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Future Health Spending in Latin America and the Caribbean: Health Expenditure Projections & Scenario Analysis

Krishna D. Rao
Andrés I. Vecino Ortiz
Tim Roberton
Angélica Lopez Hernandez
Caitlin Noonan

Social Protection and Health Division

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scl-sph@iadb.org

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Future Health Spending and Treatment Patterns in Latin America and the Caribbean

Health Expenditure Projections & Scenario Analysis

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This report was prepared by a team at Johns Hopkins University, USA in collaboration with a team of consultants.

Johns Hopkins University: Krishna D. Rao, Andrés, I. Vecino Ortiz, Tim Roberton, Angélica Lopez Hernandez, and Caitlin Noonan

Co-Investigators: Paulina Giusti, Augusto Portocarrero, Midori de Habich (Instituto de Análisis y Gestión Perú); Angela Vega Landaeta, Natalia M. Palacio Martínez (National Administrative Department of Statistics, Colombia); Andrea M. Prado, Claudio A. García Mora (INCAE Business School); Carla Jorge Machado (Federal University of Minas Gerais); Yvonne Flores Leonard, Paula Ramírez Palacios, Marisol Torres Toledano, Célida Duque Molina (Mexican Institute of Social Security); T. Alafia Samuels (University of the West Indies, Jamaica); Althea La Foucade, Karl Theodore, Christine Laptiste, Vyjanti Beharry, Charmaine Metivier (University of the West Indies, St. Augustine, Trinidad and Tobago); and Daniel Maceira, Alen Jimenez (National University of Buenos Aires, Argentina)

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Executive Summary

Introduction

Latin American and Caribbean countries will face significant increases in future health expenditures. A variety of factors are responsible - population growth and aging, the epidemiological transition to noncommunicable diseases (NCDs), and economic growth and technology, among others. Increasing health expenditures are particularly concerning to countries in Latin America and the Caribbean (LAC) given growing levels of debt, insufficient fiscal revenues, and high out-of-pocket payments.

With this knowledge, the Inter-American Development Bank commissioned the Johns Hopkins Bloomberg School of Public Health (JHSPH) in collaboration with seven LAC institutions to develop an economic model to estimate health expenditures in the region over the next three decades. The "Future Health Spending and Treatment Patterns in Latin America and the Caribbean" project aims to (a) forecast current health expenditures (CHE) to 2050 and (b) to understand the effects of modifying NCD risk factors and controlling health care costs on CHE growth.

Projecting health expenditures

For seven countries (Argentina, Brazil, Colombia, Costa Rica, Mexico, Peru, and Trinidad and Tobago), we obtained a baseline current health expenditure matrix for the year 2018 or 2019 disaggregated by age group and ICD-10 Chapter. We call these our "index countries" and developed a growth model for each one based on population growth and aging, changes in prevalence of diseases, and an 'economic growth and technology' parameter. This parameter captures the contribution of income growth and other factors such as technological changes, intensity of service use, health sector wage increases, and government policies. To estimate future health spending for each age and disease category to 2050, we applied the growth model to our index countries' baseline expenditure matrices.

To extrapolate from our index countries to the remaining LAC countries, we grouped countries by their average per capita health expenditures from 2015-2018. We then assumed that the age-expenditure profile of the index countries represented those of the other countries they were grouped with. In this way, baseline CHE matrices by age group and ICD-10 Chapter were established for each LAC country in this study. We projected expenditures to 2050 using country-specific changes in population, epidemiology, and economic growth and technology. The effect of modifying NCD risk factors and cost control strategies on future health expenditures was obtained by suitably modifying model parameters.

Projection results

In nearly all Latin American and some Caribbean countries, there is at least a doubling of CHE per capita between baseline and 2050. Large increases are seen in the Dominican Republic (447%), Panama (373%), Peru (344%), and Trinidad and Tobago (257%). The projected average annual per capita CHE growth rate from 2018-2050 is slightly higher in Latin American countries (3.2%) than in the Caribbean (2.4%).

The share of health expenditure in GDP is projected to increase to 2030 in all LAC countries besides Guyana, though the extent of the increase is heterogeneous. In some countries (Argentina, Nicaragua, Uruguay, Brazil, and Suriname), the projected share of CHE in GDP is expected to be 11% or higher by 2030, which has important implications for affordability. Our projections also indicate per capita health expenditures will continue growing faster than per capita GDP in the majority of LAC countries.

The highest median annual growth rates of CHE by ICD-10 Chapter are observed for noncommunicable diseases including neoplasms and diseases of the genitourinary system and circulatory system. Expectedly, these disease categories will also experience the largest increases in the share of CHE among all disease categories between baseline to 2050. Disease categories encompassing infectious diseases and those related to maternal and neonatal health experience relatively lower growth in CHE. Trends in health expenditure growth by ICD-10 Chapter are similar between Latin American and Caribbean countries.

By age, the median annual growth in CHE between baseline and 2050 is lowest for the youngest age groups and increases with age. In the Latin American region, the median growth rate is at or below 2% a year until around age 25, and then it increases to over 6% for the oldest age groups. In the Caribbean region, similar trends are observed, but the median annual growth rates are lower compared to Latin America. Furthermore, the median share of CHE by age group decreases over time in the younger age groups until age 50-54, after which the median share increases over time with the largest increase in the 85+ age group. These trends in growth rates indicate that the growth in CHE will be driven by expenditures in the older age groups, which in turn is driven by the growth in the size of these age groups, as well as the growth in the per capita health expenditure in these ages.

Of the four factors we considered in our projections (economic growth and technology, population growth, population age structure, and disease prevalence), economic growth and technology has the largest effect on increasing CHE. The effect of demographics and epidemiology, including the effects of population growth, aging, and age-specific disease prevalence, have the second largest effect on CHE for Latin America and the Caribbean. The contribution of only population growth and only aging are modest in comparison to other factors. Overall, the relative change in CHE is from 2018/19-2050 is 2.7 for Latin American countries and 4.7 for Caribbean countries.

Variation in current health expenditures attributable to reducing risk factors for noncommunicable diseases, cost control, and achieving universal health (UHC) coverage

We modeled the potential effect on CHE growth of 1) a reduction in the prevalence of selected risk factors (tobacco use, hypertension, high blood glucose, and alcohol use) and 2) cost containment policies. We carried out the cost containment scenario by substituting a lower rate of growth due to constraining the effect of economic growth and technology on health expenditures. The lower rate of growth was based on western European and high-income countries as applied to LAC countries. In addition, we calculated the CHE growth required to achieve a UHC index equal to 90 by imputing the elasticity of UHC to CHE growth and assuming a linear trend.

Reducing the prevalence of hypertension is the most important risk factor for reducing projected CHE in 2030 for most countries. Reducing the prevalence of high blood glucose has variable benefits across LAC countries with the highest benefits in the Caribbean and Mexico. As expected, countries with the highest prevalence of smoking, like Brazil, receive the greatest reductions in CHE and DALYs with reductions in tobacco use. Of these risk factors, the lowest effect on CHE and DALYs reduction is alcohol. The feasibility of reducing the prevalence of risk factors varies substantially; there are known interventions to decrease alcohol and tobacco consumption while hypertension and high blood glucose are more challenging to address.

Discussion

Our projections indicate that between baseline and 2030, many LAC countries will experience per capita health expenditure growth rates that exceed the growth in their national incomes. These trends make it imperative for LAC countries to implement cost control mechanisms while striving for universal health coverage. The main driver of health expenditure growth is economic growth and technology. The effect of demographics and epidemiology (which includes the effects of population growth, aging, and age-specific disease prevalence) had more modest effects on expenditure increases. Further, the share of chronic conditions in CHE will increase in the future, as will the share of older age groups. Among strategies to control NCD risk factors, a focus on hypertension control will be the most rewarding in terms of CHE growth.

'Economic growth and technology' is the strongest driver of health expenditures. As such, policies aimed at cost containment will be the most effective in reducing CHE. To tackle this issue, certain strategies are key, such as the ability to set up explicit prioritization systems and benefit plans that establish common rules for payers and providers, while at the same time ensuring that the technology offered by each country's health system is cost-effective. Thus, the development of health technology assessment agencies in countries might be an important step to take in the short-term to reduce long-term costs associated with technological change.

This analysis reveals that most countries are not on track to achieve a UHC index of 90 by 2030. The investments needed to achieve this goal by 2030 range greatly with some countries with higher baseline UHC values in 2020 requiring less than 5% increases in CHE and other countries requiring investments of over 100% of their baseline CHE. Latin American countries require less investment on average compared to Caribbean countries to reach a UHC index value of 90.

Conclusions & recommendations

Health systems in Latin America and the Caribbean are expected to face significant challenges in meeting future health spending needs and aspirations for UHC. As such, it is important for countries in the LAC region to engage in cost containment strategies. The following strategies are recommended to support cost control and the efficient use of health resources:

1. Establish structured fee negotiations and standardize prices for government/payers and providers that balance the interests of payers and providers.

2. Deploy provider payment methods that encourage efficient provider behavior, while ensuring quality and patient centeredness.

3. Strengthen primary health care systems to improve prevention and treatment at lower levels of care.

4. Improve the integration of services and the provision of cost-effective preventive and public health services.

5. Enhance interoperable and integrated information systems that improve coverage and data availability for policy makers, while also reducing transaction costs, inefficiency, and redundancies.

6. Promote the use of cost-effective technologies by creating agencies for Health Technology Assessment (HTA).

These projections offer insights into health expenditures for LAC countries in coming decades with implications for the multilevel approaches required to address the drivers of spending.

Introduction

Countries in Latin America and the Caribbean (LAC) have experienced important developments over the past several decades that will profoundly affect the growth of their health expenditures, as well as their abilities to finance health care. Sustained economic growth has pushed most countries in the LAC region into upper middle-income status. Further, demographic and epidemiological transitions have raised life expectancy, increased population aging, and made non-communicable diseases (NCDs) –which are more expensive to manage– the main source of the region's disease burden. These and other factors will continue to fuel increases in health expenditures that threaten the sustainability of the region's health systems, since most LAC countries are middle-income and face significant fiscal constraints. As such, governments in the LAC region have important challenges ahead in financing future health expenditure growth while aspiring for universal health coverage.

Conscious of this issue, the Inter-American Development Bank commissioned the Johns Hopkins Bloomberg School of Public Health (JHSPH) in partnership with seven Latin American and Caribbean institutions to estimate health expenditure trends in LAC countries. The project "Future Health Spending and Treatment Patterns in Latin America and the Caribbean" aims to develop an economic model to project health expenditures in the LAC region over the next 30 years. Previous studies have found that growth in health spending per capita is expected to be slower than historical growth but still above the economy's growth rate over the next fifteen years (1). This report aims to build upon that existing body of research and examine how health expenditures over the next 30 years will change based on changing disease burden, inflation, and demographic change.

The following are the primary questions that this study will attempt to answer in the context of LAC countries:

I. How will health expenditures in LAC evolve over the next 30 years due to changes in economic growth, population increases, population aging, epidemiological change, and other related factors?
II. What intervention related to modifying NCD risk factors would improve population health while reducing or slowing the growth of health expenditures?
III. What are the potential impacts of controlling health care costs or moving towards universal health coverage on future health expenditures?

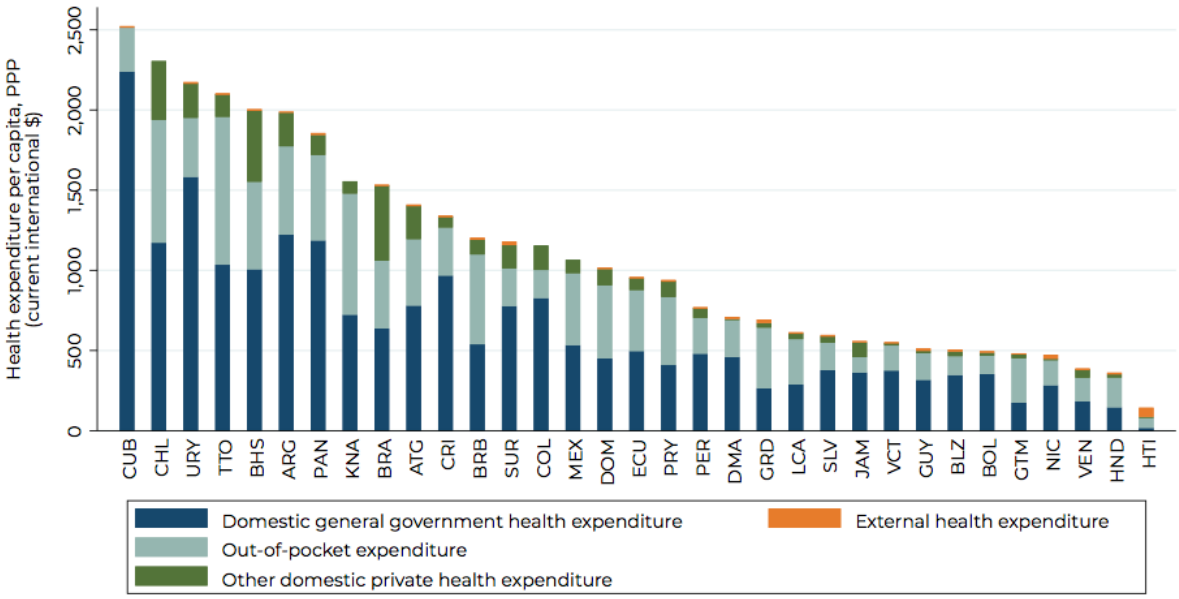
Chapter 1

Health Expenditures in Latin America and the Caribbean

Countries in the Latin American and Caribbean (LAC) region present differing levels of expenditures on health. Per capita health spending ranges from a low of $63 USD for Haiti or $173 USD for Nicaragua to a high of $1,455 USD in Chile or $1,686 USD in Uruguay. Countries in Latin America ($632 USD) and the Caribbean ($636 USD) have similar levels of per capita health expenditure on average (Figure 1.1). However, compared to high income countries, LAC countries have significantly lower per capita health spending. For example, average per capita expenditures in the LAC countries (PPP $1,251 USD) are around one fourth of the OECD average (PPP $5,313 USD) (2). As a share of GDP, health expenditures in LAC countries show large variation (Figure 1.2). The LAC countries (excluding Cuba) spend from a low of 3.6% to a high of 9.6% of their GDP on health (Figure 1.2). Several countries like Argentina, Brazil, Uruguay, and Chile spend at levels observed in universal coverage systems of high-income countries, which typically spend between 8% to 11% of their GDP on health (2). However, among these four countries, the total spending in Argentina and Brazil is driven by large shares of out-of-pocket and private voluntary insurance expenditures; whereas publicly mandated and supported financing in Chile and Uruguay dominate the composition of health sector spending in patterns that are more similar to the OECD.

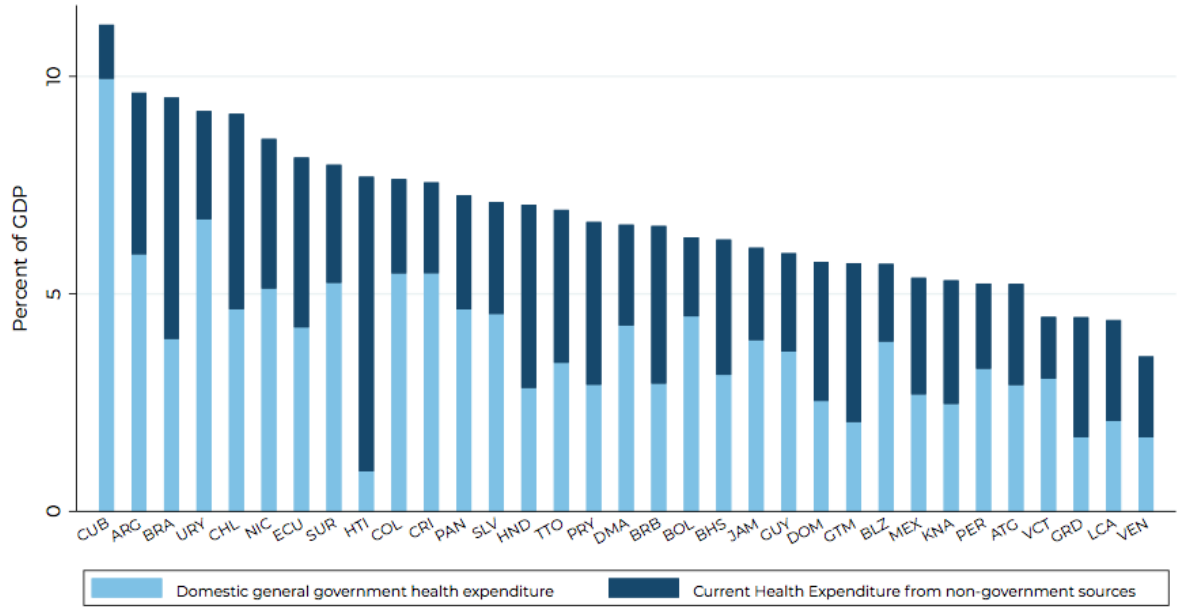
Public spending on health is recognized as a necessary ingredient for progressing towards universal health coverage. Higher levels of public spending on health are associated with lower out-of-pocket expenditures and associated financial hardship and impoverishment (3). A benchmark of 5% of GDP is commonly cited as the minimum level of public spending on health necessary for universal coverage, though the amount a country needs to spend is also affected by how efficiently it spends and its goals for population health (4). Countries in the LAC region display wide variation in the levels of public spending on health as a share of GDP. Countries like Nicaragua, Suriname, Colombia, Argentina, Costa Rica, and Uruguay have government health expenditure levels around the 5% benchmark. Yet most countries in the region are below this benchmark, and some of them like Venezuela, Grenada, Guatemala, Honduras, and Mexico have lower expenditure levels of around 3% of GDP. It is important to note, however, that countries in the LAC region have significantly higher public spending on health compared to countries in South Asia and Africa.

Figure 1.1 Current health expenditure per capita as share of government, private, and external health expenditure in LAC, 2018.



Source: World Bank World Development Indicators 2021

Figure 1.2 Current health expenditure and government expenditure as share of GDP in LAC, 2018.



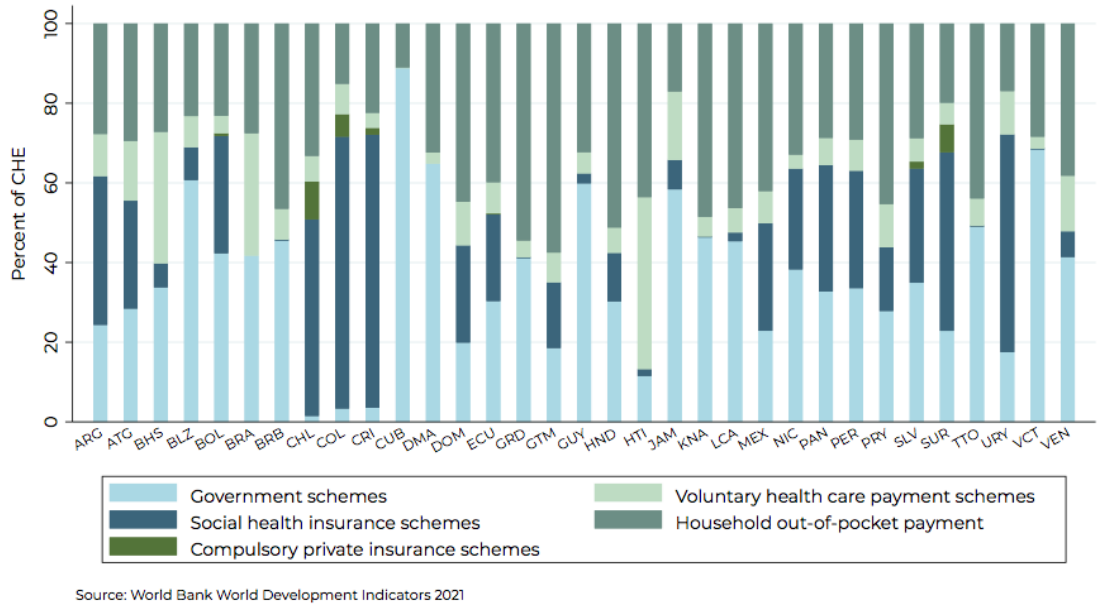
Source: World Bank World Development Indicators 2021

Across the LAC region, a large portion of health expenditures are publicly financed (Figures 1.1 & 1.2). For most countries presented in Figure 1.2, public financing represents an important source of health care funds. This is a testimony to efforts made by countries in the region to increase public financing of health care, as well as achieve universal health coverage. Many Latin American countries have established social health insurance systems as a means

of achieving universal coverage, notable among them being Colombia and Costa Rica (Figure 1.3). Others, especially in the Caribbean, have adopted a National Health Service approach by financing health care primarily through general tax revenues that is (largely) free at the point of service. Brazil has aspired to a national health service by unifying public spending in a single national program, but its *de facto* system is dual, with most of the private spending and some public funds being used to subsidize private services. Countries in the LAC region are comparable or better than those in South and East Asia in terms of public financing of health care; however, they lag behind those in Western Europe and other high-income countries. As such, private sources of funding for health continue to be an important source of financing health expenditures in the LAC region.

Out-of-pocket expenditures on health have declined across the LAC region (Figure 1.4). This has largely been due to increased government investments in health. However, despite the relatively high levels of public financing of health care, out-of-pocket spending continues to be relatively high in many LAC countries (Figures 1.3 & 1.4). For instance, in Honduras, Grenada, and Guatemala, nearly 50% of current health expenditures are financed by out-of-pocket expenditures. At the other extreme, countries like Colombia, Uruguay, Jamaica, Suriname, and Costa Rica have out-of-pocket expenditure levels below 20% of current health expenditures. For most countries in this region, out-of-pocket spending on health represents a major source of financing for health with levels upwards from 30% of current health expenditures. Financing health care through out-of-pocket spending is a regressive way to pay for health care. Further, high levels of out-of-pocket spending, typically over 20% of current health expenditures, are associated with high levels of catastrophic health expenditures and impoverishment (5). Because out-of-pocket health expenditures decline with increased public spending on health, the persistently high levels of out-of-pocket expenditures in LAC countries are somewhat surprising. Possible reasons for this include moderate coverage of pre-paid health services, and poor responsiveness and quality of publicly financed health services in addition to the preference for privately provided services paid for out-of-pocket in some contexts.

Figure 1.3 Sources of health care financing in LAC.



Source: World Bank World Development Indicators 2021

Figure 1.4 Out-of-pocket spending (OOPS) as a share of current health expenditure (2000-2018).

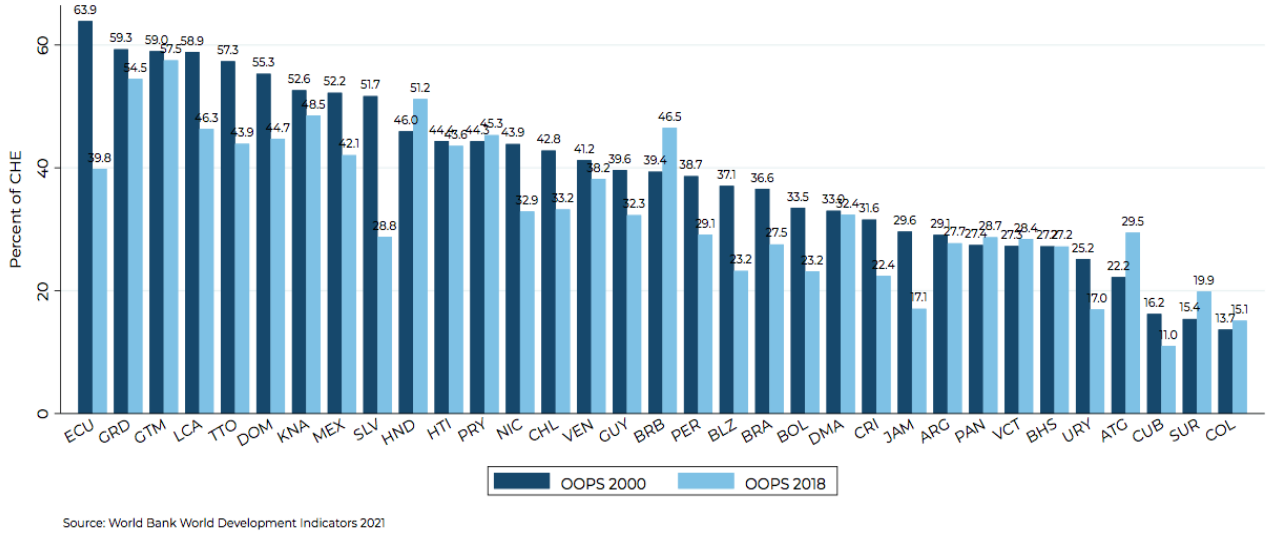
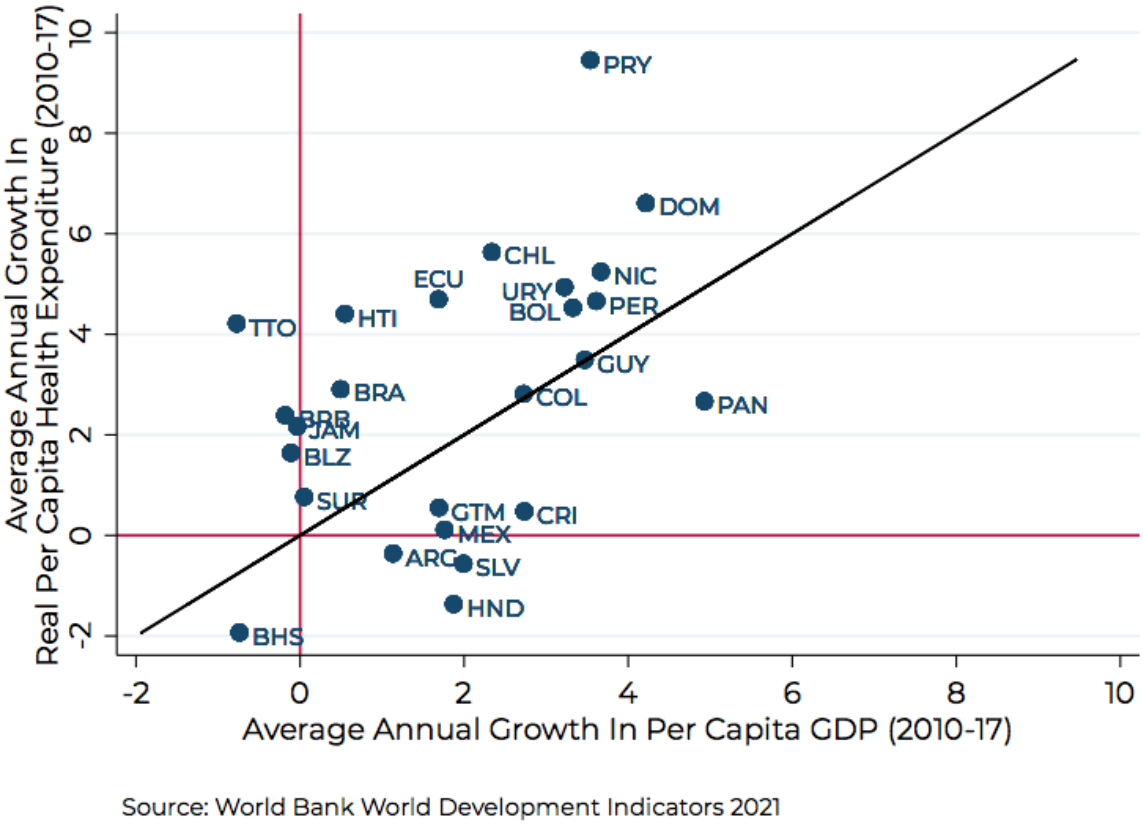


Figure 1.5 Growth in annual per capita health expenditure and annual per capita GDP (2010-2017).



Growth in health spending will be a constant concern to governments in the LAC region because many of them finance most of their health expenditures through public means and

others aspire to increase public spending to progress towards universal coverage. Figure 1.5 shows the positive relationship between growth in real per capita health expenditures and the average annual growth in per capita GDP from 2010 to 17. Countries lying above the diagonal trend line have had higher growth in health expenditure than in GDP, while those lying below have experienced lower growth in health expenditure than in GDP. For countries above the diagonal line, such as Chile, Peru, Bolivia, Brazil, and Trinidad and Tobago there are important concerns about their ability to afford the growth in future health expenditures. For countries below the diagonal line like Mexico, Guatemala, and Costa Rica there are fiscal opportunities to expand spending on health given that increases in national income are outpacing health expenditures.

Chapter 2

Determinants of health expenditures

Health expenditures have increased over time in every region of the world (6). This trend is captured in the idea of the health financing transition wherein countries shift from an early period in which health spending is low and financed largely by out-of-pocket expenditures to a time where health spending is high and financed largely by pooled funds (e.g., through general taxes or social health insurance) (6). Studies have identified several factors responsible for increasing national health expenditures - economic growth, population aging, burden of disease and changes in risk factors, changes in medical technology and practices, general inflation in the economy, inflation in price of health care, and changes in the financing and management of the health system (1). Below we discuss these factors in the context of LAC countries.

Income growth: The level of national expenditures on health is determined by several factors. Wealthier countries spend more on health than poorer ones. Further, as countries get wealthier, they spend more on health. As several studies have pointed out, the level and growth in national income has the largest effect on increasing health expenditures (7–9). Economic growth contributes to health expenditures at the individual and national level in multiple ways. People's demand for health services, particularly quality health services, which are more expensive, increases with wealth. Secondly, as countries get richer, governments increase their investment in mechanisms such as national insurance programs or national health services to fulfill policies aimed at increasing coverage and lowering out-of-pocket spending.

The relationship between wealth and health spending is also played out in the LAC region. Among LAC countries, Haiti (with a GDP per capita of $1,435 USD) and Nicaragua ($2,014 USD) are among the poorest with per capita health expenditures of $64 USD and $173 USD, respectively. At the other end of the spectrum, Trinidad and Tobago ($17,037 USD), Chile ($15,888 USD) and Costa Rica ($12,468 USD) spend around $1,123, $1,455 and $909 USD respectively. In other words, the wealthiest countries in the LAC region spend at least five times more per person than the poorest countries.

The contribution of economic growth to health expenditures has been a topic of much research. There is a long history of studies that have attempted to quantify the contribution of growth in national income to growth in health expenditures (8). Table 2.1 presents recent estimates of income elasticities based on panel data. Income elasticity indicates the percentage increase in health expenditures for a 1% increase in national income – for example, an elasticity value of 0.14 indicates that a 1% increase in national income contributes to a 0.14% increase in health expenditures. There are some notable patterns - income elasticities decline with rising national income. The income elasticity for lower middle-income countries ranges from 0.9 to 1.2, while for high income countries it is between 0.45 and 0.62. One implication of this is that while health is a normal good (i.e., increases in income raise health expenditures), health tends to be more of a luxury good in poor countries and a necessity (income elasticity below 1) in richer ones. Studies specific to OECD countries have

values of around 0.7 (10). More on point, one study has reported elasticity for LAC countries ranging from 1.3 to 1.6 (Table 2.1). However, this estimate combines two very different regions, Latin America -with significant presence of health insurance schemes supported by payroll taxes (except in countries like Brazil which are characterized by a combination of national health services and private insurance) - and the Caribbean where public health systems based on general taxes prevail. The authors of this study estimate that the income elasticity for Latin America is 0.88 and for the Caribbean is 1.14 (Annex 5).

Table 2.1 Recent estimates of income elasticity of health expenditures

Region	Elasticity Values
Western European Countries	0.14 – 0.66[12]
Latin American and Caribbean	1.3 – 1.6[12]
High income	0.5[11]; 0.45 – 0.62[12]
Upper-middle income	0.51[1]; 0.63-0.65[12]
Lower-middle income	0.9-1.2[12]
OECD	0.73 [1]

Source: (1, 11,12)

Studies forecasting health expenditures have consistently found that economic growth is the largest contributor to growth in health expenditures. A study on predicting health expenditures in OECD countries found that income is the most important driver, increasing growth by 1.5% - equivalent to half of annual health spending growth (1).

Demography: Both the demographic and epidemiological transitions have important implications for health expenditures. As populations progress through demographic and epidemiological transitions, mortality at younger ages and fertility rates fall, and the age structure of the population shifts from countries having many younger and few elderly people to fewer younger and many elderly people. As life expectancy increases, the disease burden shifts from communicable to non-communicable diseases, including diet-related non-communicable diseases. Per capita health expenditures generally increase with age and are typically highest in the oldest age groups because older people use health services more frequently and more intensively than younger people. Chronic illnesses also increase with age and require more expensive longer-term care; thus, health expenditures are generally high in the period preceding death. While an aging population will have an upward effect on health expenditures, the important question is if this is a large effect, particularly compared to other factors.

Studies indicate that shifts in the population age structure to older ages over time explain only a modest part of the rise in health care expenditures relative to other drivers such as economic growth and treatment practices related to technology (13,14). Health expenditures are highest in the period before death. As such, with populations living longer, end-of-life

health expenditures are pushed further into the future, reducing health expenditures in the now "younger" age-groups. This pattern suggests that population aging itself will have modest effects on health expenditures. Further, the global push towards healthy aging, whereby the elderly achieve a life characterized by little disease and disability, high functional capacity, and active engagement, will also contribute to moderating health expenditures in older ages (15). A study from China reported that population growth contributed 0.2 percentage points of the 8.4% growth in health expenditures over a 35-year period (16). A report from the OECD found that the demographic effect increases health expenditures by 0.7% per year, and this can range from 0.1% to 1.5% per year, depending on the country (1).

Epidemiology: Over time as countries progress through demographic, epidemiological, and nutritional transitions, longer life spans are accompanied with shifts in the disease burden from communicable to non-communicable diseases (NCDs). These chronic illnesses require care over extended periods and at more expense costs. The LAC region has a high burden of non-communicable diseases – around 77% of deaths are attributable to NCDs (17). The consequences of this changing disease burden are closely linked to the effects of population aging discussed earlier. Further, changing patterns of disease burden make it difficult to judge the directional effect on health expenditures. Gains in reducing the disease prevalence of cardiovascular disease through control of risk factors such as smoking will reduce health expenditures, while the increasing prevalence of obesity and diabetes will put an upward pressure on health expenditures. The net effect will depend on the context of the country. As such, studies that decomposed growth in health expenditures have found that changes in disease burden have a minimal and, in some instances, negative, independent effect on growth in health expenditures (16,18).

Technology: In general, technological change in health has increased health care spending (6,19). The effects of new technologies on expenditures can be difficult to determine both due to methodological considerations, as well as variations in effect by type of technology. To illustrate, innovations in medical devices have been found to only modestly increase health care expenditures compared to pharmaceuticals. Changes in pharmaceutical technologies can reduce costs if the newly approved medication is a cost-effective way of preventing, managing, or treating an illness that was previously more costly to address. However, even in these cases, if greater affordability leads to a more than proportional increase in prescription and use, the total overall cost to society could still rise. Indeed, many studies have shown that technological advances in health care tend to increase health expenditures, either because new technologies with lower costs are followed by increased volumes demanded or because new technologies which are more expensive are prescribed by clinicians and sought after by patients who want the newest, high-cost investigations and interventions. A study of OECD countries reported that technological change contributed to a 0.4% increase in health spending annually, all else equal (1).

Productivity: Health is a human resource intensive sector. As such, technological advancements will not lessen the need for labor as they may in other sectors. In fact, technological advances in health can increase costs due to increased need for specialization in health workers or even more health workers. Therefore, technological advancements may not proportionally increase the productivity of health workers, like they do in other sectors of the economy. Baumol posited that as productivity and wages rise in the 'progressive' (i.e.

that experience productivity increases due to better technology) sectors of the economy, non-progressive sectors like health, which don't experience productivity increases, will also experience increase in wages to remain competitive with other sectors of the economy (20,21). If wages did not increase in the health sector, then there would be a shortage of workers due to migration to progressive sectors. Recent literature has shown that the Baumol effect is significant in explaining health spending trends. A study of OECD countries reported that productivity factors contributed between 0.1% to 1% of health expenditure growth (1).

Other factors: There are several other drivers of health expenditures. These include treatment practices (e.g., a focus on treatment at tertiary care rather than at primary care facilities) and policies such as those that promote the expansion of service or insurance coverage to meet UHC goals. Such factors can either increase or reduce health expenditures. For instance, resource misallocations due to policies that promote spending on interventions which are less cost-effective than others increase health expenditures. Secondly, expenditures will also increase due to misallocation of patients across health care facilities, such as treating conditions at higher cost facilities (e.g., hospitals) which could be resolved at lower cost facilities (i.e., clinics). Third, wasteful expenditures, such as paying higher prices than necessary for medical inputs, diagnostics, and supplies; absenteeism, poor time use of staff; ghost workers, theft, and embezzlement can also increase expenditures. Judicial intervention can be another important factor driving health expenditures. In many LAC countries, the public sector has made efforts to avoid spending on treatments which have very low cost-effectiveness or unproven effectiveness; however, patients (sometimes sponsored by pharmaceutical companies or health care providers) have gone to court to get judgments forcing the government to pay for their treatment regardless of opportunity cost.

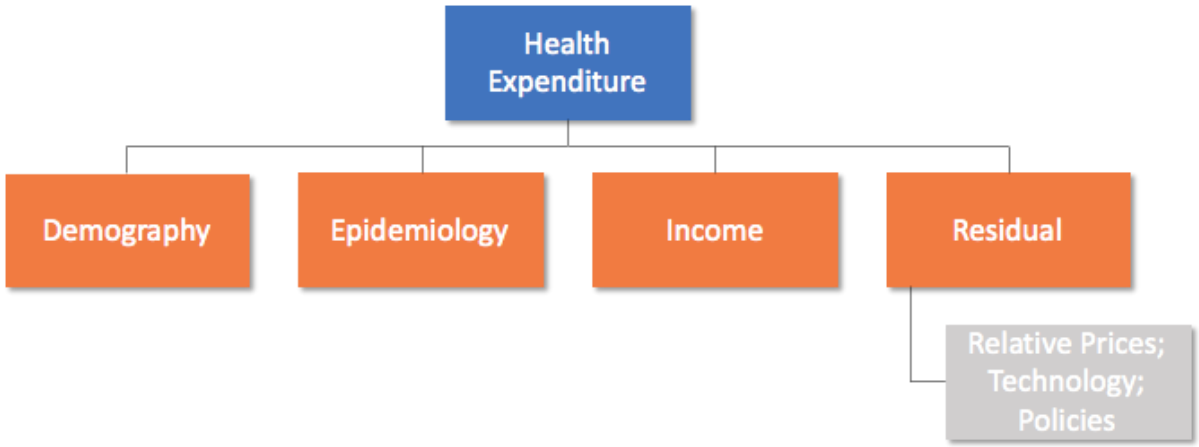
Policies to progress toward UHC will also increase health expenditures, as expected. Reaching more people with the same quality services as currently available to most of the population is expensive, but it is even more expensive if the people currently outside the system live in remote areas (mountains, islands, jungles), have more difficulty to manage health conditions (addictions, mental health combined with other chronic ailments), or lack the capacity to interact with the system (language barriers, cultural obstacles). Further, policies to improve health care quality also increase expenditures. Improving the quality of health care services generally improves efficiency and could potentially lower costs. However, most empirical research shows that quality improvements require substantial investment and that, subsequently, the main positive impact is improvements in population health with similar or higher levels of expenditure.

Chapter 3

Projecting health expenditures

As discussed in Chapter 2, several factors affect the level and growth of national health expenditures. These include demographic effects like population growth and population aging, the disease burden and associated risk factors, growth in national income, and changes in technology, policies, and health worker productivity. Figure 3.1 depicts these factors. The 'residual' box includes factors which affect health expenditures other than demography, epidemiology, and income. Several studies have projected health expenditures using varying methodologies, and these have informed our approach to health expenditure projections.

Figure 3.1 Factors contributing to health expenditure growth.



We projected current health expenditure (CHE)[1] in LAC countries based on estimated changes in three underlying factors: changes in prevalence of diseases, population, and economic growth and technology. The economic growth and technology parameter captures the contribution of economic growth and residual factors to growth in health expenditures (see Annex 5). This is depicted in the equation 1 below:

$$CHE_t = \sum_j \sum_k S_{tj} * p_{tjk} * \phi_{tjk} * CHE_{t-1jk}$$

Where S_{tj} is the relative change of population size in age group "j" in time "t", compared to the base year (2018/2019); p_{tjk} is the relative change of prevalence of disease "k" in age group "j" in time "t", compared to the base year (2018); ϕ_t is a composite terms that captures the annual real growth in CHE due to income growth and other factors, which we label "economic growth and technology"; and CHE_{t-1jk} is the CHE in the previous year for disease "k" in age group "j". The parameter ϕ_t captures the contribution of real GDP growth and

[1] Current expenditure on health care is the final consumption expenditure of resident units on health care goods and services, including the health care goods and services provided directly to individual persons as well as collective health care services. It excludes expenditures on capital goods.

other residual factors (e.g., technology, wage increases in the health sector, and such factors) to growth in health expenditures (see Annex 5). Note that 'economic growth and technology' is a country-specific parameter estimated as the sum of the contribution of a country's income growth and a regional residual growth to real CHE growth. E_{t-1jk} , the CHE for the previous year starting from baseline (2018/19), is upwardly adjusted iteratively based on relative changes over time in the other model parameters. Because E_{t-1jk} implicitly represents expenditures related to the health system operating at baseline (2018/19) levels of service coverage and health system efficiency, expenditure projections assume that these features continue. However, we vary this assumption in the scenario analysis in Chapter 5. Finally, all these parameters are specific to the individual country for which the projection was made.

Baseline current health expenditures (CHE)

We compiled baseline information on CHE by age and disease group for a set of seven index countries – Costa Rica, Peru, Mexico, Argentina, Colombia, Trinidad and Tobago, and Brazil. Ages were in five-year groups, and diseases were classified according to the ICD-10 Chapter. In each of these countries, baseline data for 2018 (or 2019) was sourced from household surveys, claims data from social insurance programs, and government sources (see Annex 1 for more details on data sources). The baseline year was 2019 for Brazil, Peru, and Trinidad and Tobago data, and 2018 for all other countries. These expenditure estimates included expenditures on curative care and public health. While the process of arriving at these estimates differed by country due to varying data sources, in general the following process was followed: (a) identifying the different health financing schemes in the index country, and (b) collecting available information from these health financing schemes – information was usually available only for one or two schemes (typically for out-of-pocket payments and social health insurance). Information on age-disease expenditures from these sources was extrapolated to the other schemes keeping the overall expenditure envelope as per the CHE reported in the National Health Accounts of the country (as reported in WHO Global Health Expenditure database) (7).

Changes in disease prevalence

For changes in prevalence, we used Global Burden of Disease (GBD) data, available from the Institute for Health Metrics and Evaluation (IHME) website (22). The causes in GBD are classified into 4 levels. At level 1, there are three large cause groupings: communicable, maternal, neonatal, and nutritional deficiencies; non-communicable diseases; and injuries. At level 2, there are 21 disease and injury categories –this is the closest classification to the 22 ICD-10 Chapters. The finest level of detail in causes is provided at levels 3 and 4 and corresponds to blocks A00 to Z99 in the ICD-10. For this project, we included all GBD changes in prevalence for all level 2 and level 3 disease categories, for different five-year age categories from 0 to 85 years between 1990 and 2019. We used the GBD to ICD-10 cause list to consolidate the prevalence data into every corresponding ICD-10 Chapter. Most level 2 disease categories mapped into a single ICD chapter, and we used ICD level 3 categories for diseases in Chapters 4, 7, 8, and 14. This approach meant that we had meaningful data for 21 of the 22 ICD-10 Chapters, except for Chapter 21 "Factors influencing health status and contact with health services" (codes Z00-Z99). This chapter includes the following reasons for

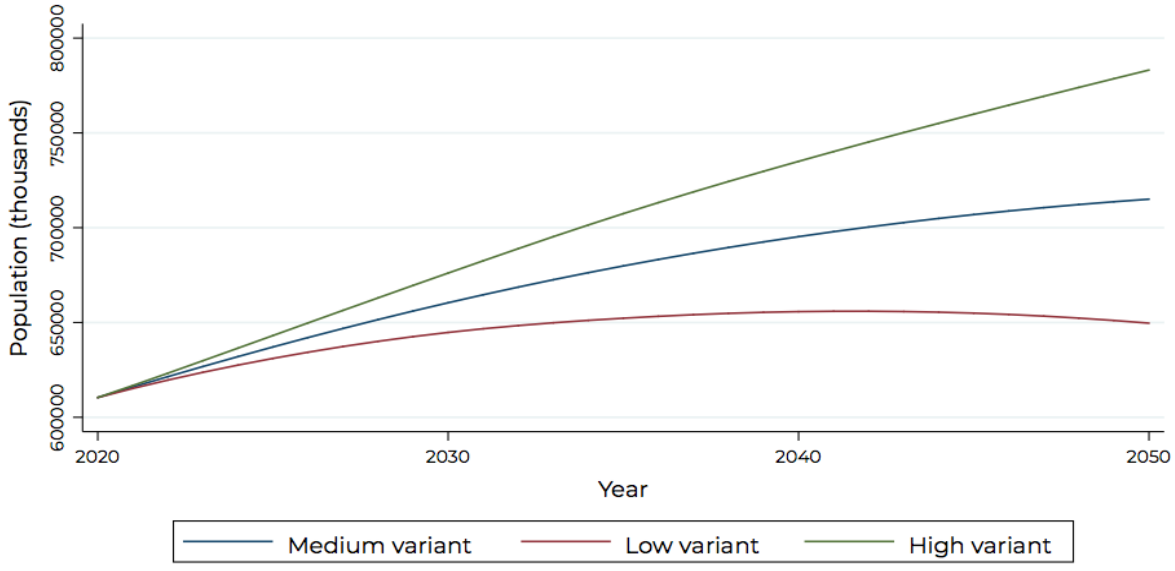
encounters: occupational exposures, incarcerated individuals, dependence on enabling machines, pre-employment examinations, medical certificates, immunization, and screening procedures not elsewhere classified. Thus, for ICD Chapter 21, we assumed a flat prevalence trend.

Having extracted the GBD prevalence data for each country for the relevant Level 2 and Level 3 diseases, and for all age categories, we used the GDB estimates from 1990-2019 to create a trend in prevalence until the year 2050. For each age category and disease category, we fit a linear trend, using a logit transform to constrain estimated prevalence values to between 0% and 100%. We implemented this model in Stata, using the *glm* command, with a binomial family and logit link. Where there was insufficient data to construct a model, we assumed a "no change" scenario (a flat trend). This methodology gave us prevalence estimates for the years 2020-2050, for all age and disease categories. From these estimates we calculated the relative change in prevalence for the years 2019-2050 compared to the baseline values for 2018/2019.

Population growth and aging

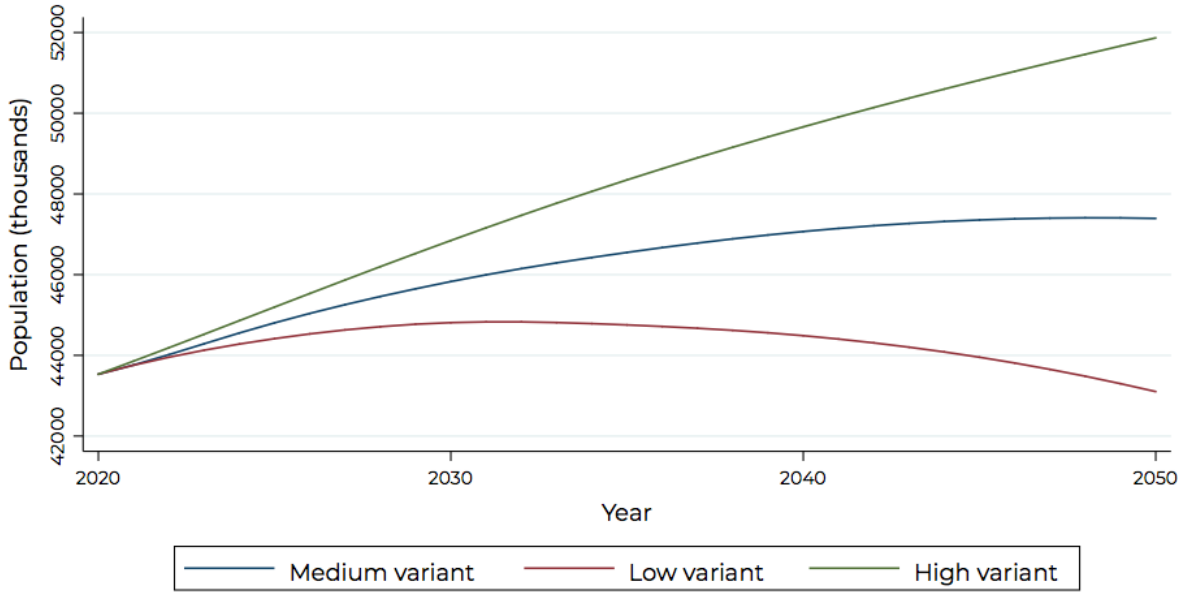
For **population growth**, we used estimates from the UN "World Population Prospects 2019" database, maintained by the UN Department of Economic and Social Affairs, Population Dynamics team. The dataset we obtained ("WPP2019_PopulationByAgeSex_Medium.csv") contained annual population estimates by five-year age categories. We used the "medium variant" as the most likely scenario for population growth (Figure 3.2 & 3.3). We took numbers for both sexes combined and did not disaggregate by sex because of lack of data. With these data, we calculated the relative change in population size, for each five-year age category, for the years 2018/19-2050 compared to 2018/19.

Figure 3.2 Projected population growth and aging in Latin America (2020-2050).



Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019.

Figure 3.3 Projected population growth and aging in the Caribbean (2020-2050).



Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019.

Economic growth and technology

Several factors affect the growth of CHE: population growth and structure, disease prevalence, economic growth, medical price inflation (due to increase in health sector prices), technology (e.g., use of generics), intensity of medical service use, coverage of health services, policies, and other factors which can inflate health expenditures (6). In our model, the "economic growth and technology" parameter captures these factors except the contribution of population growth and structure, and disease prevalence. The economic growth and technology parameter is estimated as the sum of (i) the contribution of economic growth to health expenditures, and (ii) the contribution of a residual factor that includes increases in medical prices, the effects of introducing new technologies, the intensity of medical service use, changes in health service coverage and other factors. This residual factor is estimated by subtracting the contributions of demographic change, disease prevalence, and economic growth from total health expenditure growth. Note that we do not include general inflation in the economy because we use real health expenditures in our projections.

Studies have shown that income growth is the main driver of health expenditure growth. As such, determining the size of the income elasticity i.e., the extent to which increasing income growth contributes to the rise in health expenditures has important policy implications for financing. Studies indicate that as countries get richer and have more established health systems, their income elasticity decreases. However, lower income elasticity estimates in richer countries are partly due to their health systems having maturity in terms of financing and coverage, but also because of deliberate attempts by governments to control costs. For example, in Japan, Germany, and France, the government actively negotiates the prices of health services with providers (23).

One study estimated income elasticity of health expenditures as follows: 0.45-0.62 for high-income countries, 0.63-0.65 for upper-middle income countries, and 0.9-1.2 for lower middle-income countries (12). Further, the elasticity estimate for western European countries was 0.14-0.66. In this study, we estimated an income elasticity of 0.88 for Latin American countries and 1.14 for Caribbean countries (see Annex 5 for more details). We estimated country specific growth rates for the economic growth and technology parameter by combining the country specific contribution of economic growth to health expenditure growth with a regional (i.e., Latin America or Caribbean) residual factor. We applied this rate to project medical expenditures for 2019 and 2021 onwards.

The above analyses gave us relative changes in prevalence, population, and economic growth and technology for the years 2019-2050 compared to the base year of 2018/19. We assumed that these three factors change independently and in a linear fashion. We also assumed that the overall change is a product of the relative change due to each individual factor. In other words, we multiplied the individual changes for each factor to get the overall change in expenditure. In the results, we report the effect of each factor separately and combined, giving us the following trends: economic growth and technology only; population growth only; aging only; population growth, aging, and changes in age-specific prevalence combined; and all factors combined.

COVID-19 pandemic

To account for the COVID-19 pandemic, we adjusted our projection for 2020 before returning to the regression trend rate. Because countries in the LAC region responded very differently to the pandemic regarding health spending, we varied our approach for each country based on reports of how economic growth had been affected in 2020. All LAC countries experienced negative economic growth in 2020 (except Guyana) (24). We set economic growth and technology for 2020 to zero for all countries in our study. Note that economic growth is the biggest driver of CHE.

Extrapolating from index countries to the region

A key challenge for making regional-level projections in health expenditures is the availability of baseline data on the distribution of current health expenditures (CHE) by age and disease group. For most countries in LAC, this information is not readily available. Our regional extrapolations are confined to the countries listed below, which are borrowing member countries of the Inter-American Development Bank.

To extrapolate from the seven index countries to others in the region, we first grouped countries in Latin America and the Caribbean separately in terms of their average per capita health expenditures from 2015-2018 (see below). The seven index countries were used to generate reference expenditure profiles for the whole group - the reference index countries are bolded or mentioned in parenthesis below. Because we had only one index country from the Caribbean, we used Peru and Colombia as reference countries for Group 1 and 2 in the Caribbean region. Note that this assumption only means that the distribution of relative health expenditures across age-groups is common to countries within a group. We exclude Venezuela and Haiti from our projections because of the difficulty in getting data for

projections in Venezuela and the difficulty in extrapolating from the index countries in our study to Haiti because of widely different economic and financing contexts (e.g., health expenditures in Haiti are heavily reliant on external sources of funds).

In Latin America, four groups were formed (index countries in bold):

Group 1: Nicaragua, Honduras, Bolivia, Guatemala, El Salvador, **Peru**
Group 2: Paraguay, **Colombia**, Ecuador, **Mexico**.
Group 3: **Brazil**, **Costa Rica**, Panama
Group 4: **Argentina**, Chile, Uruguay

For the Caribbean countries, the following three groups were formed:

Group 1: Guyana, Belize, Jamaica (Reference profile: Peru)
Group 2: Suriname, Dominican Republic (Reference profile: Colombia)
Group 3: **Trinidad and Tobago**, Barbados, the Bahamas

We developed age-expenditure profiles for the index countries (see Figure 3.4) where the relative per capita expenditure in each age group was estimated relative to the reference age-group of 0-4 years of age. Each point on the graph indicates how many times higher (or lower) per capita health expenditures are in that age group compared to the 0-4 years age group. In general, the per capita health expenditures fall in the younger years of life, then rise with age and are highest for the oldest age group. The high values for the older ages indicate the greater intensity of health resources spent on these age groups. In some countries, the relative per capita expenditures fall for the oldest age group – this could be due to missing expenditure information on this age group or represent home care for the very old.

Figure 3.4 Age expenditure profiles of index countries.

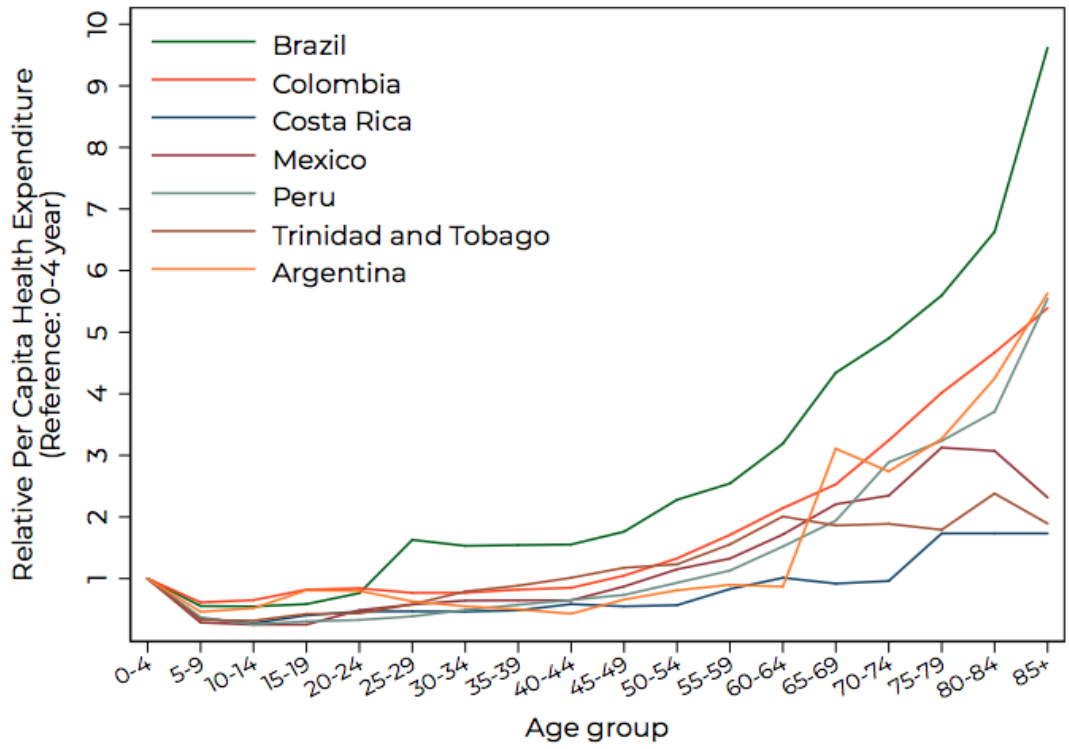


Figure 3.5 Relative age expenditure profiles for Latin American countries.

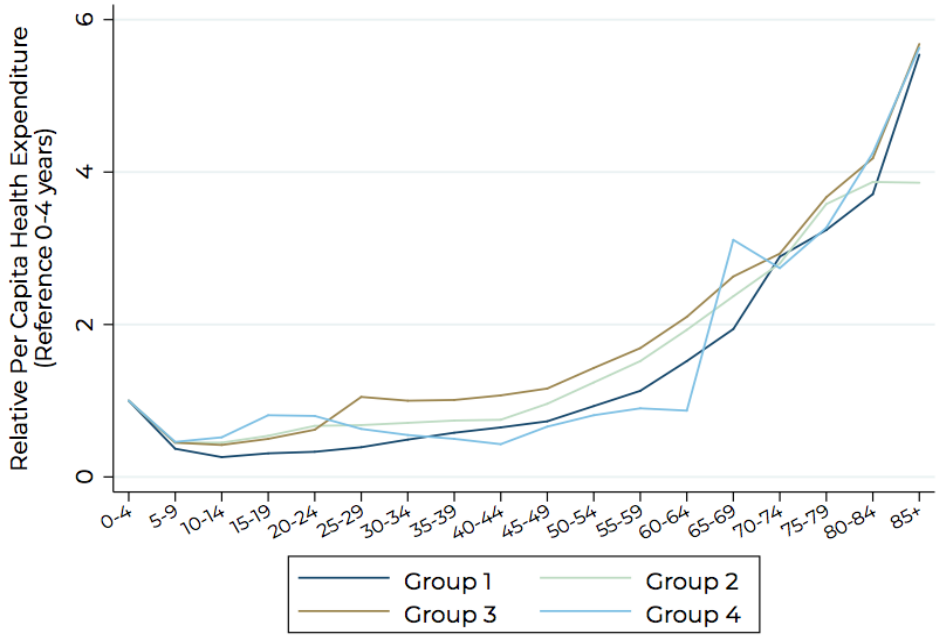


Figure 3.6 Relative age expenditure profiles for Caribbean Countries.

We assume that the age-expenditure profile of the index countries represents those of other countries in each group (Figures 3.5 & 3.6). Note that this assumption only means that the distribution of relative health expenditures across age-groups is common to countries within a group, not the absolute levels. For the next step, CHE of countries in the group was distributed across ages using the index age-expenditure profile. For groups where there was more than one index country, we took the average of the profile values within each age-group (Figures 3.5 & 3.6). Once the health expenditure in each age group was estimated for a country, we then distributed this across disease groups based on the index country proportion of expenditures in each disease group within an age-group. In this manner, the baseline age-disease distribution matrix was established for each country in the LAC region. These baseline expenditures were then projected into the future based on country specific changes in population, epidemiology, and economic growth and technology (Equation 1).

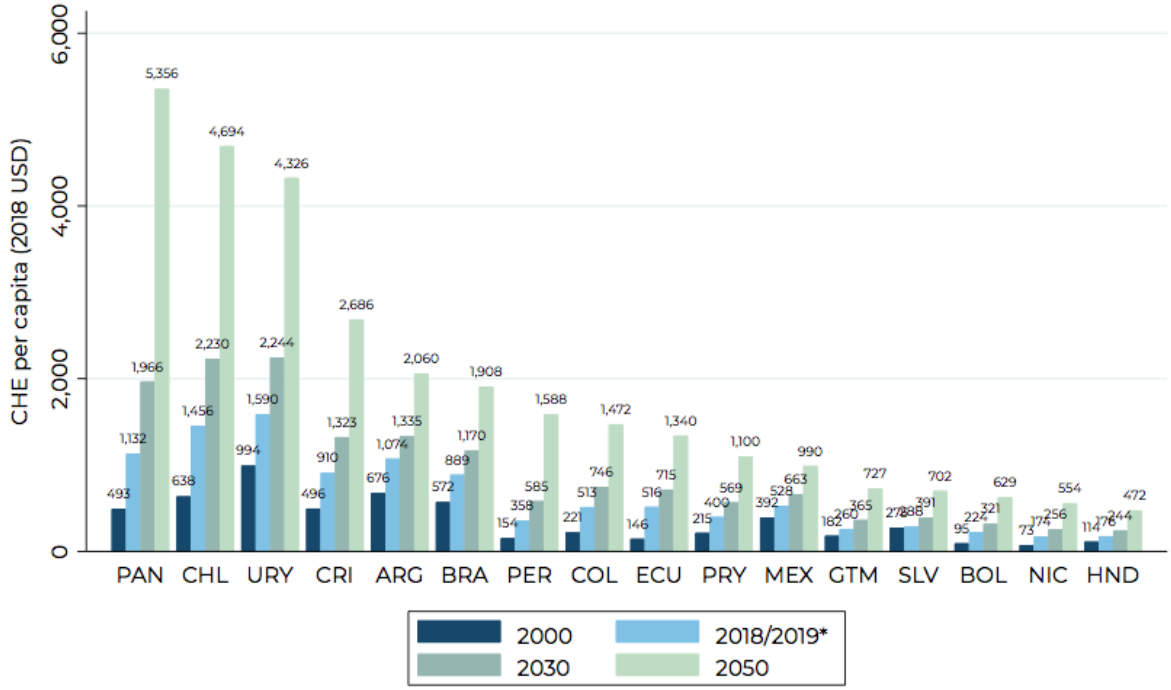
Chapter 4

Projection results

Projections of current health expenditures

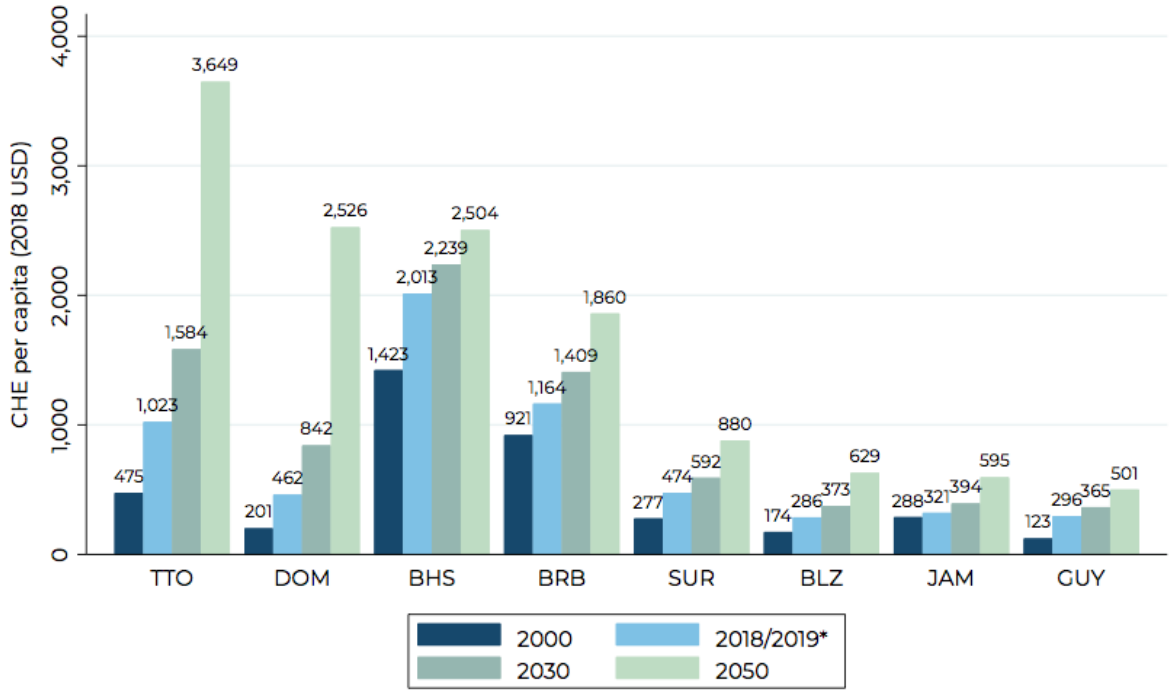
Current health expenditures (CHE) per capita are projected to increase across LAC countries between baseline (2018/2019), 2030, and 2050 (Figures 4.1 & 4.2). Also shown are historic CHE levels in 2000 and 2018/19. In almost all Latin American countries, there is at least a doubling of CHE per capita between baseline and 2050, spanning a little over 30 years. In some instances, the increases are substantial. For example, large increases in per capita CHE between baseline and 2050 are projected in countries like Panama (373%), Peru (344%), Chile (222%), Nicaragua (219%), Costa Rica (195%), and Colombia (187%). Countries in the Caribbean also will experience increases in per capita CHE, but these will be quite varied (Figure 4.2). It is important to note that projections for Guyana do not account for the discovery of oil reserves in the country that will likely affect future CHE values. Between baseline and 2050, per capita CHE is projected to more than double in the Dominican Republic (447%), Trinidad and Tobago (256%), and Belize (120%), while other Caribbean countries will have more modest increases in CHE.

Figure 4.1 CHE per capita in Latin America (2000-2050).



*Baseline year is 2019 Brazil and Peru and 2018 for all other countries.
Note: 2000 CHE per capita value taken from WHO Global Health Expenditure Database.

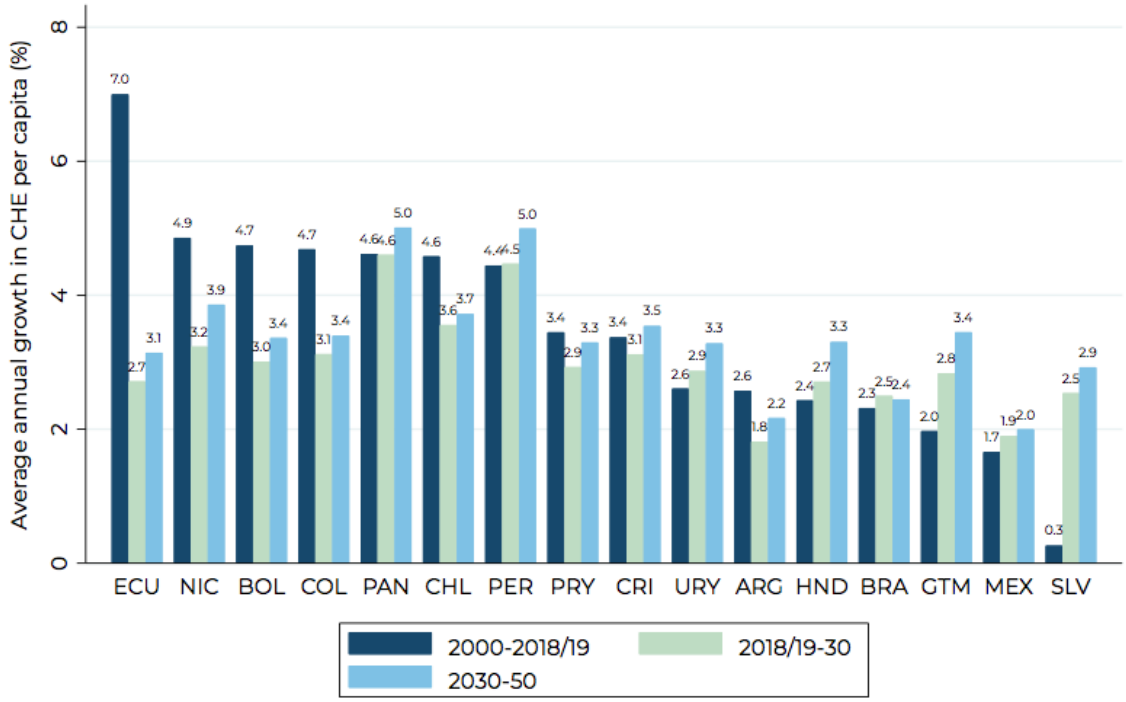
Figure 4.2 CHE per capita in the Caribbean (2000-2050).



*Baseline year is 2019 for Trinidad & Tobago, and 2018 for all other countries.
Note: 2000 CHE per capita value taken from WHO Global Health Expenditure Database.

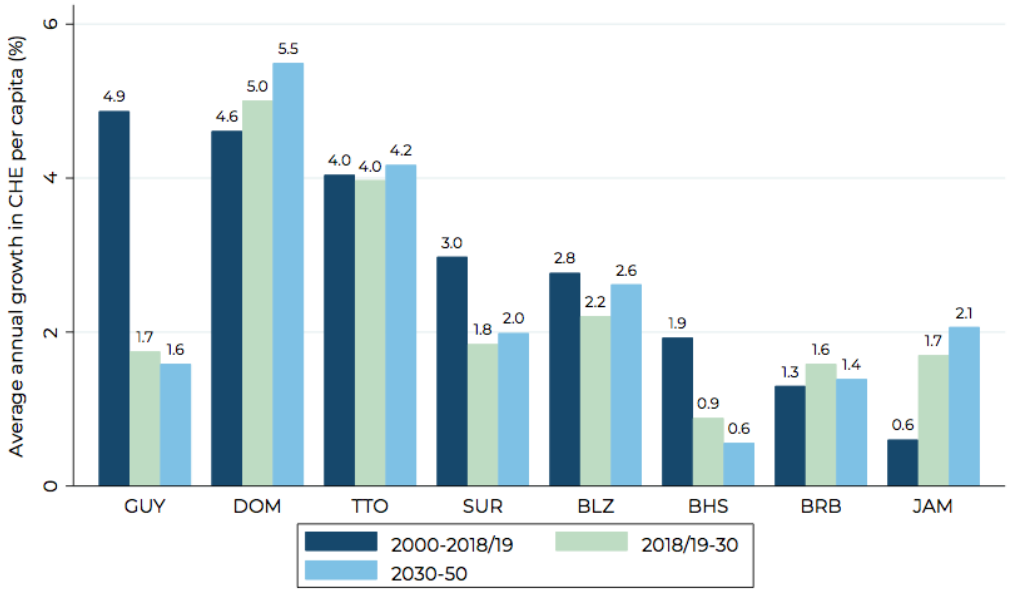
The projected average annual per capita CHE growth rate from 2018-2050 is higher in Latin American countries (3.2%) than in the Caribbean (2.4%) (Figures 4.3 & 4.4). Most LAC countries will experience annual growth in per capita CHE of around 2% or higher. In Latin America, relatively high (> 3.4% in 2030-50) projected growth rates are seen in Panama, Peru, Nicaragua, Chile, Costa Rica, Bolivia, Colombia, and Guatemala. In the Caribbean, high (>3.0% in 2030-50) growth rates are observed in Dominican Republic and Trinidad and Tobago. Across the LAC region, projected per capita CHE growth rates vary in comparison to historic growth (between 2000-2018/19). In Latin America, the historical growth rates in per capita CHE are higher than the projected rates in Argentina, Ecuador, Paraguay, Bolivia, Colombia, Chile, and Nicaragua. In the Caribbean, historical growth rates are higher in the Bahamas, Guyana, Suriname, and Belize.

Figure 4.3 Annual growth in CHE per capita, Latin America (2000-2050).



Note: The baseline year is 2019 for Brazil and Peru, and 2018 for all other countries.
2018/2019 age disease data was collected from Brazil, Costa Rica, Colombia, Mexico, and Peru.
2000 CHE per capita value taken from WHO Global Health Expenditure Database.

Figure 4.4 Annual growth in CHE per capita, the Caribbean (2000-2050).

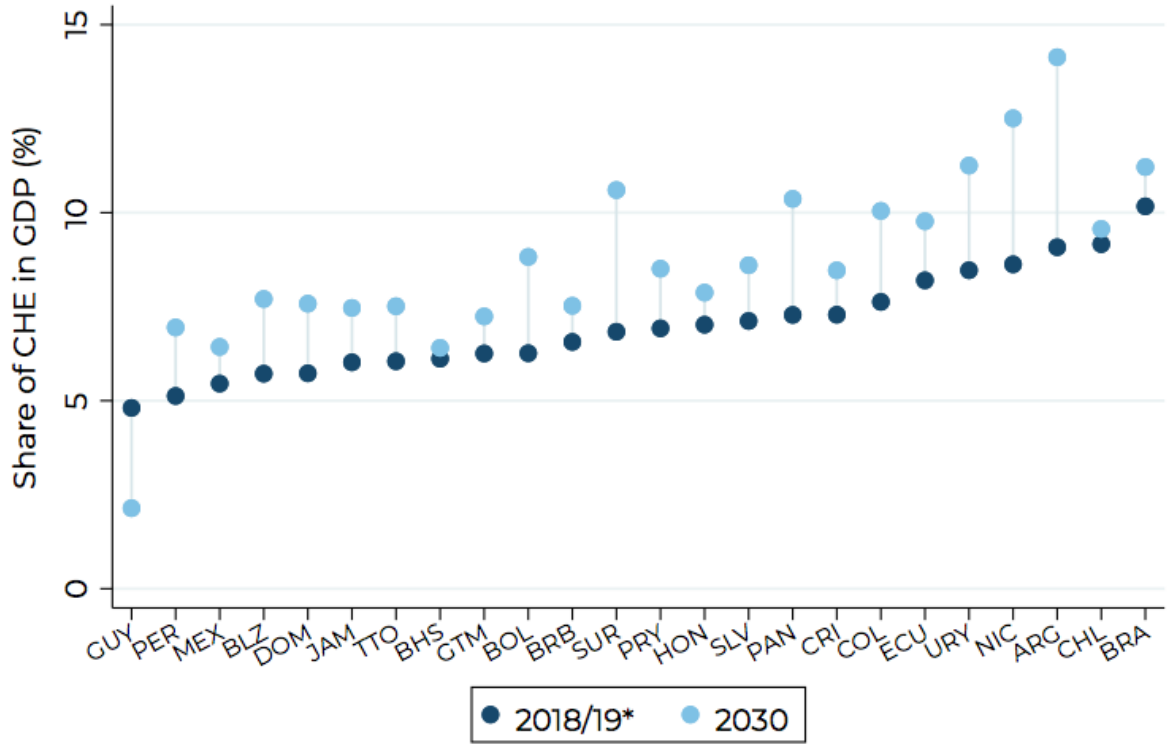


Note: The baseline year is 2019 for Trinidad & Tobago, and 2018 for all other countries.
2018/2019 age disease data was collected from Trinidad & Tobago.
2000 CHE per capita value taken from WHO Global Health Expenditure Database.

The share of CHE in GDP, as well as the relative growth rates in CHE over time, indicate the ability of countries to sustain growth in health expenditures (Figures 4.5 & 4.6). GDP values for 2030 were determined by projecting the IMF's 2026 GDP estimates to 2030 using

2000-2018 historical growth rates (25). The share of health expenditures in GDP is projected to increase in all LAC countries except Guyana, though the extent of this increase is heterogeneous (Figure 4.5). In Argentina and Nicaragua, the projected share of CHE in GDP is expected to approach 15% by 2030, which has important implications for affordability. The decline in Guyana's share of CHE in GDP does not account for the effect of expected oil revenues.

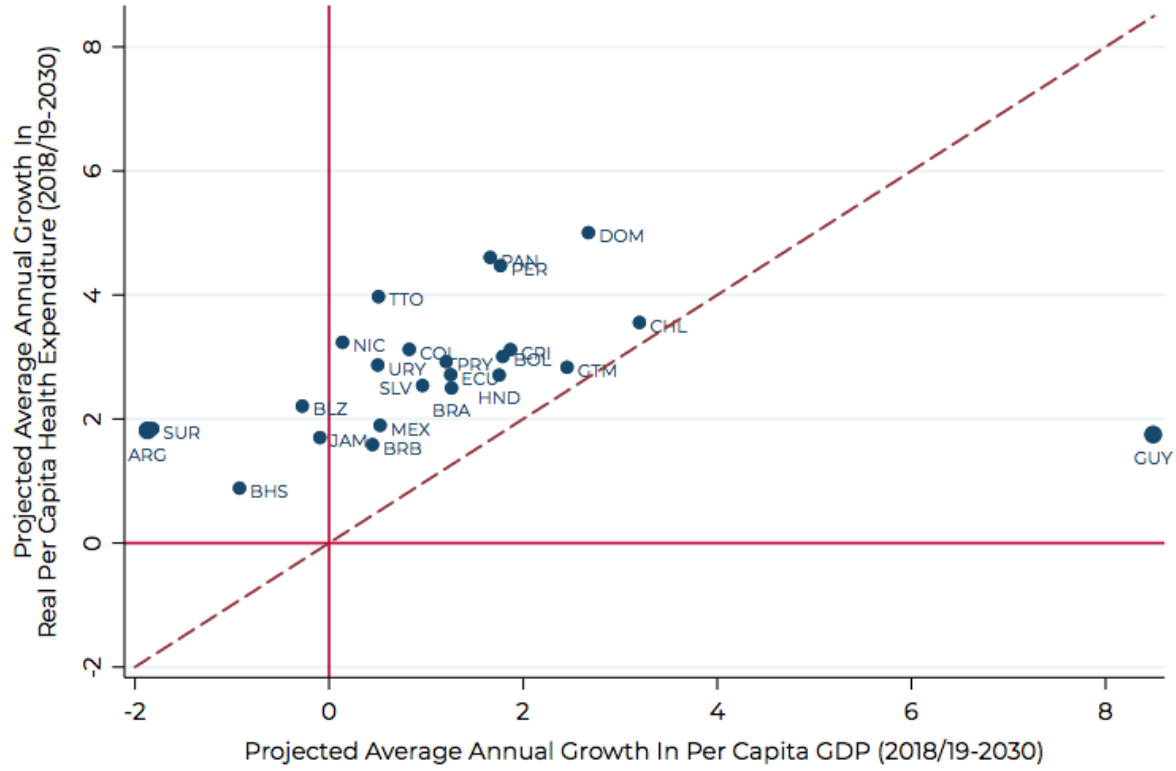
Figure 4.5 Share of CHE in GDP (2018/19-2030).



Note: The baseline year is 2019 for Brazil, Peru, and Trinidad & Tobago, and 2018 for all other countries.

As noted earlier (Figure 1.5), historically, per capita health expenditures have been growing faster than per capita GDP in most LAC countries. Our projections (Figure 4.6) indicate that this trend will continue and increase in the future. Between baseline and 2030, all LAC countries aside from Guyana are projected to experience per capita health expenditure growth that is higher than per capita GDP growth (i.e., countries above the diagonal line). In many countries like Nicaragua, Trinidad and Tobago, Uruguay, Belize, and Colombia, the growth in CHE is expected to be over twice that of GDP growth.

Figure 4.6 Projected growth in GDP per capita vs projected growth in CHE per capita.

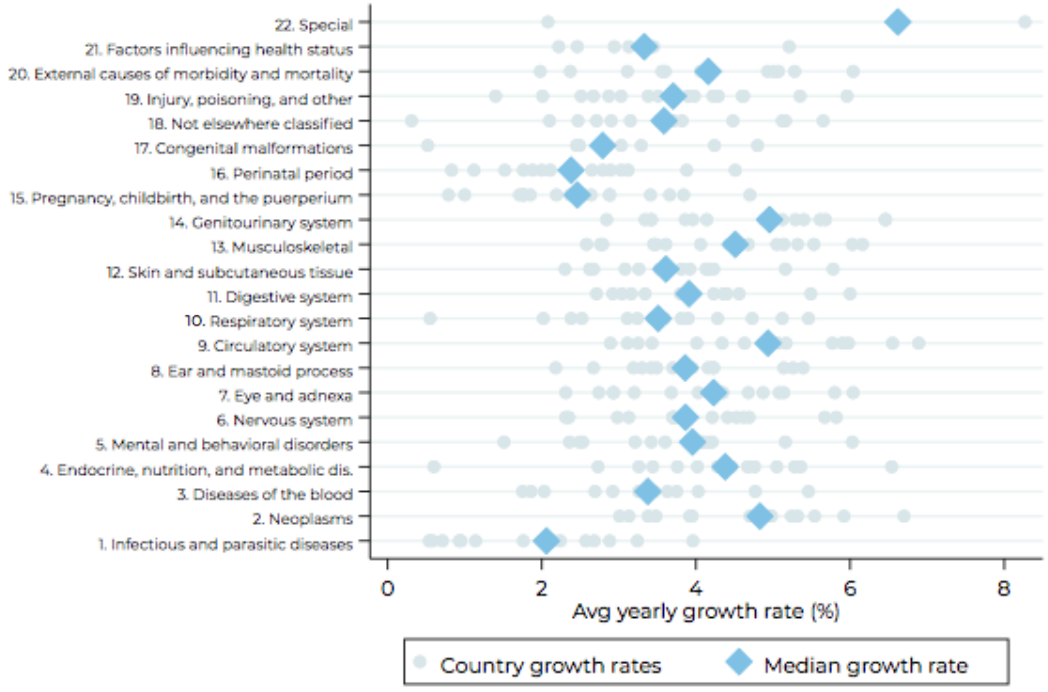


Note: The baseline year is 2019 for Brazil, Peru, and Trinidad & Tobago, and 2018 for all other countries.

Current health expenditure growth by disease groups

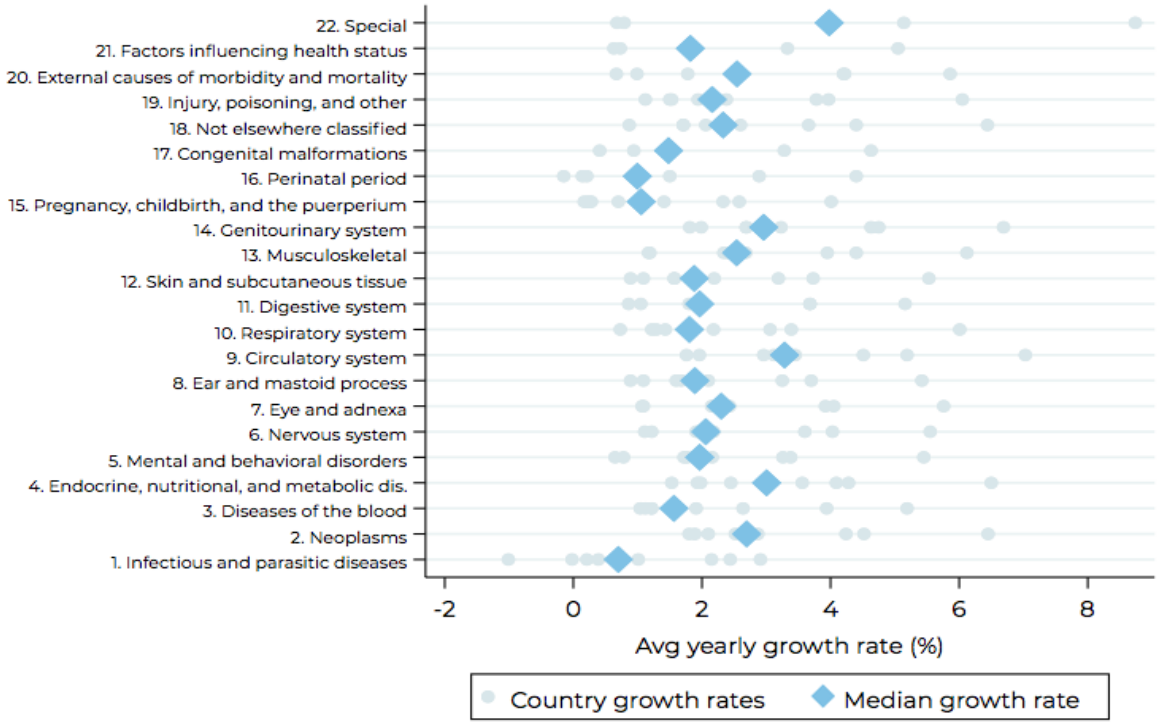
Growth in CHE varies across disease groups. Figure 4.7 and 4.8 show the median annual growth rates in CHE by disease group for LAC countries. In general, there is positive growth in CHE between baseline and 2050 across all ICD-10 Disease Chapters, as indicated by the median annual growth rates. The median growth rate values in Figure 4.7 and 4.8 indicate the disease groups that are expected to drive growth in CHE between baseline and 2050. In Latin America, median annual growth rates in CHE of around 4% or more are seen for neoplasms (Chapter 2); endocrine, nutritional, and metabolic diseases (Chapter 4); disease of the eye and adnexa (Chapter 7); disease of the circulatory system (Chapter 9); diseases of the musculoskeletal system and connective tissue (Chapter 13); diseases of the genitourinary system (Chapter 14); external causes of morbidity and mortality (Chapter 20); and illnesses classified under codes for special purposes (including new diseases, and resistance to antimicrobial and antineoplastic drugs) (Chapter 22). Further, some disease groups will experience relatively lower growth in CHE, including certain infectious and parasitic diseases (Chapter 1); pregnancy, childbirth, and the puerperium (Chapter 15); certain conditions originating in the perinatal period (Chapter 16); and congenital malformations, deformations, and chromosomal abnormalities (Chapter 17). Similar trends are also observed for Caribbean countries, though the median growth rates are lower than those of Latin America, and typically hover around an average of 2% per annum (Figure 4.8). Note that some countries do not have projections for all ICD-10 Chapters because the index countries Argentina, Mexico, and Peru did not report data for Chapters 17, 21, and/or 22 (see Annex 4).

Figure 4.7 Median annual growth rate of CHE in Latin America by ICD-10 Chapter, 2018/19-2050.



Note: The baseline year is 2019 for Brazil and Peru, and 2018 for all other countries. 2018/2019 age disease data was collected from Argentina, Brazil, Costa Rica, Colombia, Mexico, and Peru.

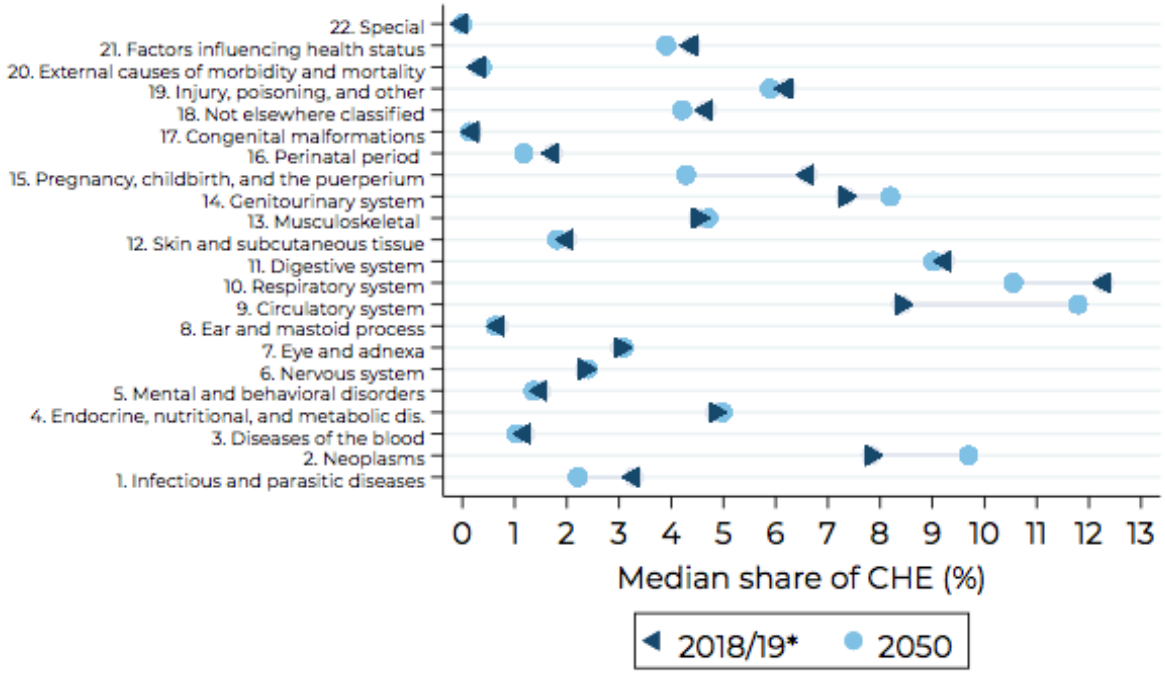
Figure 4.8 Median annual growth rate of CHE in the Caribbean by ICD-10 Chapter, 2018/19-2050.



Note: The baseline year is 2019 for Trinidad and Tobago and 2018 for all other countries. 2019 age disease data was collected from Trinidad and Tobago.

Figures 4.9 and 4.10 report the median share of each ICD-10 Chapter at baseline (2018/19) and 2050 in LAC countries. The direction of the arrows shows the increase or decrease between the two time periods. Among Latin American countries, between baseline and 2050, the largest increase in median share of CHE is seen in neoplasms (Chapter 2); disease of the circulatory system (Chapter 9); and diseases of the genitourinary system (Chapter 14). Large declines in median CHE share between baseline and 2050 are observed for certain infectious and parasitic disease (Chapter 1); diseases of the respiratory system (Chapter 10); pregnancy, childbirth, and the puerperium (Chapter 15); and certain conditions originating in the perinatal period (Chapter 16).

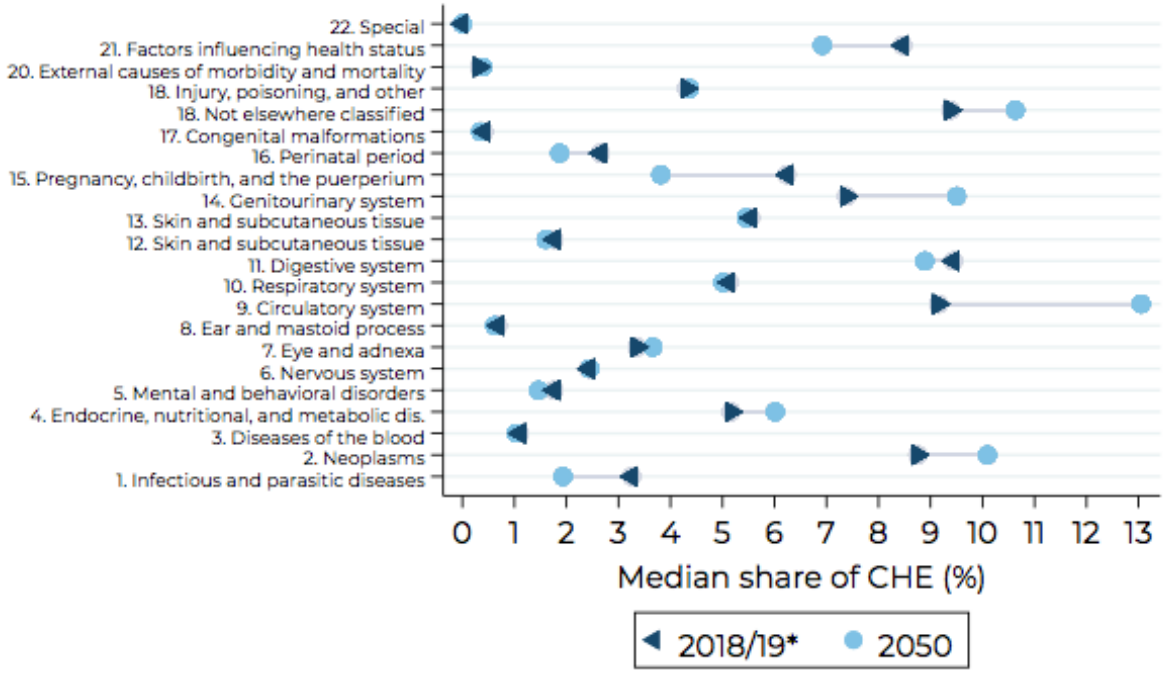
Figure 4.9 Median share of ICD-10 Chapter in CHE, Latin America (2018/19-2050).



*The arrow's direction indicates the direction of change between baseline (2018/19) and 2050.

Note: The baseline year is 2019 for Brazil and Peru, and 2018 for all other countries. 2018/2019 age disease data was collected from Argentina, Brazil, Costa Rica, Colombia, Mexico, and Peru.

Figure 4.10 Median share of ICD-10 Chapter in CHE, the Caribbean (2018/19-2050-2050).

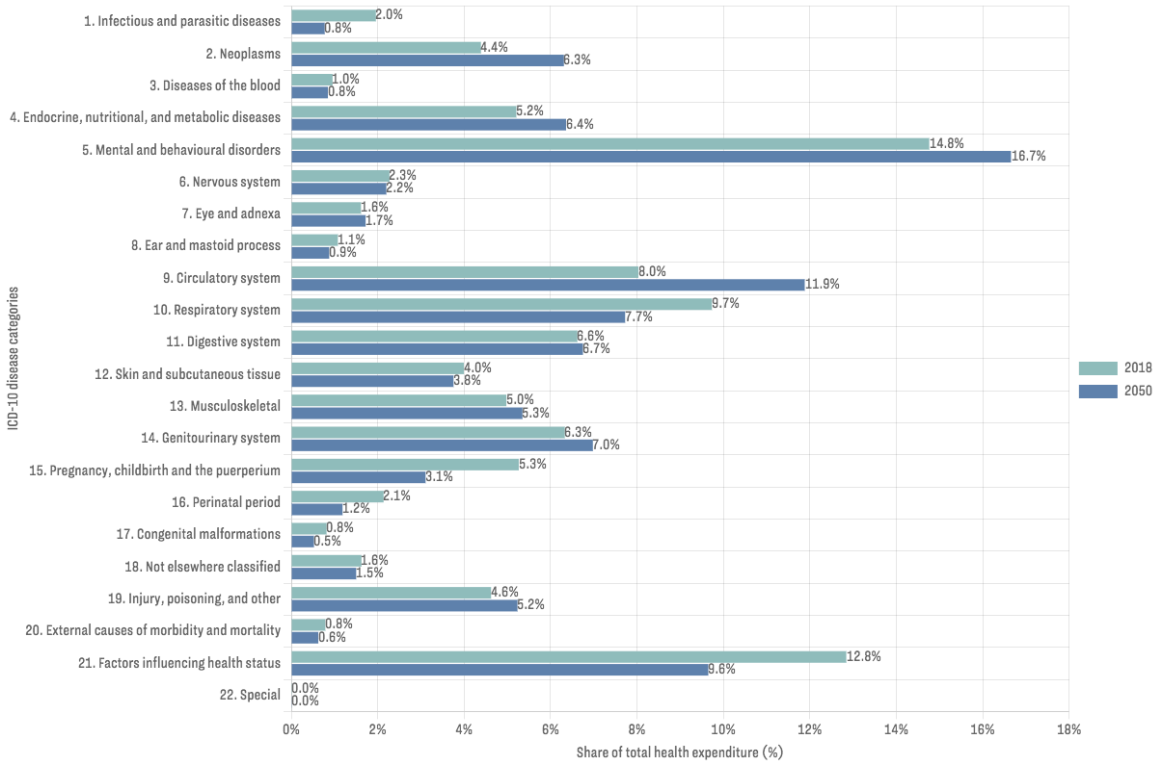


*The arrow's direction indicates the direction of change between baseline (2018/19) and 2050.

Note: The baseline year is 2019 for Trinidad & Tobago, and 2018 for all other countries. 2018/2019 age disease data was collected from Trinidad & Tobago.

Similar patterns are observed for Caribbean countries with some differences (Figure 4.10). Between baseline (2018/19) and 2050, the largest increases in median share of CHE are seen in neoplasms (Chapter 2); endocrine, nutritional, and metabolic diseases (Chapter 4); diseases of the circulatory system (Chapter 9); diseases of the genitourinary system (Chapter 14); and symptoms, signs, and abnormal clinical and laboratory findings not elsewhere classified (Chapter 18). Large declines in median CHE share between baseline and 2050 are observed for certain infectious and parasitic disease (Chapter 1); diseases of the digestive system (Chapter 11); pregnancy, childbirth, and the puerperium (Chapter 15); certain conditions originating in the perinatal period (Chapter 16); and factors influencing health status (Chapter 21).

Box 1.
Share of expenditure over time by ICD-10 Chapter, Costa Rica

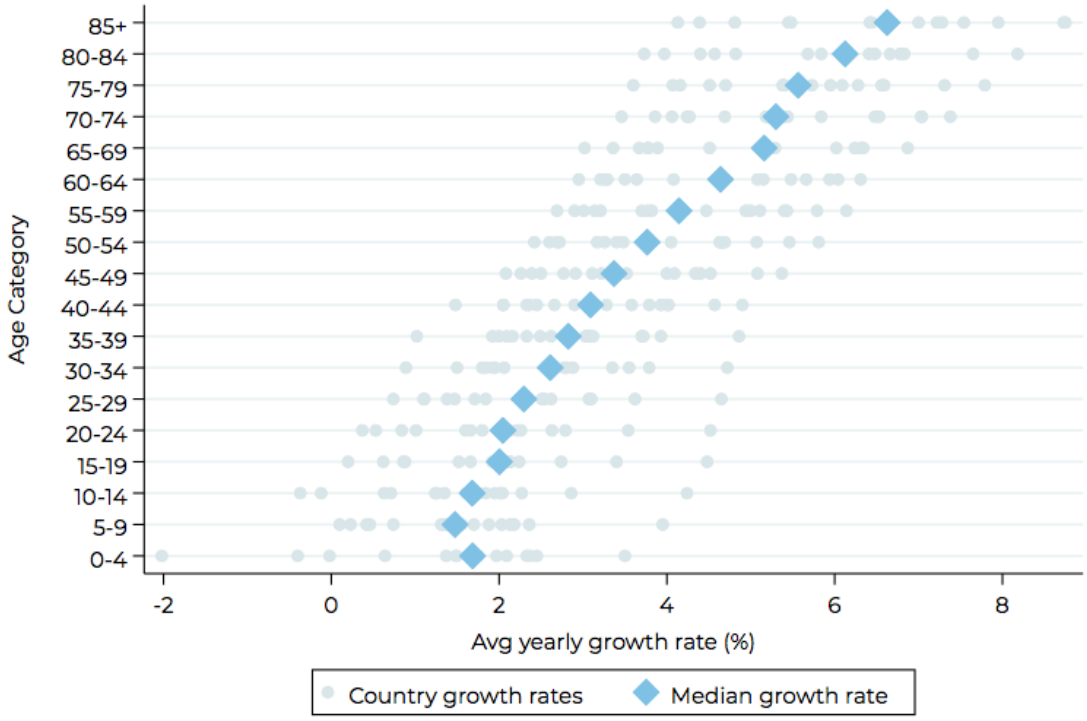


The figure above shows the relative share of CHE of each disease category in 2018 and 2050 in Costa Rica. In 2018, the top three disease categories (excluding Chapter 21) contributing the greatest share were Chapter 5 (mental, behavioral, and neurodevelopmental disorders) at 15%, diseases of the respiratory system (Chapter 10) at 10%, and diseases of the circulatory system (Chapter 9) at 8%. In 2050, the distribution will shift such that Chapter 5 will represent an even greater share at 17%, and Chapter 9 (diseases of the circulatory system) will become the second-highest contributing disease category at 12%. Further, between 2018 and 2050, the expenditure share of the following conditions will increase: neoplasms; endocrine, nutritional and metabolic diseases; mental and behavioral disorders; eye and adnexa; circulatory diseases; digestive diseases; musculoskeletal diseases; genitourinary diseases; and injuries. Compared to the median values in the Latin American region (Figure 4.7), Costa Rica shows Chapter 5 representing a greater total share of health expenditure in 2018 and 2050, Chapter 2 (neoplasms) showing a lower share, and Chapter 9 as a similar share.

Current health expenditure growth by age groups

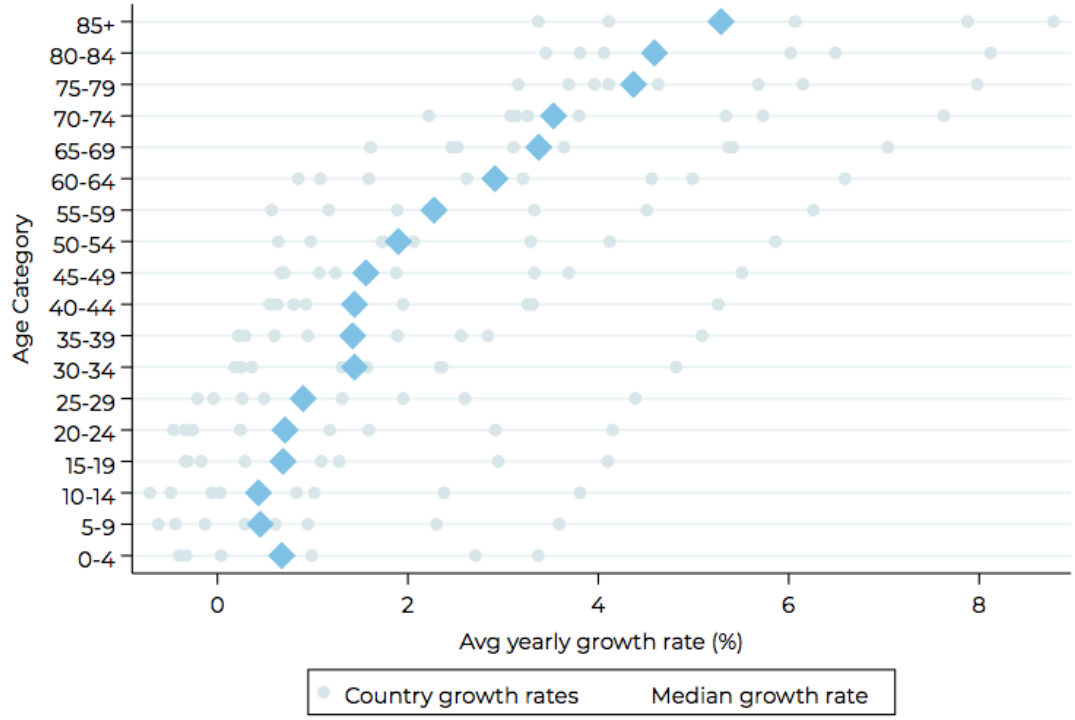
The median annual growth in CHE between baseline and 2050 in LAC countries is lowest for the youngest age groups and then increases with age (Figures 4.11 & 4.12). In the Latin America region, the median growth rate is at or below 2% a year until around age 25, and then increases to over 6% for the oldest age groups. In the Caribbean region, similar trends are observed but the median annual growth rates are lower compared to Latin America. Overall, these trends in growth rates indicate that the growth in CHE will be driven by expenditures in the older age groups, which in turn is driven by the growth in the size of these age groups, as well as the growth in the per capita health expenditure in these ages.

Figure 4.11 Median annual growth rate of CHE in Latin America by age group (2018/19-2050).



Note: The baseline year is 2019 for Brazil and Peru, and 2018 for all other countries.
2018/2019 age disease data was collected from Brazil, Costa Rica, Colombia, Mexico, and Peru.

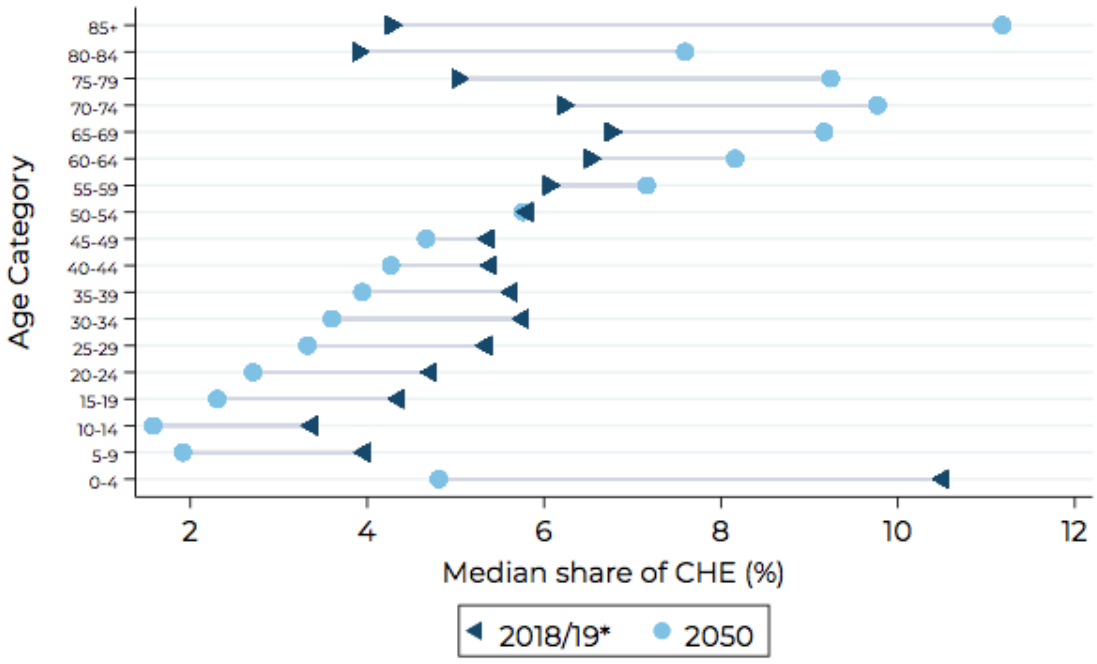
Figure 4.12 Median annual growth rate of CHE in the Caribbean by age group (2018/19-2050).



Note: The baseline year is 2019 for Trinidad and Tobago and 2018 for all other countries.
2019 age disease data was collected from Trinidad and Tobago.

Figures 4.13 and 4.14 present the median share of CHE in each age group between baseline and 2050 for Latin American and Caribbean countries respectively. During this period, the median share of age-specific CHE in health expenditures decreases over time in the lower age groups until age 50-54, after which the median share of age groups in CHE increases over time. The biggest temporal declines in median CHE share are in the 0–4-year age group and the largest increase is in the 85+ age group. This pattern indicates a shift in the share of CHE from younger to older age groups over time.

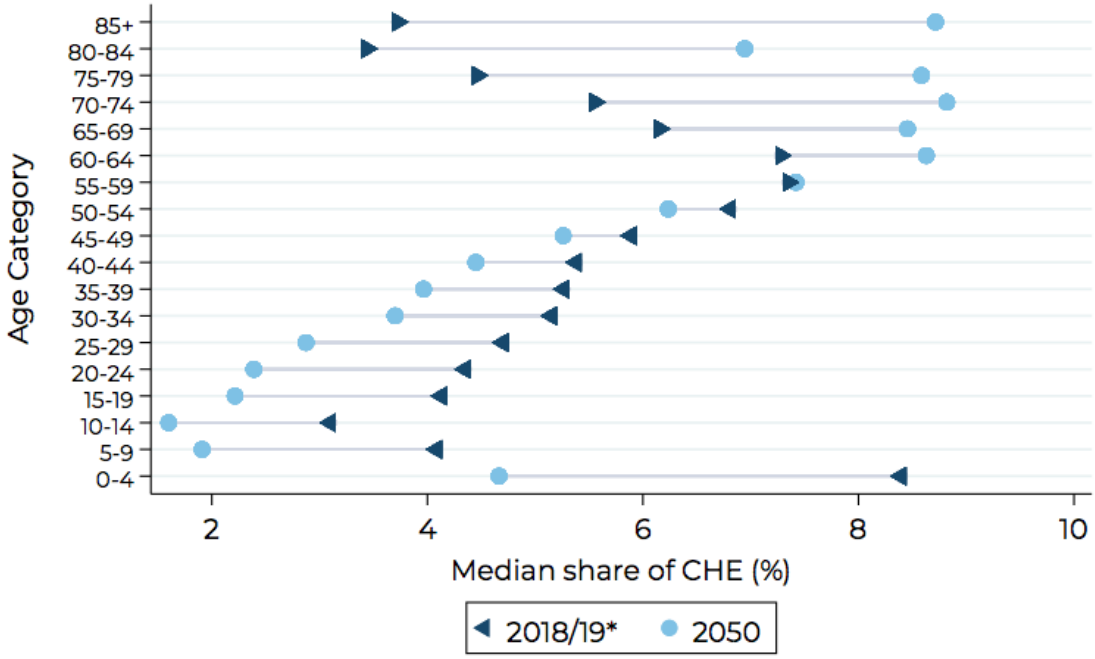
Figure 4.13 Median share of age category in CHE, Latin America (2018/19-2050).



*The arrow's direction indicates the direction of change between baseline (2018/19) and 2050.

Note: The baseline year is 2019 for Brazil, and Peru, and 2018 for all other countries.
2018/2019 age disease data was collected from Argentina, Brazil, Costa Rica, Colombia, Mexico, and Peru.

Figure 4.14 Median share of age category in CHE, Caribbean (2018/19-2050-2050).

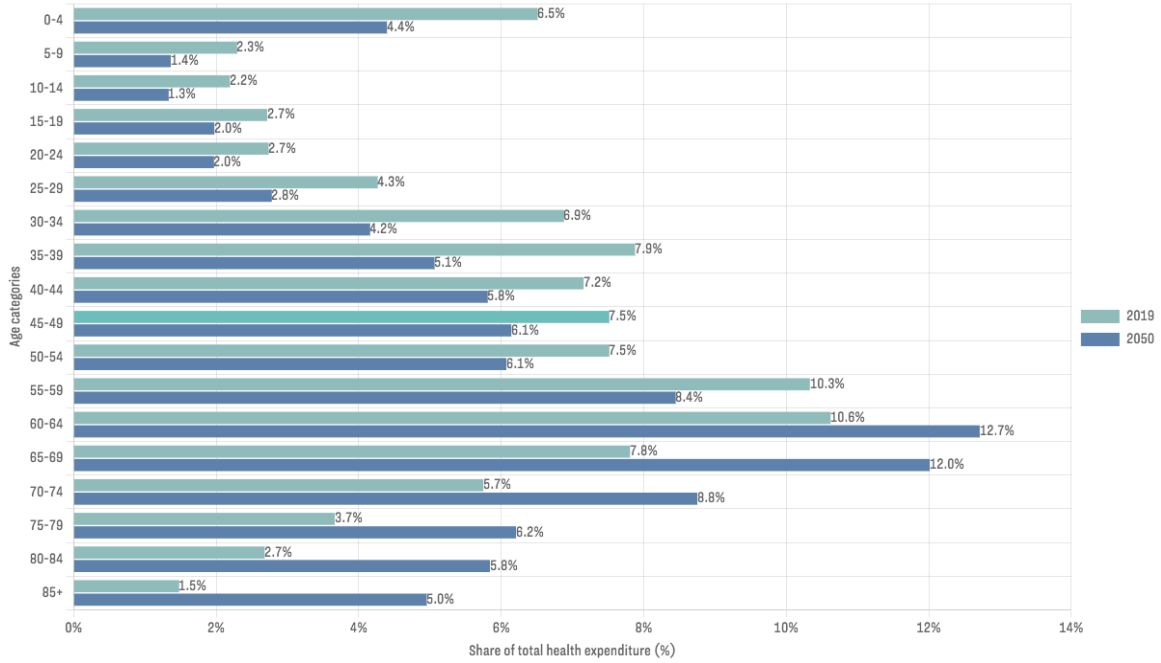


*The arrow's direction indicates the direction of change between baseline (2018/19) and 2050.

Note: The baseline year is 2019 for Trinidad & Tobago, and 2018 for all other countries.
2018/2019 age disease data was collected from Trinidad & Tobago.

Box 2.

Share of expenditure over time by age category, Trinidad and Tobago



The figure above summarizes the relative share of CHE over time in each age category in Trinidad and Tobago. It is not surprising that the highest annual growth rates are in the 55-69 age categories, while younger age categories exhibit lower annual rates in the next decades. It also shows that, in 2050, people aged 60 years and older will contribute an estimated 51% of overall CHE, compared to 32% in 2019, similar to the overall trends in median share of CHE found in the Caribbean (Figure 4.14).

Factors contributing to growth in current health expenditures

We projected CHE in the LAC region into the future for each country based on relative (to the baseline) changes in economic growth and technology, population growth, age structure of the population, and disease prevalence. Figure 4.15 shows the combined results for the LAC region. CHE is projected to nearly triple between 2018/19 and 2050. Further, in terms of individual factors, economic growth and technology is the main driver of this growth, followed by population aging, and population growth. Table 4.1 shows the average relative increase in CHE between baseline and 2050 among countries in the region resulting from the influence of all these factors and each factor individually. Overall, the average CHE increased by 2.8 times between baseline and 2050 in LAC countries, 2.7 times for Latin American countries, and 4.7 times for Caribbean countries. In LAC countries, economic growth and technology had the largest effect on increasing CHE – on average, it nearly doubled CHE in Latin American countries and increased CHE by nearly three times in Caribbean countries. The effect of demographics and epidemiology (which includes the effects of population growth, aging, and age-specific disease prevalence) had the second largest effects for Latin America and the Caribbean. The contribution of only population growth and only aging was modest in comparison to economic growth and technology. Note that the relative ranking and magnitude of these factors varies by country. For example, as discussed in Box 3, in

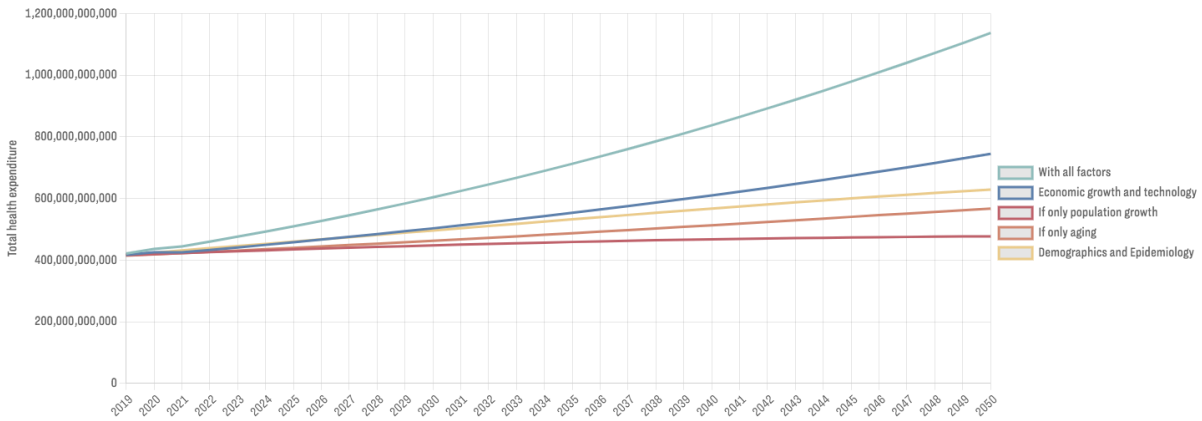
Mexico, demographics and epidemiology contribute to a greater share of CHE growth than economic growth and technology.

Table 4.1 Relative change in CHE from 2018/19 to 2050, by contributing factor.

	All factors	Economic growth & technology	Population growth	Population aging	Demographics and Epidemiology*
LAC	2.75	1.80	1.15	1.37	1.52
Latin America	2.71	1.78	1.16	1.37	1.52
Caribbean	4.67	2.97	1.14	1.27	1.53

*This column shows the effects on health expenditures growth from population growth, aging, and changes in age-specific prevalence.

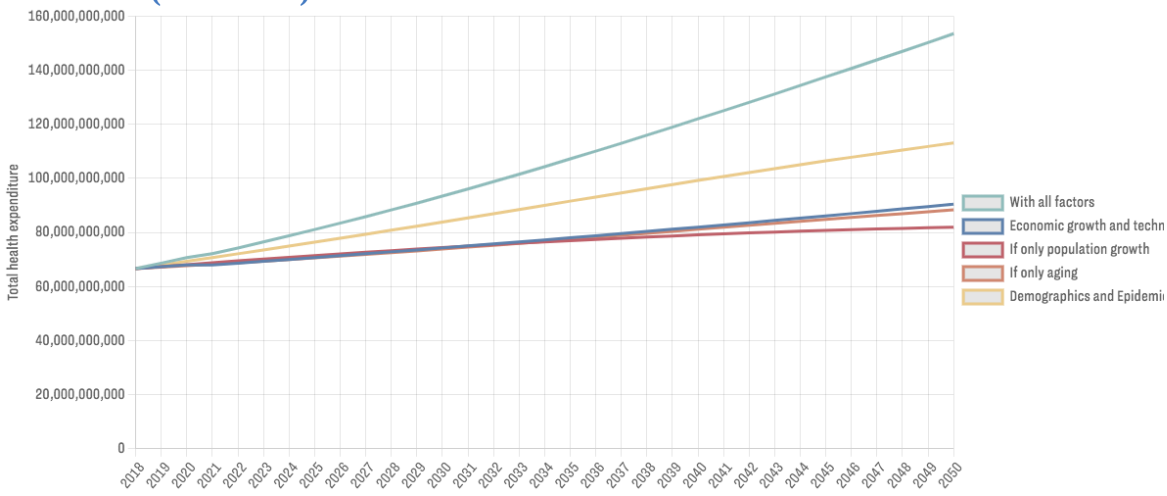
Figure 4.15 Expenditure over time in LAC by contributing factor (2018/2019-2050).



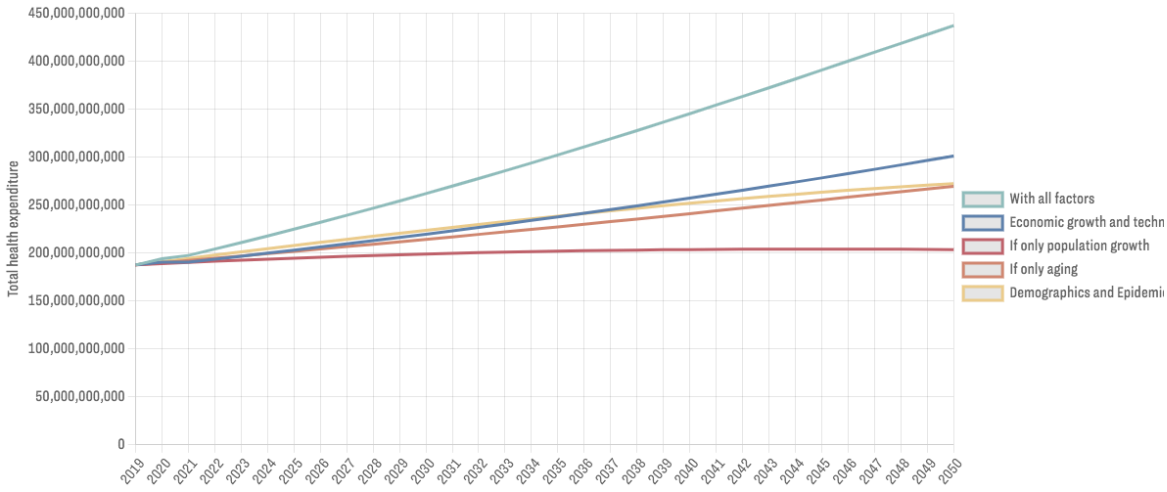
Box 3.

Contribution to Current Health Expenditure growth in Mexico and Brazil (2018/19-2050)

A: Mexico (2018-2050)



B: Brazil (2019-2050)



Some countries diverge from the region-wide average findings of economic growth and technology being the main driver of CHE growth. For example, in Mexico, CHE increases 130.3 percent between 2018 and 2050. The other lines in the figure represent the increases that would be seen **if each individual factor were applied by itself in isolation**. In Mexico's case, the factor which would individually contribute the greatest increase in CHE is epidemiology and demography, with a percent increase in CHE of 69.7 percent from 2018 to 2050, followed by economic growth and technology with an increase in CHE of 35.7 percent, and aging with an increase in CHE of 32.6 percent. Interestingly, and in variance with overall regional trends, population aging by itself contributes as much to CHE growth as economic growth and technology. The results for Mexico differ from other countries, as demonstrated by the comparison to Brazil – here, as in most LAC countries, economic growth and technology drive growth in CHE more than epidemiology and demography.

Chapter 5

Variation in current health expenditures attributable to reducing risk factors for noncommunicable diseases, cost control, and achieving universal health coverage

In the previous chapters, we presented the results of a model that 1) projects current health expenditures (CHE) for a set of six index countries in Latin America and the Caribbean (LAC) from 2020 to 2050, and 2) extrapolates costs from 2020 to 2050 for non-index countries in the region using data from the seven index countries. In the previous chapters, we found that countries in the LAC region will experience real increases in CHE and per capita CHE between baseline and 2050. Overall, among Latin American and Caribbean countries, the median increase in CHE is expected to be 2.71 and 4.67 times between baseline and 2050, respectively. We found that a majority of LAC countries double their real CHE per capita between baseline and 2050. However, we found substantial heterogeneity in projected CHE across countries.

In many low- and middle-income countries (LMICs), health expenditure growth is a cause for concern due to the increasing demographic, epidemiological, and technological pressures that health systems are facing in the context of growing levels of debt, insufficient fiscal revenues, and high out-of-pocket payments. More recently, the economic and social consequences of the COVID-19 pandemic have likely worsened these issues (26,27). Health expenditure growth represents a significant financial risk for health systems as it directly threatens the objective of achieving universal health coverage in a context of constrained resources.

For this reason, previous studies have focused on estimating the effect of the prevalence of both risk factors and different diseases on health expenditures. For example, a previous study in China found that changes in risk factors and disease prevalence influenced health expenditure growth (16). Similar results were found in Australia where the main drivers of CHE growth were health sector inflation, population growth, and aging (28). Another study in Australia found that the effect of aging on CHE growth is mainly related to the presence of comorbidities in the Australian population (18). Consistent with economic growth and technology being an important factor driving CHE growth, previous research has focused on the effect of cost-control methods in reducing CHE growth (1). Of relevance, cost-control methods do not necessarily reduce access to health services and instead, might improve it by freeing health sector resources to satisfy other needs (23).

These studies try to inform decision-makers on the expected CHE growth that they will face if they don't address medical inflation and the prevalence of high-cost conditions. A different question that has also become relevant for decision makers as countries expand UHC is what is the cost of such expansion? On this topic there is literature addressing the issue but we were not able to find previous attempts at estimating it (29–31).

As a consequence of these concerns, we are interested in assessing the potential impact of interventions that can reduce CHE growth. For this reason, we modelled the potential effect

on CHE growth of 1) a reduction in the prevalence of selected risk factors and 2) a cost-control strategy. Also, we are interested in the consequences in terms of CHE growth of expanding UHC in LAC countries. Therefore, we calculate the additional CHE growth required to achieve a UHC index equal to 90 according to the IHME estimations published elsewhere (32).

Methods

Estimating scenarios of interventions for noncommunicable diseases

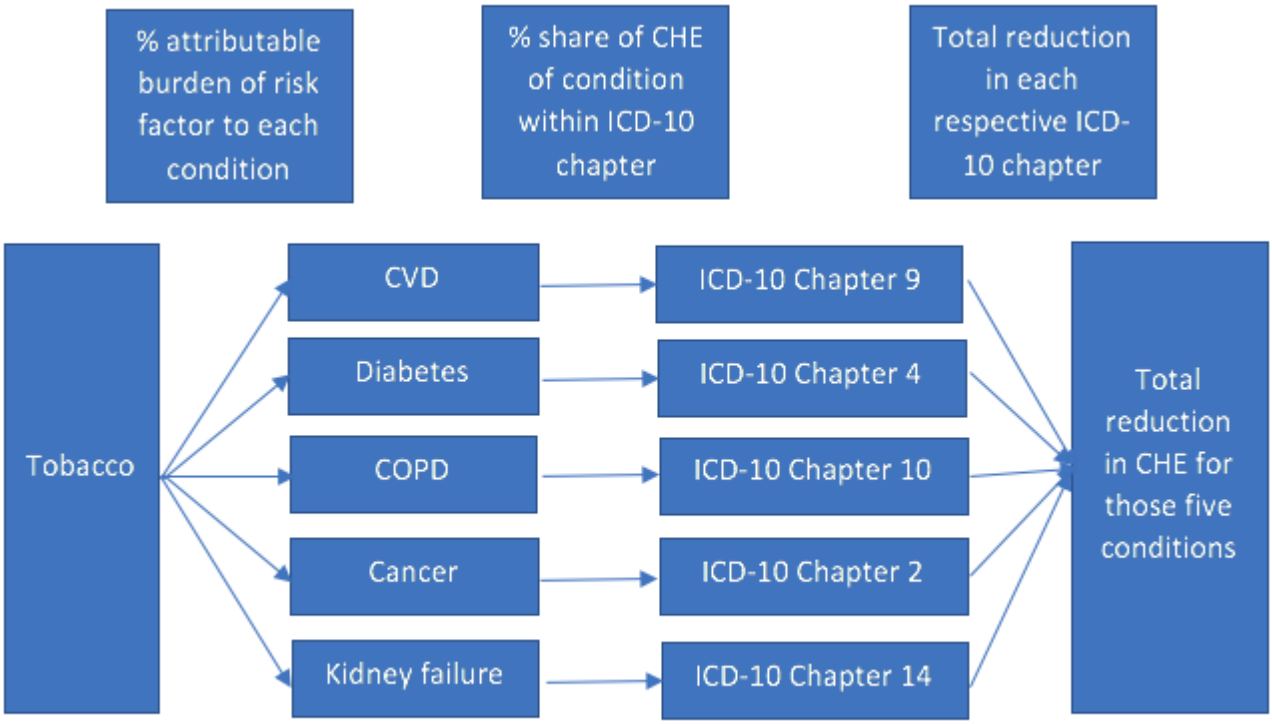
More than 50% of the burden of disease in the region is attributable to four risk factors and four chronic conditions, which correspond to the 'Best Buys' for recommended interventions for the prevention and control of noncommunicable disease of the World Health Organization (33). The Best Buys from WHO include these four main risk factors: tobacco use, alcohol use, diet, and physical activity; and the following four main conditions: cardiovascular disease, cancer, respiratory obstructive disease, and diabetes.

For risk factors, we used tobacco and alcohol use data, which were obtained from IHME (22). Given the difficulty to operationalize changes in diet and physical activity at a country level (the remaining two risk factors from the WHO Best Buys), we included two other risk factors ("high blood glucose" and "high systolic blood pressure") that are highly related to the four conditions identified by the WHO Best Buys and also available in the IHME datasets. Regarding the conditions evaluated, we included the four conditions included in the WHO Best Buys, and added a very high-cost condition, kidney failure. We also used IHME data (22) to map the attributable fraction of the selected four risk factors to our selected five outcomes.

In order to estimate the potential impact of changes in the prevalence of risk factors on current health expenditures, we carried out a comparative risk assessment (34,35). In this analysis, we examined scenarios of the effect of changes in the prevalence of the four selected risk factors on total CHE and DALYs through changes in the five selected conditions. We then compared these scenarios to the concurrent baseline projections to estimate effects of these scenarios.

We calculated the expected impact in terms of health expenditures by multiplying 1) the projected CHE for any given year for each country and ICD-10 Chapter; 2) the percent change in the prevalence of each risk factor (reductions of 5%, 10% and 25%); 3) the attributable fraction that the risk factor has on each of the five selected conditions in terms of DALYs; and 4) the share of CHE attributed to each of the five selected conditions within their respective chapter (this data is obtained from Colombia and assumed similar in all LAC countries). We assume that the effect of risk factor changes progressively increase over a ten-year period by which the maximum effect is achieved. See Figure 5.1 for and equation 2 for further clarity.

Figure 5.1 Estimating the effect of reduction in one risk factor (tobacco use) on total CHE.



$$Eq.2\ P_{ijkpt} = CHE_{ijkt}\ x\ ChangePrevRF_{ipt}\ x\ \frac{DALY_{ijkpt}}{DALY_{ijkt}}\ \ x\ ShareCol_{jk}$$

Where the expected policy impact on current health expenditures *P* in country *i*, age category *j*, outcome *k*, risk factor *p*, and year *t* is represented by CHE multiplied by: (i) the share of the age-specific expenditures (ShareCol) that each outcome represent within a single ICD-10 Chapter in Colombia (averaged between 2015 and 2018 - this is the only country where we obtained this granularity of the data and therefore, we are applying those shares to the other countries in the region; (ii) the proportion of DALYs out of each conditions that is attributable to each risk factor; (iii) the change in the prevalence of the risk factor ($ChangePrevRF$).

Estimating effect of cost containment policies

Several factors affect the growth of CHE: population growth and structure, disease prevalence, economic growth, medical price inflation (due to increase in health sector prices), technology (e.g., use of generics), intensity of medical service use, coverage of health services, policies, and other factors, which can inflate health expenditures (6). In our model, the 'economic growth and technology' parameter captures these factors except the contribution of population growth and structure, and disease prevalence. Economic growth and technology are estimated as the sum of (i) the contribution of economic growth to health expenditures, and (ii) the contribution of a residual factor that includes increases in medical prices, the effects of introducing new technologies, the intensity of medical service use,

changes in health service coverage and other factors. Our forecasting results in the previous chapter indicate that economic growth and technology is by far the main driver of health expenditures in the LAC region. Of interest is to understand what effect **cost containment measures** would have on reducing CHE.

Economic growth has been found to be the main driver of health expenditure growth (26). Determining the size of the income elasticity, which estimates the contribution of economic growth to growth in health expenditures, has important implications for health care financing. Studies indicate that as countries get richer and have more established health systems, income elasticity decreases. However, lower income elasticity estimates in richer countries are partly due to their health systems having maturity in terms of financing and coverage, but also because of deliberate attempts by the government to control costs. For example, in Japan, Germany, and France, the government actively negotiates the prices of health services with providers (23).

To generate the cost-control scenario, we assumed that over a ten-year period LAC countries would be able to achieve cost-control on health expenditures. We operationalize this by applying income elasticities of western European and high-income countries to the calculation of the economic growth and technology parameter for LAC countries. The following adjustments are made to this parameter to characterize the effects of an effective cost-control strategy: the contribution of economic growth is adjusted via the income elasticity which is assumed to decline in Latin American (Caribbean) countries from 0.88 (1.44) to 0.6 over 10 years. We set target income elasticity to 0.6 based on high-income and western European country estimates (see Table 2.1). Further, the residual factor declines by half over these 10 years (see Annex 5).

Expenditures required to achieve universal health coverage in 2030

A final scenario we examined is what it would cost countries in the LAC region to approach UHC. For this estimation, we used the Universal Health Coverage index based on the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2019 from IHME(32). This index includes 23 effective coverage indicators that are either direct measures of intervention coverage or outcome-based indicators. This index is validated on content and convergence against five health service domains (promotion, prevention, treatment, rehabilitation, and palliation) over five population-age groups (newborn, children <5 years, children and adolescents aged 5–19 years, adults aged 20–64 years, and adults aged ≥65 years). Each of the indicators is weighted by the potential health gains in terms of the disability-adjusted life-years (DALYs) associated with each effective coverage indicator. The scale of the index ranges from 0 to 100.

These estimations assess the potential increase in CHE required to achieve a universal health coverage (UHC) index of 90 by year 2030 (Eq. 3). To conduct these estimations, we used historical data in CHE between 2010 and 2018, and the historical changes in UHC between 2019 and 2019 (32). Data on CHE was not available for 2019 at the time of this study so CHE for 2018 are assumed to be similar to those in 2019. We assumed linear increases.

$$\text{Eq. 3: } I_{it} = \frac{90-\left(UHC_{2019}+t(\Delta UHC_i)\right)}{t} \; x \; \frac{\Delta CHE_i}{\Delta UHC_i}$$

Where the expected investment *I* in terms of current health expenditures to achieve an index of 90 in country *i* in *t* years is represented by two multiplicative terms. The first term represents the country-specific required change on UHC to achieve a UHC index equal to 90, and the second term represents the country-specific elasticity of current health expenditures (CHE) to changes in the UHC index. To estimate the required change in UHC, we estimated the annual UHC growth needed to achieve a UHC of 90 in *t* years based on the annual country specific historical UHC growth ΔUHC_i, assuming the starting baseline equal to the actual UHC index in 2019 (UHC_{2019}). This first term is multiplied by the historical country-specific elasticity of CHE to UHC growth $\frac{\Delta CHE_i}{\Delta UHC_i}$.

Results

Table 5.1 shows the reduction in CHE by 2050 that would be achieved by the risk factor interventions and cost control scenarios, in each country, compared to the expected 2050 health expenditure in the absence of any scenario (i.e., compared to the base case). The greatest reductions would be achieved under the cost control scenario, with reductions of over 10% in all but three countries, and reductions of over 20% in the Dominican Republic, Panama, Peru, and Trinidad and Tobago.

Among the four risk factor intervention strategies, the greatest reductions would be achieved by reducing prevalence of hypertension, except in Brazil, where tobacco reduction would bring the largest gains. Note that these reductions in CHE should be viewed as 'gross reductions' because there will likely be investments made to achieve changes in risk factors.

The final column in Table 5.1 shows the investment required to reach universal health care, as a proportion of CHE. The estimates vary across countries, with some countries requiring an investment of over 100% of the current annual CHE between 2020 and 2030, while others requiring less than 5%. On average, Caribbean countries required higher levels of spending (35%-106%) through 2030 in order to reach a UHC index of 90. Latin American countries required less investment on average but still with considerable dispersion (7% to 85%).

Table 5.1 Relative change in CHE in 2050 compared to base case, by scenario and country.

5.1a Latin America.

	Tobacco			Hypertension			High blood glucose			Alcohol			Cost control	Reaching Universal Health Care by 2030 (90%) *
	5%	10%	25%	5%	10%	25%	5%	10%	25%	5%	10%	25%		
Argentina	0.32%	0.64%	1.59%	0.33%	0.66%	1.65%	0.20%	0.41%	1.02%	0.04%	0.08%	0.20%	13.42%	13.72%
Bolivia	0.13%	0.25%	0.64%	0.34%	0.69%	1.71%	0.26%	0.51%	1.28%	0.01%	0.02%	0.04%	18.32%	40.76%
Brazil	0.44%	0.88%	2.19%	0.29%	0.57%	1.43%	0.18%	0.35%	0.88%	0.10%	0.21%	0.52%	12.28%	**Not assessed**
Chile	0.25%	0.50%	1.25%	0.46%	0.91%	2.28%	0.27%	0.54%	1.35%	0.04%	0.08%	0.20%	18.84%	11.33%
Colombia	0.15%	0.31%	0.77%	0.46%	0.92%	2.30%	0.33%	0.66%	1.65%	0.01%	0.02%	0.06%	19.03%	1.60%

	Tobacco			Hypertension			High blood glucose			Alcohol			Cost control	Reaching Universal Health Care by 2030 (90%) *
	5%	10%	25%	5%	10%	25%	5%	10%	25%	5%	10%	25%		
Costa Rica	0.17%	0.33%	0.83%	0.42%	0.83%	2.09%	0.26%	0.53%	1.32%	0.01%	0.02%	0.06%	19.91%	7.02%
Ecuador	0.14%	0.28%	0.70%	0.34%	0.68%	1.71%	0.30%	0.61%	1.51%	0.01%	0.02%	0.05%	17.10%	15.91%
El Salvador	0.15%	0.29%	0.73%	0.46%	0.92%	2.30%	0.35%	0.70%	1.76%	0.01%	0.02%	0.05%	13.40%	9.13%
Guatemala	0.13%	0.26%	0.64%	0.39%	0.78%	1.94%	0.31%	0.62%	1.55%	0.01%	0.02%	0.05%	16.19%	35.84%
Honduras	0.21%	0.42%	1.06%	0.41%	0.82%	2.04%	0.32%	0.63%	1.59%	0.03%	0.06%	0.14%	14.35%	15.46%
Mexico	0.15%	0.31%	0.77%	0.43%	0.87%	2.17%	0.37%	0.74%	1.85%	0.02%	0.04%	0.10%	8.34%	**Not assessed**
Nicaragua	0.18%	0.36%	0.91%	0.45%	0.90%	2.26%	0.33%	0.65%	1.63%	0.02%	0.04%	0.09%	17.44%	62.40%
Panama	0.13%	0.25%	0.63%	0.40%	0.80%	2.01%	0.30%	0.60%	1.49%	0.02%	0.05%	0.12%	27.33%	28.87%
Paraguay	0.24%	0.48%	1.21%	0.37%	0.74%	1.85%	0.25%	0.50%	1.26%	0.03%	0.06%	0.15%	17.07%	85.69%
Peru	0.11%	0.22%	0.55%	0.45%	0.90%	2.24%	0.24%	0.48%	1.20%	0.01%	0.02%	0.06%	24.33%	7.57%
Uruguay	0.34%	0.67%	1.68%	0.36%	0.72%	1.80%	0.21%	0.42%	1.04%	0.04%	0.08%	0.21%	19.37%	39.78%
All Latin America countries	**0.29%**	**0.58%**	**1.46%**	**0.36%**	**0.72%**	**1.81%**	**0.24%**	**0.49%**	**1.22%**	**0.06%**	**0.11%**	**0.28%**	**14.62%**	

*Values for "Reaching Universal Health Care" represent estimated *increases* in expenditure by 2030.

5.1a Caribbean.

	Tobacco			Hypertension			High blood glucose			Alcohol			Cost control	Reaching Universal Health Care by 2030 (90%) *
	5%	10%	25%	5%	10%	25%	5%	10%	25%	5%	10%	25%		
Bahamas	0.14%	0.29%	0.72%	0.50%	1.00%	2.51%	0.29%	0.58%	1.45%	0.05%	0.10%	0.26%	--	106.01%
Barbados	0.13%	0.26%	0.66%	0.55%	1.09%	2.73%	0.39%	0.78%	1.94%	0.06%	0.12%	0.31%	10.36%	44.60%
Belize	0.20%	0.40%	1.01%	0.40%	0.80%	2.01%	0.26%	0.53%	1.31%	0.03%	0.06%	0.16%	14.06%	24.97%
Dominican Republic	0.23%	0.47%	1.16%	0.45%	0.89%	2.24%	0.25%	0.50%	1.25%	0.03%	0.05%	0.13%	38.02%	40.42%
Guyana	0.15%	0.30%	0.75%	0.42%	0.85%	2.12%	0.32%	0.65%	1.62%	0.03%	0.07%	0.16%	9.38%	38.27%
Jamaica	0.25%	0.51%	1.27%	0.49%	0.97%	2.43%	0.36%	0.73%	1.82%	0.03%	0.06%	0.14%	10.17%	**Not assessed**
Suriname	0.20%	0.41%	1.02%	0.39%	0.79%	1.97%	0.33%	0.66%	1.65%	0.03%	0.06%	0.14%	13.88%	53.09%
Trinidad and Tobago	0.23%	0.45%	1.13%	0.54%	1.08%	2.71%	0.38%	0.77%	1.91%	0.04%	0.08%	0.19%	32.25%	35.16%
All Caribbean countries	**0.23%**	**0.46%**	**1.14%**	**0.46%**	**0.92%**	**2.31%**	**0.27%**	**0.55%**	**1.37%**	**0.03%**	**0.06%**	**0.14%**	**33.96%**	

*Values for "Reaching Universal Health Care" represent estimated *increases* in expenditure by 2030. ¥ The darker the color the greater the effect.

The risk factor interventions and cost control scenarios that we modeled would result in significant cumulative savings over the long term. These savings are driven by the relative reduction in CHE for each scenario (per Table 5.1) and the absolute CHE for each country. Note that these reductions in CHE should be viewed as 'gross reductions' because there will likely be investments made to achieve changes in risk factors. In Table 5.2, we present results with discounted values for costs through 2050. The discounted values were estimated at a 3% annual discount rate. If every country in the region were to implement the cost control

scenario, we estimate combined cumulative savings of $813 billion across the region by 2050 (discounted).

Table 5.2 Discounted cumulative savings by 2050 due to scenarios, by scenario and country (2018 billion US$).

5.2a Latin America.

	Tobacco 10%	Hypertension 10%	High blood glucose 10%	Alcohol 10%	Cost control
Argentina	6,235	6,693	4,017	818	73,203
Bolivia	180	478	360	13	7,951
Brazil	36,209	22,559	13,808	8,895	272,862
Chile	3,933	6,850	4,030	642	81,109
Colombia	2,046	5,810	4,183	158	72,166
Costa Rica	396	977	608	31	14,034
Ecuador	648	1,557	1,344	53	23,840
El Salvador	118	357	275	8	3,077
Guatemala	330	981	779	26	13,386
Honduras	187	359	280	26	4,063
Mexico	4,4332	12,115	10,278	571	63,133
Nicaragua	114	285	206	13	3,518
Panama	500	1,542	1,139	100	34,188
Paraguay	350	538	362	44	7,579
Peru	911	3,661	2,017	114	64,819
Uruguay	886	977	544	113	14,223
All Latin America countries	**57,477**	**65,737**	**44,229**	**11,623**	**753,151**

5.2b Caribbean.

	Tobacco 10%	Hypertension 10%	High blood glucose 10%	Alcohol 10%	Cost control
Bahamas	37	125	72	14	--
Barbados	15	61	44	7	293
Belize	111	21	14	2	230
Dominican Republic	914	1,745	966	106	49,889
Guyana	13	34	26	3	205
Jamaica	85	157	118	10	924
Suriname	23	42	35	3	417
Trinidad and Tobago	186	431	303	31	7,559
All Caribbean countries	**1,284**	**2,616**	**1,578**	**176**	**59,517**

In addition to reductions in health expenditures, the risk factor interventions would also result in health gains, offering the double benefit of reducing mortality and morbidity, while also reducing expenditures due to that morbidity and mortality. Table 5.3 shows the estimated reduction in DALYs for the four risk factor scenarios. Each scenario would reduce DALYs for two or more of the five conditions: cardiovascular disease, cancer, respiratory obstructive disease, diabetes, and kidney failure. Across the entire region, a 10% reduction in the prevalence of high blood glucose and hypertension would reduce DALYs due to the five conditions by 2.82% and 2.6%, respectively. Table 5.4 shows the same figures for individual

countries. For some countries, the largest health gains would come from reducing hypertension, while in other countries the largest gains would come from reducing high blood pressure. Alcohol seems to be a risk factor whose impact on burden of disease in the region is relatively low compared to other risk factors.

Table 5.3 Relative reduction in DALYs among all LAC countries, by scenario and condition.

	Tobacco			Hypertension			High blood glucose			Alcohol		
	5%	10%	25%	5%	10%	25%	5%	10%	25%	5%	10%	25%
Cardiovascular diseases	0.74%	1.47%	3.68%	2.62%	5.23%	13.08%	1.15%	2.30%	5.76%	0.08%	0.17%	0.42%
Cancer (neoplasms)	0.78%	1.57%	3.92%				0.20%	0.39%	0.98%	0.20%	0.41%	1.02%
Chronic obstructive pulmonary disease	2.29%	4.58%	11.45%									
Diabetes mellitus	0.64%	1.29%	3.22%				5.00%	10.00%	25.01%	-0.03%	-0.06%	-0.16%
Chronic kidney disease				2.82%	5.64%	14.10%	1.55%	3.10%	7.74%			
Five conditions combined	**0.77%**	**1.55%**	**3.87%**	**1.30%**	**2.60%**	**6.51%**	**1.41%**	**2.82%**	**7.06%**	**0.09%**	**0.18%**	**0.44%**

¥ The darker the color the greater the effect.

Table 5.4 Relative reduction in 2050 DALYs from 5 causes, by scenario and country.

	Tobacco			Hypertension			High blood glucose			Alcohol		
	5%	10%	25%	5%	10%	25%	5%	10%	25%	5%	10%	25%
Argentina	1.15%	2.30%	5.76%	1.15%	2.31%	5.77%	0.96%	1.93%	4.82%	0.17%	0.34%	0.85%
Bahamas	0.47%	0.95%	2.37%	1.57%	3.14%	7.84%	1.36%	2.72%	6.80%	0.15%	0.29%	0.73%
Barbados	0.37%	0.74%	1.84%	1.18%	2.37%	5.92%	1.95%	3.89%	9.73%	0.14%	0.28%	0.69%
Belize	0.67%	1.34%	3.35%	1.30%	2.61%	6.52%	1.56%	3.13%	7.82%	0.12%	0.23%	0.59%
Bolivia	0.43%	0.85%	2.13%	1.00%	2.01%	5.02%	1.22%	2.43%	6.09%	0.02%	0.04%	0.11%
Brazil	0.98%	1.95%	4.89%	1.36%	2.72%	6.79%	1.19%	2.39%	5.97%	0.11%	0.22%	0.56%
Chile	0.83%	1.66%	4.14%	1.35%	2.70%	6.74%	1.17%	2.34%	5.86%	0.15%	0.30%	0.76%
Colombia	0.62%	1.23%	3.08%	1.19%	2.38%	5.96%	1.34%	2.69%	6.72%	0.04%	0.07%	0.18%
Costa Rica	0.67%	1.33%	3.33%	1.42%	2.85%	7.12%	1.27%	2.55%	6.37%	0.06%	0.12%	0.30%
Dominican Republic	0.91%	1.83%	4.57%	1.68%	3.35%	8.38%	1.14%	2.28%	5.70%	0.11%	0.21%	0.54%
Ecuador	0.45%	0.89%	2.23%	1.10%	2.20%	5.50%	1.39%	2.78%	6.95%	0.04%	0.08%	0.21%
El Salvador	0.41%	0.81%	2.03%	1.45%	2.90%	7.25%	1.72%	3.44%	8.59%	0.02%	0.03%	0.08%
Guatemala	0.43%	0.86%	2.15%	1.22%	2.43%	6.08%	1.92%	3.84%	9.59%	0.02%	0.04%	0.11%
Guyana	0.57%	1.13%	2.83%	1.66%	3.32%	8.31%	1.86%	3.72%	9.30%	0.14%	0.27%	0.68%
Honduras	0.76%	1.52%	3.80%	1.55%	3.10%	7.74%	1.43%	2.86%	7.16%	0.09%	0.18%	0.44%
Jamaica	0.70%	1.41%	3.52%	1.21%	2.41%	6.03%	1.79%	3.58%	8.95%	0.08%	0.15%	0.38%
Mexico	0.57%	1.15%	2.87%	1.30%	2.59%	6.49%	1.96%	3.91%	9.79%	0.06%	0.11%	0.28%
Nicaragua	0.51%	1.02%	2.55%	1.60%	3.20%	8.00%	1.74%	3.49%	8.72%	0.05%	0.10%	0.25%
Panama	0.47%	0.94%	2.36%	1.27%	2.55%	6.37%	1.63%	3.26%	8.14%	0.09%	0.19%	0.47%
Paraguay	1.01%	2.02%	5.04%	1.43%	2.85%	7.13%	1.45%	2.89%	7.23%	0.14%	0.29%	0.71%
Peru	0.28%	0.55%	1.38%	1.11%	2.22%	5.56%	1.01%	2.01%	5.04%	0.04%	0.08%	0.19%
Suriname	0.89%	1.77%	4.44%	1.37%	2.75%	6.87%	1.75%	3.51%	8.77%	0.11%	0.22%	0.55%
Trinidad and Tobago	0.70%	1.40%	3.50%	1.44%	2.88%	7.19%	2.17%	4.34%	10.86%	0.06%	0.12%	0.31%
Uruguay	1.22%	2.44%	6.09%	1.06%	2.11%	5.28%	0.76%	1.52%	3.80%	0.18%	0.36%	0.90%
All LAC countries	**0.77%**	**1.55%**	**3.87%**	**1.30%**	**2.60%**	**6.51%**	**1.41%**	**2.82%**	**7.06%**	**0.09%**	**0.18%**	**0.44%**

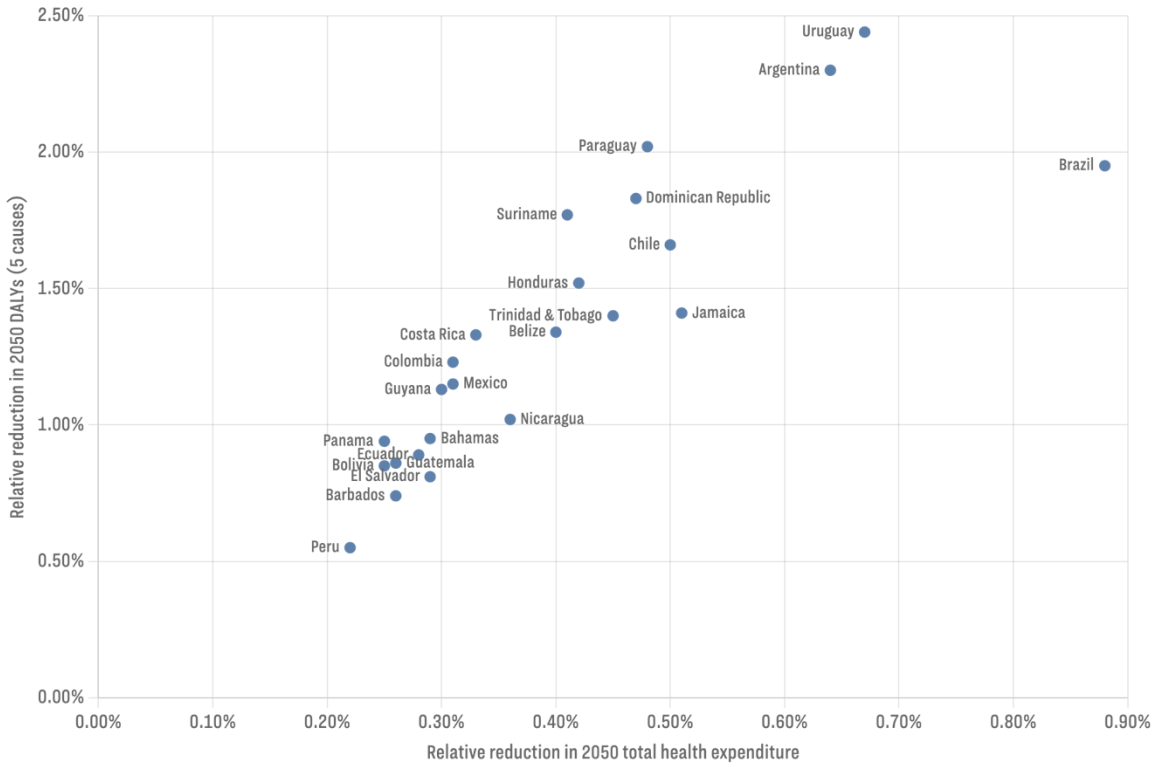
¥ The darker the color the greater the effect.

Figure 5.2 puts the estimated reductions in expenditure in 2050 alongside the estimated health gains by 2050, for each of the risk factor intervention scenarios (10% reductions). Each point represents a single country. The figure shows that, in general across countries, a 10% reduction in the prevalence of hypertension would bring the greatest economic benefit, reducing yearly CHE by over 0.65% for most countries, while a 10% reduction in the prevalence of high blood glucose would bring the biggest health gains, reducing DALYs for the five conditions by over 2% for most countries. A 10% reduction in alcohol would bring the least benefit in both economic and health terms.

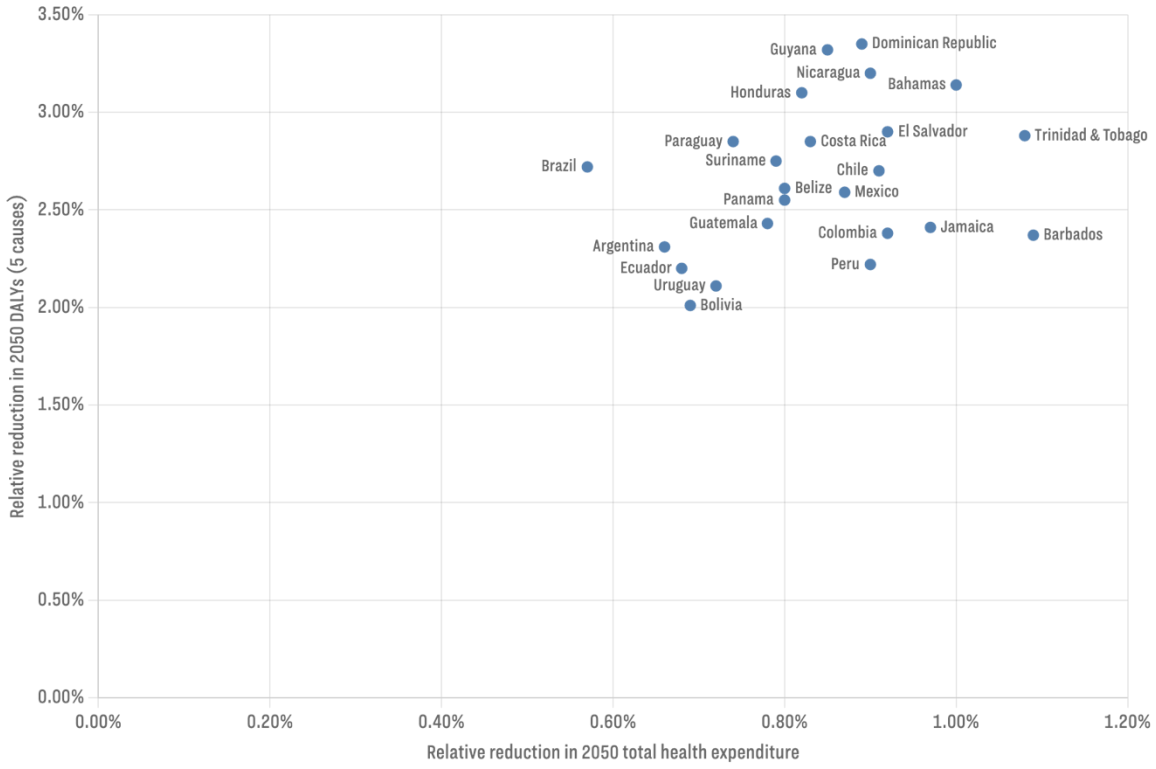
Figure 5.2 also reveals some interesting trends. For example, the relationship between the relative reduction in disease burden and the relative reduction in expenditures is almost linear with some exceptions (e.g., Bolivia), implying that there is a direct link between health expenditures attributed to tobacco smoking and burden of disease. However, large changes in disease burden are associated with relatively much smaller changes in CHE. Most of countries in the upper right corner have adult tobacco smoking prevalence higher than 10%. In the case of high blood pressure, we note that there seems to be less of an association between reduction in disease burden and CHE and there are not clear patterns between known prevalence of hypertension and CHE. It is noticeable that the variation in the burden of disease has a wider range than the variation of CHE, perhaps implying that resource utilization and prices a more relevant driver of CHE than prevalence of disease. In the case of high-blood glucose, which is substantially higher in Caribbean countries as well as in Central America and Mexico, there appears to be a linear relationship between relative reduction in disease burden and CHE, though large changes in disease burden are associated with relatively much smaller changes in CHE. Regarding alcohol consumption, this risk factor seems to have a more pronounced effect on DALYs than on health expenditures. A potential reason for this is the important effect that alcohol has on injuries and external causes of burden of disease, many of them leading to a higher number of deaths that might be better captured in the DALY data than in the health expenditures data. Of note, are the cases of Argentina, Paraguay, and Brazil with the highest consumption levels in the region (36). The case of Brazil is particular because of the significantly higher effect on health expenditures with respect to other countries. Despite Brazil having a high prevalence of alcohol consumption in patterns of “binge drinking” and other studies that have identified large costs attributed to alcohol consumption, the reason for the deviation with respect to other countries in the region cannot be concluded from the data (37,38).

Figure 5.2 Relative reduction in 2050 total health expenditure vs DALYs.

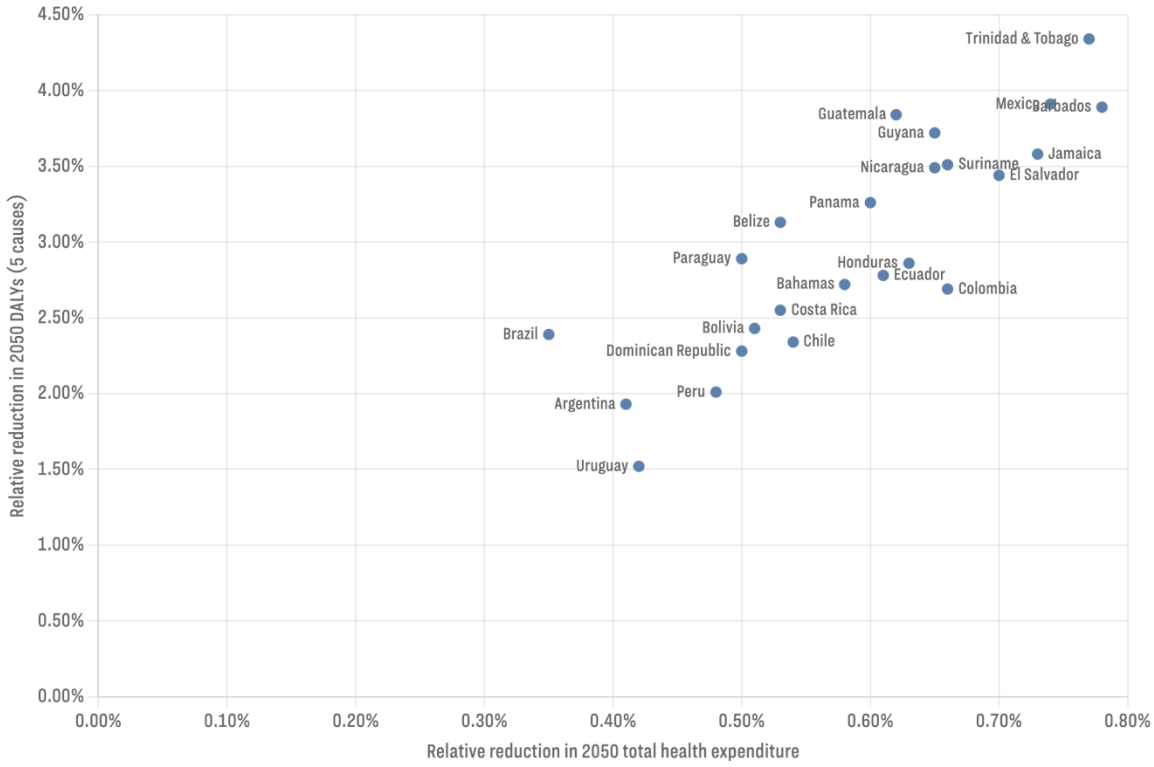
5.2a. 10% Reduction in prevalence of tobacco.



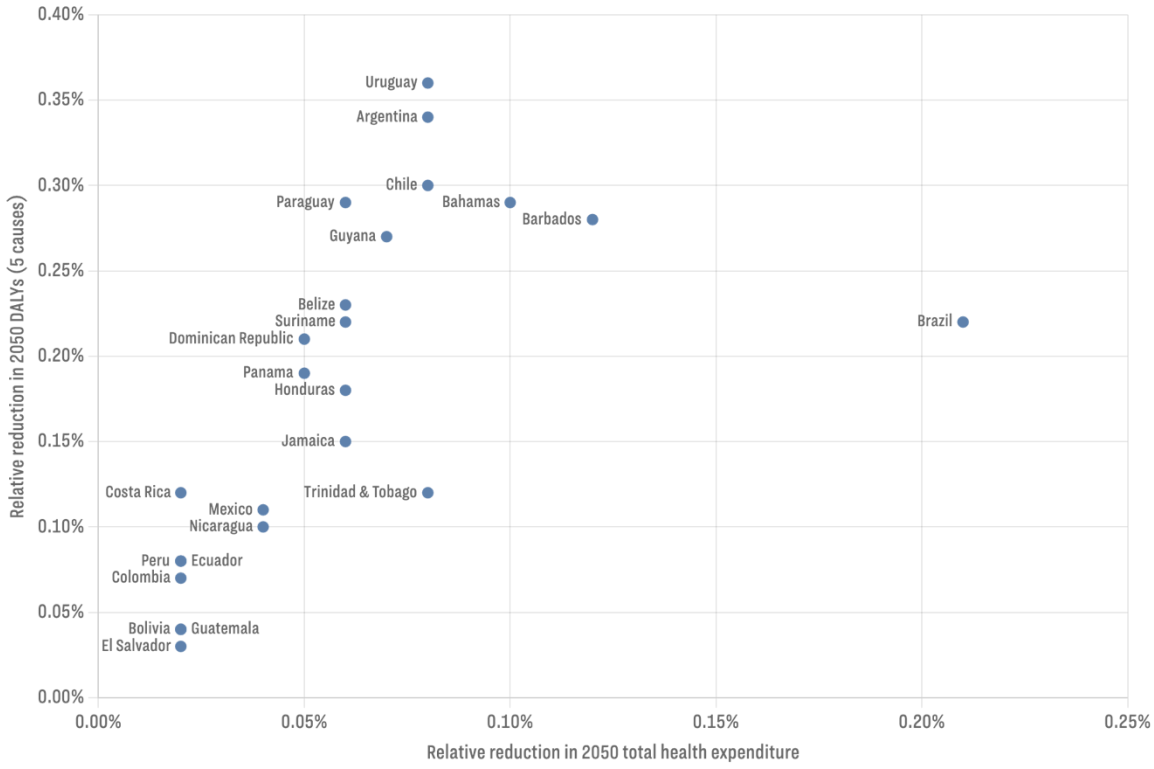
5.2b 10% reduction in prevalence of hypertension.



5.2c 10% Reduction in prevalence of high blood glucose.



5.2d 10% Reduction in prevalence of alcohol.



While it is interesting to compare the relative economic and health gains that could be achieved by a 10% reduction in each of the risk factors, we stress that the ***feasibility*** of achieving the same prevalence reduction in each risk factor is likely highly different. While a 10% reduction in tobacco may not bring the same gains as a 10% reduction in hypertension, for example, it may be more feasible and thus represent a more effective policy option. These determinations will be highly country-specific and involve other factors that go beyond the scope of this study. Also, it is important to highlight that the reductions in burden of disease might not be valued in the same way as reductions in CHE. Reductions in burden of disease are likely higher in value, especially since our estimations focus on reductions of expenditures in five main conditions.

Chapter 6

Discussion and conclusions

The aim of this study was to develop an economic model to project health expenditures in Latin America and the Caribbean (LAC) over the next 30 years. We used information on current and future prevalence of disease, population growth, change in the population age structure, and economic growth and technology, to project current health expenditures (CHE) between 2018/19 (baseline) and 2050 for select LAC countries. The LAC countries generally display impressive levels of health care spending as a share of their GDP ranging from a low of 3.6% to a high of 9.6% of their GDPs and are generally higher relative to countries in South and South East Asia. Several LAC countries like Argentina, Brazil, Uruguay, and Chile spend at levels seen in universal coverage systems of high-income countries.

Our findings reveal that countries in the LAC region will experience real increases in CHE and per capita CHE between baseline and 2050. Overall, among LAC countries, the average increase in CHE is expected to be 2.75 times between baseline and 2050. In nearly all Latin American countries, there is at least a doubling of CHE per capita between baseline and 2050. In some instances, the increases are substantial; large increases in per capita CHE are projected in countries like Panama (373%), Peru (344%), Chile (222%), Nicaragua (219%), Costa Rica (195%), Colombia (187%), and Bolivia (181%). In Caribbean countries, at least a doubling of per capita CHE is projected for Dominican Republic (447%), Trinidad and Tobago (257%), and Belize (120%). The average annual per capita CHE growth from baseline to 2050 for Latin American countries is 3.2% per year and 2.4% for the Caribbean. Most LAC countries will experience annual growth in per capita CHE of around 2% or higher. In Latin America, relatively high (>3.4% in 2030-50) projected growth rates are seen in Panama, Peru, Nicaragua, Chile, Costa Rica, Bolivia, Colombia, and Guatemala. In the Caribbean, high (>3.0% in 2030-50) growth rates are observed in Dominican Republic and Trinidad and Tobago.

Rising health expenditures are a concern because of affordability. This is a particular challenge in Latin American countries because of the strong push to achieve universal health coverage and increase government spending on health. In the medium term, the region's fiscal space has been sharply reduced by the COVID-19 pandemic; spending and borrowing have increased while the unprecedented economic contracting has seriously reduced revenues.

The share of health expenditures in GDP is projected to increase across LAC countries besides Guyana. In Argentina and Nicaragua, it is expected to approach 15% of GDP by 2030. For these (and other countries) in the LAC region, it becomes important to implement strategies to help control future health expenditures, preferably by increasing the efficiency of spending and enacting policies to explicitly reduce the significant contribution of economic growth and technology.

Another important measure of future affordability is the extent to which per capita CHE growth exceeds per capita GDP growth. Our projections indicate that between baseline and 2030, almost all LAC countries will experience health expenditure growth rates that exceed the growth in their national income. Trends in the increasing share of GDP devoted to health,

as well as the higher growth in health expenditures relative to national income, make it critical for LAC countries to implement cost control mechanisms while balancing the demands of universal health coverage.

Our study results indicate that the relative effect of changes in demography and epidemiology will have modest effects on increasing health expenditures in LAC countries. The main driver of health expenditures is economic growth and technology. On average, it nearly doubled CHE in Latin American countries and increased CHE by nearly three times in Caribbean countries. The effect of demographics and epidemiology (which includes the effects of population growth, aging, and age-specific disease prevalence) had the second largest effects for Latin America and the Caribbean. The contribution of only population growth and only aging was modest in comparison to economic growth and technology. However, there are exceptions to this. For example, in Mexico the main driver of health expenditures is population growth, aging, and epidemiology. These factors combined exceeded the effect of economic growth and technology on current health expenditures.

Changes in the distribution and growth of health expenditures by disease and age-groups in LAC countries are due to the demographic and epidemiological transitions they are undergoing. CHE growth by ICD-10 Chapters showed lower median values for infectious and parasitic diseases, pregnancy and childbirth, and perinatal conditions, while increased values were observed for expenditures associated with neoplasms; endocrine, nutritional, and metabolic diseases; disease of the circulatory system; diseases of the musculoskeletal system and connective tissue; and diseases of the genitourinary system. Expenditures were found to increase with age in all countries, implying that countries with older populations and more inverted population pyramids might experience rising costs over the years. Our results generally show modest effects of both the epidemiological and demographic transitions on CHE. One explanation for this is that the main contributor of high health expenditures in older ages is care required in the period before death. As people live longer, these expenditures shift to the oldest age groups reducing health expenditures in the now 'younger' age groups over time.

Our estimates of projected annual CHE growth (median of 3.8% annually) are consistent with current literature where projections of annual CHE growth range between 2.7 during 2015-30 for OECD countries (1) to 8.4 in China between 2015-35 (16). Our results also support what other scholarly work has found in terms of increasing expenditures in countries with larger populations of senior individuals and those suffering from cardiovascular conditions and cancer (16). We observed that the most important determinant of health expenditure growth in most countries is economic growth and technology (exceptions include Mexico), which mainly captures the effect of economic growth, as well as other factors such as technological change. Other studies have also identified economic growth to be the main driver of health expenditures (1,8,9).

Ensuring that technological change adds value

Our results indicate that economic growth and technology is the most concerning determinant of increasing health expenditures. Previous work has shown that technology might explain between 25% to 75% of health expenditure growth in the US (19). To tackle this

issue, certain strategies are key, such as the ability to set up explicit prioritization systems and benefit plans that establish common rules for payers and providers, while at the same time ensuring that the technology offered by each country's health systems is cost-effective. Thus, the development of health technology assessment agencies in countries might be an important step to take in the short-term to reduce long-term costs associated with technological change.

Health expenditures and out-of-pocket payments

Our study indicates that there will be increases, substantial in some countries, in health expenditures in LAC countries over the next 30 years. Further, there have been declines in the share of out-of-pocket expenditures across most LAC countries in the past. These two features comprise a health financing transition as conceptualized by Fan and Savedoff (6). There are some concerns that this transition may have stalled or will not be complete in the short-term. For one, despite historical declines in out-of-pocket payments, they remain persistently high in many LAC countries. So, it appears that increased public expenditures on health may not translate into proportionately lower out-of-pocket expenditures. Factors such as the quality of publicly financed health services and the coverage of services may be responsible for this. A rich literature shows that patients often bypass government health facilities to seek care with more expensive private providers. Clearly, it is important to direct policy action towards improving quality and coverage of health services, in conjunction with increasing expenditures on health.

Overall, the projected increases in health expenditures also poses important challenges for ensuring adequate fiscal space for health in the LAC regions. Special attention must be placed not only on improving efficiency or controlling expensive and less effective technological change, but also by finding sustainable sources of revenues and innovative financial mechanisms, including different ways to pool resources or the possibility of enacting or increasing taxation on tobacco, alcohol, and unhealthy food and drink products.

Availability of health expenditure data

Another important lesson of this effort is the need to improve the availability of health expenditure information at the country level. The availability of health expenditure data related to different health financing schemes was fragmented in almost every LAC country. Disaggregated expenditure information by age or disease group was available only for one or two financing schemes within countries. These tend to be from social health insurance schemes. In some countries, though disaggregated expenditure data was available, having access to these databases was very difficult. In addition, several countries in our study had data systems on health expenditures that were not very informative, particularly relating to public spending on health. Better visibility in terms of health expenditure data can only help understand the current situation and what to expect in the future (19).

Containing current health expenditures through reducing risk factor prevalence and cost-control strategies

Government strategies for directly controlling health expenditures, through means such as active negotiations on prices between payers and providers, regulation of prices related to

drugs and diagnostics, and more efficient technologies, seem to be the most impactful intervention to reduce CHE in the region. Reducing CHE does not necessarily imply that the standards of care are reduced. To the contrary, they can lead to more efficient use of resources if the design of the cost control instruments leads to more cost-effective strategies. For example, the IADB has largely promoted the explicit prioritization of health benefit plans as a sound way to reduce costs and at the same time reduce inequities in access to health care (42,43). Also, reducing fragmentation, reformulating payment schemes, and improving information systems are avenues that both reduce costs and also increase the quality and coverage of services provided (43). These findings are consistent with previous literature where economic growth and the intensity of use of technology are the main drivers of CHE (16,28).

Reducing the prevalence of risk factors decreased CHE over time in a magnitude that ranges between 2.71% (reduction in hypertension by 25% in Trinidad and Tobago) and 0.11% (reduction in tobacco use by 5% in Peru). More generally, hypertension reduced CHE in a larger magnitude than high blood glucose, which in turn reduced CHE in a larger magnitude than tobacco. This is possibly related to the recent rise in hypertension and metabolic diseases in the region compared to tobacco use (44,45). Yet, the magnitude of these reductions is not negligible. Almost all LAC countries experience continued CHE per capita growth larger than GDP per capita growth, and the compounded effects of CHE reductions over time associated with either reducing risk factor prevalence or controlling costs are counted in the millions to the billions of USD (at 2018 prices). True but modest results have also been found in previous research when the prevalence of risk factors is reduced (16,18).

At the same time, we found that these interventions reflected reductions in DALYs that ranged between 10.86% (25% reduction of high blood glucose in Trinidad and Tobago) and 0.28% (tobacco reduction by 5% in Peru). Since our estimates are limited to changes in CHE and we are not assessing gains in terms of productivity, the economic returns of these interventions are likely to be larger. A tool that might lead to reductions in the prevalence of risk factors and that can also provide government revenues are health taxes targeting tobacco, alcohol, and some food products.

Investing in universal health coverage

Our findings reveal that most countries are not on track to achieve a UHC index of 90 by 2030. There is important heterogeneity across LAC countries in terms of the UHC index, which not only reveals the differences in current health spending but also the heterogeneity in the design of the different health systems of these countries.

In order to reach this target, it is key for countries to increase annual CHE. Our results assume linear growth consistent with the historical UHC growth trend between 2010 and 2018. However, it is possible that countries reach a UHC index of 90 at a lower cost if they become more efficient at spending and at selecting highly cost-effective programs or interventions. Similarly, increasing spending cannot lead to expanding UHC by itself. Additional spending must be accompanied by explicit cost-effective initiatives that have UHC as a target. It is important to highlight that the health system design of each country is key on how linear growth will yield a UHC index of 90. Any nonlinear effects when reaching a UHC index target

of 90 via economies of scale or decreasing marginal returns might overestimate or underestimate, respectively, the investment needs to reach this target. It needs to be said that we developed this model to inform decision-makers, but UHC targets are not static and there needs to be a focus not only on how much but also on how these investments are spent.

Limitations

It is important to note that health expenditure projections are inherently uncertain, particularly over the long term. Parameters extracted from past trends may not be good predictors for the future; projections from the UN, IHME, and IMF on population, population aging, disease prevalence, and economic growth also have uncertainty. Further, limited data on health expenditure schemes in the index countries introduced uncertainty regarding the expenditure by disease-age group. Extrapolating the health expenditures by disease-age group from index to other countries may have introduced further errors in the projections. Finally, unanticipated factors, such as another pandemic, or long-term challenges such as climate change may make the future look very different than the past.

Nevertheless, these projections offer useful insights into what future health expenditures might look like in the LAC region. Our projections are also broadly within the parameters observed in historical trends, and the scenario analysis (e.g., cost control scenario) offers insight into how the projections can change when key parameters like economic growth and technology are varied. Secondly, our analysis provides important insight into what factors are driving health expenditures in LAC countries. These findings have been consistent with other studies from other regions of the world. Third, the scenario analysis provides important insight into how future health expenditures might be reduced due to changes in disease risk factors, or cost control measures. These findings are also broadly consistent with previous studies and can only help policy makers prepare better policies for controlling future health expenditures.

Conclusions and recommendations

Our findings suggest that all countries in the LAC region will experience increases in CHE, and this may put tremendous fiscal pressure on many countries as they pursue policies related to universal health coverage and increased government spending. Because economic growth is the most powerful driver of health expenditures, as LAC countries become wealthier there will be upward pressure on health expenditures as well. As such, it becomes important to find ways of limiting health expenditures without reducing coverage or sacrificing the quality of services. This will not be an easy path to travel, but there are some options. This report constitutes a call for LAC countries to consider strategies to help ensure that the health resources they invest in the coming decades are used more efficiently, to pay attention to the health of older populations, and implement policies that reduce the burden on their health systems, which will enable countries to bend the cost curve. Some key recommendations to improve efficiency while also improving access include:

1) Government/payers and providers engaging in structured fee negotiations and standardize prices that balance the interests of payers and providers. Examples of this are observed in France, Germany, and Japan (23).

2) Deploying provider payment methods that encourage efficient provider behavior, while ensuring quality and patient centeredness

3) Strengthening primary health care systems to improve prevention and treatment at lower levels of care

4) Improving the integration of services and the provision of cost-effective preventive and public health services (39,40)

5) Enhancing interoperable and integrated information systems that improve coverage, while also reducing transaction costs, inefficiency, and redundancies (41)

6) Promoting the use of cost-effective technologies by creating agencies for Health Technology Assessment (HTA)

The projections presented in this study offer insights into the direction of health expenditures for LAC countries in the coming decades. With an understanding of the drivers of health expenditure, including economic growth and technology and to a lesser extent demographics and epidemiology, governments in the LAC region can consider a range of policies and programs to improve their approaches to controlling costs and increasing spending efficiency. Strengthening countries' health information systems and data comparability across the region will help inform these policy decisions and propel countries towards UHC.

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Annex 1. Data sources description

For all countries the distribution by age and sex were obtained from the UN population projection. Similarly, the prevalence by ICD-10-chapter, age, and sex were obtained from the IHME. Medical expenditure data sources are described below:

Medical expenditures data sources						
Argentina	**Brazil**	**Colombia**	**Costa Rica**	**Mexico**	**Peru**	**Trinidad and Tobago**
-Total Current Health Expenditures were calculated using price-prevalence lists from four nationally representative health facilities (Obras Sociales).	-National expenditures obtained from WHO's National Health Accounts. -Inpatient expenditures from DATASUS -Outpatient expenditures from SIASUS. -Share of administrative expenditures: Transparency Portal of the Federal Public Administration. -Voluntary schemes: data from National Regulatory Agency for Private Health Insurance and Plans (ANS).	-For contributory, subsidized, and private schemes: administrative records from the Individual Registry for the Provision of Health Services (RIPS in Spanish). -For non-medical expenditures the information was extracted from the National Health Accounts.	-Outpatient and inpatient records were obtained from REDATAM. Distributed these age-disease records using a health facility survey. -Used National Health Accounts to match the total expenditures from different financing schemes.	-National-level health expenditures were extrapolated from the social insurance scheme (IMSS). -Out-of-pocket costs were obtained from the National Health and Nutrition Survey (ENSANUT). -Used the National Public Spending on Health report (SICUENTAS) to match the total expenditures for other schemes.	-Government expenditures obtained from SIS-FISAL. -Direct expenditures from public facilities obtained from the Ministry of Economy. -Social insurance: expenditures obtained from EsSALUD. -Private expenses (EPS) come from the reports sent to the National Superintendency. -Out of pocket expenditures were obtained from a household survey (ENAHO).	-Public expenditure data were received from the Ministry of Health and Finance. -Private expenditures were reported by one health insurance company that accounts for 28% of the data.

Annex 2. Country abbreviations

Country Name	Abbreviation
Antigua and Barbuda	ATG
Argentina	ARG
Aruba	ABW
Bahamas, The	BHS
Barbados	BRB
Belize	BLZ
Bolivia	BOL
Brazil	BRA
British Virgin Islands	VGB
Cayman Islands	CYM
Chile	CHL
Colombia	COL
Costa Rica	CRI
Cuba	CUB
Curacao	CUW
Dominica	DMA
Dominican Republic	DOM
Ecuador	ECU
El Salvador	SLV
Grenada	GRD
Guatemala	GTM
Guyana	GUY
Haiti	HTI
Honduras	HND
Jamaica	JAM
Mexico	MEX
Nicaragua	NIC
Panama	PAN
Paraguay	PRY
Peru	PER
Puerto Rico	PRI
Sint Maarten (Dutch part)	SXM
St. Kitts and Nevis	KNA
St. Lucia	LCA
St. Martin (French part)	MAF
St. Vincent and the Grenadines	VCT
Suriname	SUR
Trinidad and Tobago	TTO
Turks and Caicos Islands	TCA
Uruguay	URY
Venezuela, RB	VEN
Virgin Islands (U.S.)	VIR

Annex 3. ICD-10 Chapter descriptions

Chapter	Description
1	Certain infectious and parasitic diseases
2	Neoplasms
3	Diseases of the blood
4	Endocrine, nutritional, and metabolic diseases
5	Mental and behavioral disorders
6	Diseases of the nervous system
7	Diseases of the eye and adnexa
8	Diseases of the ear and mastoid process
9	Diseases of the circulatory system
10	Diseases of the respiratory system
11	Diseases of the digestive system
12	Diseases of the skin and subcutaneous tissue
13	Diseases of the musculoskeletal system and connective tissue
14	Diseases of the genitourinary system
15	Pregnancy, childbirth, and the puerperium
16	Certain conditions originating in the perinatal period
17	Congenital malformations
18	Symptoms, signs, and abnormal clinical and laboratory findings not elsewhere classified
19	Injury, poisoning, and certain other consequences of external causes
20	External causes of morbidity and mortality
21	Factors influencing health status
22	Special

Annex 4. Index countries baseline expenditure matrices

Table A4.1 Expenditure in 2018, Argentina

2018 Argentina Current Health Expenditures, 2018 USD Current (thousands)																		
ICD-10 Chapter	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
I: Infectious	217,174	71,262	61,075	68,649	53,191	50,951	51,406	50,574	47,616	59,449	53,152	53,203	47,496	180,004	136,695	132,291	111,047	123,968
II: Neoplasms	62,009	51,982	48,254	51,887	42,953	47,501	57,855	74,701	88,928	114,165	159,449	192,548	196,203	748,694	551,989	419,125	277,886	207,618
III: Blood and immune mechanism	46,602	36,489	31,902	31,622	16,434	14,559	12,429	12,029	12,809	18,982	35,260	33,533	25,086	63,999	47,487	40,064	37,538	47,530
IV: Endocrine nutritional metabolic	158,428	137,436	121,706	92,439	52,464	46,922	39,470	36,243	38,046	69,906	103,563	103,100	83,812	226,767	150,567	131,780	112,841	164,057
V: Mental behavioral	164,188	146,891	143,424	214,732	193,383	179,488	196,145	169,542	171,325	266,527	234,882	228,629	176,860	397,594	215,925	153,160	66,298	92,074
VI: Nervous	35,826	10,841	10,372	10,205	10,361	9,111	7,832	9,000	9,806	8,682	12,569	12,054	13,934	57,313	40,372	42,163	30,484	23,274
VII: Eye	177,424	188,321	166,827	124,542	67,539	58,295	48,462	42,215	39,773	78,624	119,458	106,908	70,749	98,014	57,168	37,039	17,647	35,594
VIII: Ear	6,655	2,406	1,822	1,191	1,795	1,495	1,441	1,762	1,579	2,008	2,320	4,201	4,926	23,707	26,113	22,166	23,912	21,549
IX: Circulatory	148,540	116,784	100,871	121,826	73,265	68,038	63,322	67,424	81,102	140,608	247,770	274,828	270,922	952,366	724,106	669,526	637,079	732,518
X: Respiratory	744,019	248,853	190,094	138,017	75,281	66,015	59,061	58,481	59,472	91,201	121,600	136,684	130,464	493,337	418,520	391,020	384,794	527,666
XI: Digestive	143,334	129,943	156,743	179,007	219,334	209,091	200,304	214,091	210,948	220,051	246,536	255,004	221,352	815,989	544,806	433,706	353,992	328,688
XII: Skin	98,710	88,671	79,906	68,005	39,242	33,659	29,591	26,364	25,775	43,884	46,360	44,880	33,618	78,249	51,418	38,167	28,720	31,806
XIII: Musculoskeletal	147,618	162,192	149,532	145,381	86,671	76,781	64,993	60,322	56,667	99,348	150,709	137,731	92,871	169,862	105,651	83,718	39,616	54,965
XIV: Genitourinary	141,405	119,819	109,700	441,014	292,833	254,983	212,651	185,310	173,551	338,533	169,563	155,967	112,396	238,672	149,529	121,964	104,530	126,631
XV: Pregnancy childbirth puerperium	0	0	271,702	941,701	1,265,501	894,522	618,445	400,630	163,618	9,959	1,607	1,239	0	0	0	0	0	0
XVI: Perinatal	891,985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XVII: Congenital	176,522	16,039	14,301	8,508	5,130	3,568	3,093	2,791	2,569	3,805	2,648	2,953	3,378	20,802	16,344	21,182	23,497	30,094
XVIII: Unclassified abnormal findings	229,171	45,296	43,918	55,100	62,291	51,731	49,137	50,341	51,258	50,089	62,162	68,665	74,414	319,916	260,647	229,008	220,602	261,678
XIX: Injuries	167,828	96,234	106,765	199,864	228,818	165,293	135,362	124,366	103,769	96,625	91,121	99,375	95,451	397,696	305,297	304,989	336,602	441,782
XX: External causes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XXI: Contact health services	210,099	153,716	164,580	168,819	153,725	128,109	102,272	86,810	77,459	127,488	129,240	118,945	78,730	147,220	89,867	78,992	57,250	78,253
XXII: Special purposes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A4.2 Expenditure in 2019, Brazil

2019 Brazil Current Health Expenditures, 2018 USD Current (thousands)																		
ICD-10 Chapter	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
I: Infectious	271,267	39,236	51,117	55,995	126,729	316,787	233,663	224,822	402,873	186,803	464,294	439,994	196,360	1,413,993	216,340	230,782	223,258	453,524
II: Neoplasms	1,235,716	886,093	601,102	903,227	1,175,988	2,100,296	3,898,075	4,832,388	4,615,976	5,058,294	6,179,551	6,169,872	6,342,675	5,592,043	4,622,199	3,434,260	1,953,464	1,401,595
III: Blood and immune mechanism	35,343	20,567	18,707	31,193	45,366	68,049	70,457	55,090	34,048	24,898	19,275	17,637	14,053	12,966	10,163	8,405	6,950	5,765
IV: Endocrine nutritional metabolic	268,225	906,211	1,581,541	655,804	120,293	146,218	171,373	178,258	164,675	164,912	171,045	127,666	111,095	110,047	92,952	62,968	75,507	112,348
V: Mental behavioral	1,079,696	847,382	570,956	555,286	622,463	672,518	609,588	463,631	323,311	233,973	190,653	150,624	134,462	65,301	55,721	43,044	45,606	75,309
VI: Nervous	580,660	277,559	198,043	266,771	306,391	393,356	435,340	418,421	403,500	333,738	392,792	347,704	304,441	311,448	204,047	178,343	156,150	164,811
VII: Eye	103,655	33,685	35,167	81,095	134,281	200,751	366,995	282,626	337,093	424,097	645,968	950,089	1,503,881	1,827,401	1,646,080	1,086,145	617,004	331,037
VIII: Ear	327,991	155,731	109,883	105,269	117,905	164,337	285,724	209,207	191,744	219,847	244,946	270,611	309,265	333,603	356,762	332,164	316,768	338,031
IX: Circulatory	85,156	22,272	34,949	62,941	127,546	323,177	387,994	618,799	618,558	849,094	1,289,954	1,321,928	1,572,238	1,429,978	1,444,710	1,223,148	1,058,246	1,321,421
X: Respiratory	666,025	151,771	82,375	226,922	236,463	158,467	317,359	224,675	204,888	246,284	329,098	441,695	369,562	645,171	485,615	560,386	619,088	1,138,796
XI: Digestive	183,321	68,581	81,158	172,901	178,564	270,922	332,585	328,518	376,827	386,339	572,685	422,106	549,708	402,985	316,375	420,637	263,628	337,884
XII: Skin	31,581	13,781	12,420	27,740	42,740	59,109	75,497	86,384	74,988	75,373	96,919	85,022	84,788	92,496	73,819	61,344	32,811	60,591
XIII: Musculoskeletal	97,984	49,644	92,244	129,193	212,206	357,950	512,079	645,327	601,692	654,860	920,692	686,444	553,920	434,669	306,491	237,367	159,056	103,907
XIV: Genitourinary	100,228	67,211	41,757	108,227	254,968	488,483	668,635	639,655	602,165	555,164	529,320	738,055	415,248	358,474	628,975	279,737	220,518	429,104
XV: Pregnancy childbirth puerperium	1,182	464	9,171	170,540	421,524	354,721	457,941	378,658	89,996	7,103	2,112	1,262	1,506	3,415	545	4,084	2,630	9,070
XVI: Perinatal	753,081	2,572	3,080	38,826	148,796	450,755	345,592	200,538	86,262	38,154	10,554	7,387	2,995	4,116	1,652	2,832	1,326	3,194
XVII: Congenital	348,801	109,951	134,137	104,269	63,178	58,039	51,206	40,982	28,382	23,583	24,561	19,794	16,122	12,985	8,365	5,343	3,212	2,028
XVIII: Unclassified abnormal findings	392,802	97,919	142,679	158,952	269,735	562,205	757,672	577,460	529,318	607,602	611,549	515,353	605,410	1,255,864	874,976	240,673	924,816	962,007
XIX: Injuries	205,718	105,482	131,212	304,112	540,818	676,313	758,157	676,060	502,251	455,687	401,165	398,231	387,980	286,316	285,095	287,466	280,224	432,237
XX: External causes	14,988	5,271	4,961	26,164	33,160	36,079	43,664	53,372	41,580	29,917	42,315	32,390	36,415	24,555	19,494	13,168	16,756	28,755
XXI: Contact health services	499,794	188,368	214,794	642,416	1,393,372	5,964,527	2,435,380	2,120,773	1,657,385	1,400,900	1,331,917	1,258,627	1,094,639	871,274	706,430	675,519	416,178	732,574
XXII: Special purposes	1	0	0	0	1	1	0	2	5	0	1	0	6	0	2	0	0	0

Table A4.3 Expenditure in 2018, Colombia

2018 Colombia Current Health Expenditures, 2018 USD Current (thousands)																		
ICD-10 Chapter	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60-64**	**65-69**	**70-74**	**75-79**	**80-84**	**85+**
I: Infectious	77,233	37,858	31,325	37,891	52,886	70,726	70,415	65,531	57,807	57,383	55,256	50,823	39,653	30,070	24,205	18,669	13,733	15,030
II: Neoplasms	19,486	21,974	26,739	31,013	32,927	40,756	52,579	69,295	83,956	106,562	134,477	159,681	164,323	159,803	136,933	110,658	75,198	53,520
III: Blood and immune mechanism	14,496	13,398	14,590	19,962	16,748	14,544	15,395	18,677	13,908	13,545	9,510	9,045	9,085	7,941	6,388	6,362	4,750	6,355
IV: Endocrine nutritional metabolic	22,092	14,215	15,613	16,568	24,326	27,993	32,108	37,078	43,531	59,824	87,538	116,153	132,642	133,107	120,998	103,192	78,625	66,510
V: Mental behavioral	13,271	43,382	37,104	44,741	36,338	30,148	29,317	25,037	21,018	22,141	26,905	24,507	21,066	16,214	14,284	14,457	16,975	26,071
VI: Nervous	23,840	28,488	33,897	32,967	37,345	34,615	33,640	36,443	33,467	37,601	42,485	44,070	36,781	31,167	26,125	21,621	16,349	18,095
VII: Eye	12,914	10,240	12,148	12,677	10,727	12,981	11,534	12,970	14,964	20,541	26,193	32,337	37,050	41,538	37,221	31,135	20,187	11,867
VIII: Ear	18,402	11,744	9,735	8,285	7,886	7,800	7,860	9,440	8,654	11,102	9,737	11,473	10,426	10,446	8,078	6,783	7,089	4,512
IX: Circulatory	12,441	4,660	7,941	13,683	18,103	26,558	32,787	51,929	76,417	126,608	190,285	265,046	327,498	345,455	328,164	282,468	224,147	217,324
X: Respiratory	286,622	77,025	44,907	35,063	36,003	34,827	35,162	40,884	35,611	38,615	48,860	61,915	75,958	73,218	81,875	80,026	72,879	91,773
XI: Digestive	77,481	130,137	152,350	187,887	134,313	141,413	134,135	134,881	126,836	122,641	137,195	133,253	113,226	84,073	70,190	50,205	36,404	30,615
XII: Skin	32,295	19,402	17,973	22,906	19,539	21,367	19,150	18,417	17,212	17,311	21,877	28,145	20,230	20,882	15,942	16,293	9,980	11,723
XIII: Musculoskeletal	17,815	18,563	31,972	41,293	38,847	51,459	56,571	77,179	83,983	104,775	133,252	147,908	136,969	110,488	85,922	59,330	40,390	24,386
XIV: Genitourinary	39,757	23,640	26,252	65,632	102,038	104,842	107,061	112,797	116,662	128,153	147,254	158,883	165,027	166,306	153,293	138,924	107,849	98,299
XV: Pregnancy childbirth puerperium	201	13	3,417	95,581	303,497	126,387	84,645	49,031	15,462	1,630	399	28	6	5	3	4	2	6
XVI: Perinatal	136,933	69	63	332	525	346	201	131	67	6	2	14	16	18	19	12	11	6
XVII: Congenital	66,187	21,044	17,623	11,378	6,355	6,381	5,393	4,785	3,611	3,823	3,643	3,516	3,242	2,504	2,178	1,263	1,475	522
XVIII: Unclassified abnormal findings	256,172	154,531	154,399	206,632	222,504	212,089	204,694	190,530	174,436	194,016	227,437	249,515	234,331	208,722	188,934	153,487	120,264	127,076
XIX: Injuries	46,370	65,418	59,468	77,181	83,165	80,143	71,127	70,213	61,010	59,120	68,525	68,962	65,720	47,654	48,573	37,805	32,919	43,119
XX: External causes	4,114	3,165	4,271	6,295	5,722	6,463	4,973	4,653	4,594	3,985	6,225	5,719	4,814	5,125	4,196	2,707	2,366	1,588
XXI: Contact health services	464,391	309,599	445,879	591,530	446,387	391,645	314,831	279,395	225,435	243,539	291,728	280,546	248,395	221,481	168,892	151,941	101,882	97,017
XXII: Special purposes	2	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	0	8

Table A4.4 Expenditure in 2018, Costa Rica

	2018 Costa Rica Current Health Expenditures, 2018 USD Current (thousands)																	
ICD-10 Chapter	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60-64**	**65-69**	**70-74**	**75-79**	**80-84**	**85+**
I: Infectious	20,791	8,610	4,649	3,345	4,622	5,387	5,748	5,743	5,553	3,873	4,089	3,495	3,011	2,963	1,503	1,886	1,886	1,886
II: Neoplasms	3,408	2,364	2,647	3,959	5,460	6,031	8,629	10,340	12,321	15,770	17,053	19,600	21,381	21,598	18,080	10,320	10,320	10,320
III: Blood and immune mechanism	12,734	4,019	2,629	1,785	1,982	1,868	1,978	1,801	1,624	1,663	1,402	1,583	1,535	1,569	1,127	1,389	1,389	1,389
IV: Endocrine nutritional metabolic	11,052	4,570	5,488	3,969	8,268	8,485	8,952	10,013	10,893	22,483	23,471	24,822	26,346	21,669	15,753	10,186	10,186	10,186
V: Mental behavioral	2,312	9,703	11,543	21,599	27,117	38,617	32,517	30,721	56,704	52,863	51,114	123,616	98,654	36,593	12,897	21,554	21,554	21,554
VI: Nervous	6,786	5,457	5,961	7,224	6,781	6,398	6,785	6,908	6,456	6,150	7,040	7,302	7,088	5,409	4,225	2,445	2,445	2,445
VII: Eye	5,379	4,255	3,573	2,896	3,562	3,643	3,641	3,670	3,717	4,654	4,670	4,856	4,688	5,000	6,032	3,043	3,043	3,043
VIII: Ear	7,928	4,872	3,158	2,129	3,095	3,107	3,119	3,131	3,066	2,443	2,465	2,518	2,366	2,353	1,608	547	547	547
IX: Circulatory	2,421	1,677	1,555	2,051	7,443	8,268	9,002	9,933	12,659	26,740	31,579	38,795	41,346	35,496	37,391	32,949	32,949	32,949
X: Respiratory	121,456	48,641	24,434	17,424	17,122	17,586	18,371	17,854	18,915	13,091	14,751	16,091	18,328	12,296	13,696	17,505	17,505	17,505
XI: Digestive	18,665	13,190	11,431	12,999	17,766	19,331	20,187	20,670	20,669	18,000	20,664	21,518	21,088	17,244	14,464	11,026	11,026	11,026
XII: Skin	28,553	14,485	10,767	11,901	10,139	10,210	10,667	10,880	10,999	8,146	8,915	9,625	9,296	7,122	4,174	5,228	5,228	5,228
XIII: Musculoskeletal	7,181	6,994	8,252	9,066	16,346	16,170	16,680	16,782	16,817	14,068	16,390	18,381	16,562	15,620	11,585	6,470	6,470	6,470
XIV: Genitourinary	12,859	5,989	5,502	14,603	21,723	21,988	23,402	24,284	25,759	16,893	17,302	17,366	19,097	13,382	12,117	11,831	11,831	11,831
XV: Pregnancy childbirth puerperium	16	0	1,323	36,590	58,552	58,412	46,543	27,675	9,560	479	71	58	58	6	6	2	2	2
XVI: Perinatal	94,425	36	79	666	388	388	388	388	388	0	0	0	0	0	0	0	0	0
XVII: Congenital	26,100	3,312	2,242	1,064	453	555	437	413	281	766	322	303	243	301	97	81	81	81
XVIII: Unclassified abnormal findings	9,880	7,230	4,992	4,730	4,449	4,626	4,775	4,667	4,728	3,185	2,880	3,493	3,455	2,245	2,443	2,028	2,028	2,028
XIX: Injuries	9,146	5,910	5,773	9,852	16,276	14,763	14,716	11,873	11,197	12,033	13,074	12,885	13,892	12,513	10,757	11,860	11,860	11,860
XX: External causes	3,562	3,541	2,844	2,860	2,797	2,797	2,797	2,797	2,797	1,513	1,513	1,513	1,513	1,015	1,015	338	338	338
XXI: Contact health services	116,296	30,979	25,387	52,410	48,225	48,520	48,085	48,188	47,223	18,591	19,217	19,240	19,060	9,349	8,770	8,132	8,132	8,132
XXII: Special purposes	1	0	0	0	29	0	0	0	0	0	0	0	0	0	2	29	29	29

Table A4.5 Expenditure in 2018, Mexico

	2018 Mexico Current Health Expenditures, 2018 USD Current (thousands)																	
ICD-10 Chapter	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
I: Infectious	294,007	106,327	108,035	58,814	233,800	116,455	139,906	86,953	85,414	81,148	81,780	136,256	88,164	62,417	61,029	41,777	39,021	29,609
II: Neoplasms	66,831	72,012	78,003	78,420	97,489	96,614	178,522	242,383	285,743	318,319	321,781	462,507	303,923	322,395	234,073	185,730	77,493	47,547
III: Blood and immune mechanism	33,766	27,783	21,112	17,077	16,881	16,804	15,630	17,467	21,123	24,362	21,195	20,510	21,305	20,744	18,099	15,860	11,198	9,650
IV: Endocrine nutritional metabolic	43,109	22,565	36,613	35,066	40,069	63,449	91,222	200,889	227,203	464,825	568,542	656,934	673,964	700,293	481,758	357,815	431,049	137,417
V: Mental behavioral	13,192	29,498	36,964	41,275	38,196	50,733	46,078	91,948	70,265	88,133	81,401	115,771	50,951	39,271	73,466	24,969	18,734	20,631
VI: Nervous	64,323	49,084	55,094	47,831	56,930	71,211	63,973	83,910	125,667	99,533	81,526	81,857	67,737	54,712	47,247	35,929	24,290	18,797
VII: Eye	34,292	18,629	14,719	11,178	17,320	21,933	22,829	25,190	32,870	44,245	44,841	50,695	64,854	58,057	52,878	41,795	26,824	16,584
VIII: Ear	59,390	79,719	22,767	11,875	13,919	14,794	20,943	31,467	22,340	39,079	20,535	23,848	26,756	17,291	40,375	10,097	14,823	6,789
IX: Circulatory	26,775	25,750	76,038	29,579	37,294	68,205	90,022	144,328	268,986	555,404	537,204	669,542	1,282,794	922,564	772,388	968,779	495,208	342,664
X: Respiratory	4,394,101	817,492	536,327	231,743	314,113	294,482	350,544	199,706	283,307	341,667	350,026	356,342	280,351	266,827	256,804	339,108	179,961	215,740
XI: Digestive	124,983	115,344	113,701	139,476	231,506	326,940	430,156	296,622	320,702	468,455	351,086	537,279	400,375	391,404	243,431	198,169	179,320	142,127
XII: Skin	90,949	107,709	77,941	49,729	77,300	76,083	90,104	72,530	97,752	80,109	137,650	68,700	119,728	48,596	59,930	29,177	29,305	19,384
XIII: Musculoskeletal	16,968	25,304	41,249	48,936	82,148	111,530	128,714	154,686	179,440	219,578	241,480	253,694	240,382	260,689	153,157	147,864	50,255	29,491
XIV: Genitourinary	76,363	78,848	68,426	117,949	193,959	295,449	304,781	287,214	303,444	419,918	387,030	386,354	406,622	402,229	386,551	241,471	134,647	148,458
XV: Pregnancy childbirth puerperium	9,288	0	5,229	357,987	1,200,895	1,478,716	1,035,130	520,259	149,009	16,809	4,166	5	0	0	0	0	0	0
XVI: Perinatal	1,053,939	2,528	2,393	1,014	516	656	757	943	1,294	1,678	1,905	1,845	1,732	1,653	1,241	852	515	342
XVII: Congenital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XVIII: Unclassified abnormal findings	119,272	125,812	116,263	148,025	256,112	285,087	244,942	233,433	232,211	242,109	229,726	221,808	214,465	195,480	179,123	169,091	138,232	153,729
XIX: Injuries	197,799	127,145	182,983	150,306	260,175	216,378	214,625	505,826	265,911	271,549	590,435	127,597	153,378	191,627	100,193	36,314	57,261	24,895
XX: External causes	655,301	290,368	274,529	296,028	364,687	433,062	589,275	624,942	637,714	672,112	954,238	632,306	559,842	822,024	385,044	467,792	136,402	108,644
XXI: Contact health services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XXII: Special purposes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A4.6 Expenditure in 2019, Peru

2019 Peru Current Health Expenditures, 2018 USD Current (thousands)																		
ICD-10 Chapter	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
I: Infectious	98,707	38,371	26,510	23,022	24,362	25,969	28,332	28,231	26,703	29,031	55,917	25,315	32,349	27,627	24,057	29,366	32,016	47,656
II: Neoplasms	22,492	42,729	16,733	13,590	13,534	15,023	31,699	55,541	89,529	96,869	97,156	116,488	127,003	103,018	78,883	89,540	44,116	32,342
III: Blood and immune mechanism	63,535	10,382	4,895	4,409	3,159	3,196	4,543	4,852	5,743	4,912	4,092	4,575	4,781	8,516	8,013	6,585	4,657	6,194
IV: Endocrine nutritional metabolic	59,361	19,237	12,694	9,304	7,492	10,515	15,189	22,241	34,858	44,600	59,460	67,703	67,876	63,375	50,236	34,043	20,195	12,352
V: Mental behavioral	8,805	15,478	10,458	9,987	9,232	7,643	7,852	7,909	7,925	8,635	8,832	8,604	7,885	8,603	6,000	7,684	11,770	7,090
VI: Nervous	13,793	12,064	13,477	12,642	13,353	12,857	13,124	14,517	15,811	17,632	18,726	15,494	19,617	22,309	16,830	20,298	17,185	11,294
VII: Eye	10,316	10,823	8,265	5,738	4,735	7,435	9,965	11,810	15,912	19,109	24,521	30,209	38,851	51,150	55,890	45,715	33,187	16,252
VIII: Ear	7,796	7,332	5,014	2,100	1,654	2,551	3,815	3,783	4,203	4,240	4,595	4,565	4,905	5,175	6,504	4,449	2,979	1,814
IX: Circulatory	5,146	2,258	2,604	3,253	4,195	6,139	10,267	15,306	23,627	39,625	54,612	74,819	105,157	135,928	156,808	151,952	110,819	95,381
X: Respiratory	312,467	154,481	77,939	43,764	29,696	34,765	40,342	44,757	46,542	43,904	43,350	43,230	54,680	52,715	132,833	62,769	56,909	125,886
XI: Digestive	41,208	31,496	33,979	47,567	48,890	58,130	69,390	71,667	74,173	70,664	73,512	81,417	75,423	76,192	80,384	65,415	60,867	45,279
XII: Skin	22,866	12,692	13,395	14,531	9,083	11,086	12,569	14,289	14,561	14,594	15,682	15,293	13,551	11,254	11,093	11,277	5,896	8,724
XIII: Musculoskeletal	3,821	4,427	11,354	13,815	14,965	23,556	37,333	49,809	66,887	75,965	89,613	88,285	92,319	100,304	105,473	64,584	41,208	26,079
XIV: Genitourinary	24,234	18,197	17,920	25,641	35,074	43,686	52,477	61,718	71,799	75,583	79,575	86,884	107,878	108,015	91,480	71,161	52,389	65,616
XV: Pregnancy childbirth puerperium	0	0	3,404	66,666	115,982	146,100	162,220	140,436	69,452	29,304	17,472	0	0	0	0	0	0	0
XVI: Perinatal	464,744	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XVII: Congenital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XVIII: Unclassified abnormal findings	63,117	38,931	27,745	21,265	18,195	24,027	27,357	32,895	29,713	28,164	27,837	24,567	25,167	28,193	27,418	27,540	23,105	21,872
XIX: Injuries	35,151	26,275	24,402	25,263	39,031	43,775	49,436	50,841	50,231	46,912	44,348	51,200	37,344	44,176	35,332	27,748	27,480	61,905
XX: External causes	2,501	1,763	1,398	1,428	1,173	1,500	1,107	1,222	1,180	1,361	2,346	1,191	2,760	757	5,367	7,071	2,984	963
XXI: Contact health services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
XXII: Special purposes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A4.6 Expenditure in 2019, Trinidad and Tobago

2019 Trinidad & Tobago Current Health Expenditures, 2018 USD Current (thousands)																		
ICD-10 Chapter	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
I: Infectious	7,398	3,342	1,425	912	890	1,259	2,316	2,039	2,388	1,968	2,245	2,704	2,173	1,818	2,277	760	673	693
II: Neoplasms	123	85	113	587	1,491	1,335	2,217	4,800	11,069	10,369	8,479	21,052	25,095	19,336	10,598	7,735	2,786	1,738
III: Blood and immune mechanism	723	563	463	746	336	320	510	559	2,908	692	2,408	747	1,734	764	463	519	416	259
IV: Endocrine nutritional metabolic	202	95	400	858	887	1,390	2,900	3,474	4,114	5,918	8,012	11,537	13,119	9,486	7,014	4,441	3,448	1,427
V: Mental behavioral	892	1,230	710	1,364	2,162	2,234	3,207	2,497	1,660	1,632	1,665	2,585	1,878	1,088	645	348	165	149
VI: Nervous	1,675	643	704	1,077	916	1,456	3,356	2,428	2,349	2,076	2,458	4,650	11,850	2,191	2,335	1,077	827	445
VII: Eye	733	1,150	1,818	1,627	1,290	2,139	4,247	6,230	4,889	5,215	5,939	8,037	8,324	7,481	5,104	2,683	1,539	942
VIII: Ear	1,049	768	590	345	286	387	528	587	543	1,133	808	892	918	657	516	321	181	137
IX: Circulatory	209	128	322	770	528	2,449	1,493	6,031	5,072	18,475	13,293	32,182	28,752	26,524	19,580	13,494	11,756	5,563
X: Respiratory	8,242	4,337	2,277	1,375	1,141	2,144	2,476	3,448	2,745	2,330	2,974	3,468	3,184	2,389	2,326	3,403	1,042	907
XI: Digestive	3,299	5,311	7,380	6,897	4,473	6,495	11,132	13,205	11,932	11,475	11,706	12,458	12,331	7,362	5,510	3,149	2,899	1,582
XII: Skin	2,479	843	913	1,141	882	1,218	1,630	2,360	1,686	1,495	2,393	1,944	1,898	1,495	952	602	282	397
XIII: Musculoskeletal	887	1,040	2,356	2,118	2,013	3,874	5,675	6,367	7,553	6,787	9,883	9,368	6,385	5,658	4,416	2,327	1,053	531
XIV: Genitourinary	963	1,129	758	5,401	1,859	3,627	5,424	8,479	7,446	11,137	8,304	7,606	8,245	10,164	7,634	3,932	2,766	2,260
XV: Pregnancy childbirth puerperium	0	0	132	1,995	8,356	15,358	26,128	23,446	9,681	1,834	1,135	11	1	0	0	0	0	0
XVI: Perinatal	35,341	2	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
XVII: Congenital	1,716	1,023	716	1,537	36	66	72	103	546	84	66	157	43	32	37	41	57	12
XVIII: Unclassified abnormal findings	10,326	5,682	4,787	3,888	3,528	4,820	6,601	8,109	8,840	10,439	10,645	12,371	13,056	8,542	8,781	4,437	6,115	2,233
XIX: Injuries	2,036	1,338	981	755	1,333	1,566	4,850	2,808	1,905	1,374	2,733	2,992	2,353	923	608	873	637	776
XX: External causes	3,224	1,235	815	797	1,035	1,136	2,431	1,802	1,639	1,090	1,257	1,893	1,689	912	746	621	747	551
XXI: Contact health services	11,433	2,804	3,636	4,575	5,617	7,645	11,035	13,691	13,198	11,774	10,907	10,826	8,603	4,638	2,521	1,532	868	526
XXII: Special purposes	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0

Annex 5. Determinants of health expenditure growth

Growth in national health expenditures is driven by both demographic and non-demographic factors. Economic growth is one of the principal non-demographic drivers of national health expenditures. As countries get richer, they spend more on health. Indeed, as national income increases there is a health financing transition where the share of out-of-pocket payments is replaced by other forms of financing like social health insurance and/or public spending on health. Health expenditures also can rise due to rising health sector wages, even if there are no productivity improvements (Baumol effect). Rising wages in other sectors of the economy would push wages upwards in the health sector. Non-demographic factors affect how much countries spend on health. For one, the size of the population will drive the size of health spending. Other demographic factors such as the age structure of the population, particularly the share of the population at the extremes of the age distribution, have been found to have large effects on national health expenditures. Consumption of health services is typically most intensive in the early years of life, as well as, at older ages. Studies have reported other factors that drive health expenditures over time (and between countries) such as technological change, and government policies (e.g., right to health care or universal coverage policies).

Estimates of the contribution of economic growth, technical change, and other non-demographic factors are useful for projecting growth of health expenditures into the future. We directly estimate the contribution of income (per capita GDP) growth on health expenditure and indirectly capture the contribution of other factors like technical change and health sector wage increases, government policies in a catch-all "residual" factor using a simple growth accounting method.

We estimate the following fixed effects regression model to estimate the effect of income and demography on health expenditures. We provide separate estimates for Latin America (LA) and the Caribbean (CAR) countries:

$$LnPCHEXP_{it} = \propto_i + \delta_t + \beta_1 LnPCGDP_{it} + \beta_2 LnAGE65_{it} + \epsilon_{it}$$

where, $LnPCHEXP_{it}$ is the log of per capita health expenditure in country i in year t, $\propto_i$ are country specific fixed effects, δ_t are year (2000 to 2017) effects, $LnPCGDP_{it}$ is the log of per capita GDP, and $AGE65$ is the proportion of the population over 65 years of age. Since all variables are in log form, β_1 is the income elasticity estimate, and β_2 represents the percentage increase in health expenditure for a 1% increase in the proportion of population above 65 years of age. Health expenditures per capita GDP were deflated using the GDP deflator and expressed in PPP terms - they are in constant 2017 PPP dollars. The country fixed effects remove the effect of country specific effects that are invariant over time (like a specific government policy) and the time effects remove time variant effects that are common across countries (like a regional recession or epidemic). Data are from the World Bank's World Development Indicators. The regression results are given in the table below.

Variable	LA1	LA2	LA3	CAR1	CAR2	CAR3
lngdppc	1.32***	0.96***	0.88**	1.39***	1.06*	1.14**
lnpopover65		0.60	0.44		0.87	0.26
year						
2001			0.03			-0.05
2002			0.03			-0.01
2003			0.05			-0.04
2004			0.03			0.01
2005			0.02			-0.01
2006			0.02			-0.08
2007			0.03			-0.07
2008			0.04			-0.07
2009			0.10			0.02
2010			0.08			0.04
2011			0.07			0.04
2012			0.10			0.07
2013			0.10			0.05
2014			0.10			0.06
2015			0.12			0.12
2016			0.10			0.15
2017			0.07			0.12
_cons	-5.64**	-3.45*	-2.46	-6.50**	-5.05*	-4.74*
N	288	288	288	162	162	162
N_g	16.00	16.00	16.00	9.00	9.00	9.00
r2_o	0.87	0.90	0.90	0.94	0.93	0.95
rho	0.77	0.71	0.65	0.87	0.85	0.74

legend: * p<0.05; ** p<0.01; *** p<0.001

Note: LA is Latin America, and CAR is Caribbean.

For Latin American countries we use the income elasticity of 0.88 and the demographic elasticity of 0.44 to estimate the contribution of income, demography, and "residual" factors to health expenditure growth. Health expenditures in the Latin American region grew by 3.3% annually between 2000 and 2017, per capita real GDP grew by 2.05 percent, and the proportion of the population above 65 years grew by 0.88%.

The tables below show, for Latin American countries, the average annual growth in health expenditure per capita, and contribution to this growth of per capita GDP (assuming income elasticity of 0.88), age (assuming elasticity of 0.44), and of residual factors. The annual growth in health care expenditures due to economic growth and residual factors i.e., 'economic growth and technology' in LAC is estimated as: 2.05% + 0.43% = 2.48%. For the Caribbean countries we use income elasticity of 1.14 and age elasticity of 0.26 to estimate the contribution of 'economic growth and technology' to CHE growth of 1.2%.

Table A5.1 Economic growth and technology for Latin America countries

Country Code	Contribution of GDP Growth (Elasticity-0.88)	Contribution of GDP Growth (Elasticity-0.4)	Residual	Economic growth and technology (Elast=0.88)	Economic growth and technology (Elast=0.5)
ARG	1.2	0.7	-1	1.6	0.9
BOL	2.3	1.3	1.1	2.7	1.5
BRA	1.2	0.7	0.1	1.6	0.9
CHL	2.3	1.3	1	2.7	1.5
COL	2.3	1.3	1.2	2.7	1.5
CRI	2.4	1.4	-1	2.8	1.6
ECU	1.8	1	4.7	2.2	1.2
GTM	1.9	1.1	0.6	2.3	1.3
HND	1.6	0.9	0.1	2	1.1
MEX	0.6	0.3	0.4	1	0.5
NIC	2.1	1.2	2.5	2.5	1.4
PAN	3.8	2.2	-1.5	4.2	2.4
PER	3.4	2	0.2	3.8	2.2
PRY	2	1.1	0.9	2.4	1.3
SLV	1.3	0.8	-2.4	1.7	1
URY	2.4	1.4	0	2.8	1.6
Total	2	1.2	0.4	2.4	1.4

Table A5.2 Economic growth and technology for Caribbean Countries

Country Code	Contribution of GDP Growth (Elasticity-0.88)	Contribution of GDP Growth (Elasticity-0.4)	Residual	Economic growth and technology (Elast=0.88)	Economic growth and technology (Elast=0.5)
BHS	-1.1	-0.5	1.4	-0.7	-0.3
BLZ	0.6	0.3	2.6	1	0.5
BRB	0.3	0.1	2.7	0.7	0.3
DOM	3.8	1.7	0.3	4.2	1.9
GUY	0	0	-1.6	0.4	0.2
HTI	-0.2	-0.1	1	0.2	0.1
JAM	0.2	0.1	-0.2	0.6	0.3
SUR	0.4	0.2	-2.7	0.9	0.4
TTO	3	1.3	2.8	3.4	1.5
Total	0.8	0.3	0.7	1.2	0.5

Annex 6. Current Health Expenditures in LAC over time

Table A6.1 Current Health Expenditures (2018/2019*-2050) (2018 USD)

Country	2018/2019	2020	2030	2040	2050
ARG	47,629,223,757	50,311,884,364	65,494,087,236	86,090,226,755	113,020,159,240
BHS	776,430,174	808,884,994	955,580,885	1,074,928,902	1,160,285,352
BRB	333,805,445	346,867,801	407,778,769	467,647,312	515,345,712
BLZ	109,552,861	118,740,109	174,309,205	253,490,718	359,416,433
BOL	2,538,535,938	2,783,007,315	4,247,261,510	6,526,725,965	9,957,615,598
BRA	187,594,111,107	194,005,481,488	261,933,419,912	345,218,421,808	436,999,058,502
CHL	27,262,405,258	29,776,108,474	43,397,802,656	65,750,639,205	95,368,162,793
COL	25,483,997,830	27,822,587,366	39,872,599,627	58,228,720,847	82,389,811,546
CRI	4,547,851,758	4,954,565,296	7,232,438,751	10,740,467,647	15,505,857,358
DOM	4,904,901,329	5,565,290,700	9,905,315,292	18,111,231,468	32,318,417,936
ECU	8,819,744,704	9,622,158,542	14,171,147,618	21,255,989,277	31,330,081,625
SLV	1,852,494,239	1,972,974,104	2,652,620,816	3,601,315,650	4,871,532,870
GTM	4,477,889,073	4,926,911,967	7,737,906,519	12,334,409,234	19,574,435,350
GUY	230,241,625	240,828,608	299,569,127	360,281,745	413,106,629
HND	1,689,774,046	1,843,455,565	2,792,719,275	4,291,204,654	6,531,390,372
JAM	942,017,740	978,623,614	1,199,803,785	1,474,634,969	1,761,365,200
MEX	66,669,832,868	70,746,794,352	93,461,897,053	122,044,399,236	153,529,051,166
NIC	1,123,484,986	1,228,214,603	1,894,042,881	3,008,703,502	4,729,959,754
PAN	4,726,810,782	5,384,034,244	9,690,289,038	17,687,244,245	31,348,421,292
PRY	2,785,153,343	3,039,766,327	4,521,526,681	6,762,878,040	9,987,916,851
PER	11,624,315,583	12,425,250,634	21,070,144,884	36,983,717,186	64,130,224,802
SUR	273,092,042	288,624,729	374,061,106	480,627,559	598,678,895
TTO	1,427,511,107	1,496,751,527	2,239,142,286	3,372,073,393	4,903,106,062
URY	5,484,553,519	5,859,630,637	8,009,678,664	11,268,264,271	15,742,031,283

*Note: The baseline year is 2019 for Brazil, Peru, and Trinidad and Tobago, and 2018 for all other countries.

Annex 7. Current Health Expenditures growth in LAC by ICD-10 Chapter (2018/2019- 2050)

Table A7.1 Average annual Current Health Expenditures growth in LAC by ICD-10 Chapter, Part 1

Average annual growth in Current Health Expenditure (%)												
ICD-10 Chapter	Argentina	Bahamas	Barbados	Belize	Bolivia	Brazil	Chile	Colombia	Costa Rica	Dominican Republic	Ecuador	El Salvador
I: Infectious	0.71%	-0.02%	0.21%	2.15%	2.12%	2.68%	2.24%	0.95%	0.93%	2.91%	0.54%	1.14%
II: Neoplasms	3.38%	1.89%	1.80%	4.24%	4.88%	3.01%	3.95%	4.78%	4.97%	6.45%	5.54%	3.48%
III: Blood and immune mechanism	2.69%	1.04%	1.12%	2.64%	3.63%	1.86%	4.03%	3.26%	3.46%	5.19%	3.75%	2.03%
IV: Endocrine nutritional metabolic	2.73%	1.93%	1.53%	4.09%	4.28%	0.60%	4.43%	4.02%	4.46%	6.50%	5.36%	3.44%
V: Mental behavioral	2.36%	0.65%	0.78%	3.26%	4.06%	1.51%	3.21%	3.60%	4.21%	5.45%	4.07%	2.49%
VI: Nervous	3.13%	1.22%	1.11%	3.60%	4.41%	2.35%	4.69%	3.90%	3.73%	5.55%	3.83%	2.98%
VII: Eye	2.31%	1.07%	1.09%	4.05%	4.68%	3.68%	2.93%	4.35%	4.03%	5.76%	4.29%	3.20%
VIII: Ear	3.42%	0.89%	1.09%	3.25%	4.16%	3.30%	5.14%	3.84%	3.19%	5.42%	3.70%	2.67%
IX: Circulatory	2.89%	1.96%	1.76%	5.19%	5.17%	3.43%	4.34%	4.63%	5.06%	7.03%	5.00%	4.01%
X: Respiratory	3.24%	0.73%	1.22%	3.06%	3.51%	2.38%	4.73%	3.81%	3.11%	6.01%	2.02%	2.52%
XI: Digestive	3.04%	0.86%	1.05%	3.68%	4.40%	3.16%	4.37%	3.34%	3.89%	5.16%	3.93%	2.92%
XII: Skin	2.62%	0.89%	1.09%	3.19%	4.16%	3.08%	3.58%	3.92%	3.64%	5.53%	3.53%	2.67%
XIII: Musculoskeletal	2.79%	1.19%	1.17%	4.40%	5.05%	2.58%	3.48%	4.43%	4.06%	6.12%	4.68%	3.61%
XIV: Genitourinary	2.84%	1.81%	1.99%	4.63%	5.29%	3.42%	3.86%	4.88%	4.14%	6.69%	5.40%	3.96%
XV: Pregnancy childbirth puerperium	1.76%	0.17%	0.28%	2.33%	3.41%	0.79%	1.77%	1.85%	2.19%	4.01%	2.64%	1.71%
XVI: Perinatal	1.88%	0.14%	0.92%	1.50%	3.03%	2.11%	2.89%	3.12%	2.00%	4.40%	2.36%	0.83%
XVII: Congenital	2.49%	0.41%	0.94%	-	-	0.52%	4.24%	2.78%	2.45%	4.63%	3.03%	-
XVIII: Unclassified abnormal findings	2.71%	1.71%	1.71%	3.66%	3.82%	2.10%	4.48%	2.47%	3.59%	6.44%	3.52%	2.90%
XIX: Injuries	2.67%	1.12%	1.50%	3.97%	3.90%	1.40%	4.62%	2.01%	4.22%	6.05%	3.51%	2.87%
XX: External causes	-	0.67%	0.99%	4.22%	4.06%	1.98%	-	2.37%	3.11%	5.86%	4.16%	3.60%
XXI: Contact health services	2.46%	0.63%	0.73%	-	-	2.22%	3.33%	3.33%	2.94%	5.05%	3.45%	-
XXII: Special purposes	-	0.79%	0.68%	-	-	2.08%	-	6.62%	6.62%	8.74%	-	-

Table A7.2 Average annual Current Health Expenditures growth in LAC by ICD-10 Chapter, Part 2

Average annual growth in Current Health Expenditure (%)												
ICD-10 Chapter	Guatemala	Guyana	Honduras	Jamaica	Mexico	Nicaragua	Panama	Paraguay	Peru	Suriname	Trinidad & Tobago	Uruguay
I: Infectious	2.15%	-1.01%	2.88%	0.39%	0.58%	1.76%	3.96%	2.00%	3.24%	1.01%	2.44%	2.57%
II: Neoplasms	5.32%	2.10%	4.98%	2.52%	3.13%	5.24%	6.70%	4.70%	5.92%	2.87%	4.52%	3.92%
III: Blood and immune mechanism	3.41%	1.22%	2.92%	1.21%	1.75%	3.27%	5.46%	3.40%	4.77%	1.91%	3.94%	3.35%
IV: Endocrine nutritional metabolic	5.28%	1.98%	4.67%	2.45%	3.26%	4.33%	6.54%	5.05%	4.76%	3.56%	4.28%	3.76%
V: Mental behavioral	4.01%	1.77%	3.90%	1.72%	2.53%	4.17%	6.03%	4.10%	5.16%	2.16%	3.38%	3.42%
VI: Nervous	4.62%	1.91%	4.21%	1.94%	2.31%	4.53%	5.82%	3.70%	5.67%	2.18%	4.03%	3.70%
VII: Eye	5.08%	2.17%	4.87%	2.15%	2.74%	5.14%	6.04%	4.17%	5.80%	2.43%	3.92%	2.93%
VIII: Ear	4.23%	1.60%	3.88%	1.68%	2.18%	4.22%	5.39%	3.49%	5.26%	2.10%	3.70%	3.95%
IX: Circulatory	5.98%	2.96%	5.77%	3.12%	3.11%	5.90%	6.89%	4.87%	6.55%	3.45%	4.51%	3.25%
X: Respiratory	3.51%	1.29%	3.59%	1.43%	0.55%	4.28%	5.12%	3.44%	5.46%	2.18%	3.39%	3.90%
XI: Digestive	4.56%	1.91%	4.23%	2.02%	2.71%	4.36%	6.00%	3.86%	5.49%	1.80%	3.68%	3.80%
XII: Skin	4.23%	1.57%	3.81%	1.57%	2.30%	4.13%	5.78%	3.54%	5.16%	2.19%	3.73%	3.26%
XIII: Musculoskeletal	5.53%	2.34%	5.14%	2.40%	2.76%	5.32%	6.16%	4.59%	6.03%	2.68%	3.95%	3.45%
XIV: Genitourinary	5.68%	2.69%	5.12%	2.69%	3.34%	5.61%	6.46%	5.03%	6.46%	3.23%	4.75%	3.42%
XV: Pregnancy childbirth puerperium	3.66%	0.70%	2.88%	0.23%	1.00%	2.88%	4.70%	2.55%	3.84%	1.41%	2.58%	2.37%
XVI: Perinatal	2.79%	-0.15%	1.52%	0.21%	1.12%	2.40%	4.51%	1.76%	3.88%	1.07%	2.89%	2.65%
XVII: Congenital	-	-	-	-	-	-	4.80%	2.79%	-	1.48%	3.28%	0.0329
XVIII: Unclassified abnormal findings	5.12%	2.06%	3.70%	0.87%	3.15%	3.70%	5.65%	3.58%	5.16%	2.60%	4.40%	0.31%
XIX: Injuries	4.60%	1.94%	3.98%	1.53%	2.51%	4.29%	5.96%	3.38%	5.35%	2.38%	3.78%	3.03%
XX: External causes	5.07%	2.60%	5.01%	2.49%	3.56%	5.28%	0.0493	4.19%	6.04%	1.78%	4.20%	-
XXI: Contact health services	-	-	-	-	-	-	5.21%	3.37%	-	1.82%	3.33%	3.13%
XXII: Special purposes	-	-	-	-	-	-	8.27%	-	-	5.14%	3.98%	-

Annex 8. Current Health Expenditures growth in LAC by age category (2018/2019-2050)

Table A8.1 Average annual Current Health Expenditures growth in LAC by age category, Part 1

Average annual growth in Current Health Expenditure (%)												
Age Cateogry	**Argentina**	**Bahamas**	**Barbados**	**Belize**	**Bolivia**	**Brazil**	**Chile**	**Colombia**	**Costa Rica**	**Dominican Republic**	**Ecuador**	**El Salvador**
0-4	1.49%	0.04%	0.66%	0.99%	1.68%	-0.02%	1.97%	1.49%	1.75%	3.37%	-2.02%	0.64%
5-9	1.31%	-0.44%	0.29%	0.95%	1.88%	0.10%	1.70%	1.40%	1.55%	3.59%	1.35%	0.74%
10-14	1.35%	-0.71%	0.03%	1.02%	2.27%	-0.37%	1.84%	1.25%	1.75%	3.81%	1.95%	-0.12%
15-19	1.66%	-0.31%	0.29%	1.28%	2.74%	0.20%	1.92%	0.88%	2.00%	4.10%	2.01%	0.62%
20-24	1.66%	-0.34%	0.24%	1.59%	2.79%	0.37%	1.60%	1.01%	1.80%	4.15%	2.08%	0.53%
25-29	1.71%	-0.04%	0.26%	1.95%	3.07%	0.74%	1.47%	1.38%	1.84%	4.39%	2.62%	1.11%
30-34	1.95%	0.36%	0.25%	2.34%	3.35%	0.89%	1.84%	1.92%	2.06%	4.82%	2.88%	1.80%
35-39	2.00%	0.29%	0.22%	2.84%	3.70%	1.02%	2.33%	2.16%	2.49%	5.09%	3.05%	2.09%
40-44	2.05%	0.63%	0.55%	3.26%	4.02%	1.48%	2.36%	2.66%	2.90%	5.26%	3.28%	2.33%
45-49	2.50%	0.70%	0.67%	3.69%	4.40%	2.08%	2.39%	3.11%	3.22%	5.51%	3.52%	2.77%
50-54	2.69%	0.98%	0.64%	4.12%	4.69%	2.42%	2.60%	3.26%	3.40%	5.86%	4.05%	3.48%
55-59	2.90%	1.17%	0.57%	4.51%	5.00%	2.69%	3.14%	3.70%	3.82%	6.26%	4.47%	3.77%
60-64	2.95%	1.59%	0.85%	4.99%	5.15%	3.29%	3.50%	4.08%	4.59%	6.59%	4.69%	3.64%
65-69	3.02%	2.52%	1.61%	5.41%	5.19%	3.77%	3.89%	4.51%	5.13%	7.04%	5.22%	3.67%
70-74	3.46%	3.26%	2.22%	5.73%	5.21%	4.24%	4.69%	5.18%	5.39%	7.63%	5.84%	4.06%
75-79	3.60%	3.96%	3.16%	6.15%	5.39%	4.51%	5.38%	5.73%	5.95%	7.98%	6.09%	4.16%
80-84	3.73%	4.56%	3.45%	0.0602	0.0568	4.57%	6.12%	6.41%	6.83%	8.12%	6.66%	0.044
85+	4.13%	5.23%	4.11%	6.07%	6.42%	5.48%	7.00%	7.28%	7.95%	8.78%	7.22%	5.45%

Table A8.2 Average annual Current Health Expenditures growth in LAC by age category, Part 2

Average annual growth in Current Health Expenditure (%)												
Age Category	**Guatemala**	**Guyana**	**Honduras**	**Jamaica**	**Mexico**	**Nicaragua**	**Panama**	**Paraguay**	**Peru**	**Suriname**	**Trinidad & Tobago**	**Uruguay**
0-4	2.45%	-0.33%	1.37%	-0.40%	-0.40%	1.69%	3.50%	2.33%	2.37%	0.69%	2.71%	2.09%
5-9	2.18%	-0.13%	0.23%	-0.62%	0.42%	0.46%	3.95%	2.13%	2.36%	0.61%	2.30%	2.03%
10-14	1.24%	-0.06%	0.63%	-0.49%	0.71%	1.61%	4.24%	2.04%	2.86%	0.83%	2.38%	2.01%
15-19	2.13%	-0.17%	1.52%	-0.34%	0.86%	2.10%	4.48%	2.24%	3.40%	1.09%	2.95%	2.13%
20-24	2.63%	-0.26%	2.01%	-0.46%	0.84%	2.26%	4.52%	2.22%	3.54%	1.18%	2.92%	2.12%
25-29	3.10%	0.49%	2.51%	-0.21%	1.10%	2.34%	4.65%	2.54%	3.62%	1.31%	2.60%	2.25%
30-34	3.55%	1.31%	2.80%	0.18%	1.50%	2.62%	4.72%	2.78%	3.79%	1.57%	2.36%	2.60%
35-39	3.93%	0.95%	3.08%	0.60%	1.92%	3.03%	4.86%	3.12%	3.72%	1.89%	2.56%	2.62%
40-44	4.57%	0.93%	3.79%	0.80%	2.05%	3.58%	4.90%	3.93%	4.00%	1.95%	3.31%	2.45%
45-49	5.37%	1.24%	4.52%	1.07%	2.26%	4.09%	5.08%	4.34%	4.00%	1.88%	3.33%	2.91%
50-54	5.81%	1.74%	5.07%	1.73%	2.72%	4.64%	5.46%	4.66%	4.63%	2.06%	3.29%	3.17%
55-59	6.14%	1.89%	5.40%	2.22%	3.01%	5.11%	5.79%	4.94%	5.43%	2.33%	3.33%	3.21%
60-64	6.04%	1.08%	5.66%	2.62%	3.21%	5.48%	6.31%	5.08%	5.94%	3.21%	4.56%	3.26%
65-69	6.24%	2.46%	6.02%	3.11%	3.78%	6.31%	6.87%	5.29%	6.34%	3.64%	5.37%	3.36%
70-74	6.48%	3.14%	6.53%	3.08%	4.27%	7.04%	7.38%	5.44%	7.03%	3.80%	5.34%	3.86%
75-79	6.28%	4.11%	6.56%	3.69%	4.70%	6.59%	7.79%	5.40%	7.31%	4.63%	5.68%	4.07%
80-84	6.13%	4.06%	6.48%	0.0381	0.0482	6.78%	8.18%	5.84%	7.65%	4.62%	6.49%	3.97%
85+	6.65%	5.30%	6.60%	3.37%	4.81%	7.54%	8.73%	6.44%	8.75%	5.28%	7.88%	4.39%