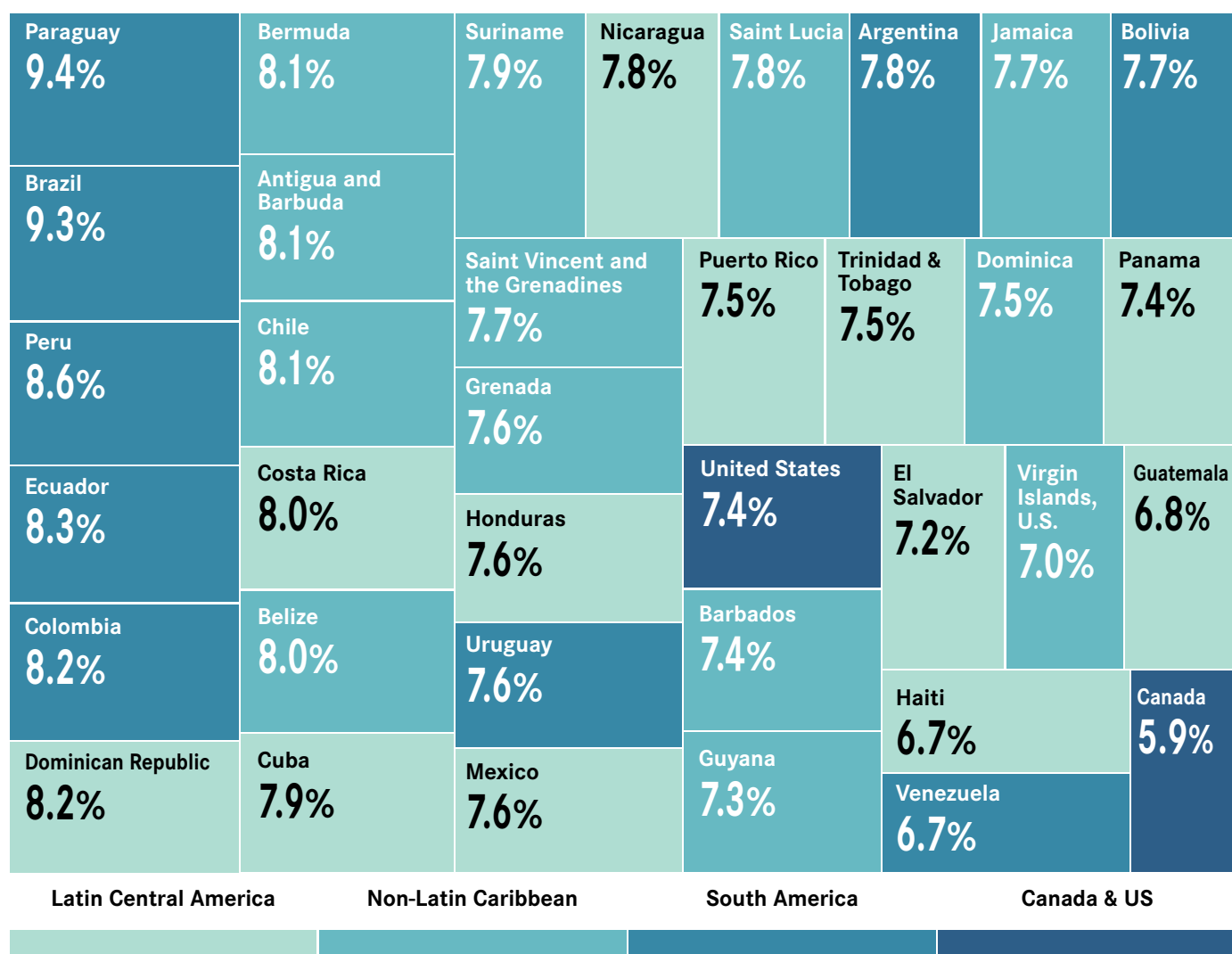
and behavioral syndromes, they are considered in this section of common mental illness.

■ Depressive disorders

For the purpose of the current analysis, depressive disorders comprise depressive disorder and dysthymic disorder. Depressive disorder can be a highly disabling condition, as reflected by its disability weight in the burden of disease framework. Severe depressive episodes are considered, based on surveys of the

general population, to be the fifth-most disabling human health state, after acute schizophrenia, untreated neck-level spinal cord lesion, severe multiple sclerosis, and severe heroin dependence (24). Even mild depressive disorders and dysthymia are considered highly disabling, at the same level of, for example, severe anemia or uncontrolled asthma. The disability resulting from depressive disorders, both at the individual and at the population level can be considered as a continuum of health states from moderately to severely disabling.

Figure 9: Depressive disorder disability tree map (YLDs by country as a percentage of total disability)



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.

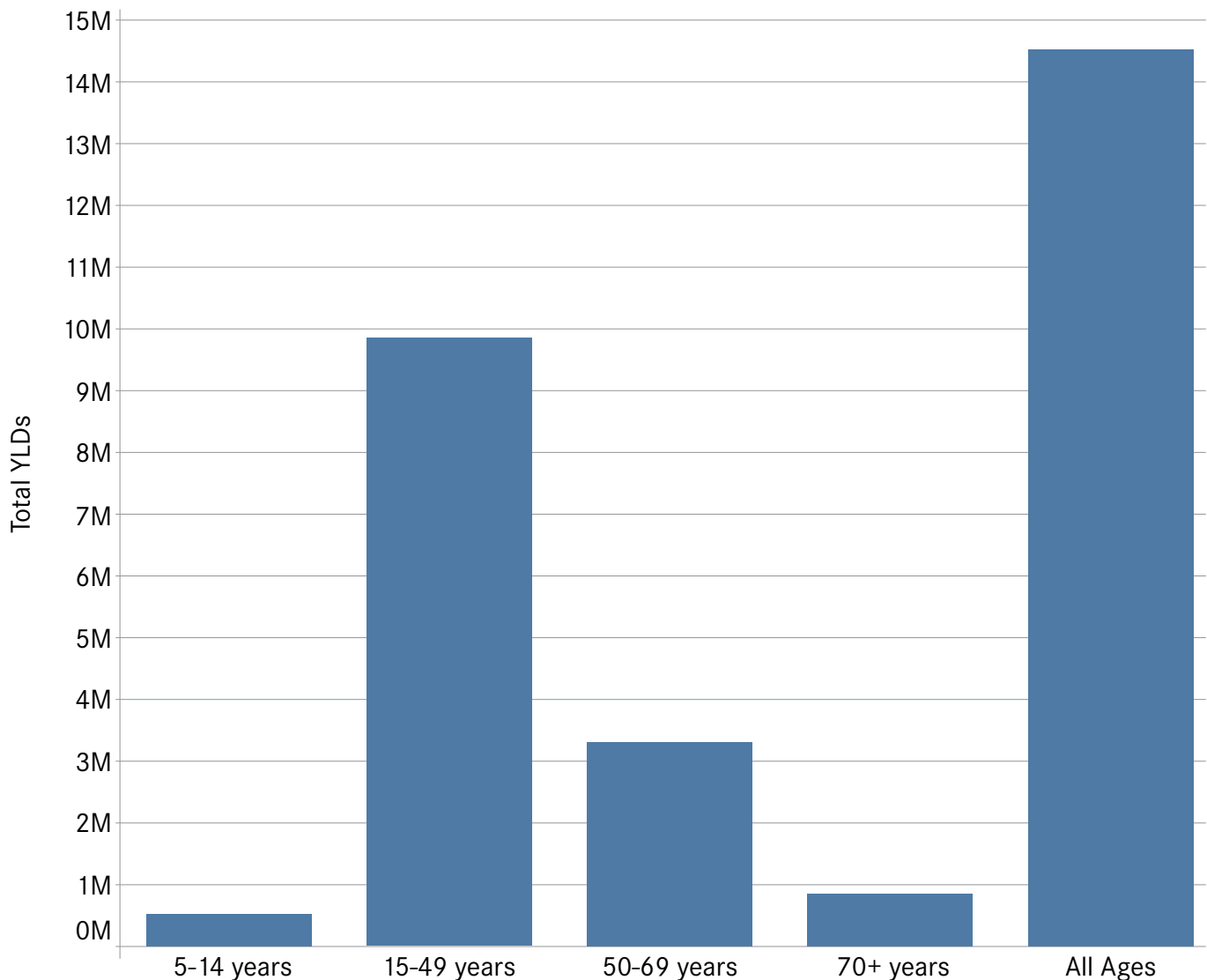
At the regional level, this analysis places depression at the top of disability causes, with 7.8% of total disability, and a range from 5.9% in Canada to 9.4% in Paraguay. A subregional pattern of increased disability in South America is evident, as indicated by the following: (a) Paraguay, Brazil, Peru, Ecuador, and Colombia constituting the top five in the depression disability ranking; and (b) a clear majority of South American countries at or above the country-average (7.7%) and regional aggregate (7.8%) (see Figure 9). Another important aspect of depressive disorders is that they affects mainly the young: nearly 10 million

of the 14.5 million depression YLDs in the Americas fall within the 15- to 50-year-old age group (see Figure 10).

■ Anxiety disorders

This group of disorders comprises many syndromes characterized by prominent anxiety, such as generalized anxiety disorder, panic disorder, social anxiety disorder, and others. From a disability perspective, they can range from severely disabling to mildly troublesome, and for

Figure 10: Depressive disorder: years lived with disability by age groups (total of YLDs)



our 2015 data analysis we consider them aggregated, including post-traumatic stress disorder and obsessive-compulsive disorders.

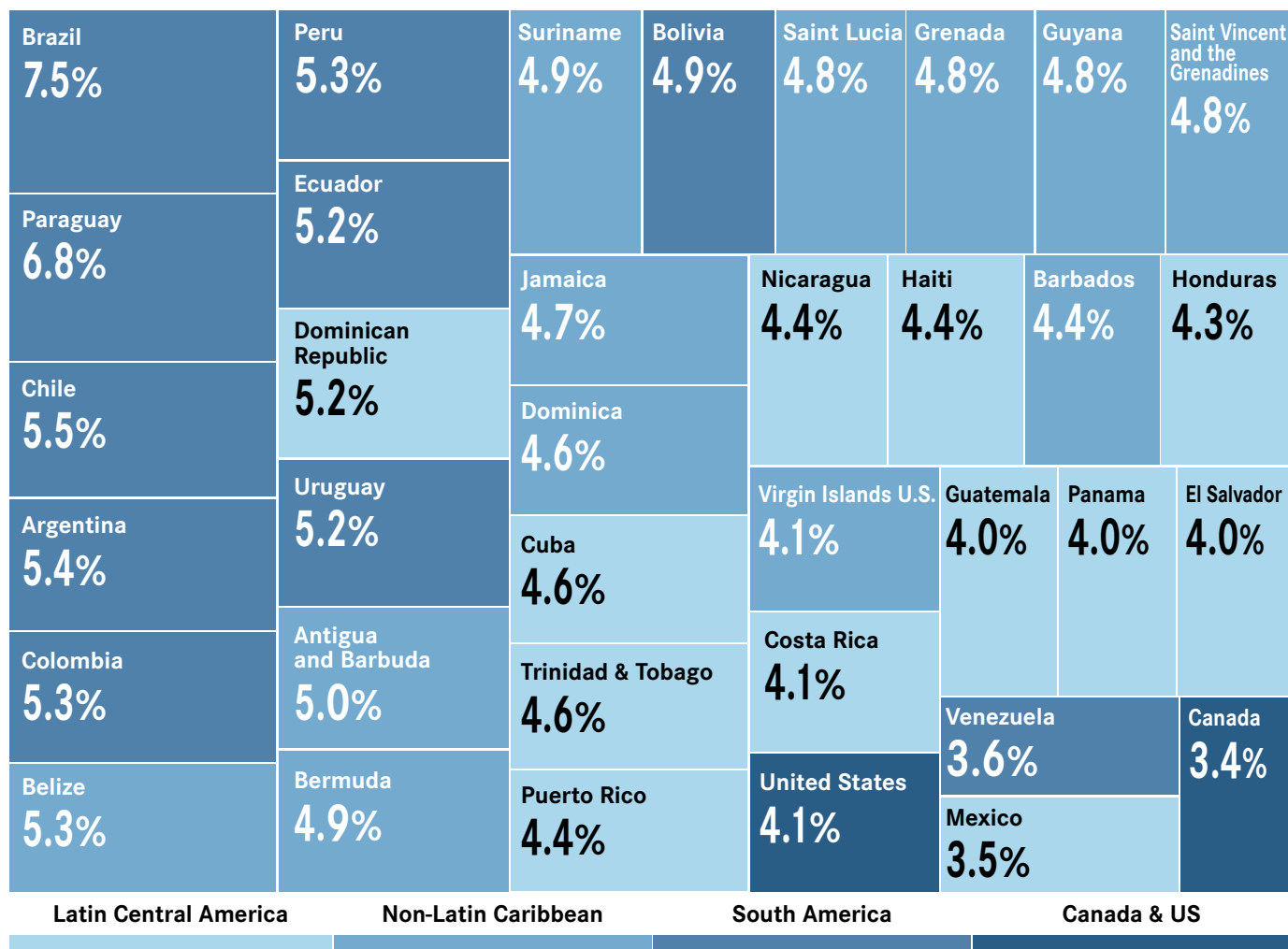
Anxiety disorder is the second-most disabling mental disorder in most countries of the Americas. A subregional pattern is even more discernible than for depressive disorders, with Brazil at the top (7.5%); all but one South American country showing above country-average (4.7%) and regional aggregate (4.9%) disability; and 8 of the top 10 countries in terms of disability corresponding to this subregion (see Figure 11). North America falls at the other end of the spectrum, with Canada showing the least

disability (3.4%), followed by Mexico (3.6%) and the USA (4.1%) also well below the regional average and aggregate.

■ Self-harm and suicide

Given the well-established relationship of common mental illnesses (such as depressive and personality disorders) with suicide and self-harm, these illnesses are considered in this section. The burden of disease framework does not include personality disorders, a well-established cause of non-lethal self-harm (23,27), and YLDs resulting from self-

Figure 11: Anxiety disorders disability tree map (YLDs by country as a percentage of total disability)



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.

harm are not captured in the burden of disease framework. Therefore, this section will focus on suicide DALYs, which are largely due to years of life lost due to premature death.

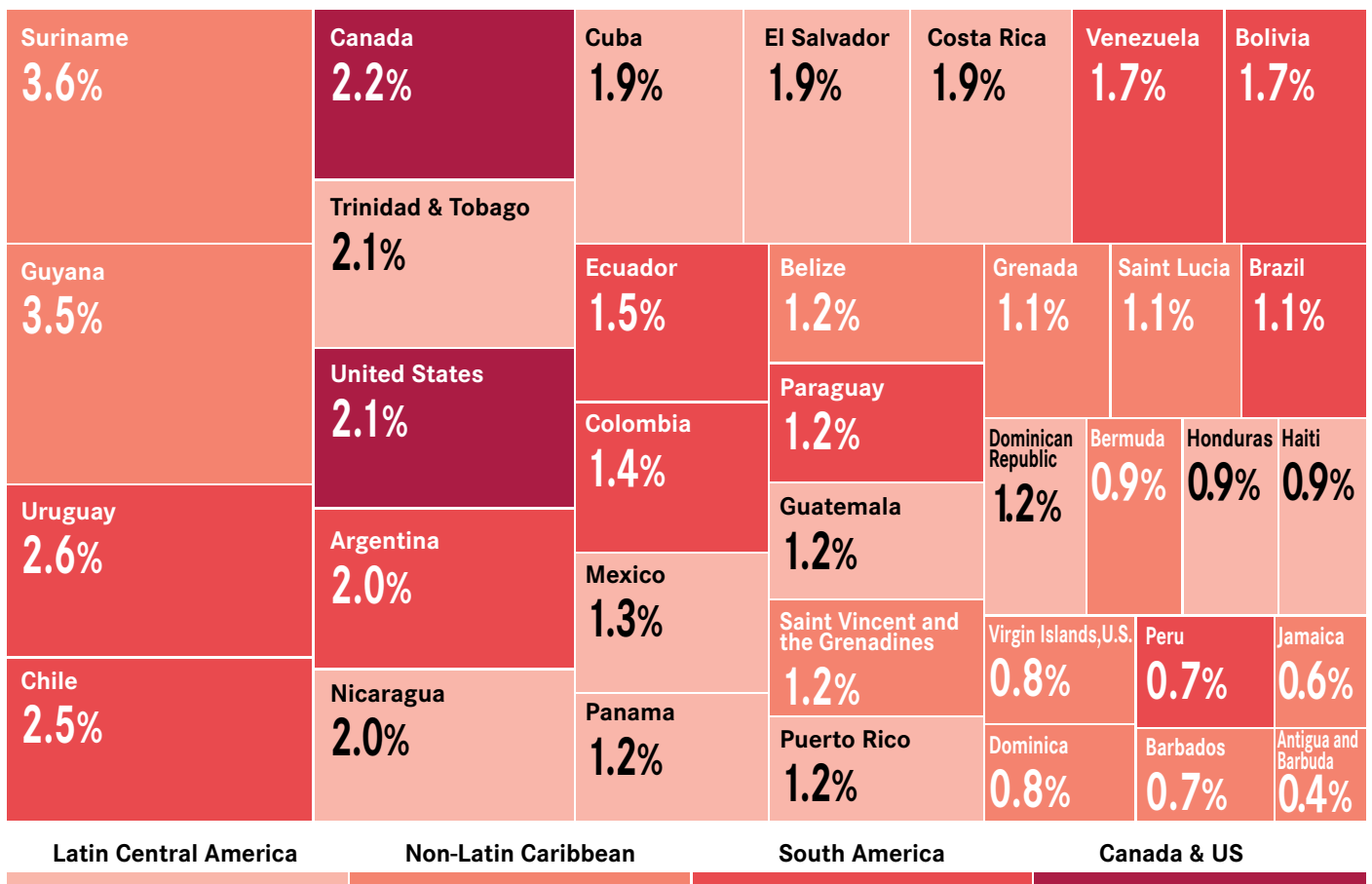
Suicide is the fifth highest cause of DALYs in the Americas, with an almost nine-fold range in terms of percentage of total burden, from 0.4% in Antigua and Barbuda to 3.6% in Suriname. There is a remarkable subregional pattern affecting Suriname (3.6%), Guyana (3.5%), and, to a lesser extent, nearby Trinidad and Tobago (2.1%); as well as Uruguay (2.6%), Chile (2.5%), and Argentina (2%) in South America. The United States (2.2%) plus Canada (2.1%) also comprise subregional clusters affected by suicide well in excess of the country-average (1.5%) and aggregate (1.6%) percentages

(see Figure 12). The toll that suicide takes in the Americas is daunting, and it falls mainly on younger working-age populations: 60% of the nearly 100,000 suicides occurred between 15 and 50 years of age; 4,129,576 years of life were lost, of which around 75% were lost by this same age group (see Figure 13).

■ Somatoform disorders/persistent somatoform pain disorder

Somatoform disorders with predominant pain are poorly understood syndromes and thereby frequently ignored by clinicians, psychiatrists, and epidemiologists (22,28).

Figure 12: Suicide and self-harm burden tree map (DALYs by country as a percentage of total disability)

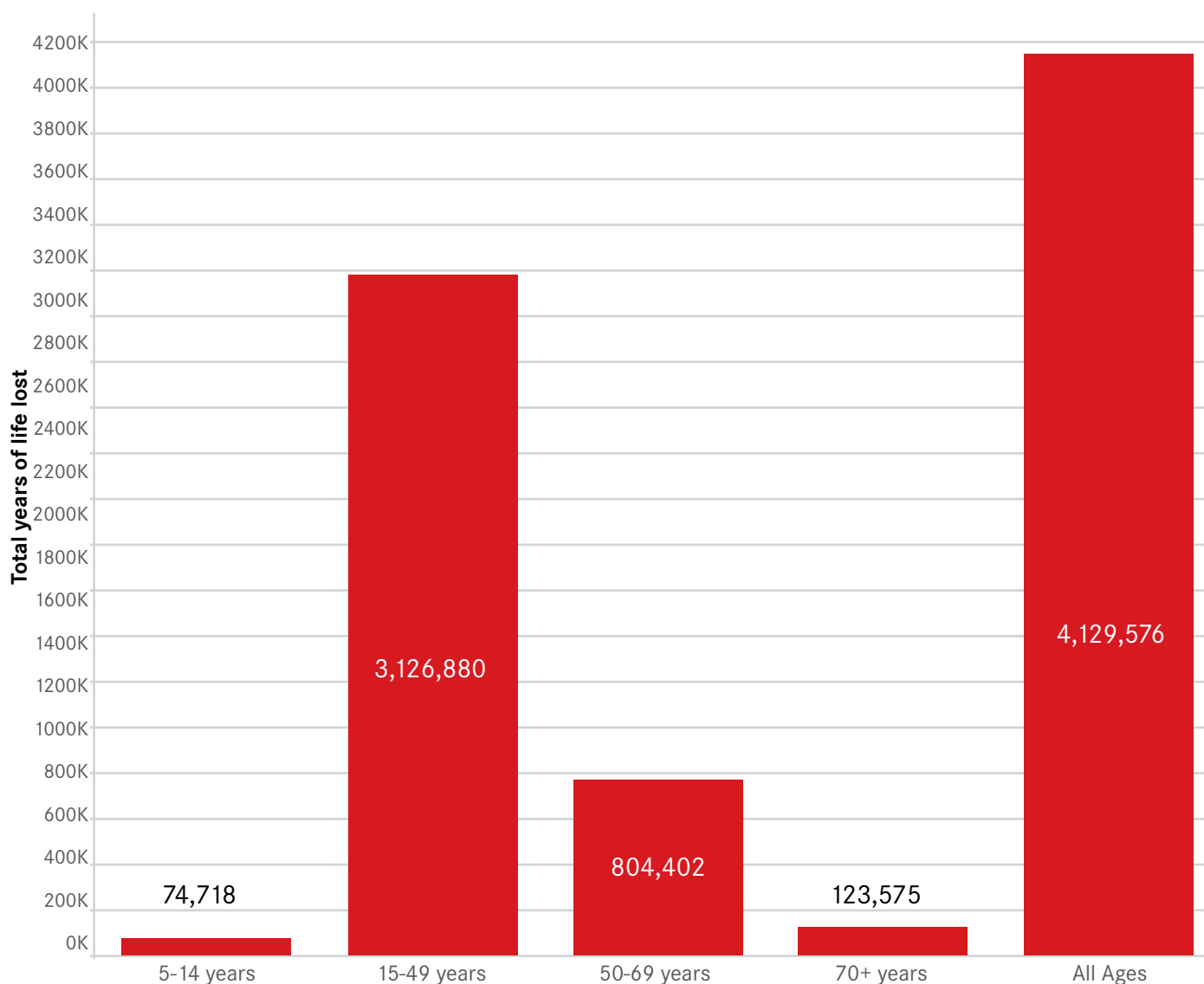


Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.

When properly studied, however, they are highly prevalent, especially in women: the 12-month prevalence of DSM-IV pain disorder has been established by one study as 11% for females and 4% for males, with an overall rate of 8%, the largest for any mental disorder (21). Some 56% of pain disorder patients meet the criteria for another psychiatric disorder, most frequently depressive or anxiety disorders. The prevalence of painful syndromes in patients diagnosed with depressive or anxiety disorders has been found to be greater than 30%, and up to 80% in specific post-

traumatic stress disorder populations (29). Routine burden of disease assessments assign 0% of the burden of painful syndromes to mental disorders, an assumption lacking minimal face validity. Reattributing a fraction of this burden to MNSS as described elsewhere yields an estimate of 4.7% of total YLDs due to somatic symptom disorder with prominent pain (15). The estimated range is between 6.2% in Canada and 3.2% in Haiti, and higher-income countries seem to be more affected than lower-income countries. These estimates should be considered indicative until

Figure 13: Total years of life lost by age group*



*Columns represent total YLLs in the Americas for four separate age groups, and a fifth column for all ages.

primary data on somatoform disorders disability become available. Of note, the importance of this issue has led to the recent creation of a specific section to screen for somatic symptom disorders in the WHO World Mental Health Composite International Diagnostic Interview, to be administered in future World Mental Health Surveys, filling this gap.

Severe mental disorders

Schizophrenia and bipolar disorders are usually referred to as severe mental disorders. Indeed, they exact some of the largest tolls conceivable on human beings: acute psychotic episodes in the context of schizophrenia are considered the most disabling health state in the burden of disease framework (24); manic episodes are highly disabling medical emergencies, frequently leading to socioeconomic ruin, injury, or death if untreated; and depressive episodes in the context of bipolar illness can be as severe as those of depressive disorder, particularly in the context of bipolar disorder type II. Severe mental illness is particularly lethal in low-income settings, which tend to also be contexts of high stigma. The increased lethality is due to the lack of effective mental care and to inadequate general medical care for people with severe mental disorders, which lead to largely preventable excess mortality. The lack of effective, accessible, or even available services, coupled with the catastrophic economic and emotional burden on families, frequently lead to systematic human rights abuses in lieu of treatment, resulting in what has been memorably labeled a “failure of humanity” (30). Indeed, as detailed in the section devoted to the health system response, lower country income is associated with decreased availability of services, worse services when available, and earlier death for severe mental illness.

■ Schizophrenia

In the burden of disease framework, the schizophrenias are considered the most disabling human disorders, particularly during acute episodes.

The regional variation of schizophrenia disability as a percentage of total disability ranges between 1.1% in Haiti and 2.5% in the United States (see Figure 14). Subregional patterns are less clear, but the USA, Canada, and most South American countries are above the country average (1.6%). Several factors could explain an increasing share of the disability as income level grows, most notably increased premature mortality and/or decreased case-detection capacity in poor settings. Research has shown that people with schizophrenia die between 10 and 30 years younger than their peers, with the worst outcomes seen in low-income countries (17,31), which would explain the decreasing share of the resulting survival with disability.

■ Bipolar disorders

Bipolar disorders are the cause of significant disability and mortality in the Americas. Clinical presentation is highly variable both across and within cases: some episodes constitute mild or moderate fluctuations in mood that are compatible with a high functionality and quality of life, while others evolve into severe depressive or manic episodes, the former of which can lead to suicide, and the latter, as mentioned before, to death, disability, or socioeconomic ruin if untreated. So, unlike the uniformly high disability resulting from schizophrenia, disability resulting from bipolar disorders can range from mild dysfunction during *residual* states to almost complete impairment during severe manic and depressive episodes. For the purposes of our analysis, bipolar disorders comprise types I and II, characterized by manic and hypomanic episodes, respectively. The latter constitutes a milder and shorter behavioral and psychological activation syndrome than the former.

A subregional pattern seems to emerge for bipolar disorder disability: every country in continental Central America is above the country-average and regional aggregate of 1.4% (see Figure 15), while both Canada and the United States are below the aggregate (1.3% and 1.2%, respectively). The range is between 1.1% of total YLDs in the Virgin Islands to 1.7% in Nicaragua.

Substance use and eating disorders

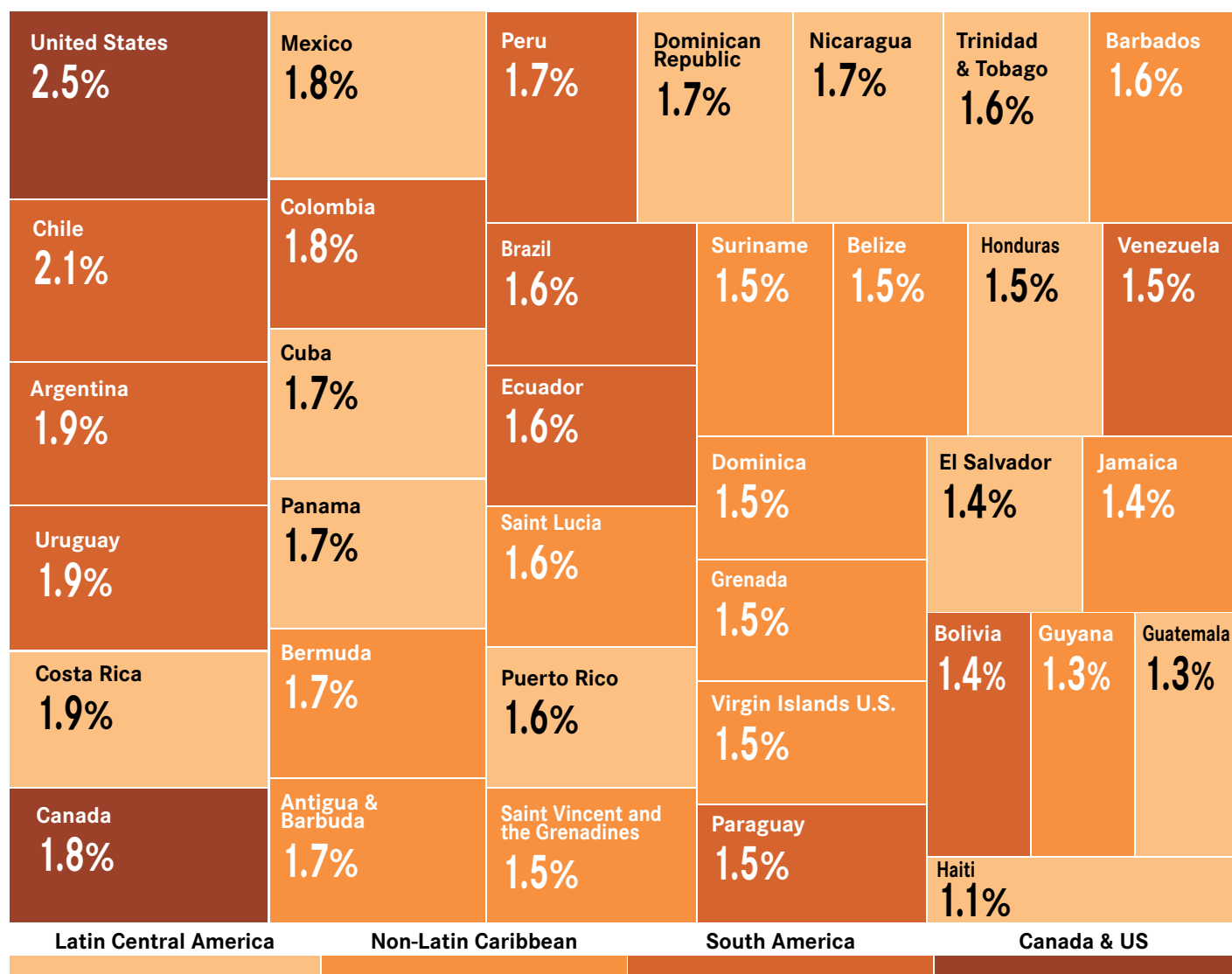
Disorders stemming from the use of substances (alcohol, drugs, or food) are frequently considered together due to their similar clinical pattern, mostly related to their compulsive nature and the direct behavioral dysfunction they entail. This makes them different from smoking, which entails mostly indirect disability through its physical consequences. The current analysis focuses on alcohol use disorder, substance use disorders, and eating disorders. These disorders include

varying severities that range from the low impairment of mild cannabis use disorder to the almost total disability resulting from severe heroin dependence, and including the moderate disability resulting from anorexia and bulimia.

■ Disorders due to use of alcohol

The disability resulting from alcohol use disorders ranges from 0.5% in Paraguay to 1.9% in Guatemala and El Salvador. It presents a subregional pattern with the United States, Canada, and most South American

Figure 14: Schizophrenia disability tree map (YLDs by country as a percentage of total disability)



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.

countries well below the country average of 1.2% (only Chile exceeds it at 1.5%), and at or below the regional aggregate (0.9%). Meanwhile, every country in Central America and the Caribbean is above the regional aggregate, and most are above the country average (see Figure 16).

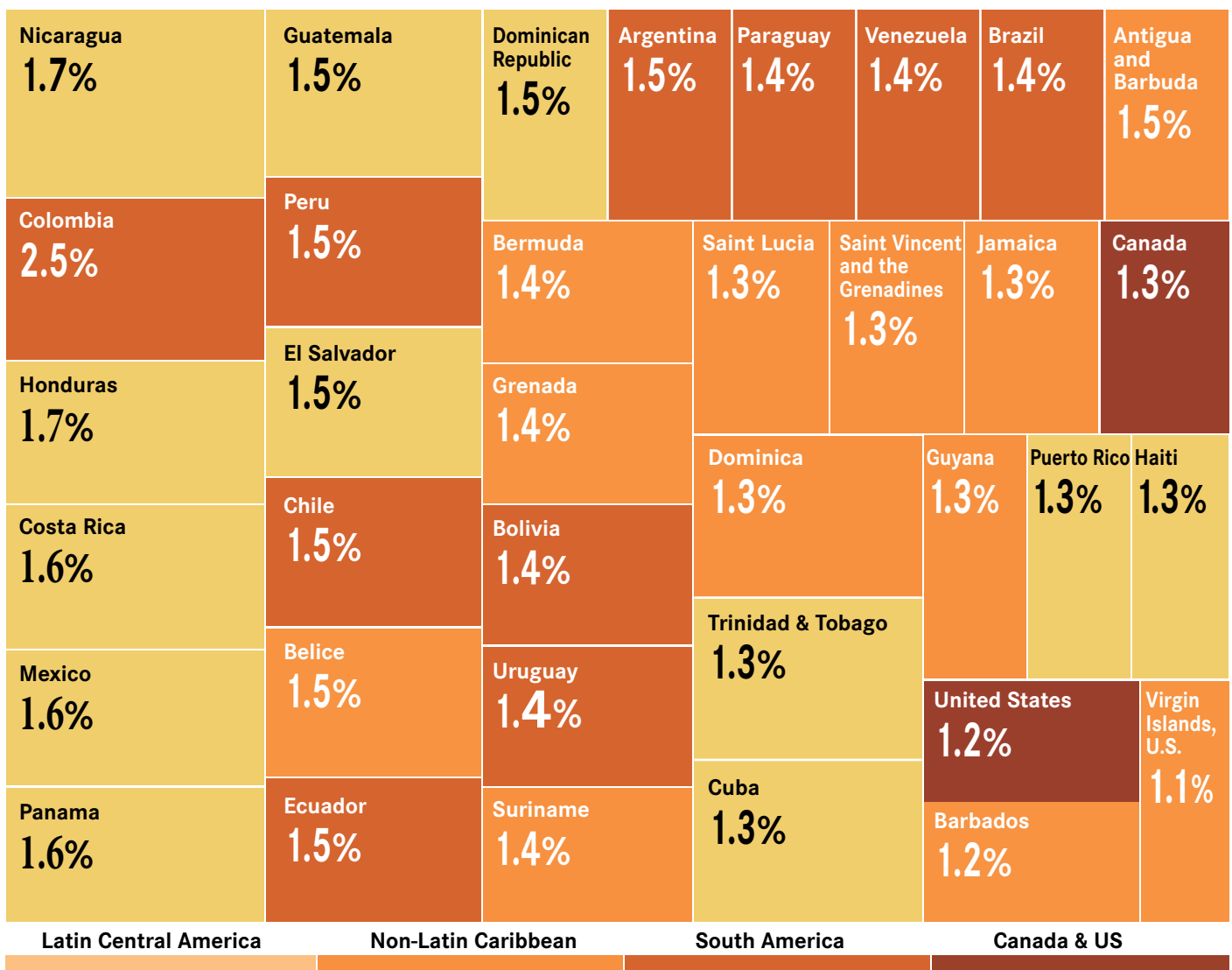
It should be noted that Figure 16 represents years lived with disability (YLDs), but alcohol use disorders also impose a significant burden in terms of years of life lost

(YLLs), both directly and through excess death due to cardiomyopathy, liver cancer, and cirrhosis.

Disorders due to substance use (not alcohol)

We consider here together cannabis, cocaine, amphetamine, and opioid use disorders. The variation in disability burden resulting from drug use ranges from 0.5% in Barbados and 0.6% in Haiti and Cuba, to 3.1% in

Figure 15: Bipolar affective disorder disability tree map (YLDs by country as a percentage of total disability)



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.

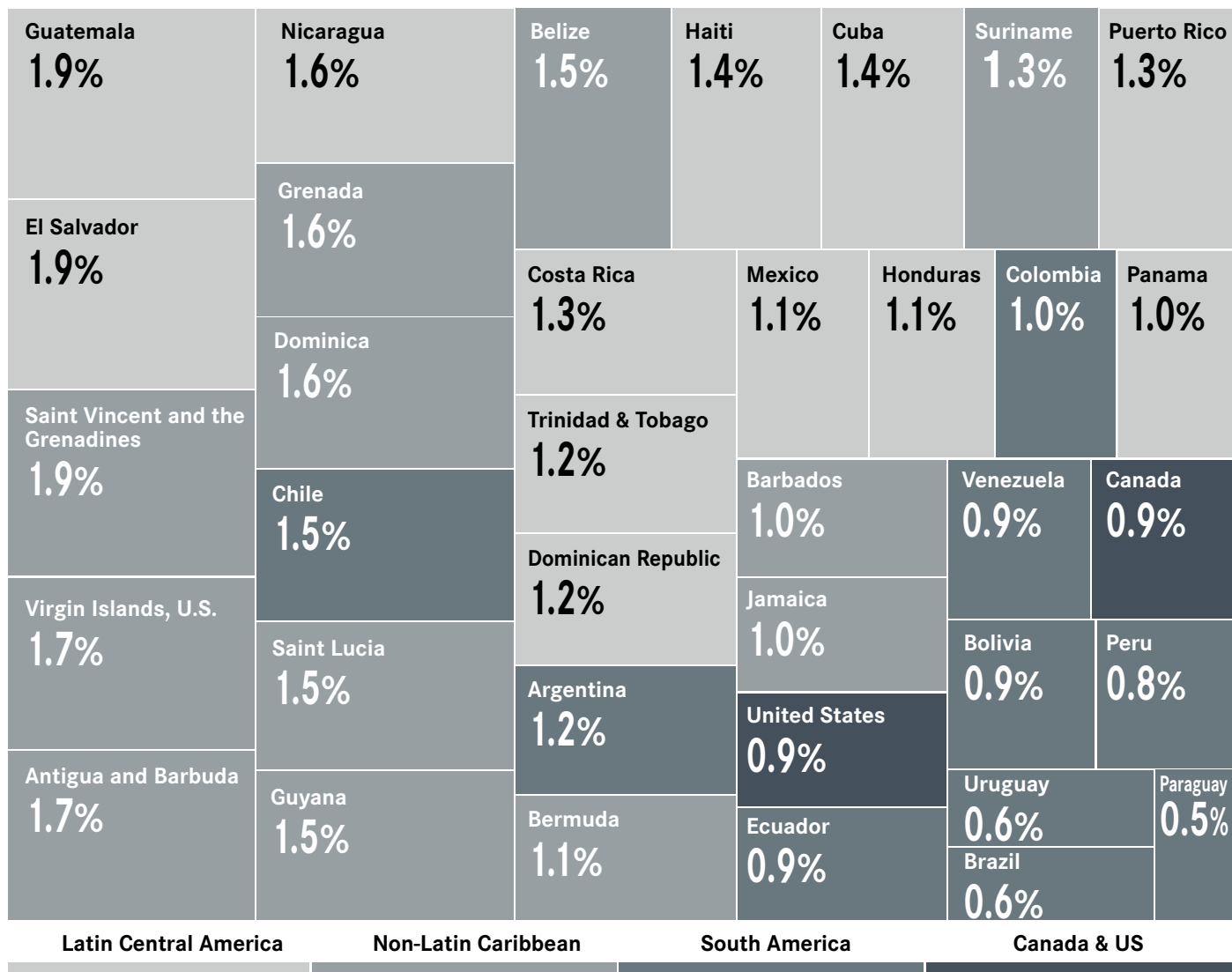
the United States (see Figure 17). This six-fold variation reflects the raging epidemic of opioid use disorders affecting the United States and Canada (2.5%); in both of which, the specific burden of opioid use disorders constitutes around 70% of all drug use disability.

As is the case with alcohol, other substance use disorders cause a significant number of years of life lost across the region, but most notably in the United States and Canada, where they produced 1.73% and 0.92% of total years of life lost, respectively.

■ Eating disorders

Anorexia and bulimia together account for a comparably much smaller fraction of total burden; between 0.07% in Haiti and 0.42% in the United States. Only the United States and Canada are above the regional aggregate percentage of 0.3%, indicating that the burden of eating disorders falls mostly on well-off countries.

Figure 16: Disorders due to use of alcohol disability tree map (YLDs by country as a percentage of total disability)



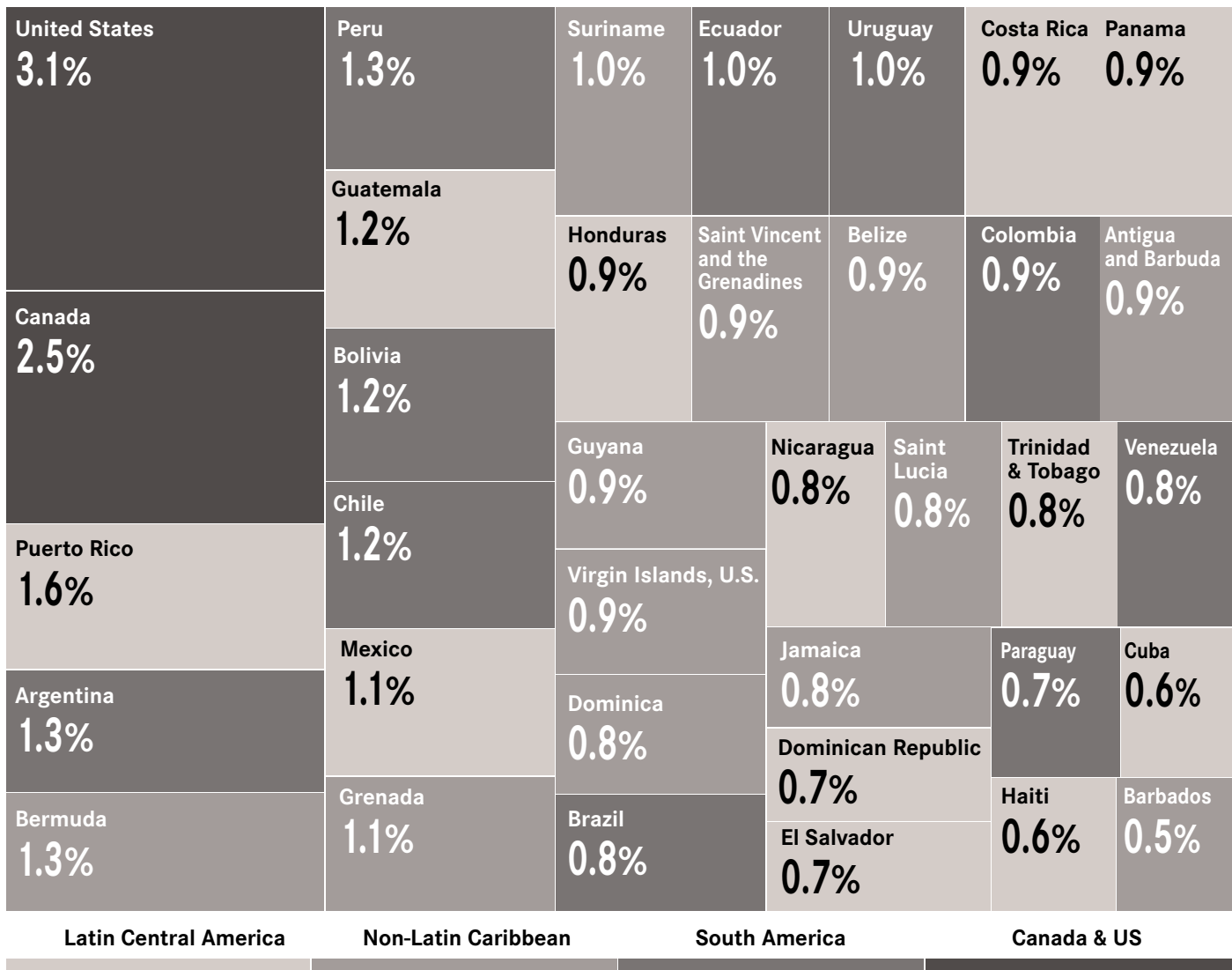
Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.

Disorders with onset usually occurring in childhood and adolescence

Collectively, disorders that affect mainly children and adolescents account for 2.2% of total YLDs in America. They include, in order of importance, autism (1.2%),

conduct disorders (0.7%), intellectual disability (0.2%), and attention-deficit and hyperactivity disorder (0.1%). They show a clear subregional pattern, with all continental Central American countries and all South American countries above the regional aggregate percentage. Conversely, most of the English-speaking Caribbean islands, the United States, and Canada (1.8% in both) show the lowest burden (see Figure 18).

Figure 17: Disorders due to substance use (not alcohol) disability tree map (YLDs by country as a percentage of total disability)



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.

Neurological disorders

This category includes the disability resulting from neurocognitive disorders—such as Alzheimer’s disease, epilepsy, migraine, and tension-type headache, all of which have prominent mental and behavioral syndromes.

■ Neurocognitive disorders

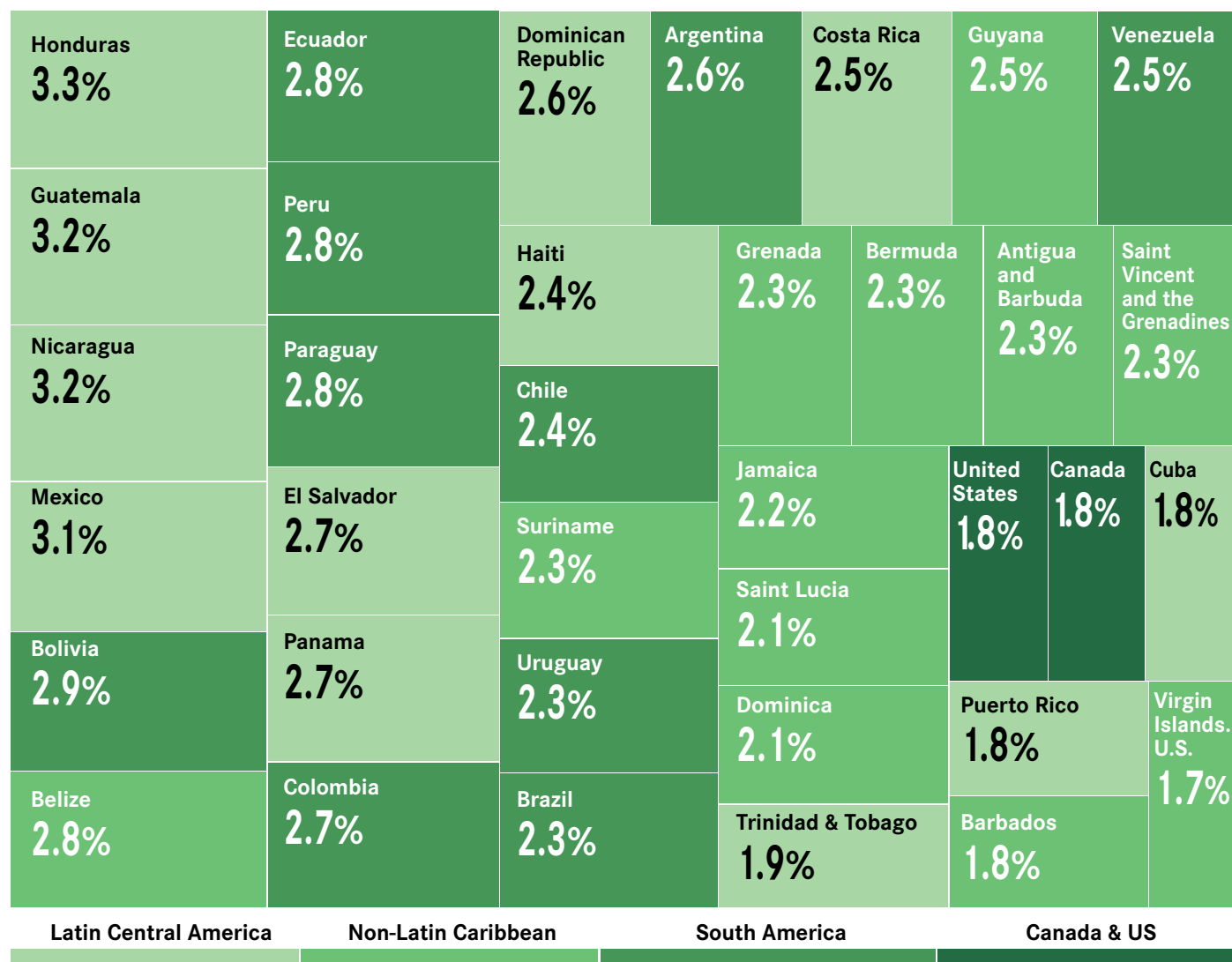
Alzheimer’s and other dementias account for 1.2% of total disability, ranging from 0.4% in Haiti to 1.9% in Canada. They reflect a highly significant trend, correlating higher

GDP with a higher percentage of total disability attributable to the dementias. This is an expression of the demographic change in age structure, where increased survival, and disability resulting from the disorders of older adults, accompanies economic development (see Figure 19).

■ Epilepsy

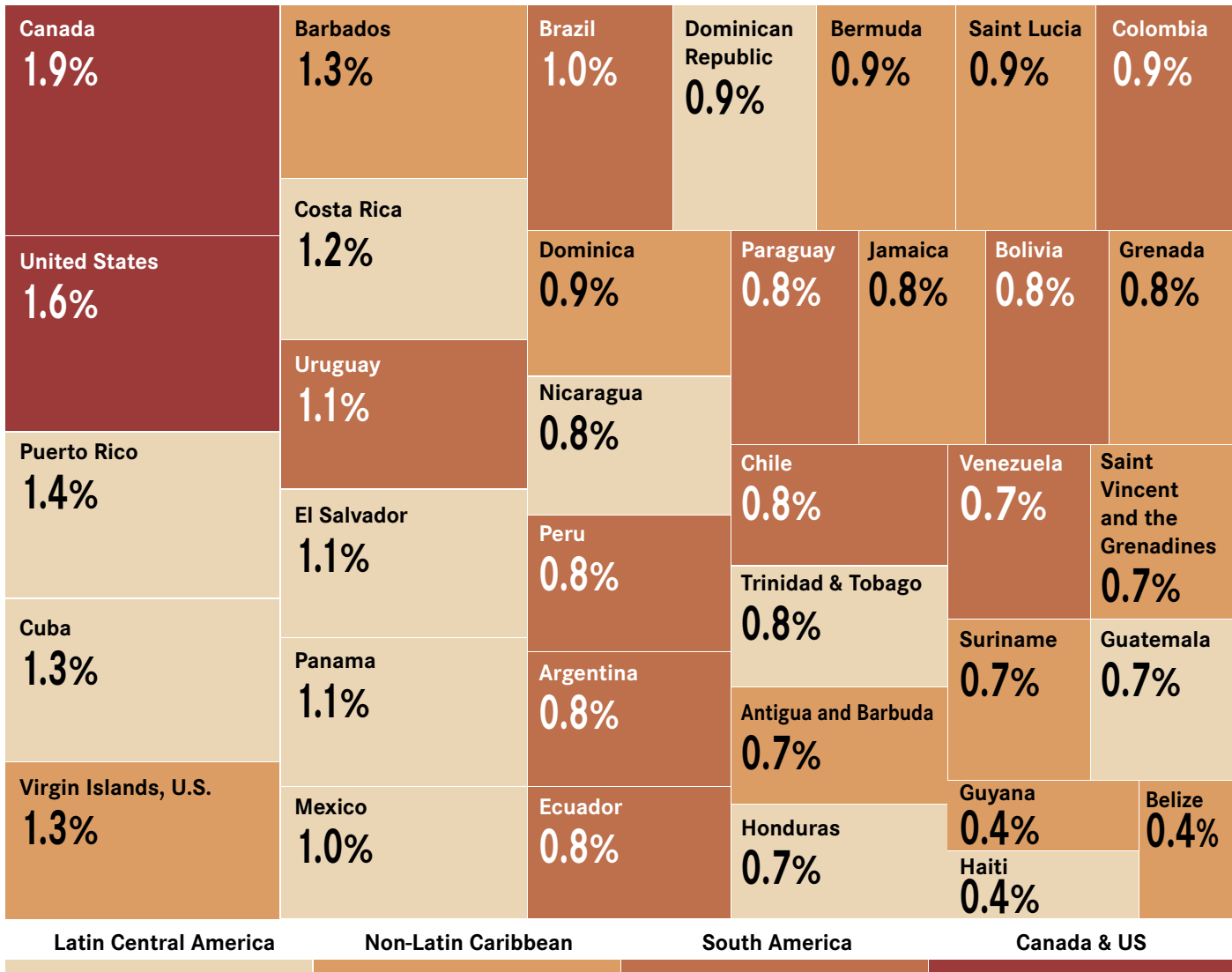
Epilepsy is responsible for 0.8% of total disability in the region, ranging between 0.2% in Canada and 1.6% in Honduras. Subregionally, epilepsy produces a lower percentage of disability in Canada and the United

Figure 18: Disorders with onset usually occurring in childhood and adolescence disability tree map



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burdens are clustered together in the same region of the tree map.

Figure 19: Dementia disability tree map



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burden are clustered together in the same region of the tree map.

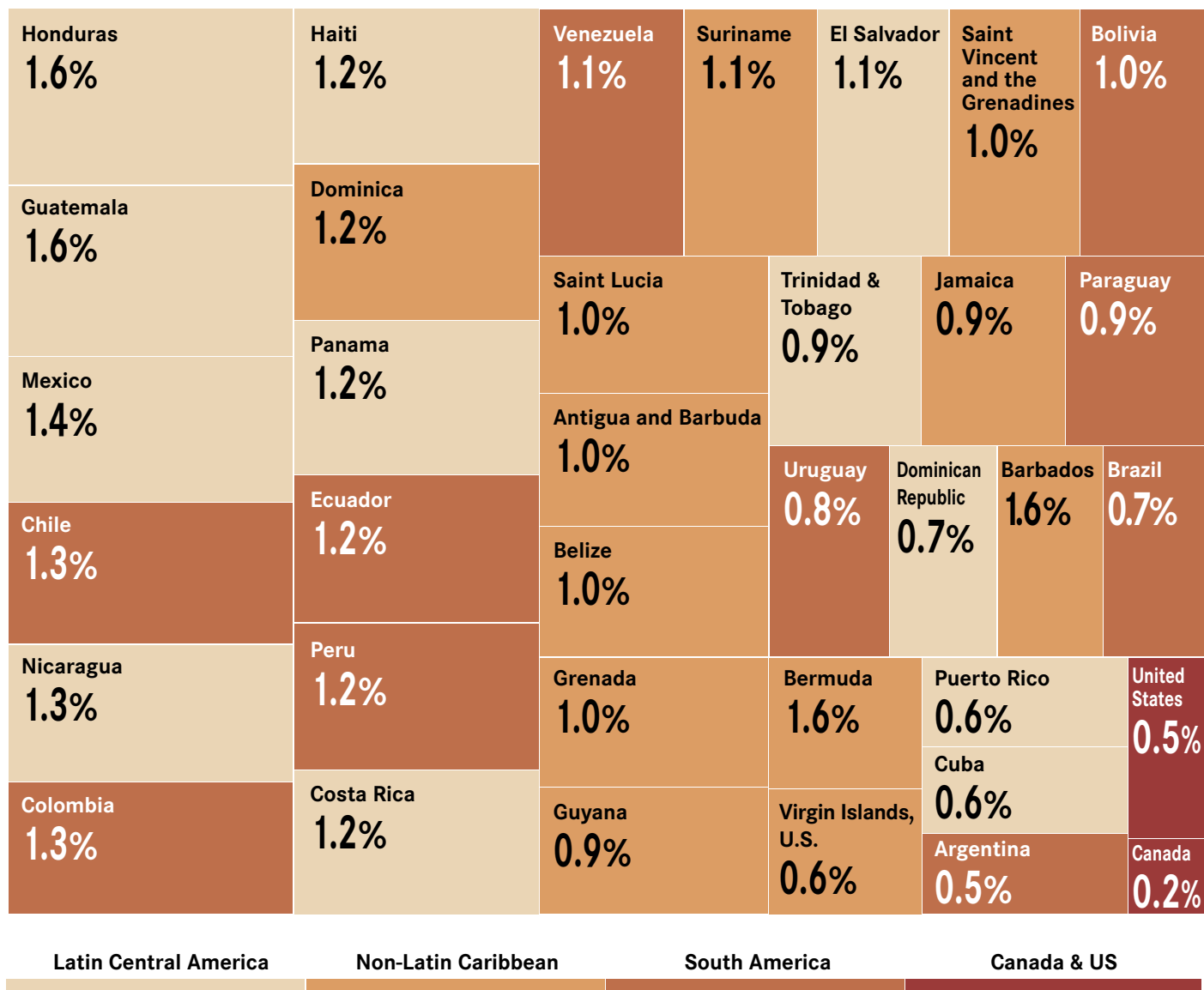
States, and a larger proportion in Honduras, Guatemala, and Mexico. In fact, most countries in Central America, South America, and the Caribbean are above the regional aggregate percentage (see Figure 20).

■ Migraine and tension-type headaches

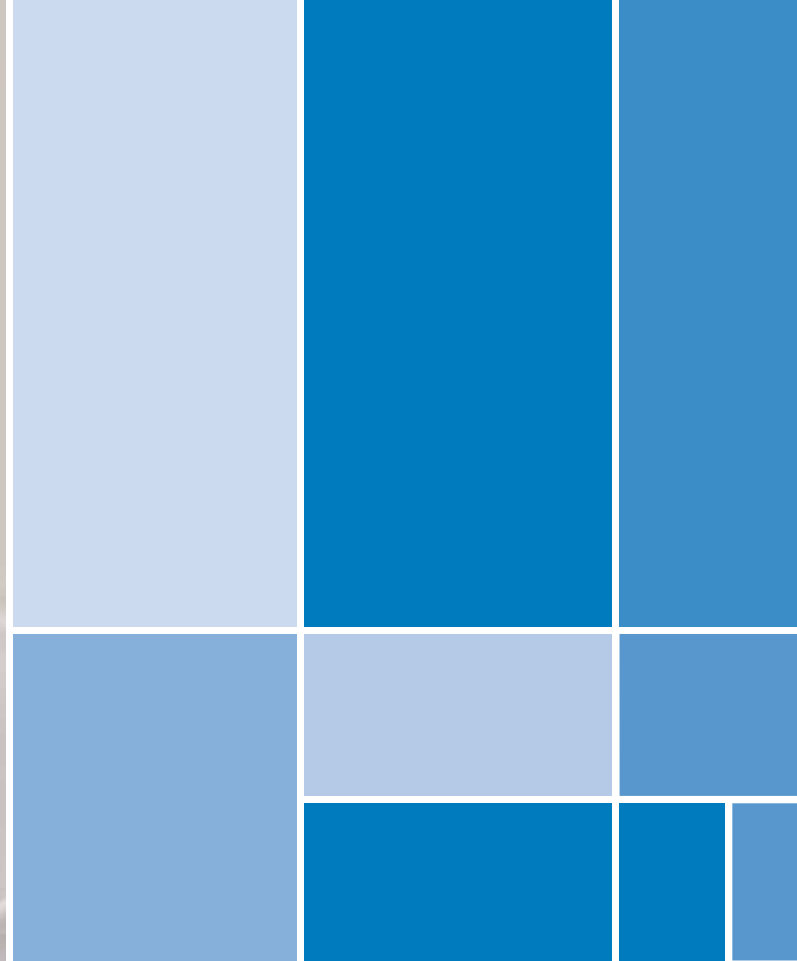
Migraines account for 4.4% of the regional disability burden, ranging from 3.6% in the United States (3.6%) to 5.4% in Peru. Tension-type headaches produce a comparatively lower regional burden (0.3%), and there

does not appear to be a subregional pattern for either condition. However, the significant burden of headache-related disability and its potential implications for health systems—namely, the need for widespread training of primary care workers in their detection and management—have only recently come to the fore.

Figure 20: Epilepsy disability tree map



Tree map dimensions: the color indicates the subregion and the size of each rectangle reflects the magnitude of the burden. Countries with similar burden are clustered together in the same region of the tree map.



Health system response in the Americas: Government funding for mental health services

This section will focus on how our societies respond to the challenge presented by the MNSS. In so doing, this study will analyze how investment in mental health services and allocation of spending vary as a function of national income. As a result, simple intuitive metrics are presented that allow for comparison of the gap between burden and spending across countries.

The present analysis is based on a set of estimates of health spending and allocation obtained by collating the latest available data reported to PAHO by governments of the Americas and published in the WHO Assessment Instrument for Mental Health Systems (WHO-AIMS). This

was supplemented with additional published data when missing, or when more recent WHO-AIMS country-level data were available (range: 2009-2015). For countries or territories with unavailable data for mental health spending or for fraction spent on mental hospitals, we imputed the median regional value. We excluded countries missing both data points, as well as territories without burden of disease data. We also obtained 2015 real per-capita GDP from the International Monetary Fund's World Economic Outlook Database. For the British Virgin Islands we imputed the subregional median for the Non-Latin Caribbean territories. A limitation to the following analysis emerges from the fact that these data are self-

reported by ministries of health to WHO, and its quality is variable due to lack of unified reporting criteria about which types of expenditures are included or excluded. For example, potentially significant resources allocated to dementia care or suicide prevention, or services delivered through the non-health sectors are probably not captured in these estimates. However, even considering these limitations, it is unlikely that inconsistencies in the inclusion of dementia, suicide prevention, or non-health sector expenditures would decrease the imbalance found in low-income countries. In fact, it is actually more likely that these expenditures would be much higher in high-income countries, thus increasing the strength of the inverse correlation shown here. Therefore, the following findings about the imbalance between the burden and the spending on mental health services can be considered conservative.

Mental health spending as a percentage of government health spending

Median spending in mental health services stands globally at 2.8% of total government health spending, despite the fact that mental disorders account for 12% of total DALYs and 35% of total YLDs. Low-income countries spend around 0.5% of their health budget in mental health services, and high-income countries, 5.1% (15). In the Americas, spending ranges from 0.2% in Bolivia to 8.6% reported by Suriname. There is a significant direct linear correlation between national income and Government spending in mental health as a proportion of the total health budget (see Figure 21).

WHO recommends that health spending allocation should be in proportion to the health burden, and that there should be parity between physical and mental aspects of

health care (32,33). In practical terms, this means that physical and mental health services should be provided in an integrated manner, and that the percentage of spending allocated to mental health services should be proportionate to the percentage of its attributable burden. There are several challenges to operationalizing these concepts: (a) as noted earlier, the DALY burden for mental disorders is usually underestimated due to lack of registration of deaths due to most mental illnesses. YLDs would provide a less biased comparator for disability across diseases, because disability is adequately registered for all disorders through prevalence estimates. However, since YLDs do not include mortality, they would not be appropriate as the only measure of overall burden. Also, (b) reporting mental health expenditures as a specific percentage of total government health spending is inconsistent across countries due to the lack of a unified reporting strategy (e.g. which types of services are included or excluded, how to estimate services delivered through other sectors, etc.). Moreover, it does not account for private spending, which in many countries is the main source of mental health funding. Despite these caveats, a simple measure is provided of mental health spending gap resulting from dividing the percentage of total DALYs attributable to MNSS by the percentage of the government health budget allocated to mental health services. A ratio of 1 would entail equality between the proportions of disease burden and spending, implying the assumption of equivalent cost-effectiveness of interventions across health sectors, which would not be based on current evidence.

Figure 22 shows all countries ordered by the ratio of mental illness burden to expenditure on mental health. A wide regional variation is evident, ranging from a burden that is 1.8 to 72 times the reported spending. The median for countries of the Americas is 6.1, indicating that the proportion of burden attributable to mental disorders is 6 times the proportion of health funds allocated to mental health.

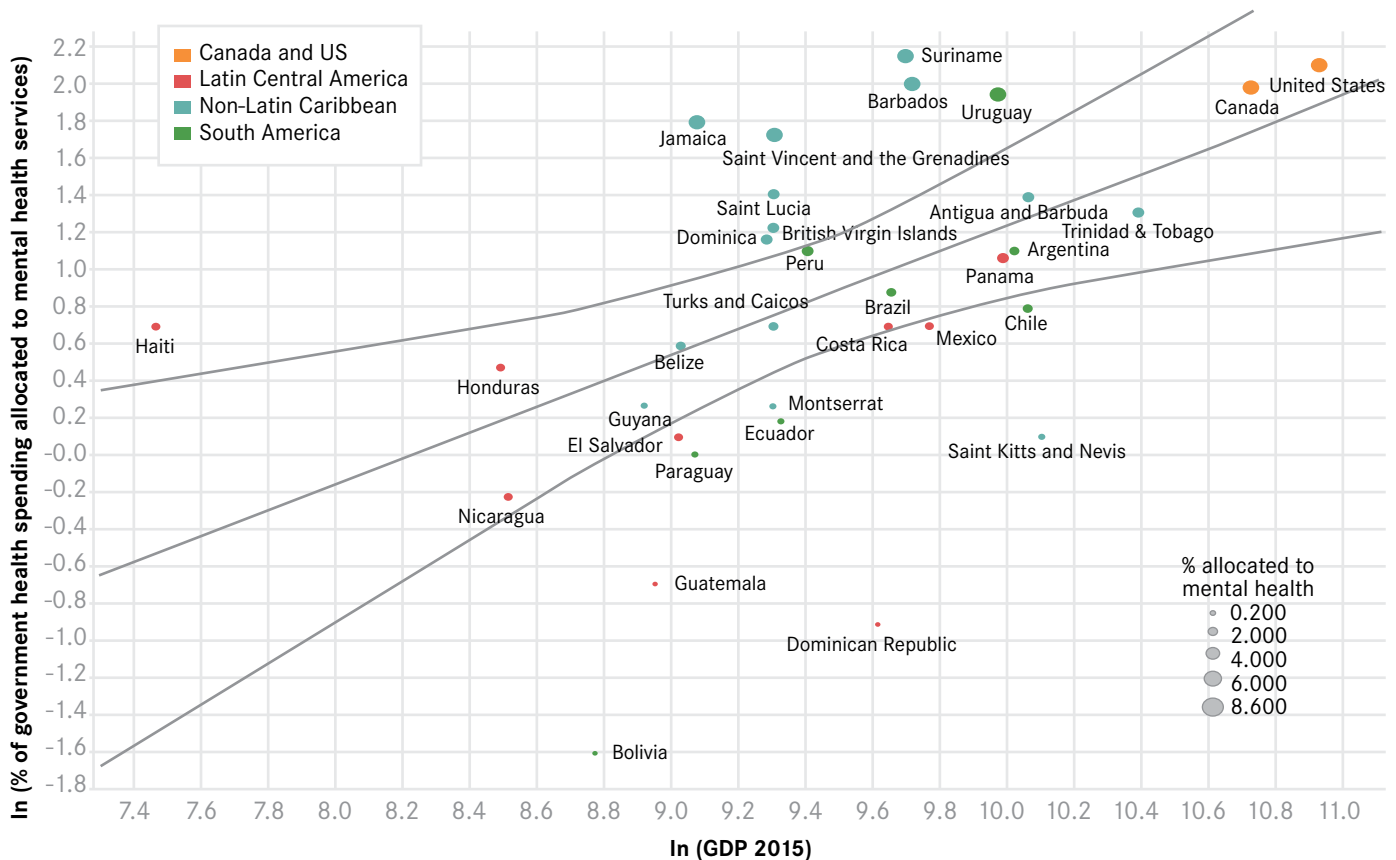
Mental health spending allocation

The previous analysis, however, does not take into account allocation of spending within the mental health subsystem. International guidelines and evidence indicate that services for mental disorders should aim at caring for people in the community, providing integrated services for mental illness in primary care or general hospitals, and community treatment plus social support for severely affected individuals (33). The fraction of mental health spending that is not allocated

to neuropsychiatric hospitals can be considered a proxy for how well allocated mental health spending is, since asylums lack any evidence of effectiveness, are notoriously inefficient, and can in fact lead to iatrogenic practices. Despite some outliers, a linear trend model correlating the natural logarithm of the percentage of the mental health budget allocated to neuropsychiatric hospitals and 2015 GDP is highly significant (see Figure 23).

The figure suggests that higher income countries not only spend a larger proportion of their health budget on

Figure 21: Mental health spending vs. per-capita GDP (PPP)*



*Linear model: $\ln(\% \text{ of health expenditures spent on MNSS}) = 0.68 \cdot \ln(\text{GDP}) + -5.6$. $R^2: 0.26$. $p=0.0036$. Confidence bands show upper and lower 95% confidence lines.

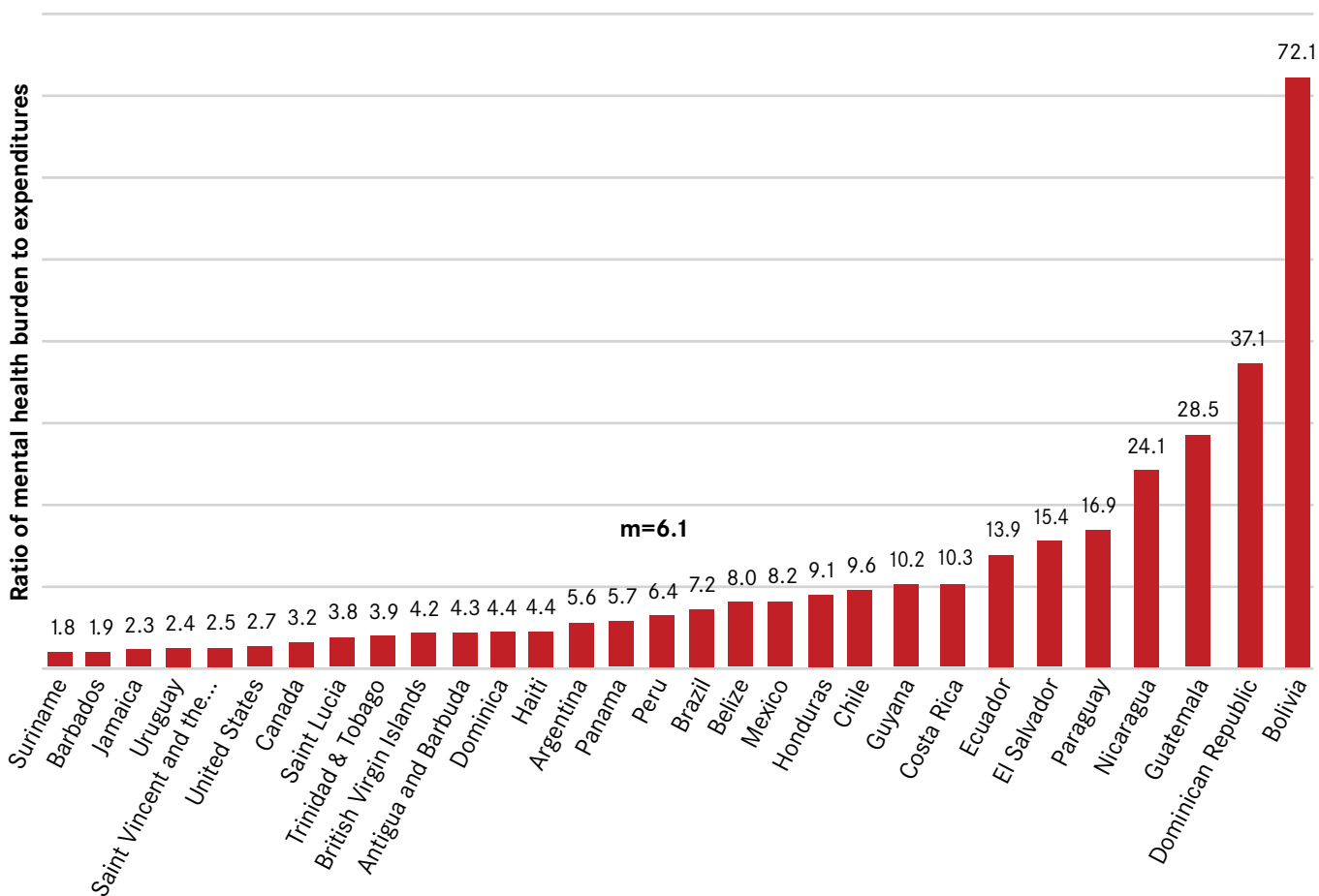
MNSS: Mental, neurological, substance use disorders and self-harm
 GDP (PPP): gross domestic product, purchasing-power parity adjusted

mental health services, but also potentially allocate that increasing proportion better, to mental health services that are evidence-based and follow international guidelines, providing integrated treatment in general health services and community support. This community-based approach is respectful of the social and human rights of patients, as opposed to asylum-based segregationist approaches that foster isolation and potentially human rights violations.

In order to visualize the magnitude of the imbalance in spending, and considering the mental burden that should

be managed in the community over the spending not absorbed by neuropsychiatric hospitals, a very different ordering can be obtained (compare Figures 22 and 24).¹ It is clear that in terms of percentage of burden over percentage of spending efficiently allocated, the imbalance varies by two orders of magnitude: from the burden being three times the spending in the USA and Canada to 435 times the spending in Haiti. The regional median indicates an imbalance between mental health burden and spending of 31.5 to 1. What this metric indicates is that there is a gap in spending associated

Figure 22: Ratio of % of total DALYs attributable to MNSS to % of health spending allocated to mental health, ordered from smallest to largest



MNSS: Mental, neurological, substance use disorders and self-harm
 m indicates the regional median value

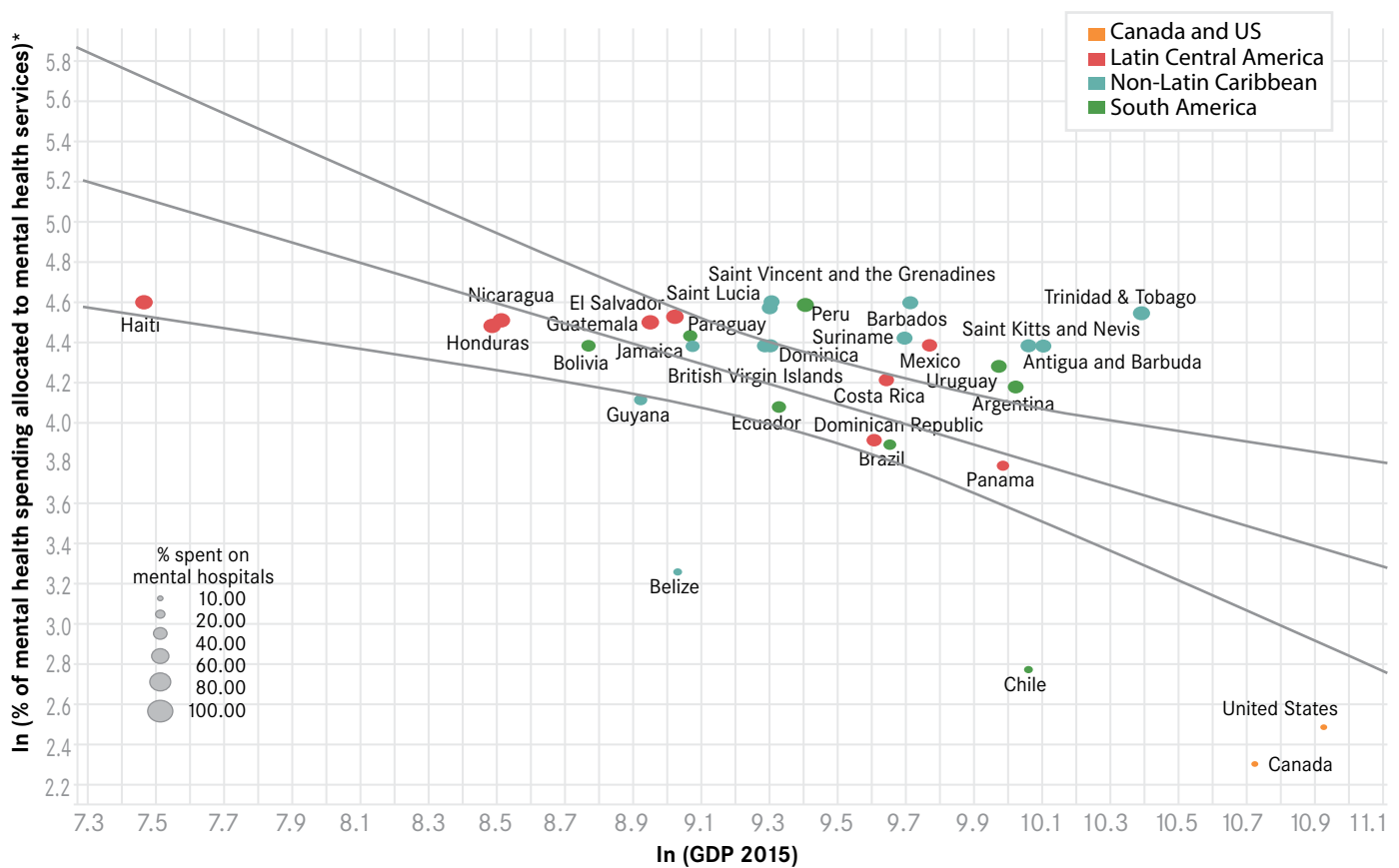
¹ This study subtracted from the numerator the percentage of burden attributable to the most severe health state associated with schizophrenia (69%), assuming that neuropsychiatric hospitals would be adequately suited to treat this fraction of the most severely affected. From the denominator, this study subtracted the fraction of spending allocated to neuropsychiatric hospitals.

with country-level income, disproportionately affecting lower-income countries.

This gap likely results in (a) an increasing treatment gap for poorer countries and (b) increased private spending in mental health services, particularly out-of-pocket expenses. For example, the 3 to 1 imbalance documented in Canada and the United States results in

undertreatment, which a recent study estimated to be 5 to 1 for depressive disorder in high-income countries. As such, only 22.4% received minimally adequate treatment in high-income countries, and specifically 26% in the United States (34). In low- or lower-middle income countries, the ratio was estimated at 27 to 1, with only 4.7% of people in need receiving minimally adequate services. Specifically, it was found that in Peru,

Figure 23: MNSS spending allocated to mental hospitals vs. GDP (PPP)¹



*Linear model: $\ln(\% \text{ MNSS expenditures spent on mental hospitals}) = -0.50 \cdot \ln(\text{GDP}) + 8.9$. $R^2=0.32$. $p=0.0012$. Confidence bands show upper and lower 95% confidence lines.

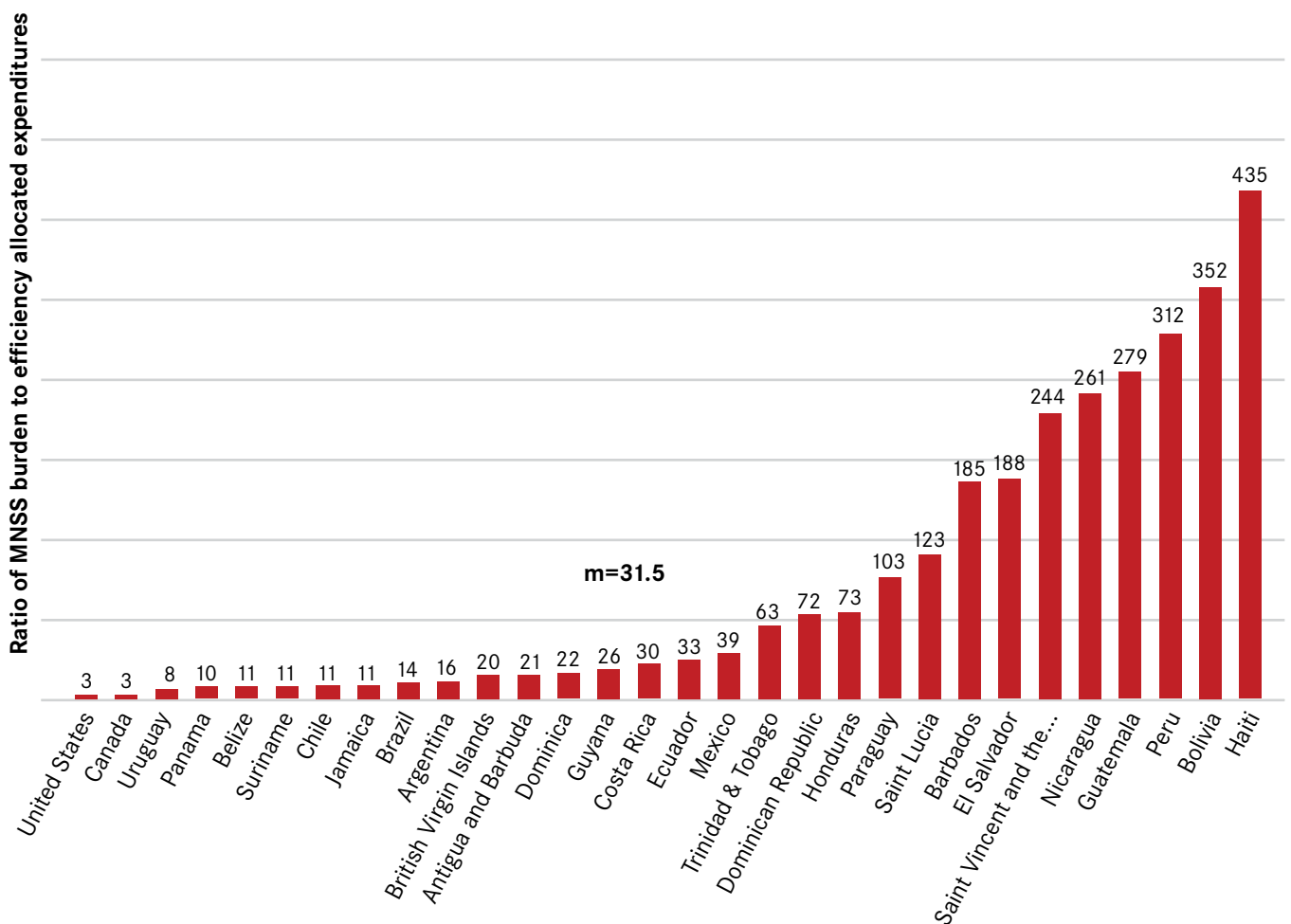
MNSS: Mental, neurological, substance use disorders and self-harm
 GDP (PPP): gross domestic product, purchasing-power parity adjusted

¹ Figures 21 and 23 raise the possibility that Haiti, Canada, and the United States may be outliers and influence our results. Hence, we re-ran the analyses excluding Haiti, Canada, and the US for both models. The results and their significance hold for the model correlating the fraction of overall health expenditures spent on mental health with GDP (with a p value <0.05) but lose significance for the model correlating the fraction spent on mental hospitals with GDP.

one person received minimally adequate treatment for every 100 persons with a valid diagnosis of depressive disorder. These numbers are consistent with the findings presented herein: (a) the United States and Canada show the lowest imbalance and (b) Peru has one of the largest gaps in the continent, with a 313-fold imbalance in burden relative to government spending. These findings merit

further study, for example, about whether the imbalance found is partly closed by private spending, leading to the 100 to 0.9 undertreatment found by Thornicroft et al., which in low-income countries would mean mostly out-of-pocket spending, piling potentially catastrophic economic burden upon the disease burden (34).

Figure 24: Imbalance in spending: ratio of MNSS burden to efficiently allocated spending *



MNSS: Mental, neurological, substance use disorders and self-harm
 m indicates the regional median value

* This ratio excludes from the nominator the percent of burden attributable to the most severe form of schizophrenia, and from the denominator the percent allocated to neuropsychiatric hospitals: (mental disorders as % of total DALYs-63% of schizophrenia DALYs)/(% health budget-% spent on neuropsychiatric hospitals). The GBD model estimates that 63% of prevalent cases correspond to acute schizophrenia, which carries a disability weight of 0.778. Meanwhile, 37% of prevalent cases correspond to residual schizophrenia, carrying a disability weight of 0.588 (disability weights range from 0, perfect health, to 1, equivalent to death). As YLLs for schizophrenia are negligible and YLDs result from multiplying prevalent cases by disability weight, it was estimated that 69% of the disease burden of schizophrenia is attributable to the acute state.



Conclusion

MNSS is a group of diseases and conditions that constitute a major cause of disability and mortality, and give rise to a third of total YLDs and a fifth of total DALYs in the Americas. Of the mental disorders, depressive disorders are the largest cause of disability alone, and combined with mortality, accounting for 3.4% of total DALYs and 7.8% of total YLDs. The second largest subset comprises anxiety disorders, with 2.1% and 4.9%, respectively, of total DALYs and YLDs. Self-harm and somatoform disorders with prominent pain should also be considered common mental disorders, accountable respectively for 1.6% of DALYs and 4.7% of YLDs. Severe mental illness leads to increased mortality, particularly in low-income settings, with high-income countries thus coping with an increased share of the disability burden due to schizophrenia. Several subregional patterns emerge in the distribution of specific mental disorders, and this report provides decision-

makers with a nuanced picture of mental disorders in most countries or territories of the Region. South America has in general higher proportions of disability due to common mental illness; suicide imposes a disproportionately high burden on three subregional clusters: Suriname, Guyana, and Trinidad and Tobago; Uruguay, Chile, and Argentina; and Canada and the USA. Depressive disorders take their largest toll on young working-age populations. Continental Central America has a larger proportion of disability due to bipolar and childhood onset disorders than other subregions, as well as due to epilepsy; and the USA and Canada suffer a high disability toll from schizophrenia and dementia, as well as devastating rates of opioid-use disorder disability and premature death.

The health system's response to the challenge of mental illness also shows regional variations, notably a correlation

with national income. Higher-income countries spend a larger share of their health budgets on mental health services, and appear to allocate their spending more efficiently, away from neuropsychiatric hospitals, towards integration of mental health into primary care and community resources. Conversely, lower-income settings seem to compound their lack of resources by allocating them to specialized neuropsychiatric hospitals instead of funding community and primary mental health services, a strategy that would target not only the increasing disability resulting from depression and common mental illness, but also the amenable mortality resulting from severe mental illness, largely due to treatable causes that remain uncared for due to stigma, lack of community support, and insufficiently integrated health services. The imbalance between the burden and the effectively allocated mental health services is appalling, ranging from 3 times in the United States and Canada to 435 times in Haiti, with a regional median of 32. This government spending gap, which disproportionally affects lower-income countries, can be expected to result in (a) undertreatment and increased amenable disability and mortality; and (b) increased out-of-pocket spending resulting in potentially catastrophic health spending, and decreased productivity both at the individual and national level.

In summary, MNSS is a group of diseases and conditions that are a major cause of disability and mortality, and give rise to a third of total YLDs and a fifth of total

DALYs in the Americas; furthermore, mental health is increasingly acknowledged as a global health and economic development priority. Indeed, the United Nation's Sustainable Development Goals explicitly refer to universal health coverage inclusive of mental health and well-being as a global commitment. It is imperative that Governments—especially of low- and middle-income countries (LAMICS)—reconsider how their health budgets are allocated. Instead of yielding to the inertia of minimal—usually reactive—adjustments to last year's line-item budgets, they can take bold steps to purposefully allocate funds following a rational assessment of needs, priorities, available resources, and existing evidence. Despite the obvious constraints that health and mental health budgets have in LAMICS, there is significant room to make meaningful improvements. In fact, it is precisely because of these constraints that effective and cost-effective use of resources is of paramount importance. Rather than allocating the lion's share to specialized hospitals, countries should prioritize funding community and primary mental health services, following a balanced care strategy that would target the multiple sources of disease burden resulting from mental disorders: mood disorders and suicide; substance use disorders and death by overdose or alcohol-related accidents and illnesses; and, finally, the increased mortality resulting from severe mental illness due to treatable causes that are ineffectively cared for due to stigma, lack of community support, and poorly integrated health services.

References

1. World Health Organization. *Mental health gap action programme. Scaling up care for mental, neurological, and substance use disorders*. Geneva: WHO; 2008.
2. Prince M, Patel V, Saxena S, et al. No health without mental health. *Lancet*. 2007;370(9590):859-877. doi:10.1016/S0140-6736(07)61238-0.
3. World Health Organization. *The world health report 2001. Mental health: new understanding, new hope*. Geneva: WHO; 2001.
4. Mnookin S, Kleinman A, Evans T, et al. Out of the shadows: *Making mental health a global development priority*. Washington, DC: World Bank; 2016.
5. Bloom DE, Cafiero ET, Jané-Llopis E, et al. *The global economic burden of noncommunicable diseases*. Geneva: WHO; 2011.
6. Patel V, Chisholm D, Parikh R, et al. Addressing the burden of mental, neurological, and substance use disorders: key messages from Disease Control Priorities, 3rd edition. *Lancet*. 2016;387(10028):1672-1685.
7. Votruba N, Eaton J, Prince M, Thornicroft G. The importance of global mental health for the Sustainable Development Goals. *J Mental Health*. 2014;23(6):283-286. doi:10.3109/09638237.2014.976857.
8. United Nations. *Transforming our world: the 2030 Agenda for Sustainable Development*. New York: UN; 2015.
9. Atun R. Transitioning health systems for multimorbidity. *Lancet*. 2015;6736(14):8-9. doi:10.1016/S0140-6736(14)62254-6.
10. Murray CJL, Barber RM, Foreman KJ, et al. Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition. *Lancet*. 2015;386(10009):2145-2191. doi:10.1016/S0140-6736(15)61340-X.
11. Murray C, Lopez A, editors. *The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020*. Geneva: WHO; 1996.
12. GBD 2015 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016;388(10053):1545-1602. doi:10.1016/S0140-6736(16)31678-6.
13. GBD 2015 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life- years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016;388(10053):1603-1658. doi:10.1016/S0140-6736(16)31460-X.

14. Charlson FJ, Baxter AJ, Dua T, Degenhardt L, Whiteford HA, Vos T. Excess mortality from mental, neurological and substance use disorders in the Global Burden of Disease Study 2010. *Epidemiol Psychiatr Sci*. 2014;24:121-140. doi:10.1017/S2045796014000687.
15. Vigo D, Thornicroft G, Atun R. Estimating the true global burden of mental illness. *Lancet Psychiatry*. 2016;3:171-178.
16. Institute for Health Metrics and Evaluation (IHME). Global Burden of Disease Study 2015 (GBD 2015) results. Seattle. <http://ghdx.healthdata.org/gbd-results-tool>.
17. Fekadu A, Medhin G, Kebede D, et al. Excess mortality in severe mental illness: 10-year population-based cohort study in rural Ethiopia. *Br J Psychiatry*. 2015;206(4):289-296. doi:10.1192/bjp.bp.114.149112.
18. Lawrence D, Hancock KJ, Kisely S. The gap in life expectancy from preventable physical illness in psychiatric patients in Western Australia: retrospective analysis of population based registers. *BMJ*. 2013;346:f2539.
19. Whiteford HA, Degenhardt L, Rehm J, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet*. 2013;382(9904):1575-1586.
20. Atun R, Vigo D, Thornicroft G. Challenges to estimating the true global burden of mental disorders - authors' reply. *Lancet Psychiatry*. 2016;3(5):403-404. doi:10.1016/S2215-0366(16)30045-1.
21. Fröhlich C, Jacobi F, Wittchen H-U. DSM-IV pain disorder in the general population. An exploration of the structure and threshold of medically unexplained pain symptoms. *Eur Arch Psychiatry Clin Neurosci*. 2006;256(3):187-196. doi:10.1007/s00406-005-0625-3.
22. Vigo DV, Selle V, Baldessarini R. [Enduring pain I. Nosology and epidemiology]. *Argentine Journal of Psychiatry, Vertex*. 2013;24(111):345-350.
23. Tyrer P, Reed GM, Crawford MJ. Classification, assessment, prevalence, and effect of personality disorder. *Lancet*. 2015;385(9969):717-726. doi:10.1016/S0140-6736(14)61995-4.
24. Salomon JA, Haagsma JA, Davis A, et al. Disability weights for the Global Burden of Disease 2013 study. *Lancet Glob Health*. 2015;3(11):e712-e723. doi:10.1016/S2214-109X(15)00069-8.
25. Marmot M. Social determinants of health inequalities. *Lancet*. 2005;365(9464):1099-1104. doi:10.1016/S0140-6736(05)71146-6.
26. Lund C, Breen A, Flisher AJ, et al. Poverty and common mental disorders in low and middle income countries: a systematic review. *Soc Sci Med*. 2010;71(3):517-528. doi:10.1016/j.socscimed.2010.04.027.
27. Black DW, Blum N, Pfohl B, Hale N. Suicidal behavior in borderline personality disorder: Prevalence, risk factors, prediction, and prevention. *J Pers Disord*. 2004;18(3):226-239. doi:10.1521/pedi.18.3.226.35445.
28. Baldessarini R, Selle V, Vigo DV. [Enduring pain II. Treatment]. *Vertex*. 2013;24(111):351-358.
29. Asmundson GJG, Katz J. Understanding the co-occurrence of anxiety disorders and chronic pain: state-of-the-art. *Depress. Anxiety*. 2009;26(10):888-901. doi:10.1002/da.20600.
30. Kleinman A. Global mental health: a failure of humanity. *Lancet*. 2009;374(9690):603-604.
31. Walker ER, McGee RE, Druss BG. Mortality in mental disorders and global disease burden implications: a systematic review and meta-analysis. *JAMA Psychiatry*. 2015;72(4):334-341. doi:10.1001/jamapsychiatry.2014.2502.
32. World Health Organization. *The mental health context-mental health policy and service guidance package*. Geneva: WHO; 2003.
33. World Health Organization. *Mental health action plan 2013-2020*. Geneva: WHO; 2013.
34. Thornicroft G, Chatterji S, Evans-Lacko S, et al. Undertreatment of people with major depressive disorder in 21 countries. *Br J Psychiatry*. 2016. doi:10.1192/bjp.bp.116.188078.
35. Pan American Health Organization. *WHO-AIMS: informe regional sobre los sistemas de salud mental en América Latina y el Caribe*. Washington, DC: PAHO; 2013.
36. Institute of Health Economics. *The cost of mental health services in Canada*. Edmonton, Canada: IHE; 2010.
37. WHO-AIMS. *Sistema de salud mental de Chile*. Santiago de Chile: WHO; 2014.

Annex 1

Non-Latin Caribbean Subregion Countries and Population

Country	
Antigua and Barbuda	91,861
Barbados	283,841
Belize	358,715
Bermuda	66,868
Dominica	71,672
Grenada	106,968
Guyana	770,068
Jamaica	2,823,613
Saint Lucia	185,108
Saint Vincent and the Grenadines	109,755
Suriname	542,588
Virgin Islands, U.S.	106,626

