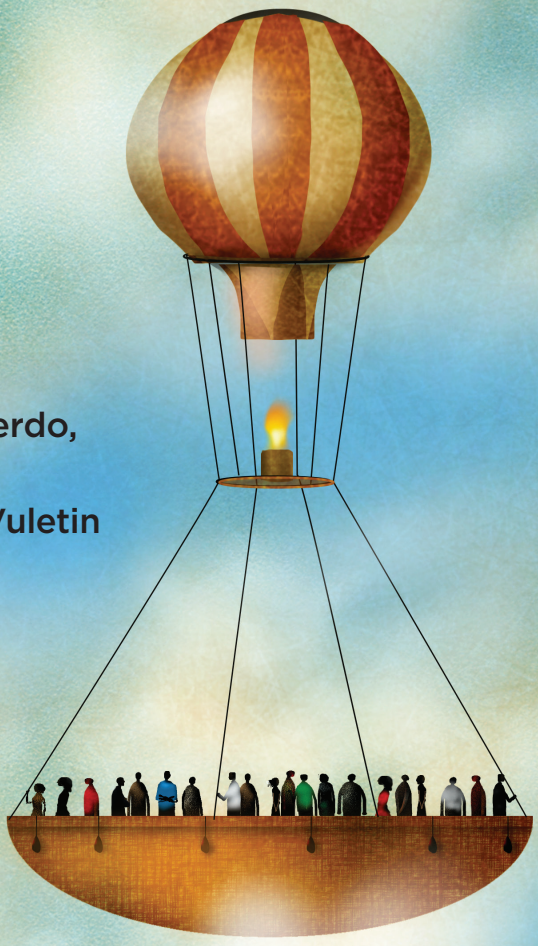
DEVELOPMENT IN THE AMERICAS

Better Spending for Better Lives

How Latin America and the Caribbean Can *Do More with Less*

Chapter 8



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8 Efficient Spending for Healthier Lives

Health systems have been a crucial driver of progress in health and well-being in Latin America and the Caribbean. Since 2000, large improvements in the coverage of skilled birth attendance and immunizations testify to citizens' expanded access to vital health services. These achievements have paid off in terms of better health outcomes, as measured by the increase in life expectancy or the decline in mortality rates of children under five years of age. Nevertheless, much is left to be done to address unmet needs and health inequities as well as to shift the focus of care toward chronic illness, which currently accounts for nearly three-fourths of deaths and years of life lost due to premature death and disability.

The case for continued investment in health is strong. Spurred by the Sustainable Development Goals (SDG) agenda, Latin American and Caribbean countries are implementing policies and programs aimed at achieving universal health coverage (UHC)—that is, ensuring that all people can obtain the services they need without suffering financial hardship (WHO, 2010). The commitment to ensure affordable access to high-quality health services for all requires that governments examine whether progress toward UHC can be met with current levels of health system investment and, if macroeconomic conditions allow, to mobilize additional resources and increase the fiscal space for health.

Yet, as presented in Chapter 1, many countries in the region anticipate further budgetary restrictions. Consequently, policy must focus on improving the efficiency of health care by investing in interventions that achieve the best health results and implementing these interventions the right way. Attaining universal health care will require not just more money for health, but more health per dollar invested.

What Is Efficiency and Why Does It Matter?

Production of health services involves using inputs—funding, human resources, physical infrastructure, drugs, medical equipment, and information—to improve health outcomes. Two dimensions of efficiency are commonly used to examine this production function: allocative and technical. The former pertains to "doing the right things." This is achieved by allocating resources to the combination of health-care services which delivers the largest gain in health outcomes for a given total expenditure or requires the smallest expenditure for a given improvement in health. This is what is usually meant by "getting value for money" in health care. Allocative inefficiency may arise from inadequate priority-setting, lack of clinical guidelines, incomplete performance reporting or, simply, inadequate governance of the system (Smith, 2016).

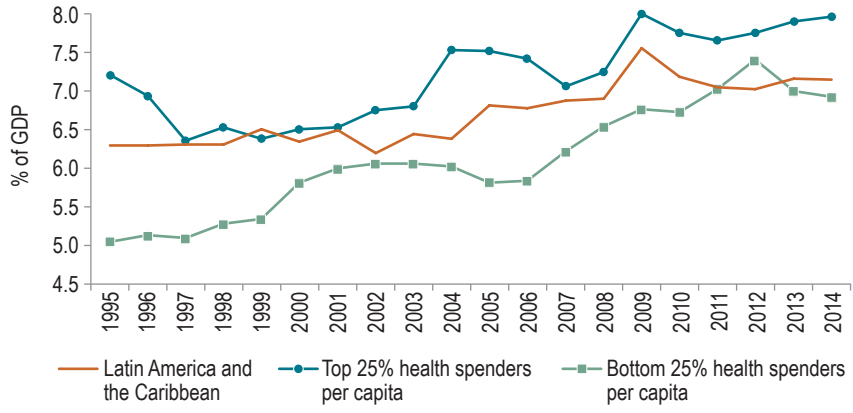
Technical efficiency refers to achieving the maximum level of output(s) for a given amount of input(s) under the prevailing technological process. It is "doing things the right way," which is achieved when outputs are produced with the least possible use of inputs. Technical inefficiency arises from misusing inputs in the process of producing valued outputs. Wasting inputs at any stage of the production process means that output will fall short of what is possible for a given level of resources. This is the case when tests are duplicated, avoidable readmissions take place, hospital stays are prolonged beyond need, or when unit costs could be lower. Technical inefficiency arises most notably at the provider and practitioner level—but is also present at the institutional level—and may result from inappropriate incentives, weak or constrained management, and inadequate information.

In the health sector, either type of inefficiency is a concern for several reasons. First, patients may not receive the best possible care for a given level of resources. Second, consuming excess resources robs treatment possibilities and health gains from other patients. Third, inefficient use of resources for health may sacrifice consumption opportunities elsewhere in the economy, such as in education. And finally, waste resulting from inefficient care may reduce society's willingness to contribute to the funding of health services, thereby harming social solidarity, health system performance, and social welfare (Smith, 2012).

Health Care Spending in the Region: Taking the Vital Signs

Between 1995 and 2014, Latin America and the Caribbean's total health expenditure as a percentage of GDP increased from 6.3 percent to 7.2

Figure 8.1 Evolution of Total Health Expenditure, 1995–2014



Source: Authors' calculation based on the World Health Organization Global Health Expenditure Database and the World Bank World Development Indicators Database.
Note: Top and bottom 25 percent are obtained using a sample of countries.

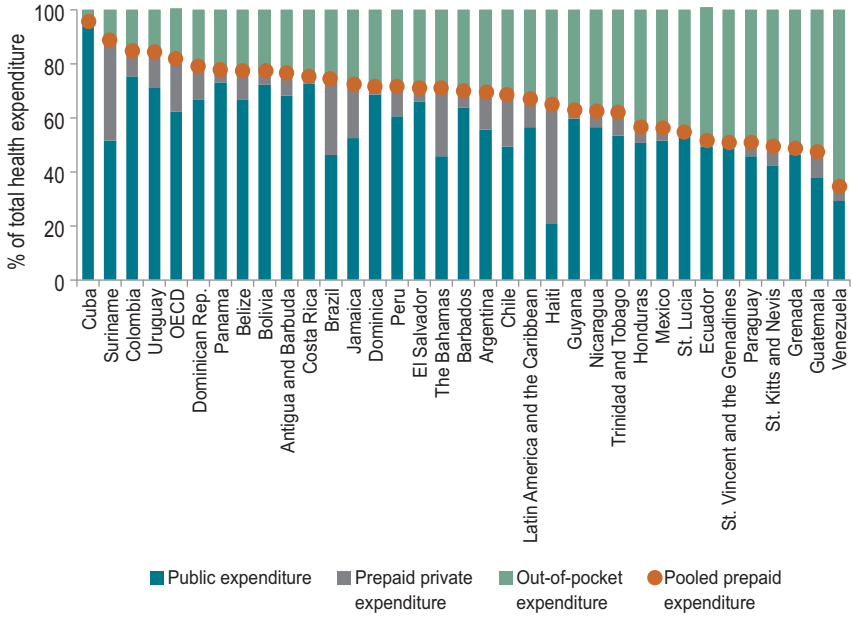
percent such that the average level of total health expenditure per capita[1] at the end of the period was $1,109 (see Figure 8.1).[2] These levels are lower than the average $4,701 per capita, or 12.3 percent of GDP, spent in the OECD in 2014 (GHED, 2017), and variation is wide, from 4.8 percent in Argentina to 11.1 percent in Cuba.

Average public health spending as a percent of total health expenditure in the region increased from 47.4 percent to 57 percent, and in 2014 was the largest financing source for health. In 2014 the value of public spending was on average 3.7 percent of GDP, which falls below a recommended threshold of 5 percent to support minimum standards of service (McIntyre et al, 2017; Chatham, 2010). However, there is much heterogeneity in the region: public health spending ranged from 1.5 percent of GDP in Venezuela, to 6.7 percent and 10.5 percent in Costa Rica and Cuba, respectively, in 2014.

Although the level of spending is important for health outcomes, so too are the sources of funding, particularly when it comes to analyzing the financial protection of individuals using the health system (Moreno, Serra and Smith, 2011). Total health expenditure can be decomposed by its financing agents into public (general government, including social security), prepaid private (i.e., voluntary health insurance), and out of pocket (i.e., the amount paid by individuals out of their own pocket on top of

1 All per capita values in this section are in constant 2011 international $PPP.
2 However, variations in per capita spending across countries are wide, ranging from $131 in Haiti to $2,475 in Cuba.

Figure 8.2 Total Health Expenditure by Financing Agent, 2014



Source: Authors' calculations based on the WHO Global Health Expenditure Database, 2017 data.

any amounts paid for insurance). The sum of public and prepaid private spending is known as prepaid pooled spending.[3] In the broader context of the push for universal health care and progress toward the SDGs, pooled prepaid health expenditure is particularly relevant, as it indicates the prepaid resources that a nation directly devotes to financial risk protection and effective access to health services. Pooled funds have been shown to be causally linked to improvements in access and public health at the cross-country level (Moreno-Serra and Smith, 2012, 2014). Latin America and the Caribbean's total health expenditure composition in 2014 is shown in Figure 8.2, ordering countries from highest to lowest in terms of pooled prepaid expenditure.

Out-of-pocket expenditure is a key indicator of financial protection. Levels above 20 percent of total health expenditure are strongly associated with catastrophic and impoverishing spending (Xu et al., 2010) and

[3] The data from Global Health Expenditure Database (GHED) presents internationally comparable health expenditures for all WHO Member States from 1995 to the present. For details on expenditure definitions and calculations see http://apps.who.int/nha/database/DocumentationCentre/Index/en.

indicate the stress households face in accessing health care. Although the share of out-of-pocket spending in the region has decreased from 37 percent to 33 percent, it still almost doubles that of OECD countries (18 percent) and is higher than the recommended limit of 20 percent for most countries. Out-of-pocket spending was as high as 64 percent and 52 percent in Venezuela and Guatemala, respectively, and only four countries are at or below the recommended limit (Colombia, Suriname, Uruguay, and Cuba).

Total private expenditure (prepaid private and out of pocket) accounts for a higher share in countries where the fiscal capacity to pool public funds is low. On average, it reached 43 percent of total health expenditure in 2014 for Latin American and Caribbean countries, which is above the 38 percent average in the OECD. Overall, prepaid private spending comprises the smallest source of health spending in the region ($122 per capita or 11 percent of total health expenditure in 2014 compared to $57 per capita and 13 percent in 1995) although in countries like Haiti and Suriname it was as high as 45 percent and 37 percent of total health expenditure, respectively, in 2014.

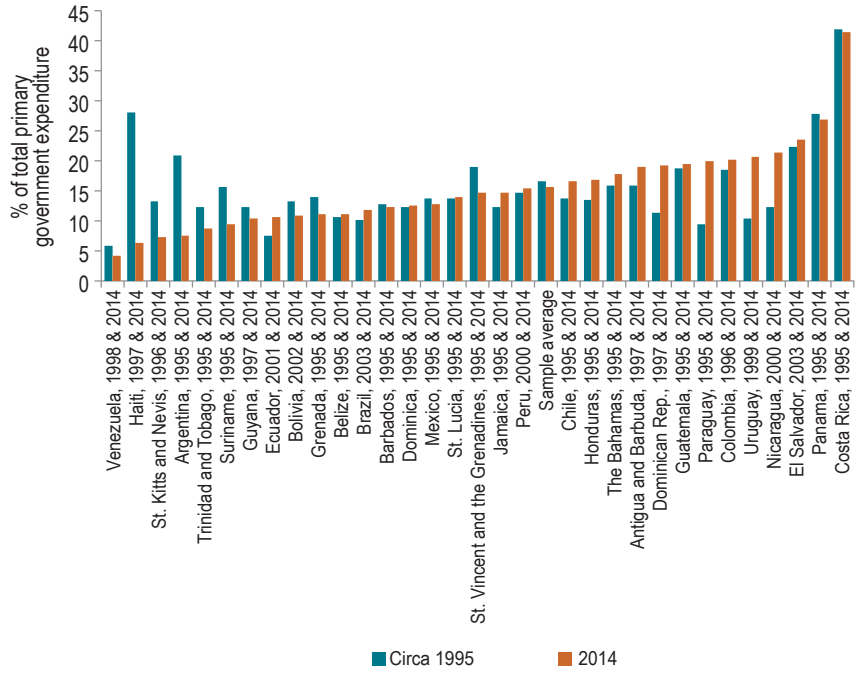
The weight of public health expenditure in primary government spending may indicate the priority placed on health in the public budget. While the ratio in several countries has remained the same since the 1990s (e.g., Guatemala, Panama, El Salvador), in others it has either increased (as in Paraguay) or decreased (as in Argentina). At the regional level, public health expenditure has remained around 16 percent of primary government spending (Figure 8.3).

For the foreseeable future, health expenditures are expected to continue to climb, driven by factors such as population aging, the rising incidence of chronic diseases, socioeconomic improvements and an associated greater demand for health services, as well as the adoption of technological developments (Maisonneuve and Oliveira Martins, 2013). These trends strengthen the case for seeking greater efficiency in public health-care spending.

Efficiency of Latin American and Caribbean Health Systems: Limping Along

Efficiency metrics to assess health system reform and policy interventions are critical to support sound decision-making. Unfortunately, there is little evidence of the sources and magnitude of inefficiency in health spending in Latin America and the Caribbean, leaving policymakers in the dark when deciding where to direct efforts for improvement. To begin filling

Figure 8.3 Evolution of Public Health Expenditure, 1995–2014



Source: Authors' calculations based on the WHO Global Health Expenditure Database, the World Bank World Development Indicators Database.
Note: Initial data correspond to 1995 or the closest available data for years following 1995.

this information void, this section provides evidence on how Latin American and Caribbean countries are doing in terms of the efficiency of public health spending from a comparative, regional system perspective, as well as at the microeconomic level.

An Aggregate Perspective

This chapter measures the efficiency levels of Latin American and Caribbean health systems and their possible determinants using Data Envelopment Analysis (DEA). DEA is useful for identifying which countries do better than others in transforming health resources into better outputs. DEA also pinpoints specific areas for policy action in each health system by highlighting areas in which a country is doing worse than its peers.

This is the first cross-country analysis of health system efficiency available for the entire region, partially due to the limited availability and comparability of health data. Although in Latin America and the Caribbean

DEA has been used mostly at the single country level,[4] the World Health Organization (WHO) and the OECD increasingly use DEA models to compare health system efficiency across countries.

This chapter uses DEA models to benchmark the efficiency of Latin American and Caribbean health systems using middle-income countries (MICs) and OECD countries for comparison. Efficiency performance was measured for eight health system outputs, grouped in three categories (health: life expectancy at birth and at age 60, under-five mortality, and Disability Adjusted Life Years [DALYs];[5] access to services: DPT immunization, and skilled birth attendance [SBA] rates; equity of access to services: rural-vs-urban and poorest-vs-richest ratios of SBA). The main input to the models was pooled prepaid health expenditure per capita.[6]

A country's ability to maximize the impact of inputs on outputs may be affected by factors external to the health system, such as a country's economic and social development or demographic structure. Therefore, GDP per capita and the share of the population aged 65 and above were included as control variables. Unfortunately, lifestyle indicators (e.g., smoking prevalence,[7] alcohol consumption, diet patterns), environmental factors (e.g., air pollution),[8] quality of services, and other factors that might affect the impact of inputs on outputs were not considered due to limited cross-country data.[9]

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4 For DEA analysis across the region see Hernández and San Sebastian (2014) for rural Guatemala; Ligarda and Ñaccha (2006) for Lima, Peru; Ramírez-Valdivia et al. (2011) for Chilean municipalities; Ruiz-Rodríguez et al. (2016) for Bucaramanga, Colombia; and Varela et al. (2010) for small Brazilian municipalities.

5 A DALY is one lost year of "healthy" life. The sum of DALYs across the population measures the gap between current health status and an ideal health situation in which the entire population lives to an advanced age, free of disease and disability.

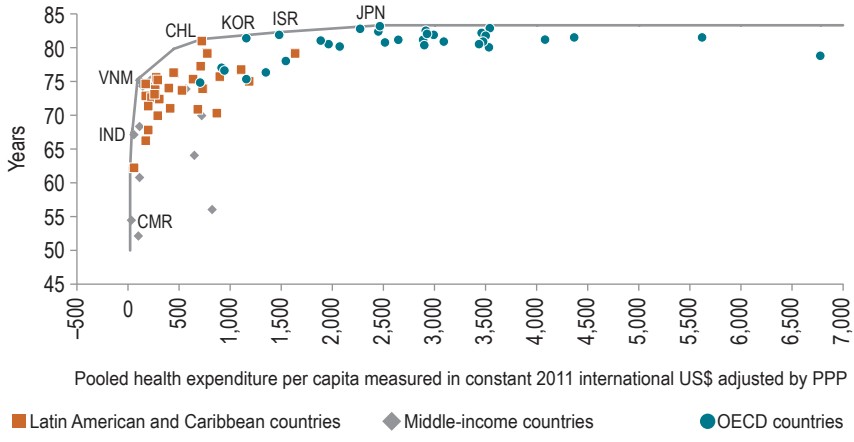
6 Pooled prepaid health expenditure per capita was preferred to total health expenditure per capita as the main input. Looking at pooled expenditures frames the discussion within the wider context of pushing for universal health care and progress toward SDGs, as pooled financing indicates resources devoted to financial risk protection and effective access in the health sector.

7 Smoking prevalence was not included because 10 countries would have been excluded due to lack of data, rendering results of limited relevance and comparability. Nevertheless, smoking prevalence was included among the inputs in a sensitivity check, resulting in no relevant changes in the efficiency scores (e.g., Chile, Costa Rica, Uruguay were still among the most efficient countries).

8 Evidence suggests that a main determinant of air pollution is GDP per capita (Buehn and Farzanegam, 2013). Therefore, including GDP per capita as a control should capture most of the influence of air pollution on outputs.

9 See Moreno-Serra et al., 2018, for details on the sample of countries, indicators, and methods).

Figure 8.4 Estimated Efficiency Frontier for Life Expectancy at Birth



Source: Authors' calculation based on the World Bank World Development Indicators Database.
Note: Life expectancy was calculated averaging data between 2011 and 2015, while health expenditure was calculated averaging data between 2006 and 2010.

Efficiency is measured, for any given level of inputs, as a country's output relative to an efficiency frontier that sets the upper limit of countries' output. Countries on the efficiency frontier are, therefore, considered the most efficient for their level of health spending. For example, Figure 8.4 shows the DEA efficiency frontier for a key output indicator: life expectancy at birth. The curve linking the most efficient countries (Cameroon, India, Vietnam, Chile, the Republic of Korea, Israel, and Japan) for different levels of pooled health expenditure constitutes the frontier against which all other countries are compared. As expected, OECD countries are the efficiency peers of Latin American and Caribbean countries in only very few instances (e.g., Korea and Israel), given their typically higher input levels (especially health expenditures and national income). Most peers are within the Latin American and Caribbean region itself or are good-performing MICs at different levels of inputs (e.g., Vietnam).

A first message of the DEA analyses is that Latin American and Caribbean countries vary widely in terms of spending efficiency (see Table 8.1). Chile is the only Latin American country among the top 25 percent of performers (8th); OECD countries occupy most of the top 25 percent. Chile's high health system efficiency is explained by its consistently positive health outcomes (life expectancy at birth, under-five mortality, and DALYs lost) from its inputs. Other relatively good regional performers are Barbados (29th), Costa Rica (31st), Cuba (32nd), and Uruguay (35th), all of whom are in the top half of the average efficiency scores. Barbados and Cuba exhibit

Table 8.1 Average Efficiency Scores by Output Indicator

Country	Life expectancy at birth	Life expectancy at the age of 60	Under-five mortality	Disability-adjusted life years lost	Skilled birth attendance	DPT immunization	Skilled birth attendance, ratio poorest/richest	Skilled birth attendance, ratio rural/urban	Average efficiency	Ranking	
Japan	1.000	1.000	1.000	1.000	1.000	0.982	1.000	0.989	0.996	2	
Korea	1.000	0.961	1.000	1.000	1.000	0.998	1.000	0.983	0.993	3	
Spain	0.998	0.967	0.998	0.989	1.000	0.978	1.000	0.986	0.989	5	
Israel	0.999	0.971	0.999	0.999	1.000	0.949	1.000	0.983	0.987	6	
Italy	0.992	0.962	0.999	0.985	1.000	0.967	1.000	0.988	0.987	7	
Chile	1.000	0.982	0.997	0.998	0.999	0.941	—	—	0.986	8	
France	0.988	0.962	0.998	0.960	1.000	0.996	1.000	0.986	0.986	9	Top 25 %
Greece	0.986	0.946	0.998	0.973	1.000	1.000	1.000	0.987	0.986	10	
Luxembourg	0.981	0.962	1.000	0.965	1.000	1.000	1.000	0.984	0.986	11	
Switzerland	0.995	0.962	0.998	0.977	1.000	0.972	1.000	0.985	0.986	12	
Portugal	0.982	0.944	0.999	0.973	1.000	0.990	1.000	0.987	0.984	13	
Sweden	0.984	0.923	0.999	0.969	1.000	0.990	1.000	0.986	0.981	15	
Australia	0.987	0.962	0.998	0.976	1.000	0.929	1.000	0.984	0.979	16	
New Zealand	0.979	0.964	0.997	0.969	1.000	0.939	1.000	0.983	0.979	17	
Finland	0.972	0.923	1.000	0.951	1.000	0.944	1.000	0.986	0.978	18	

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Table 8.1 Average Efficiency Scores by Output Indicator *(continued)*

Country	Life expectancy at birth	Life expectancy at the age of 60	Under-five mortality	Disability-adjusted life years lost	Skilled birth attendance	DPT immunization	Skilled birth attendance, ratio poorest/ richest	Skilled birth attendance, ratio rural/ urban	Average efficiency	Ranking
Iceland	0.990	0.942	1.000	0.982	1.000	0.923	1.000	0.983	0.978	19
Germany	0.972	0.923	0.998	0.958	1.000	0.973	1.000	0.988	0.977	20
Netherlands	0.977	0.923	0.998	0.964	1.000	0.974	1.000	0.985	0.977	21
Belgium	0.969	0.904	0.998	0.950	1.000	0.998	1.000	1.000	0.976	22
Canada	0.982	0.962	0.997	0.963	0.999	0.919	1.000	0.984	0.976	23
Ireland	0.974	0.923	0.998	0.957	1.000	0.964	1.000	0.925	0.975	25
Norway	0.981	0.923	0.999	0.954	1.000	0.952	1.000	0.984	0.974	26
Austria	0.975	0.923	0.998	0.952	1.000	0.954	1.000	0.986	0.973	27
United Kingdom	0.974	0.923	0.998	0.945	1.000	0.962	1.000	0.985	0.973	28
Barbados	0.952	0.957	0.993	0.948	0.991	0.932	1.000	1.000	0.971	29
Slovenia	0.972	0.896	1.000	0.950	1.000	0.964	1.000	0.985	0.971	30
Costa Rica	0.992	0.935	0.997	0.990	0.985	0.917	0.975	0.967	0.970	31
Cuba	0.981	0.885	0.999	0.935	0.998	0.996	.	0.990	0.969	32
Estonia	0.962	0.894	1.000	0.944	1.000	0.962	1.000	0.989	0.969	33
Poland	0.957	0.862	0.999	0.945	1.000	0.996	1.000	0.984	0.968	34
Uruguay	0.967	0.907	0.996	0.961	0.993	0.963	.	0.988	0.968	35
Czech Rep.	0.952	0.852	0.999	0.944	1.000	1.000	1.000	0.984	0.967	36

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Table 8.1 Average Efficiency Scores by Output Indicator *(continued)*

Country	Life expectancy at birth	Life expectancy at the age of 60	Under-five mortality	Disability-adjusted life years lost	Skilled birth attendance	DPT immunization	Skilled birth attendance, ratio poorest/richest	Skilled birth attendance, ratio rural/urban	Average efficiency	Ranking
Denmark	0.964	0.885	0.999	0.944	1.000	0.941	1.000	0.985	0.965	37
United States	0.948	0.885	0.995	0.916	1.000	0.958	1.000	0.983	0.961	39
Jamaica	0.983	0.918	0.993	0.891	0.993	0.937	0.979	0.983	0.960	40
Slovakia	0.934	0.835	0.996	0.911	1.000	0.988	1.000	0.983	0.956	41
Dominican Rep.	0.953	0.955	0.977	0.932	0.981	0.865	1.000	0.978	0.955	42
Hungary	0.938	0.817	0.998	0.895	1.000	1.000	1.000	0.987	0.954	43
El Salvador	0.940	0.952	0.992	0.852	0.994	0.926	0.954	0.969	0.947	44
Argentina	0.940	0.873	0.992	0.924	0.975	0.937	0.971	—	0.945	45
Paraguay	0.951	0.923	0.990	0.930	0.973	0.895	—	—	0.944	46
Belize	0.909	0.907	0.992	0.910	0.964	0.964	0.925	0.964	0.942	47
Colombia	0.939	1.000	0.991	0.950	0.994	0.905	0.861	0.876	0.939	48
Brazil	0.925	0.872	0.991	0.878	0.982	0.970	—	0.949	0.938	49
Mexico	0.974	0.894	0.993	0.952	0.961	0.915	—	0.876	0.938	50
Venezuela	0.948	0.968	0.992	0.922	0.961	0.820	—	—	0.935	51
Turkey	0.929	0.852	0.991	0.906	0.975	0.978	0.912	—	0.933	52

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Table 8.1 **Average Efficiency Scores by Output Indicator** *(continued)*

Country	Life expectancy at birth	Life expectancy at the age of 60	Under-five mortality	Disability-adjusted life years lost	Skilled birth attendance	DPT immunization	Skilled birth attendance, ratio poorest/richest	Skilled birth attendance, ratio rural/urban	Average efficiency	Ranking	
The Bahamas	0.919	0.840	0.991	0.856	0.985	0.978	—	—	0.928	53	
Ecuador	0.984	0.956	0.986	0.936	0.923	0.855	0.831	0.854	0.916	54	
Nicaragua	0.988	0.954	0.995	0.943	0.942	0.997	0.541	0.869	0.904	56	
Honduras	0.963	0.991	0.996	0.932	0.874	0.886	0.755	0.827	0.903	57	
Suriname	0.888	0.934	0.984	0.902	—	0.869	0.862	0.869	0.901	58	
Trinidad and Tobago	0.865	0.727	0.983	0.771	1.000	0.933	0.977	—	0.894	60	Bottom 25 %
Peru	0.967	1.000	0.991	0.968	0.874	0.913	0.657	0.727	0.887	61	
Panama	0.965	0.954	0.989	0.930	0.925	0.818	0.720	0.774	0.884	62	
Haiti	0.973	0.976	0.992	0.909	0.835	0.900	0.416	0.876	0.860	65	
Guyana	0.873	0.670	0.974	0.613	0.961	0.976	0.849	0.949	0.858	66	
Bolivia	0.891	0.846	0.974	0.768	0.877	0.973	0.675	0.752	0.845	67	
Guatemala	0.937	0.931	0.981	0.851	0.641	0.842	0.420	0.674	0.785	69	

Source: Authors' calculation based on World Bank World Development Indicators Database.
Note: Based on 2006–2015 data. Best-performing countries for each output indicator, given their level of spending, receive an efficiency score of 1. Countries that receive a score below 1 are considered less efficient. For example, if country A has an efficiency score of 0.87, it is performing at a level of 87 percent compared to a country with the highest efficiency score. Average efficiency scores for each output indicator have been computed by averaging the results of three alternative DEA models using an "output orientation" specification: model 1 includes pooled health expenditure per capita as the sole input; model 2 includes pooled health spending per capita and GDP per capita as inputs; model 3 includes pooled health spending per capita, GDP per capita, and population aged 65 and above as inputs. Missing values are marked as "—". The table does not display the scores of middle-income countries. However, the ranking positions take these into account.

good efficiency performance by producing wider and equitable access to health services.

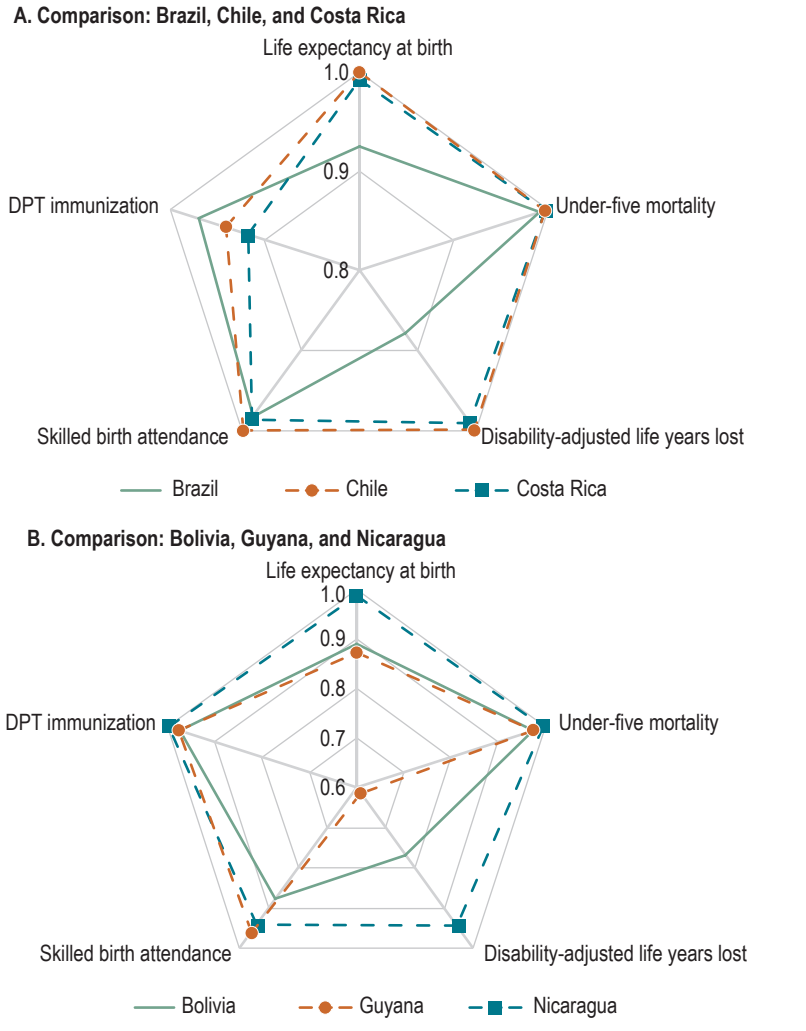
However, 22 of 27 Latin American and Caribbean countries are in the bottom half of the average efficiency rankings, and 12 are in the bottom 25 percent. Underperformers across each of the eight outputs are Bolivia, Ecuador, Guatemala, Guyana, Panama, and Suriname. In general, Latin American and Caribbean countries perform particularly less efficiently in the provision of equitable access to services.

Head-to-head comparisons between Latin American and Caribbean countries with similar levels of pooled health expenditure (peers) can help identify specific areas for efficiency improvements. Figure 8.5A compares relatively high-spending countries: Brazil, Chile, and Costa Rica. Conversely, Figure 8.5B compares low-spending countries: Bolivia, Guyana, and Nicaragua. Among high spenders, Brazil approximates Chile's efficiency levels for service access indicators more than for health outcomes, while Costa Rica has better health outcomes than access to care. Among low spenders, efficiency bottlenecks in health outcomes achieved are clearly the main issue in Guyana, whereas Bolivia needs to improve both service coverage and health outcomes.

A key message is that there is room for efficiency improvements in the region. Latin American and Caribbean countries are on average less efficient than the OECD group for every DEA output considered (see Figure 8.6). Moreover, Latin American and Caribbean countries are as inefficient as the MIC group in providing equitable access to services. On the positive side, Latin America and the Caribbean outperforms MICs for most health outcomes, and efficiency performance is relatively close to that of the OECD for life expectancy at age 60 and under-five mortality rate. This does not mean that they have the same outcomes as OECD countries, but rather, that they are as efficient as OECD countries given their level of development and amount of resources spent.

This analysis suggests that several Latin American and Caribbean countries could substantially improve health output indicators while keeping their current health budget stable, if they could boost efficiency to the frontier (Table 8.2). For example, average life expectancy could be extended by four years, or 5.4 percent. Potential gains in life expectancy reach at least seven additional years in Bolivia, Guyana, Suriname, and Trinidad and Tobago. Under-five mortality could be reduced by 10 deaths per 1,000 or 46.5 percent, with potential cuts of more than 24 deaths per 1,000 live births in Guyana and Bolivia. DALYs lost for all causes could be reduced on average by 6,143 per 100,000 people or 19.1 percent. Regarding access to services, skilled birth attendance could be improved by 4.4

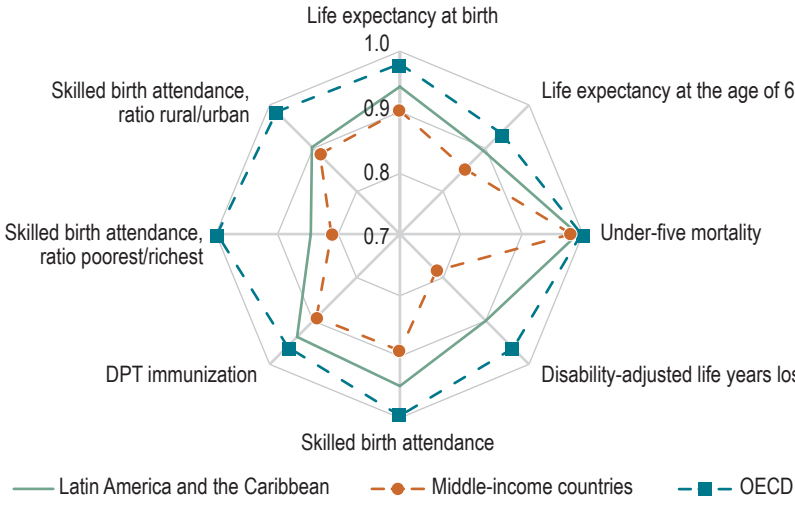
Figure 8.5 Comparison of Average Efficiency Scores



Source: Authors' calculation based on the World Bank World Development Indicators Database.
Note: Based on 2006–2015 data.

percentage points (from 91.9 percent to 96.3 percent), and reach as much as 22 percentage points in low-performing countries like Guatemala. DPT immunization rates could improve by 7 percentage points (from 89.9 percent to 96.9 percent) and about 14 percentage points in low performers like Panama and Venezuela. The message to policymakers in Latin America and the Caribbean is clear: improving spending efficiency can contribute to healthier lives without compromising additional resources.

Figure 8.6 Comparison of Average Efficiency Scores by Group of Countries Using DEA Outputs



Source: Authors' calculation based on the World Bank World Development Indicators Database.
Note: Based on 2006–2015 data.

The DNA of Health System Efficiency

What characteristics of a health system determine its efficiency? What accounts for the differences in efficiency among countries? Characteristics of health systems resulting from policy choices are of particular interest to policymakers because they are within their control. For example, studies in higher-income countries show that higher efficiency scores are associated with fewer insurers (Hadad et al., 2013), health service delivery models in which primary care physicians act as gatekeepers (Bhat, 2005), and decentralized health systems (de la Maisonneuve et al., 2016).[10]

This chapter represents the first attempt to provide evidence on the determinants of health system efficiency related to policy choices in Latin America and the Caribbean. Simar-Wilson cross-sectional regressions were used to estimate the association between countries' DEA efficiency scores in health outcomes, access to services, and equity, and three sets of potential determinants related to policy choices for which data were available: 1) organization of health-care financing and delivery, measured by out-of-pocket

[10] See Puig-Junoy (1998), Tajnikar and Došenović Bonča (2007), Moreno-Serra et al. (2012), and Joumard et al. (2010) for more on the institutional determinants of health system efficiency.

Table 8.2 Potential Gains by Output Indicator

	Life expectancy at birth (years)	Life expectancy at age 60 (years)	Under-five mortality (per 1,000 live births)	DALYs (per 100,000 population)	Skilled birth attendance (percentage points)	DPT immunization (percentage points)
Argentina	4.6	2.7	8.0	5,530	2.5	5.8
The Bahamas	6.1	3.4	9.3	10,017	1.5	2.2
Barbados	3.6	1.0	7.0	3,786	0.9	6.3
Belize	6.4	2.0	7.7	6,189	3.5	3.5
Bolivia	7.4	2.9	24.9	12,952	10.4	2.6
Brazil	5.5	2.8	9.2	8,328	1.8	2.9
Chile	0.0	0.4	2.8	153	0.1	5.5
Colombia	4.5	0.0	8.5	3,638	0.6	8.5
Costa Rica	0.6	1.5	2.9	763	1.5	7.5
Cuba	1.5	2.5	0.9	4,848	0.2	0.4
Dominican Rep.	3.4	1.0	22.4	4,804	1.8	11.6
Ecuador	1.2	1.0	13.4	4,555	7.1	12.3
El Salvador	4.3	1.1	7.6	9,453	0.6	6.8
Guatemala	4.5	1.4	18.2	9,345	22.5	13.1
Guyana	8.4	5.0	24.6	17,246	3.6	2.3
Haiti	1.7	0.4	7.1	3,501	6.1	6.2
Honduras	2.7	0.2	3.9	4,570	10.4	9.9
Jamaica	1.3	1.7	6.7	7,318	0.7	5.8
Mexico	2.0	2.3	6.9	3,485	3.7	7.7
Nicaragua	0.9	1.0	4.5	3,788	5.1	0.3
Panama	2.7	1.1	11.3	5,058	6.9	14.7
Paraguay	3.5	1.6	9.5	4,810	2.6	9.3
Peru	2.5	0.0	8.8	2,331	11.0	7.9
Suriname	7.9	1.5	15.4	6,880	11.3	11.9
Trinidad and Tobago	9.5	4.9	17.1	14,139	0.0	6.2
Uruguay	2.5	2.0	3.9	2,914	0.7	3.5
Venezuela	3.8	0.7	7.6	5,473	3.7	14.6

Source: Authors' calculation based on World Bank World Development Indicators Database.
Note: Potential gains for each output indicator have been computed by averaging the results of three alternative DEA models using an "output orientation" specification: model 1 includes pooled health expenditure per capita as the sole input; model 2 includes pooled health spending per capita and GDP per capita as inputs; model 3 includes pooled health spending per capita, GDP per capita, and population aged 65 and above as inputs. Based on 2006–2015 data.

health expenditure as a share of total health expenditure, and hospital beds per 1,000 people; 2) quality of health system institutions, measured by the existence of a medium-term sectoral vision, as well as the ability to set and monitor plans and objectives; and 3) quality of governance, proxied by six governance indicators and their average, including government effectiveness, voice and accountability, rule of law, regulatory quality, political stability and absence of violence/terrorism, and control of corruption.[11]

Health outcomes. In three models—life expectancy at birth, life expectancy at age 60 and, most strongly, under-five mortality—better governance is linked to better health outcomes. Higher-quality health system institutions—measured by the medium-term sectoral vision indicator—are also linked to greater efficiency in lowering under-five mortality rates. Health-care financing and delivery does not seem to affect efficiency scores.

Access to services. Efficiency in providing access to services (DPT immunization) is positively associated with the quality of governance. Service coverage (both skilled birth attendance and DPT immunization) is also positively associated with the quality of health system institutions, specifically the existence of a medium-term sectoral plan.

Equity in access to services. Better governance also improves efficiency in providing equitable access to health services (measured by poorest/richest and rural/urban ratios of skilled birth attendance). On the other hand, health system institutional quality is not associated with equity.

Overall, better governance and health system institutional quality likely affect the efficiency with which countries translate a given health budget into better population health outcomes, access to services, and equity in access to services. However, more analysis is needed to determine causation.

The Micro Perspective: Pharmaceutical Policy and Health Service Delivery

In 2010, the *World Health Report* estimated that 20–40 percent of all resources spent on health are wasted (WHO, 2010). Among the major sources of technical inefficiency it identified were an inadequate or costly mix of health workers, high prices, substandard quality and misuse of medicines, suboptimal quality and scale of health-care services, over-use

[11] Refer to http://info.worldbank.org/governance/wgi.

of health-care products, and leakages due to corruption and fraud (see Table 8.3). The report also pointed out that the primary source of allocative inefficiency relates to investments in services and interventions that do not maximize health improvements, such as spending more on curative care for chronic diseases rather than on preventive measures.

Evidence of inefficiency is presented in two key areas: pharmaceutical policy and health-care service delivery (rows 2 and 4 of Table 8.3) Improved efficiency in these areas would likely produce large gains because 1) seven of the ten top sources of inefficiency in health care worldwide originate from them, 2) they are key areas for attaining universal health coverage, and 3) growing international experience provides reliable evidence of strategies that work to address efficiency concerns in these areas.

Pharmaceutical Spending and Medication Use: A Dose of Common Sense

Pharmaceutical spending represents a significant share of health-care budgets. In OECD countries, one of every five health dollars is spent on medicines (Belloni et al., 2016). Trends in pharmaceutical spending influence overall health spending patterns. This is particularly relevant for Latin America and the Caribbean, where pharmaceutical spending has grown around 12 percent annually from 2013 to 2017, four times faster than in North America and six times faster than in Europe (Global Health Intelligence, 2015). Sound pharmaceutical policies are crucial not only to curb this trend, but also to improve value for money, as four of the ten leading sources of inefficiency in health spending are related to medicines (Table 8.3).

Table 8.3 Major Sources of Inefficiency by Type of Health System Input

Health system input	Source of technical inefficiency (not using the least inputs for a level of output)
Health-care workers	Inappropriate or costly staff mix
Medicines	Higher than necessary prices for drugs Under-use of generic drugs Irrational use of drugs Sub standard or counterfeit drugs
Health-care products	Over-use of procedures, investigations, and equipment
Health-care services	Sub optimal quality of care and medical error Inappropriate hospital size Inappropriate hospital admissions or length of stay
Financial resources	Health system leakages: corruption and fraud

Source: Authors' elaboration adapted from Chisholm et al. (2010).

A unique repository of comparative information shared by Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Mexico, and Peru, denominated "Decisiones Informadas Sobre Medicamentos de Alto Impacto Financiero" (DIME), is used as the source to explore pharmaceutical policies to promote efficiency as well as to consider the use of two medicines—ertapenem and insulin glargine—to explore inefficiencies in the procurement and use of medicines in these countries.[12] Of key international recommended policies (Belloni et al., 2016; Vogler and Schmickl, 2010), Table 8.4 shows those adopted by DIME countries.[13]

Policies to control prices include price regulation and mechanisms for centralized negotiation and purchase of medicines (see Table 8.4). Regarding price regulation, Colombia, Ecuador, and El Salvador have adopted International Reference Pricing (IRP) systems. For example, Colombia benchmarks prices with 17 countries and adopts the price of the lowest 25th percentile. An initial evaluation of the Colombian IRP concluded that the average price of medicines adopting IRP decreased by 40 percent (Andia et al., 2014; Prada et al., 2018). El Salvador's IRP uses as reference the average price of Latin American countries (excluding Central America and Panama).[14] Chile, Costa Rica, Mexico, Peru, and the Dominican Republic did not adopt IRP systems, limiting potential efficiency gains. In Mexico, however, the Secretariat of Economy establishes a maximum price for medicines for the general population. All DIME countries implement mechanisms for centralized negotiation and purchase of medicines, which help reduce prices by giving governments greater bargaining power and strengthening logistical processes while minimizing low-value repetitive purchases.

Under-use of generic drugs is another major source of inefficiency. Generic drugs have the same effect (bioequivalence) as brand products but generally cost less (Belloni et al., 2016). For example, among five commonly used medicines, the price difference between brand products and generics was as high as 41 percent (Singal et al., 2011). Non-use of generics is thus inefficient since the same clinical benefits can be achieved with

[12] DIME is a platform developed by the IDB to support decision-making. Countries share data about prices, coverage (inclusion or exclusion of drugs in public formularies), competitors (number of companies offering a drug), usage, and effectiveness for a group of medicines with high financial impact.

[13] Comparative information on policies to reduce substandard and counterfeit medicine, one of the sources of inefficiency in medicines, was not available from the DIME platform.

[14] Refer to http://www.medicamentos.gob.sv/index.php/es/normativa-m/reglamentos dnm-m/reglamento-de-precio-de-venta-maximo-al-publico-dnm.

Table 8.4 Policies to Promote Efficiency in Pharmaceutical Spending in DIME Countries, 2017

Cause of inefficiency	Policy	Countries							
		Chile	Colombia	Costa Rica	Dominican Republic	Ecuador	El Salvador	Mexico	Peru
Higher than necessary prices	Price regulation	No	Yes	No	No	Yes	Yes	Yes	No
	Mechanisms for centralized negotiation/ purchase	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Governmental database for price consultation	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Under-use of generics	Incentives for production or registration of generics	No	Yes	No	No	Yes	Yes	Yes	No
Irrational use	Incentives for rational prescription	No	No	No	No	No	No	No	No
	Mechanisms for detection and notification of off-label use of medicines	No	Yes	No	No	No	No	No	No
	Use of international non proprietary names (INN) for prescription, labeling, and commercialization	Yes	Yes	Yes	Yes*	Yes	Yes**	Yes	Yes

Source: Authors' elaboration based on DIME data.
Note: The source of inefficiency "higher than necessary prices and under-use of generic" is split into two separate categories.
* Dominican Republic does not use INN for prescriptions.
** El Salvador does not use INN for commercialization.

fewer resources. Colombia, Ecuador, El Salvador, and Mexico provide incentives to produce or register generics (Table 8.4). Colombia applies lower tariffs, Mexico offers tax exemptions, Ecuador simplifies paperwork, and El Salvador financially supports technological upgrades in small and medium pharmaceutical companies that produce generics, and favors the adoption of international quality standards. Colombia, Ecuador, and El Salvador also offer abbreviated registration processes for generics. According to DIME data, despite the potential gains, countries like Chile, Costa Rica, Peru, and the Dominican Republic have not yet enacted policies promoting generics.

In terms of rational use of medicines, this concept stands on the premise that "patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community" (Holloway and van Dijk, 2011). Irrational use includes prescribing multiple medicines per patient ("poly-pharmacy"), failure to prescribe according to clinical guidelines, inappropriate self-medication, and non-adherence to dosing protocols (Holloway and van Dijk, 2011). Regarding policies to favor rational prescription, none of the DIME countries provide doctors or pharmacies with financial incentives. Colombia has made isolated efforts to detect and notify off-label use of medicines[15] using an e-prescription platform that identifies this practice. Off-label prescriptions are reimbursed only if evidence of benefits is provided.[16] On a positive note, all DIME countries adopt international non-proprietary names (INNs). An INN identifies a pharmaceutical active ingredient by a unique name that is public property and globally recognized (WHO, 2017). INN prescription, labeling, and marketing promote more rational use of medicines by establishing international standards in pharmaceutical products and encouraging the use of generics (Vogler, 2012).

Inappropriate use of drugs is common, as illustrated by the use of insulin glargine and ertapenem in a sample of Latin American countries. Insulin glargine is used to treat diabetes mellitus type 2. In Latin America and the Caribbean, 9 out of 100 persons suffer from diabetes, and by 2040 this number is expected to reach almost 12 in 100, placing diabetes among the top causes of disease and premature death in the region (Diabetes Atlas, 2017). Thus, public budgets should allocate resources to medications that maximize health outcomes at low cost. However, the cost of treatment per patient per year with insulin glargine may be 120 percent higher than that of human insulin, which has the same clinical benefit (Hua et al., 2016; Sánchez Choez et al., 2015; Machado-Alba et al., 2016).

A similar efficiency issue arises with ertapenem, an antibiotic indicated to treat in-hospital bacterial infections. Ertapenem is not recommended as the first line of treatment since there are much cheaper drugs with the same clinical effect.[17] Therefore, its use should be restricted to ensure availability

[15] Off-label uses may include giving a drug for an indication or age group other than what it is approved for.

[16] In Ecuador, off-label use of medicines may be reported to the Ministry of Public Health. However, the information collected is not used to promote appropriate use of medicines.

[17] These drugs are meropenem and Iripenem/cilastatin.

Table 8.5 Spending, Prices, and Policy Options for Ertapenem, 2017

	Ertapenem expenditure	Ertapenem expenditure per capita	Price of defined daily dose	Coverage	Local technology assessment	Clinical practice guidelines
Chile	$3,674,522	$205.17	$63.81	Exceptional mechanisms	No	No
Colombia	$12,965,331	$266.48	$53.95	Exceptional mechanisms	No	No
Costa Rica	$80,520	$16.58	$53.01	Yes	Yes	Yes
Dominican Republic	$225,566	$21.18	$64.48	Exceptional mechanisms	No	Yes
Ecuador	—	—	—	No	Yes	No
El Salvador	—	—	—	No	No	No
Mexico	—	—	$21.38	Yes	Yes	No
Peru	$724,749	$22.81	$123.08	Yes	Yes	No

Source: Authors' calculation based on DIME data and World Bank World Development Indicator Database for data on population.
Note: All variables are measured in 2018 US$.

of effective second-line therapy if first-line antibiotics fail. Neither insulin glargine nor ertapenem are on the WHO list of essential medicines (WHO, 2017). Consequently, their use is potentially inefficient, as it is not the lowest cost treatment for the patient.

Table 8.5 summarizes information on expenditure per capita on ertapenem in DIME countries, as well as the presence—or absence—of three policy options to control its use: inclusion in a public formulary (coverage), use of a local health technology assessment (HTA), and development of clinical practice guidelines (CPGs).[18] It shows that expenditure per capita on ertapenem in Colombia is about 16 times higher than in Costa Rica and 12 times higher than in Peru. Countries that spend the most on ertapenem (Chile and Colombia) cover the drug through exceptional mechanisms, meaning that prescriptions are allowed for exceptional situations, such as legal claims and case-by-case approval of use by medical committees. Yet, what differentiates Chile and Colombia from low spenders like Costa Rica and Peru is that they have not carried out local technology assessments, or developed CPGs

[18] A public formulary is a list of prescription drugs to be covered by public funding. HTA is defined as "the systematic evaluation of properties, effects, and/or impacts of health technologies and interventions". See http://www.who.int/health-technology-assessment/en/. CPGs are "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific circumstances" (Field and Lohr, 1990).

Table 8.6 Spending, Prices, and Policy Options for Insulin Glargine, 2017

	Insulin glargine expenditure*	Insulin glargine expenditure per capita*	Price of defined daily dose*	Coverage	Local technology assessment	Clinical practice guidelines
Chile	$3,658,060	$204.25	$2.82	Yes	No	Yes
Colombia	$35,716,784	$734.11	$0.90	Yes	Yes	Yes
Costa Rica	$63,121	$13.00	$2.39	Exceptional mechanisms	Yes	Yes
Dominican Republic	$157,271	$14.77	$0.99	Exceptional mechanisms	No	No
Ecuador	$813	$0.05	$1.35	No	No	No
El Salvador	$0	$0.00	$0	No	No	No
Mexico	$7,755,813	$60.81	$0.26	Yes	Yes	Yes
Peru	$1,209,042	$38.05	$2.05	Yes*	No	No

Source: Authors' calculation based on DIME data and World Bank World Development Indicator Database for data on population.
Note: All the variables are measured in 2018 US$.
* Insulin glargine is provided by the Peruvian contributory public social health insurance system, Essalud.

for ertapenem, while the low spenders have HTAs, and Costa Rica also has CPGs in place.

Table 8.6 shows similar information for insulin glargine. Here, a key beneficial policy is followed by El Salvador and Ecuador, two countries with a zero-insulin glargine policy, where human insulin is used instead. In the case of Ecuador, expenditure on insulin glargine is $0.05 per capita, in contrast to $734.11 spent in Colombia or $204.25 spent in Chile. Given that the cost of treatment per patient per year with insulin glargine may be 120 percent higher than that of human insulin, countries like Colombia and Chile could be saving considerably by switching to human insulin in their drug protocols.

Four countries that provide public coverage for glargine insulin (Colombia, Mexico, Chile, and Peru) experience the highest levels of spending. In Colombia, an analysis of insulin glargine expenditure over time confirmed that its take-off occurred right after its inclusion in the Colombian benefits plan. Interestingly, among high spenders, Colombia and Mexico implemented complementary measures to control insulin expenditure (technology assessment and CPGs), yet expenditure levels per capita are still high, implying that the existence of control tools is not enough; the quality of their implementation matters, too.

Both cases suggest that switching from ertapenem and glargine insulin to their lower-priced substitutes is likely to release additional public resources to serve a larger number of patients. From a policy perspective,

better articulation of policy action on medicines is needed, as coverage decisions that are not backed up and reinforced by rigorous technology assessments and CPGs may compromise efficiency.

Quality of Preventive Services: Cuts Are Costly

Delivery of timely, high-quality diagnostic and treatment services in primary care has been shown to prevent acute deterioration, progression, or complications in people with disease (Manns, 2012). In addition, proactive disease management in primary care may help contain health-care spending by reducing, or even avoiding, the need for more expensive emergency visits, hospitalizations, or complex procedures (Rosano et al., 2013; Guanais and Macinko, 2009).[19] Under-use of primary care interventions results in both suboptimal quality of care and inefficiency; not only is people's health compromised, but opportunities for savings are missed. The Colombian primary care system's provision of preventive exams for diabetes is a case in point.

Diabetes constitutes a major burden of disease in Colombia. Health services to manage the condition are covered by publicly funded health insurance coverage, which relies on health insurers known as Empresas Promotoras de Salud (EPS) to organize delivery at the primary care level. To promote effective diabetes care, the Colombian Ministry of Health developed national CPGs based on best international recommendations (Aschner et al., 2016; American Diabetes Association, 2016). Compliance with these CPGs is key for improving patient outcomes and avoiding unnecessary costs, since major complications of diabetes (coronary and vascular diseases, renal failure, neuropathies, amputations), as well as mortality, can be prevented or reduced by monitoring blood pressure, blood glucose (HbA1c), cholesterol, and kidney function, through outpatient visits and diagnostic testing.[20]

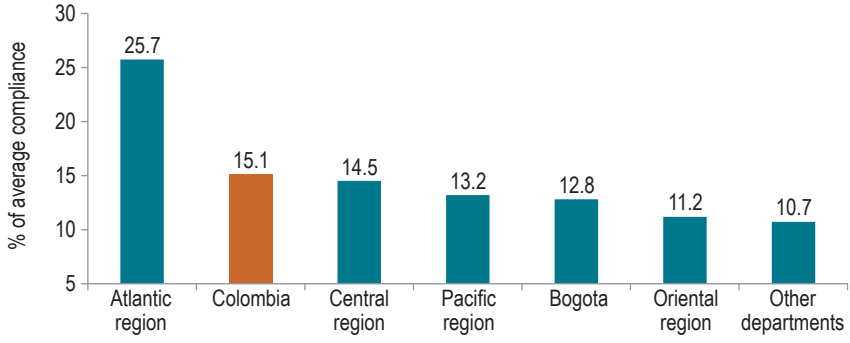
An analysis of compliance with CPGs for 324,000 diabetic patients affiliated with EPSs of the health insurance contributory regime[21] reveals that striking under-provision of appropriate preventive services leads to poor outcomes and costlier care (Buitrago et al., 2018). Only 15 percent of the diabetic population was provided all recommended tests, including yearly blood

[19] Emergency visits and hospitalizations for ambulatory care sensitive conditions (ACSCs), such as hypertension and diabetes, which can be effectively managed in ambulatory settings, are used as indicators of the quality of primary care.

[20] All these interventions are available through the insurance benefits plan.

[21] The contributory regime covers formal workers and their families and is financed through payroll taxes. The sample includes all beneficiaries of 10 EPSs covering 88% of this regime's population in 2014.

Figure 8.7 Average Regional Compliance with All Recommended Tests in Colombia, 2014

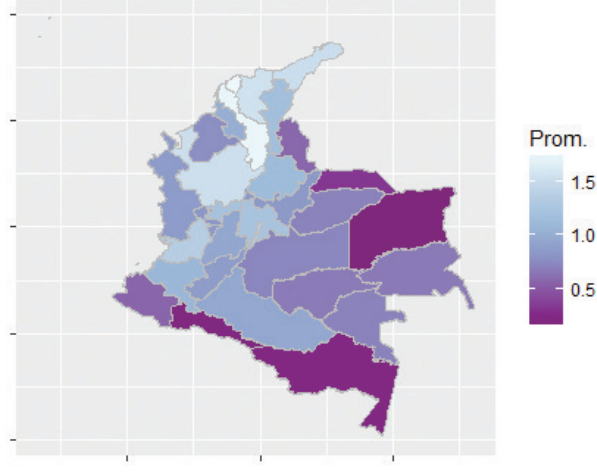


Source: Authors' calculation based on UPC, BDUA, and DANE databases.

glucose, cholesterol, and kidney function tests. Even more striking is the variation in compliance across regions (see Figures 8.7 and 8.8).

Compliance also varies by EPS provider. Table 8.7 shows large breaches in compliance for all tests—cholesterol being the most notable—as well as substantial variation across providers. For example, complete testing compliance varies from 27 percent for the best EPS provider to nearly zero for the worst. Thus, efficiency is not only about the average level of prevention, but also about homogeneous provision across regions and providers.

Figure 8.8 Yearly Number of HbA1c Tests, by Individual Patient in Colombia, 2014



Source: Authors' calculation based on UPC, BDUA, and DANE databases.
Note: Recommended number = 2.

Table 8.7 Compliance with Testing among EPS Providers in Colombia, 2017

	Percentage of Compliance			
Insurer	Complete	HbA1c	Kidney function	Cholesterol level
A	11.60	63.99	51.28	18.67
B	0.01	0.07	31.24	9.09
C	10.58	60.56	51.99	17.33
D	22.02	62.53	51.29	41.69
E	7.48	56.60	39.02	12.99
F	0.01	0.06	23.75	12.40
G	20.24	62.74	61.35	26.09
H	17.01	49.88	46.68	40.84
I	0.01	0.01	44.89	6.85
J	26.98	54.68	69.30	35.21
Observations	324,046	324,046	324,046	324,046

Source: Authors' calculation based on UPC, BDUA, and DANE databases.

Proper prevention policies for individuals with diabetes may help them avoid costly intensive care episodes as well as dialysis, revascularization, amputations, and even death. Results of detailed econometric analyses indicate how HbA1c, kidney function, and cholesterol tests can reduce these undesirable patient outcomes (see Buitrago et al., 2018, for details). Results also indicate that the larger the number of different providers a patient visits (which is a proxy for fragmentation of care, another source of inefficiency), the worse are the outcomes.

Compliance with required tests could generate substantial efficiency gains by lowering the probability of all complications, thereby cutting the costs of treatment through prevention. Take the case of HbA1c tests, the most important intervention for diabetes control.

Table 8.8 splits costs between those who followed complete HbA1c monitoring and those who did not. Data on the role of HbA1c tests in avoiding bad outcomes, together with information on costs, allows for an estimation of the marginal effect of compliance with Hb1Ac on costs. Complete HbA1c monitoring lowers the yearly total cost per patient by $430 on average. In this sample, if the 187,585 patients who did not undergo complete HbA1c testing did so, net savings of at least $80.7 million could be achieved (15 percent of total costs). Considering that the total value of premiums paid to EPS in 2015 was about US$5.968 billion, these savings alone, based on full testing for HbA1c levels could have reduced about 1.3 percent of total expenditures. Even though administering more HbA1c tests raises outpatient costs, it prevents much costlier expenditures for

Table 8.8 Costs of Diabetes Care by Compliance with HbA1c Monitoring in Colombia, 2017

Type of care for diabetic patients	Total cost	Complete HbA1c monitoring	
		Yes	No
Outpatient care	$ 68,900,000	$ 35,200,000	$ 33,700,000
Diabetes complications care	$ 511,000,000	$ 198,000,000	$ 314,000,000
Total cost	$ 561,000,000	$ 223,000,000	$ 338,000,000

Source: Authors' calculation based on UPC, BDUA, and DANE databases.
Note: All the variables are measured in 2015 US$.

patients who do not receive complete Hb1Ac tests and therefore may face further complications.

Thus, shortcuts in quality of care, in the form of unsatisfactory adherence to preventive testing, can negatively impact the efficient use of resources in Colombia. Databases like the one used in this study can be further exploited to guide improvement efforts, such as the use of CPGs to improve results for diabetic patients (Box 8.1).

Policy Prescriptions

At the international level, policy options to improve efficiency address the supply side, demand side, public management, coordination, and financing of health systems (de la Maisonneuve et al., 2016; Moreno-Serra, 2014). This chapter focuses on governance and quality of institutions, pharmaceutical policies, priority setting, and reconfiguration of health services.

BOX 8.1 BIG DATA TO INFORM ALLOCATION DECISIONS

Large administrative and clinical databases can help evaluate health program performance in LAC. Advanced statistical tools (targeted learning) were applied to diabetic patient "big data" from the DIABETIMMS program in Mexico City and Mexico state to examine differences in the control of patient blood glucose. Clinics following the practice guidelines of the DIABETIMMS program were compared against clinics with "business as usual" practices (Hubbard et al., 2018). DIABETIMMS clinics achieve far better results. Had this program been applied to all clinics in the studied sample, about 5,000 additional patients would have achieved lower blood glucose levels. Furthermore, using a precision public health methodology, predictions can determine which subset of the diabetic population would benefit most from DIABETIMMS, thus facilitating targeting resources for a more efficient allocation.

Governance and Quality of Institutions

Government effectiveness, transparency, citizen participation in policy-making, and regulatory quality likely impact favorably on the functioning and efficiency of the public sector (Wagstaff and Claeson 2004), which plays a pivotal role in the organization and operation of most health systems in Latin America and the Caribbean. The relatively efficient performance of health systems in Costa Rica, Chile, and Uruguay may be related to improvements in public sector regulation, transparency, and accountability to citizens. These countries have developed e-government systems and are advancing on e-procurement mechanisms, which have likely aided efficiency improvements (OECD, 2014; Scrollini and Durand Ochoa, 2015).

Health systems could be made more efficient by improving the quality of health institutions. In particular, a medium-term sectoral vision should be aligned with the overall government strategy. Medium-term expenditure frameworks improve the link between government expenditures and policy planning by using medium-term spending forecasts as the basis of annual spending plans. They are, thus, powerful tools that can impact efficiency through their positive effect on the supply of health-care services for a given level of expenditure.[22] In some cases, however, implementing these spending forecasts has not achieved the desired results. Adopting medium-term expenditure forecast terms is not enough; they must be carefully designed and adhered to. Successful experiences with these spending forecasts share a number of characteristics: spending priorities are easily identified from accounting frameworks; domestic resource requirements for the coming period are identified and feed into the budget preparation cycle; sector level progress is reviewed annually; and costing and resource needs for the sector are laid out realistically (Gottret and Schieber, 2006). Korea is an efficient OECD peer for higher-spending Latin American and Caribbean countries and is a good example of applying medium-term expenditure forecasts to improve fiscal responsibility, planning capacity, and spending efficiency across all areas of government (World Bank, 2013).

Yet improving the quality of governance and institutions often requires organizational reforms beyond those mentioned above to tackle inefficiencies across both government structures and processes (Savedoff and Smith,

[22] Medium-term expenditure forecasts that have been successfully implemented have been associated with improvements in budget discipline and reliability, as well as a greater ability to face fiscal challenges in the sector (Vlaicu et al., 2014).

2016). Areas of reform for Latin American and Caribbean countries include reducing fragmentation through greater coordination between different levels of the health system; supporting human resource training, distribution, and productivity; and investing in stronger information systems that support monitoring and management. Last but not least, access to detailed data is a key deficit in most health systems in the region. The fact that most countries have almost no available information on how resources are allocated to the salaries of doctors and nurses, medical equipment, medicine procurement, and other spending categories, speaks to the discretion and lack of analysis with which allocation decisions are made.

Pharmaceutical Policies and Priority Setting

Turning to pharmaceutical policies, price regulation strategies must go beyond international reference pricing.[23] Comparative evidence from European countries suggests that reference pricing alone is not the best option to improve value for money and should be complemented with other pharmaceutical policies (Drummond et al., 2011). Latin America and the Caribbean makes scarce use of regulatory and financial incentives to favor generic substitution (and more broadly, appropriate prescription practices) whereas generic substitution is in place in most European countries (Vogler, 2012). As to incentives, Hungary provides a good example, as it financially rewards doctors or pharmacies if they prescribe or dispense the cheapest from among therapeutically equivalent medicines (Belloni, 2016).

Countries may also want to consider the results of regional strategies for medication purchasing and information sharing. Mercosur and Unasur in 2016 jointly negotiated with pharmaceutical companies to purchase high-cost medications for cancer. Regional information platforms such as DIME can support better allocative decisions. For example, Ecuador decided not to include insulin glargine in its public formulary, based on a DIME assessment comparing glargine insulin and human insulin (Sánchez Choez et al., 2015). Also, the Consejo de Ministros de Salud de Centroamérica (COMISCA) negotiated regionally the purchase of medicines with some DIME countries (Costa Rica, El Salvador, Dominican Republic). This regional policy lowered the price of selected medicines by 28 percent, saving almost US$13 million in 2015 (COMISCA, 2015).

[23] For further details on other price regulation strategies, such as regulation by total rate of return (RTR) or utility, pricing based on incremental costs, and pricing based on HTA, refer to IDB (2017).

Finally, pharmaceutical policies must be part of a systemic approach to improve allocative efficiency through the development of prioritization systems based on Health Technology Assessments. In many OECD countries, decisions about financing health technologies (drugs, equipment, clinical processes, etc.) with public resources are made transparently, supported by a legal and institutional framework and reliable evidence (Sorenson, Drummond, and Kanavos, 2008; Giedion, Muñoz, and Ávila, 2012). The establishment of health technology assessments in Latin America and the Caribbean is growing and these investments are paying off.[24] For example, in Brazil, a 2010 health technology assessment supported the switch from high- to low-cost statins (drugs used to prevent and treat cardiovascular disease) in national primary care protocols, saving an estimated $2 billion in the public health system's budget (Teich and Araujo, 2011).

Common challenges that still need to be faced include weak institutional and regulatory frameworks, technical limitations in designing priority-setting tools and evaluating technologies, and fragmentation of actors and processes to evaluate, regulate, purchase, and prescribe technologies (Barraza, 2016; Cañón et al., 2016). Lessons from the priority setting experiences of three Latin American countries are highlighted in Box 8.2.

Reconfiguring Health Service Delivery

Providing high-quality, efficient health care requires reconfiguring the delivery of health services such that primary care is moved to the forefront and integrated with other levels of the health system. The primary care approach aims to keep people well with patient-centered, first-contact, continued, comprehensive, and coordinated care (Starfield 1991), which improves health, reduces growth in costs, and lowers inequality (Stigler et al., 2017; Kringos et al., 2013).

Prioritizing cost-effective primary care in the public health network has become a more common feature in the region that should improve health spending efficiency. Some of the more efficient health systems in the region, including Costa Rica and Uruguay, offered comprehensive primary care coverage to citizens from the onset of implementation of reform,

[24] In 2012, Latin America and the Caribbean was the first region in the world to adopt a resolution on the importance of HTA in health systems. According to PAHO, the region has 76 institutions that carry out some form of HTA, 49 percent of them within the public domain. Twelve countries have units, commissions, or institutes for HTA and in 7 countries legislation inserts HTA in the public decision space (IDB, 2016).

BOX 8.2 KEY ELEMENTS OF PRIORITY SETTING SYSTEMS

Case studies from Brazil, Colombia, and Mexico highlight lessons for setting priorities: 1) Establish sound and technically rigorous national health technology regulatory and surveillance agencies; 2) Assure independence and technical rigor of health technology assessments (i.e., in Mexico, an interinstitutional committee evaluates the evidence developed by the technology industry and, in some cases, develops its own evaluations); 3) Build evaluation capacity and retain qualified personnel (e.g., in Colombia, health technology officials receive training and competitive salaries, in line with those of industry peers and well above the public sector range; 4) Begin with priority setting of pharmaceuticals for which there is a consensus regarding impact on spending; 5) Develop a national technology management policy to support the creation of an integrated prioritization system (simple incremental changes in single institutions can result in improvements in silos). In this case, the best example is Brazil, which paved the way for an integrated prioritization system by encouraging discussions involving all actors.

Source: Giedion et al., 2018.

whereas less efficient ones (e.g., Argentina and Peru) started with limited coverage and gradually expanded the primary care package (Dmytraczenko and Almeida, 2014). Chile introduced reforms in 2005 (Plan AUGE) to reinforce primary care as the center of health-care networks, which covered the entire country by 2012.

Yet, investments in primary care need to move more quickly to curb wasteful spending. In 2009, in Latin America and the Caribbean an average of 9.6 million hospitalizations (19 percent of total discharges) per year could have been prevented through accessible, timely, and adequate primary care. The annual cost to the region of avoidable hospitalizations was estimated at 2.4 percent of total public health expenditure and 1.5 percent of total health expenditure overall (Guanais et al., 2013). Yet, generally, health systems in the region still rely heavily on specialist, hospital-based, and more expensive curative care rather than on preventive care (Atun et al., 2015). Considerable gaps remain in how primary care is organized, financed, and delivered. For example, surveys of primary care in six countries report numerous difficulties scheduling appointments; more than half of respondents didn't have a regular primary care provider who knows their medical history or coordinates their care, and nearly half used the emergency department for a condition treatable in a primary care setting (Guanais et al., 2018; Macinko et al., 2016). Some 39 percent of the Latin American and Caribbean population considered the quality of their primary care as good, compared to 69 percent in the OECD.

The core principles of primary care could be accelerated by implementing eHealth-based systems and services (D'Agostino et al., 2017). Examples of cost-reducing and efficiency-enhancing digital solutions include: telehealth and mobile health to support home management of patients; tools to enhance clinical decision-making and monitor treatment protocols; electronic medical records systems to reduce variability and improve monitoring and adherence to treatment protocols; data-analytics-based applications to help patients manage their medical conditions and improve lifestyle choices; and automation of ancillary processes such as appointments and admissions, as well as patient care, such as remote monitoring of intensive care units (Biesdorf and Niedermann, 2014). For the region to realize the full potential of efficiency gains from digital transformation, faster progress in developing national e-health policies is needed (OPS, 2016).

Furthermore, reconfiguring service delivery can be more effective when coupled with incentives and other strategies that reduce unwarranted variations and prioritize cost-effective interventions. OECD countries use numerous efficiency enhancements inspired by reforms, among others, to provider payment mechanisms, such as pay for performance (P4P).[25] Applying well-designed case-based payment systems for providers in hospitals has helped curtail the overprovision of services and reduced expenditures compared to retrospective reimbursement schemes, generally with no negative impact on care quality (see Moreno-Serra, 2014, for a review). These experiences in setting output-based incentive and payment structures could benefit health systems in the region that still rely largely on retrospective reimbursement mechanisms like historic budgets. Chile and Uruguay, two of the most efficient health systems in Latin America and the Caribbean, have both adopted some degree of case-based financing for hospitals, alongside pay-for-performance elements for reimbursing public providers, particularly in primary care.[26] Despite the absence of hard evidence on measurable efficiency gains, these reimbursement schemes in Chile and Uruguay represent welcome—and promising—departures from historic budgets and uncapped fee-for-service arrangements frequently used to pay providers in Latin America and the Caribbean (Dmytraczenko and Almeida, 2014).

[25] Pay for performance is a provider payment mechanism that establishes a direct linkage between purchasing and benefits, with payment to health-care providers driven by verified data on the delivery of defined goods and services (Soucat et al., 2017).

[26] A well-known and rigorously evaluated experience in Latin America is the Plan Sumar (see Celay et al., 2015; Gertler et al., 2014).

Worldwide experience suggests P4P may play a key role in improving the efficiency of domestic health financing and delivery systems by serving as a stepping stone toward building capacity for strategic purchasing (Soucat et al., 2017). The P4P approach shifts the mentality of passive budget execution to one of active data-driven output, improving the match between resource allocation, provider activities, and the health needs of the population. P4P strengthens health systems by stimulating investments in health information systems, re-engineering public financial management systems, and encouraging reforms to increase provider managerial autonomy. Countries are moving away from implementing P4P as a "scheme" or "project," but as a step within a system-wide approach to health financing reform. In designing P4P schemes, more attention is being paid to the interactions with existing provider payment systems, the local labor market, quality and access improvement strategies, public budgeting and financial management processes, and the readiness of the general environment to influence change at the provider level (Kutzin, 2014). For example, Korea, the "efficient peer" of relatively high-spending countries in Latin America and the Caribbean, piloted a replacement of the prevailing fee-for-service arrangement for a diagnosis-related group reimbursement, and was able to assess intended and unintended system-level consequences of this scheme before its national launch (Kwon, 2003).

The Diagnosis

While much more is needed to evaluate Latin American and Caribbean health systems further, this chapter provides a glimpse at inefficiency issues and their key determinants. A first contribution is the production of much needed regional efficiency health metrics. But the need is still great to improve the scope, comparability, timeliness, quality, and usefulness of health sector data in the region. This information is required to better understand allocative efficiency at the aggregate level: by function (e.g., curative vs. rehabilitative), by health-care level (primary, secondary, tertiary), and by economic classification (e.g., salaries, equipment, infrastructure). More evidence is also needed on efficiency determinants, including lifestyle factors (e.g., smoking prevalence), environment factors, as well as comparable institutional health system assessments. Using the work of the OECD on health system characteristics as an example, efforts should be made to increase the collection and availability of comparable information on health-care financing, health-care delivery, governance, and resource allocation.

The pursuit of health system efficiency is a central concern in all countries that has become more urgent due to lower economic growth and rising fiscal pressures, and longer-living populations that will push healthcare costs up. In Latin America and the Caribbean, more and better efficiency measures are essential for developing focused, effective policies. Evaluating policies aimed at efficiency improvements is also a must. Building the region's capacity to improve health outcomes in an efficient manner will help promote healthier lives for the region's current and future population without straining government budgets.