The Economist Intelligence Unit

CANCER CONTROL, ACCESS AND INEQUALITY IN LATIN AMERICA

A tale of light and shadow

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CONTENTS

ABOUT THIS REPORT

Cancer control, access and inequality in Latin America: A tale of light and shadow is an Economist Intelligence Unit report, commissioned by Roche, which examines cancer-control efforts in Latin America. It looks in detail at both the bright spots and the ongoing gaps for Latin American governments as they wrestle with cancer and seek to provide accessible prevention and care to their populations. Its particular focus is on 12 countries in Central and South America chosen for various factors, including size and level of economic development: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru and Uruguay.

This study also introduces a major tool for stakeholders seeking to understand this field: the Latin America Cancer Control Scorecard (LACCS). The LACCS relies on significant desk research to rank the 12 study countries on their performance in different areas of direct relevance to cancer-control access. In addition to the scorecard, this report also draws on its own, separate substantial research as well as 20 interviews with experts on cancer in the region and worldwide.

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EXECUTIVE SUMMARY

In Latin America, cancer and its control present often stark contrasts—or, in the words of one expert interviewed for this study, "light and shadow". Rapid change occurs next to stubborn stasis, and substantial progress in some areas is intermingled with still unmet, pressing needs in others. It is also an issue with growing political salience within the region: past success in the control of communicable diseases has increased the relative profile of non-communicable ones.

This study looks in detail at both the bright spots and the ongoing gaps for Latin American governments as they wrestle with cancer and seek to provide accessible prevention and care to their populations. Its particular focus is on 12 countries in Central and South America chosen for various factors, including their size and level of economic development. These states, referred to as "study countries", are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru and Uruguay. Together they accounted for 92% of cancer incidence and 91% of mortality in Central and South America in 2012.

The study also introduces a major tool for stakeholders seeking to understand this field: the Latin America Cancer Control Scorecard (LACCS). The LACCS relies on significant desk research to rank the 12 study countries on their performance in different areas of direct relevance to cancer-control access. In addition to the scorecard, the report also draws on its own, separate substantial research as well as 20 interviews with experts on cancer in the region and worldwide. Its key findings include the following.

Cancer is already Latin America's second-biggest killer, and the burden it exacts will grow markedly in the years ahead. In the 12 study countries cancer causes 19% of all deaths on average, and in two countries it is responsible for one-quarter or more of mortality. In large part because of population ageing and population growth, cancer incidence and—without action—mortality in Central and South America look set to rise markedly between 2012 and 2035. The number of cases is projected to go up by 91% during that time, and deaths by 106%. And although good data are lacking, the economic costs for the region are also set to rise significantly—both direct healthcare costs (such as medication, hospitalisation and diagnosis) and indirect costs (for example, loss of productivity from early mortality and working days lost).

The contours of the cancer challenge vary widely, and it is evolving unevenly both between and within the study countries. Age-standardised incidence differs markedly among the study countries, ranging from 132 per 100,000 people in Mexico to 251 in Uruguay. Just as striking are differences in the kinds of cancer each population is facing. The epidemiological transition which typically accompanies economic development includes an increase in the risk of certain types of cancer, such as those of the breast and prostate, and a decline in others, including the liver and stomach. Such changes are occurring in Latin America, but not consistently across the region. For example, Uruguay's cancer profile is now very similar to that in developed countries, while Bolivia's is far more consistent with that of developing ones. Moreover, within countries, this shift in the types

of cancer is frequently much more advanced in urban, wealthier areas than in rural, poorer ones: in Colombia, for example, increasing breast-cancer incidence is typically a much bigger problem in cities than in the countryside. Given that different kinds of cancer often require distinct responses, this leaves policymakers facing complicated challenges.

Cancer outcomes vary significantly across the region. According to experts interviewed for this study, Latin American countries tend to fall between developed states and the rest of the developing world in terms of cancer control. This is reflected in average cancer mortality per incidence—the M:I ratio—a crude but widespread measure of how effectively health systems are able to find and treat the disease. On average, the M:I ratios for South America (0.53) and Central America (0.55) fall roughly halfway between the EU's (0.40) and South-east Asia's (0.67). Study countries, however, are spread over a wide range, with Costa Rica's figure (0.47) close to the EU's one and Bolivia's (0.67) just shy of South-east Asia's.

There are also major variations between countries in terms of cancer-control efforts. The LACCS examines the efforts of countries in a range of areas relevant to access to cancer control, including planning, prevention efforts, treatment availability, spending and monitoring. It is based largely on policies related to access rather than outcomes. Country scores have a wide range. Uruguay and Costa Rica, for example, come first and second with 23 and 22 out of 30 possible points, respectively, while Bolivia and Paraguay achieve only seven and nine respectively. Even countries that are doing well have room for improvement. For example, second-place Costa Rica is unexpectedly weak on prevention and early diagnosis, while third-place Chile has data-quality issues. Money matters but is not everything: although scores do correlate to some extent with GDP per capita, the whole story is much more complex. Peru and Colombia, in particular, do far better than would be expected given the size of their economies, largely because of detailed cancer-control plans.

Despite the variation in cancer-control efforts, many countries in the middle show similar overall performance. Few points lie between the bulk of the study countries in the middle of the LACCS, with just four points separating eight countries. This suggests that, apart from the few leaders and stragglers, most of the region is in more or less the same place when it comes to cancer control. However, the scores for overall performance mask major differences between countries in individual scorecard results for the six domains covered in the LACCS: strategic plan; monitoring performance; medicines availability; radiotherapy availability; prevention and early detection; and finance.

Five priority areas

1. National Cancer Control Plans (NCCPs). Traditionally, NCCPs have not received significant attention from policymakers. That, however, has been changing in recent years. Frequently with the assistance of international organisations, a number of the 12 study countries have put in place or strengthened their NCCPs, so that today four have what the LACCS researchers deem to be up-to-date plans; meanwhile several additional countries have engaged in substantial work in this

direction. Peru's Plan Esperanza in particular, though not updated, is frequently cited by experts from the region as showing the potential for an NCCP to focus resources. However, several countries, notably Argentina, lack national plans altogether. Moreover, understanding of what an effective plan needs to contain is often lacking, as is funding to make NCCPs more than aspirational in several countries.

2. Cancer-related data: Until recently, the study countries had relatively few population-based cancer registries, which provide essential information for shaping effective cancer control and assessing the impact of policy initiatives. But in recent years progress has been made. For example, Mexico, Bolivia and Paraguay have either put in place new registries or begun to do so, while Panama is upgrading the quality of its existing national registry. Meanwhile, Colombia is creating a highly detailed national registry. There is, however, still far to go. Only 7% of the population of the study countries live in areas covered by a high-quality, population-based registry. Moreover, the people covered are not always representative of the population as a whole, and data are sometimes not collected on important sub-groups, such as indigenous people. Finally, of the 12 study countries only Mexico produces high-quality mortality data, while in five countries this information is either low-quality or non-existent. Too often a lack of funding and non-financial support—such as making reporting of cancer cases a legal requirement—impede necessary further progress.

3. Prevention and early detection: Latin America has seen marked progress in certain specific aspects of cancer prevention, but its continued high rate of late-stage diagnosis shows that much remains to be done. Numerous cancer-awareness programmes exist, but understanding of cancer risks and symptoms remains all too basic and inadequate, especially outside the better-educated demographic groups. Population prevention—the use of regulation to mould behaviour—has seen the introduction of increasingly stringent tobacco laws. However, efforts to expand this strategy to other areas, such as sugar taxes, have had mixed success. Meanwhile, efforts to interfere with certain infectious agents that can cause particular cancers have been boosted by vaccination against the human papillomavirus, the leading cause of cervical cancer. Finally, screening as a means of early detection has a mixed record. Screening is not appropriate for all cancers, and for some, cost makes it unsuitable for less economically developed states. Although an increasing number of countries in the region have begun, or are looking at, colorectal screening, in practice in Latin America cervical and breast cancer are the main targets of such programmes. Problems with programme structure, service quality, infrastructure, follow-up and integration with other health services impede the better use of screening in many study countries.

4. Budgets and resourcing: Government health budgets in Latin America are small compared with those in developed countries. Moreover, in distributing these limited funds, cancer has often been a low priority. The result of these budgetary choices is that most countries have insufficient resources for current cancer needs, let alone likely future ones, or for implementing NCCPs. Oncology personnel are in short supply: the number of specialist oncology nurses trained in Brazil, for example, would meet just half of São Paulo's current need alone. Only Uruguay and Chile have

enough radiotherapy machines to treat all of the country's patients, and across the region such equipment is less likely to be cutting-edge than in many other developing countries. Access to medication, meanwhile, is the area where study countries on average do worst. Regulatory and formulary approval of—and therefore practical access to—innovative therapies is slow, with patients increasingly turning to the courts to obtain medication. Finally, palliative-care facilities are often insufficient in number, and where they do exist, they are typically poorly integrated into cancer care.

5. Inefficiencies and inequalities: Fragmentation is the bane of cancer control in Latin America. The history of healthcare-access expansion has left many countries in the region with a number of parallel health systems. Although it is possible to achieve good health outcomes with multiple providers, the pervasive lack of communication, let alone interaction, between these systems in most of the study countries means that the kind of cancer prevention, treatment and palliative-care services patients can access depends on the system to which they happen to belong. In a situation where resources are already insufficient, this can be a matter of survival.

The problem is worse for those who are unable to afford private insurance or to obtain social security-based insurance through their employment. A few countries in this study, such as Costa Rica and Brazil, have what would qualify as universal healthcare coverage. Others are usually making efforts to meet the needs of the uninsured, with varying success. Some are creating specialist insurance vehicles, such as Mexico's Seguro Popular; others provide free hospital care in government systems, such as Paraguay and various provinces in Argentina. However, cancer control in rural areas remains a particular concern. These areas are often also the poorest in Latin American countries, with all the insurance issues that brings. Moreover, specialist human resources and equipment for cancer control remain concentrated in urban areas, making diagnosis less likely and adding travel expenses to the effective cost of treatment for those who are diagnosed with cancer.

MAINTAINING MOMENTUM: KEY AREAS WHERE POLICYMAKERS NEED TO ENSURE THAT PROGRESS CONTINUES

Although each country will have different circumstances and needs, some important considerations should be common to all.

Planning and implementing: National Cancer Control Plans (NCCPs) have become far more common in Latin America in recent years, but they are still lacking in some countries, and in others they exist largely on paper. Policymakers need to make sure that NCCPs are fit for purpose and have the resources necessary for implementation.

Data monitoring: Data registries have improved greatly in the region, but most countries provide only a partial picture of the cancer challenge they face. To mount an effective response, governments will to need to invest further here.

Building on success in prevention and early diagnosis: Human papillomavirus (HPV) vaccination programmes and tobacco-control legislation are important accomplishments that will save lives in the region. More remains to be done. Addressing the obesity epidemic, for example, will require education and potentially regulatory measures such as sugar taxes. Effective screening, meanwhile, will require programmes that are better integrated into overall healthcare.

Spending what is needed: When weighing up competing government priorities, policymakers must understand that to address the current cancer burden, let alone prepare for its inevitable growth, the budget for healthcare in general and for specialist oncological human resources and equipment will have to grow.

Breaking down barriers to access: More people in the region are getting healthcare and cancer care than ever before. Too often, though, the poor, those in the countryside, and people in the "wrong" healthcare system continue to experience insufficient cancer control. The region is engaged in multiple experiments to address this problem. Policymakers should remain alert for any that appear relevant to their national circumstances.

INTRODUCTION: THE CANCER CHALLENGE IN LATIN AMERICA

In Latin America, cancer is a major public-health issue. According to estimates from the World Health Organisation (WHO) and the International Agency for Research on Cancer (IARC), in 2012 (the latest year for which comparable international incidence and prevalence data are available) just over 1m people developed the disease in Central and South America, and it killed around 550,000. In this particular report we focus on 12 countries in the region, which together accounted for 92% of cancer incidence and 91% of mortality in Central and South America in 2012: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru and Uruguay.

What Roberto Pradier, director of Argentina's National Cancer Institute, says of the situation in his country applies across the region: "About 60,000 people die per year from cancer. That is a big, important number." In the countries covered in this study (the "study countries"), cancer accounted for just under one in five deaths in 2015 (the latest year for which WHO Global Burden of Disease data allow comparison between different reasons for dying). Cancer was also the second-biggest cause of mortality, after cardiovascular disease, in all of these countries except Mexico, where cancer came third. As of 2012, the probability of a resident of one of the study countries dying from cancer before the age of 75 was about one in ten (see table 1).

Table 1: Cancer mortality in the study countries

	1990		2015		
	Percentage of all deaths attributable to cancer	Ranking of cancer among causes of death	Percentage of all deaths attributable to cancer	Ranking of cancer among causes of death	Probability of dying from cancer before age 75
Argentina	21%	2nd	22%	2nd	12%
Bolivia	9%	4th	15%	2nd	10%
Brazil	12%	3rd	17%	2nd	11%
Chile	21%	2nd	26%	2nd	11%
Colombia	13%	3rd	19%	2nd	9%
Costa Rica	19%	2nd	23%	2nd	9%
Ecuador	12%	3rd	18%	2nd	9%
Mexico	10%	3rd	14%	3rd	7%
Panama	15%	2nd	17%	2nd	8%
Paraguay	12%	3rd	17%	2nd	9%
Peru	10%	3rd	19%	2nd	9%
Uruguay	26%	2nd	27%	2nd	15%
Average	**15%**		**19%**		**10%**

Sources: Institute for Health Metrics and Evaluation, *Global Burden of Disease Study 2015 (GBD 2015)*, GBD Results Tool. Available at: http://ghdx.healthdata.org/gbd-results-tool; International Agency for Research on Cancer (IARC); Global Cancer Observatory; Cancer Today. Available at: http://gco.iarc.fr/today.

Beyond the human toll, "the financial burden associated with cancer is huge and growing," notes Alejandro Gaviria Uribe, Colombia's minister of health and social protection. The extent, though, is hard to quantify—even more so given that the epidemiological transition is shifting the already complex playing field. A 2009 Economist Intelligence Unit study found that new cases of cancer on their own cost the economies of these 12 countries, including medical costs and lost employment productivity, a total of US$4.2bn per year.[1] A more comprehensive but less robust estimate found that in Chile alone working time lost as a result of cancer cost the economy US$3.5bn per year.[2] In Brazil, meanwhile, spending by the public healthcare system on core elements of treatment—cancer surgery, chemotherapy and radiotherapy—rose by 66% between 2010 and 2015 to reach just over US$1bn at the end of the period.[3] These data all point to a substantial economic burden from the disease, although this is probably short of the oft-repeated but difficult to source estimated cost of US$153bn per year (in the first year after diagnosis) for Latin America.[4]

The average and overall figures, though, whether for incidence, mortality or economic burden, mask a marked diversity. In Mexico and Bolivia, for example, cancer causes around 15% of deaths, while in Chile and Uruguay it is responsible for more than one-quarter. Similarly, as table 2 shows, age-standardised incidence and mortality vary by country. The prevalence of cancer patients and survivors, meanwhile, is even more diverse, and at the top end quite substantial: in Uruguay, by 2012 more than 1% of the population had been diagnosed with a cancer within the preceding five years.

Table 2: Cancer incidence, mortality and prevalence in the study countries, 2012 (age-standardised, per 100,000 people)

	Incidence	Mortality	Five-Year prevalence
Argentina	216.7	115.1	883.8
Bolivia	143.9	90.9	417.4
Brazil	205.5	103.7	720.7
Chile	175.7	103.0	660.0
Colombia	160.6	85.0	501.2
Costa Rica	179.3	84.9	615.1
Ecuador	164.5	94.5	534.3
Mexico	131.5	68.9	430.2
Panama	148.4	79.1	498.0
Paraguay	147.5	91.6	446.9
Peru	154.5	92.1	462.7
Uruguay	251.0	144.8	1163.6

Note: All cancers excluding non-melanoma skin cancer.
Source: International Agency for Research on Cancer (IARC), Global Cancer Observatory, Cancer Today. Available at: http://gco.iarc.fr/today.

1. The Economist Intelligence Unit, Breakaway: *The global burden of cancer–challenges and opportunities*, 2009.

2. J Jimenez de la Jara *et al*, "A snapshot of cancer in Chile: analytical frameworks for developing a cancer policy", *BioMed Central (BMC)*, 2015 Jan 26;48:10.

3. "Em cinco anos, gasto com tratamento contra câncer cresceu 66%", *Estadão*, August 15th 2016. Available at: http://economia.estadao.com.br/noticias/geral,em-cinco-anos-gasto-com-tratamento-contra-cancer-cresceu-66,10000069529

4. Institute for Health Metrics and Evaluation and World Bank, *The Global Burden of Diseases: Country Reports on Caribbean Countries*, 2013. Quoted in: PAHO, Economic Dimensions of Noncommunicable Diseases in Latin America and the Caribbean, 2016.

A growing challenge

Latin America's cancer challenge, then, is unambiguously large. The extent to which it may be increasing depends on the metric. In 1990, when cancer accounted for 15% of deaths on average in the 12 study countries, it was the third- or fourth-biggest cause of mortality in seven of them. Now it comes second in 11, making it hard to ignore. Ted Trimble, director of the US National Cancer Institute's Centre for Global Health, says: "There is a realisation that cancer is a major societal burden in terms of mortality and loss of economic productivity. This message is understood."

This growing relative burden of cancer, however, arises in part from progress elsewhere. In particular, decades of public-health efforts, often focused on maternal and child care and vaccination, have markedly reduced the impact of certain other diseases. For example, Bolivia and Peru saw the biggest extensions of average life expectancy among the study countries between 1990 and 2015, gaining 11.5 and 10.8 years respectively. Each benefited substantially from reductions in mortality from diarrhoea, lower respiratory tract infections and neonatal diseases, which collectively accounted for the equivalent of five years of greater lifespan in Bolivia and 3.4 years in Peru. Meanwhile, although in wealthier Latin American countries many of these improvements were realised some years ago, even relatively well-off Costa Rica saw its life expectancy benefit by the equivalent of a one-year extension as a result of progress in fighting these infections.[5]

"Health systems in Latin America in many senses are victims of their own success. Because they have dealt relatively successfully with health challenges that required simpler solutions, they now have to face more complex non-communicable and chronic diseases, such as cancer," says Felicia Knaul, professor at the University of Miami's Department of Public Health Sciences at the Miller School of Medicine and director of the Institute for Advanced Study of the Americas as well as founding president of Tómatelo a Pecho, México, a breast-cancer awareness and advocacy group, and president of the Union Latinoamericana Contra el Cáncer de la Mujer.

Whether the underlying, aggregate risk of cancer itself is rising is less clear-cut. Time-series data for cancer incidence are difficult to obtain. The IARC provides the most authoritative national incidence estimates, but because its calculation methods have changed over the time, comparisons between different years are invalid. The best option is to compare results from individual cancer registries over time—something for which only a few registries have usable data.

A recent academic study projected national figures using such data. It estimated that between 1997 and 2006 there was no change in overall age-standardised incidence in Argentina, Brazil, Chile and Costa Rica.[6] However, looking at the period 1990-2007 and drawing solely on time-series data from all the individual Latin American registries long included in the IARC's *Cancer Incidence in Five Continents* series—the gold standard of cancer measurement quality—gives a slightly different picture.[7] Among women, age-standardised incidence clearly rose in the Brazilian registry but seems largely flat in those in Colombia and Costa Rica, while declining and then rising again in Ecuador's single registry. By contrast, for men the Brazilian registry again shows a marked

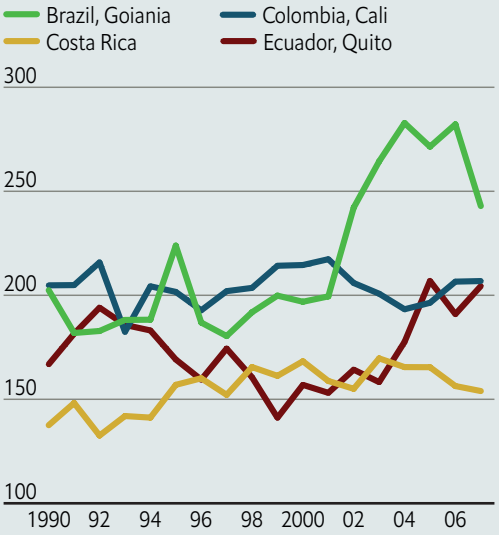
5. Institute for Health Metrics and Evaluation, Life Expectancy & Probability of Death Data, visualisation. Available at: http://vizhub.healthdata.org/le/.

6. MS Sierra *et al*, "Cancer patterns and trends in Central and South America", *Cancer Epidemiology*, 2016 Sep;44 Suppl 1:S23-S42.

7. IARC, Cancer Incidence in Five Continents. Available at: http://ci5.iarc.fr/Default.aspx

Chart 1

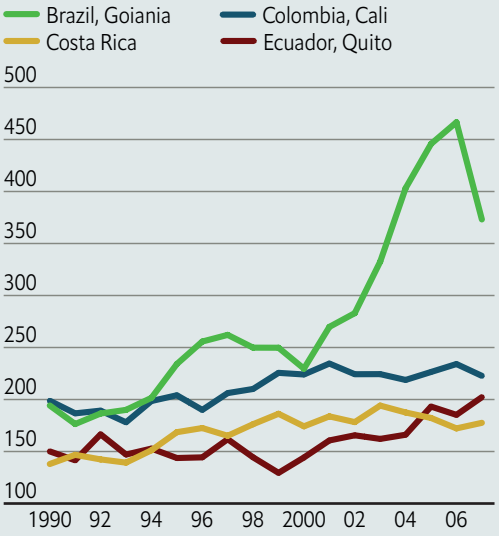
Cancer incidence, female, in selected Latin American countries, 1990-2007 (age-standardised for age 0-85+)
(rate per 100,000)



Source: IARC, Cancer Incidence in Five Continents. Available at: http://ci5.iarc.fr/Default.aspx.

Chart 2

Cancer incidence, male, in selected Latin American countries, 1990-2007 (age-standardised for age 0-85+)
(rate per 100,000)



Source: IARC, Cancer Incidence in Five Continents. Available at: http://ci5.iarc.fr/Default.aspx.

increase in incidence, whereas those in the other countries also show drifts upward, but intermixed with plateaus (see charts 1 and 2). Overall, for cancer as a whole, age-standardised incidence appears to be either stable or slightly increasing.

This is inconsistent with what experts are seeing on the ground. Raul Murillo, director of the Javeriana University Oncology Centre in Bogotá, for example, notes that "in Latin America, we have increasing exposure to certain risk factors. Incidence is rising." Part of the problem may simply be a lack of good data—a significant issue discussed further in Chapter 3.

More importantly, one rapidly increasing cancer risk in the region is by design calculated away in age-standardised rates. Latin America is ageing quickly, owing both to increased life expectancy and still-declining birth rates. According to UN population data, between 2000 and 2015 the median age of the population in the 12 study countries rose on average by 4.5 years; by 2030 it will have gone up by an additional five. Meanwhile, life expectancy in all these countries except Bolivia is already above 70 years; in seven it is above 75, and in Chile it is 81.2. This is not far off the world's regions with the highest longevity rates—North America, western Europe and Australasia—which currently average 79-82 years.[8]

Age, however, is a leading risk factor for many cancers. Accordingly, crude cancer incidence—based on the actual number of cases rather than adjusted to reflect age demographics—has already been

8. UN, *World Population Prospects: The 2015 Revision*, 2015.

Chart 3

Crude cancer incidence, female, in selected Latin American countries, 1990-2007 (age 0-85+)

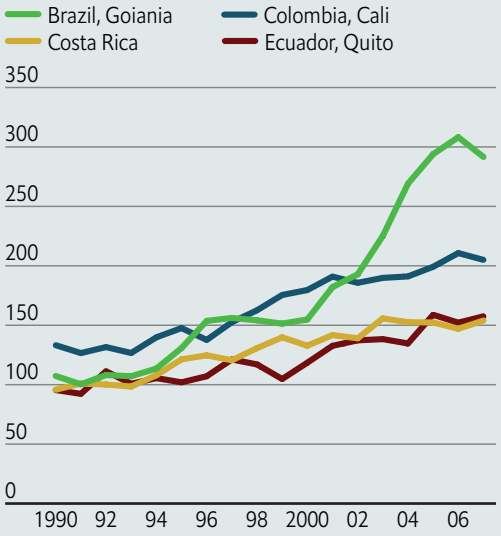
(rate per 100,000)

Source: IARC, Cancer Incidence in Five Continents. Available at: http://ci5.iarc.fr/Default.aspx.

Chart 4

Crude cancer incidence, male, in selected Latin American countries, 1990-2007 (age 0-85+)

(rate per 100,000)



Source: IARC, Cancer Incidence in Five Continents. Available at: http://ci5.iarc.fr/Default.aspx

rising quickly for decades for both men and women at registries in the region (see charts 3 and 4). Looking ahead, estimates from the IARC's Globocan database, based on ageing and population growth alone, show that by 2035 Central and South America could see almost 2m new cancer cases, a rise of 91% from 2015. The number of deaths, barring health-policy change, could reach around 1.1m by 2035, an increase of 106%. Alejandro Mohar, former director of Mexico's National Cancer Institute (INCan), expects that "it will be a big challenge to cope".

An incomplete, uneven epidemiological transition adds complexity

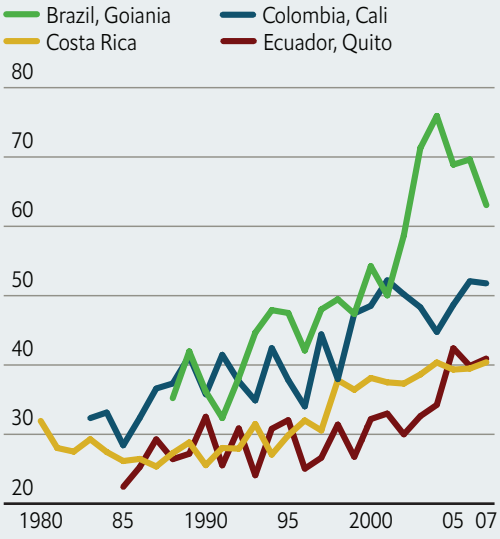
A rapid increase in total cases will be difficult enough to address. Worse still for responding to the disease is the fact that the kinds of cancer involved are changing, in some places dramatically. But to make matters even more complicated, these shifts are occurring at uneven rates between, and even within, countries in the region.

Much of Latin America has in recent decades been experiencing the intermingled economic, demographic and epidemiological transitions characteristic of rapidly growing emerging economies. The reductions in the burden of infectious disease and increases in life expectancy noted above are part of this wide-ranging transformation. In addition, the transitions are to some extent driven by, and to some degree the cause of, large-

Chart 5

Breast cancer incidence in selected Latin American countries, 1990-2007 (age-standardised for age 0-85+)

(rate per 100,000)



Source: IARC, Cancer Incidence in Five Continents.Available at: http://ci5.iarc.fr/Default.aspx.

scale behavioural change, which has a direct effect on cancer risk, and therefore incidence.

One example is changing fertility patterns. In common with other areas that are undergoing rapid economic growth, Latin America has experienced a significant drop in the average number of children per woman. In nine of the 12 study countries, for example, this figure declined by almost or more than 50% between the periods 1975-80 and 2010-15, and in eight it continues to drop by over 1% per year. The three largest exceptions—Argentina, Chile and Uruguay—saw smaller proportional declines because by 1975 fertility reduction was already much further advanced than among their neighbours.

Although lower average fertility is not without health advantages, it increases breast-cancer risk. Accordingly, this social change helps to explain the steady increase in the age-standardised incidence of the disease at the four Latin American registries in the IARC database, including recently that of Quito, Ecuador, where the national fertility rate remains the third-highest in this study (see chart 5).

Other factors associated with economic development also have links with higher cancer risk. Urbanisation is correlated with a higher incidence of ten cancers in a European study;[9] this is highly relevant in the Latin American context because, on average in the 12 study countries, more than 10% of the total population moved from the countryside to the city between 1990 and 2015.[10]

Economic growth is also frequently accompanied by dietary changes and reductions in physical activity. A proxy measure for these is the proportion of the adult population that is overweight or obese. The relative average increase in this figure between 1990 and 2013 across the 12 study countries was above 25% for both men and women, with the largest rises in those countries where being overweight was the least common at the start (see table 3). Only Argentina saw a (slight) decline. By the end of this period, on average 53% of men and 60% of women in these countries were overweight. The results are unsurprising: obesity has been associated with 12 cancer types, and in 2012 it was implicated in 2% of all male cancers in Latin America and the Caribbean, and in 6.4% among women.[11,12]

9. L Sharp *et al*, "Risk of Several Cancers is Higher in Urban Areas after Adjusting for Socioeconomic Status. Results from a Two-Country Population-Based Study of 18 Common Cancers", *Journal of Urban Health*, 2014 Jun;91(3):510-25; EIU calculations based on UN Population Division, *World Urbanization Prospects: The 2014 Revision*, 2014.

10. Based on calculations using UN, *World Urbanization Prospects: The 2014 Revision*, 2014.

11. Sierra *et al*, "Cancer patterns".

12. M Arnold *et al*, "Global burden of cancer attributable to high body-mass index in 2012: a population-based study", *Lancet Oncology*, 2015 Jan;16(1):36-46.

Table 3: Percentage of overweight and obese adults, 1990-2013

	1990		2013		Relative change 1990-2013	
	Adult males	Adult females	Adult males	Adult females	Adult males	Adult females
Argentina	57%	49%	56%	48%	-1%	-1%
Bolivia	50%	45%	52%	62%	4%	38%
Brazil	38%	44%	53%	58%	38%	33%
Chile	62%	58%	68%	64%	10%	10%
Colombia	36%	50%	53%	57%	46%	14%
Costa Rica	50%	33%	55%	67%	10%	99%
Ecuador	38%	66%	40%	70%	7%	5%
Mexico	56%	56%	67%	71%	20%	27%
Panama	8%	15%	21%	31%	158%	105%
Paraguay	59%	70%	63%	73%	6%	4%
Peru	43%	51%	45%	67%	6%	30%
Uruguay	56%	50%	60%	53%	6%	6%
Average	**46%**	**49%**	**53%**	**60%**	**26%**	**31%**

Sources: M Ng *et al*, "Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013", *Lancet*, 2014; Economist Intelligence Unit calculations.

The net result of all the changes related to economic development is typically an increase in cancers that are more common in developed than developing countries, including those of the breast, prostate and colorectum. This trend is apparent, to a greater or lesser extent, in Latin American countries for which there are data available, such as Argentina, Brazil, Costa Rica, Colombia and Ecuador.[13,14]

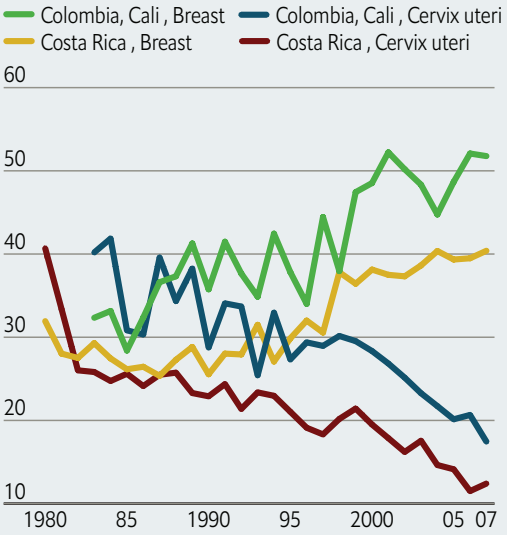
However, the implications of this epidemiological transition are not all bad for cancer. Just as some cancers become more common, others tend to decline. Notable among these are cancers where the common causes are specific viral or bacterial infections, such as those of the cervix (typically the result of the human papillomavirus, or HPV), the liver (commonly arising from hepatitis B and hepatitis C) and the stomach (often an outcome of helicobacter pylori infection). Vaccination, where possible, and the overall effects of the higher standards of healthcare commonly available in wealthier countries, normally make these infections—and thus the consequent cancers—less common. To some extent this is happening in Latin America. As the accompanying charts show, among women age-standardised incidence of breast cancer is increasing, while that of the cervix is decreasing in Costa Rica and Colombia (see chart 6). Similarly, among males prostate cancer incidence is rising, but cancer of the stomach is in decline (see chart 7).

[13] Sierra *et al*, "Cancer patterns". J Ferlay *et al*, *Cancer Incidence in Five Continents, CI5plus*. IARC CancerBase No. 9 Time Trends online analysis, IARC, 2014.

[14] IARC, Cancer Incidence in Five Continents.

Chart 6

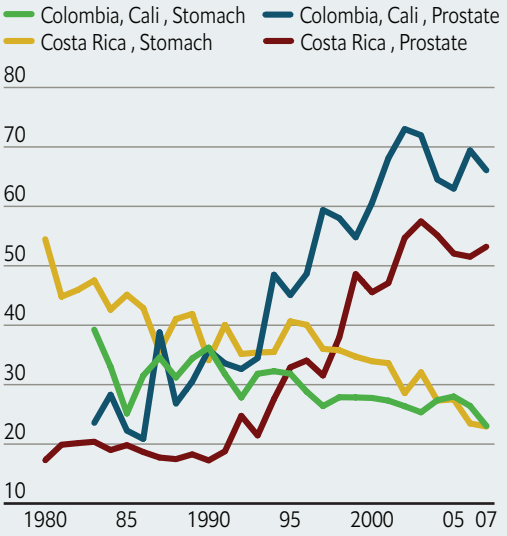
Incidence of selected cancers in females in selected Latin American countries, 1980-2007 (age-standardised for age 0-85+)
(rate per 100,000)



Source: IARC, Cancer Incidence in Five Continents. Available at: http://ci5.iarc.fr/Default.aspx.

Chart 7

Incidence of selected cancers in males in selected Latin American countries, 1980-2007 (age-standardised for age 0-85+)
(rate per 100,000)



Source: IARC, Cancer Incidence in Five Continents. Available at: http://ci5.iarc.fr/Default.aspx.

The (at most small) change in age-standardised aggregate cancer incidence discussed earlier suggests that the increased risk from certain forms of the disease has been roughly equivalent to, or slightly outweighed by, the decline of others. The problem for cancer control in Latin America, however, is that the transition from the dominance of certain types of cancers to others is both incomplete and highly uneven.

To begin with, cancers associated with lower levels of development are far from disappearing. In Panama, for example, while the incidence of prostate cancer and breast cancer saw substantial increases between 2000 and 2009 (over 2.5% per year), the incidence of liver cancer rose even faster (4%) and that of stomach cancer barely declined, with its age-standardised rate dropping by just 0.6% per year.[15] More generally, the best estimate is that 17% of cancers in South America and Mexico arise from some infection. This is much closer to the average rate in less developed countries worldwide (23%) than the average rates in Europe (7%) or North America (3%).[16]

Similarly, types of cancer that are consistent with different levels of economic development now frequently co-exist among those with the highest levels of incidence in the study countries. In nine of these, breast cancer and cervical cancer are the two most common types of the disease affecting women, with that of the cervix coming first in Bolivia and Peru. Among men, in five countries the prostate and the stomach come first and second in

15. M Politis *et al*, "Trend Analysis of Cancer Mortality and Incidence in Panama, Using Joinpoint Regression Analysis", *Medicine*, 2015 Jun;94(24):e970.

16. C de Martel *et al*, "Global burden of cancers attributable to infections in 2008: a review and synthetic analysis", *Lancet Oncology*, 2012.

terms of incidence (see table 4). As Dr Murillo puts it, in the region "we have cancer associated with wealth as well as with poverty. We have a mixed pattern and are not dealing particularly well with any of them."

Table 4: Cancers with highest incidence, 2012

	Men	Women
Argentina	Prostate, Lung	Breast, Cervix
Bolivia	Prostate, Colorectum	Cervix, Breast
Brazil	Prostate, Lung	Breast, Cervix
Chile	Prostate, Stomach	Breast, Colorectum
Colombia	Prostate, Stomach	Breast, Cervix
Costa Rica	Prostate, Stomach	Breast, Thyroid
Ecuador	Prostate, Stomach	Breast, Cervix
Mexico	Prostate, Lung	Breast, Cervix
Panama	Prostate, Colorectum	Breast, Cervix
Paraguay	Prostate, Lung	Breast, Cervix
Peru	Prostate, Stomach	Cervix, Breast
Uruguay	Prostate, Lung	Breast, Colorectum

Source: IARC, Cancer Incidence in Five Continents. Available at: http://ci5.iarc.fr/Default.aspx

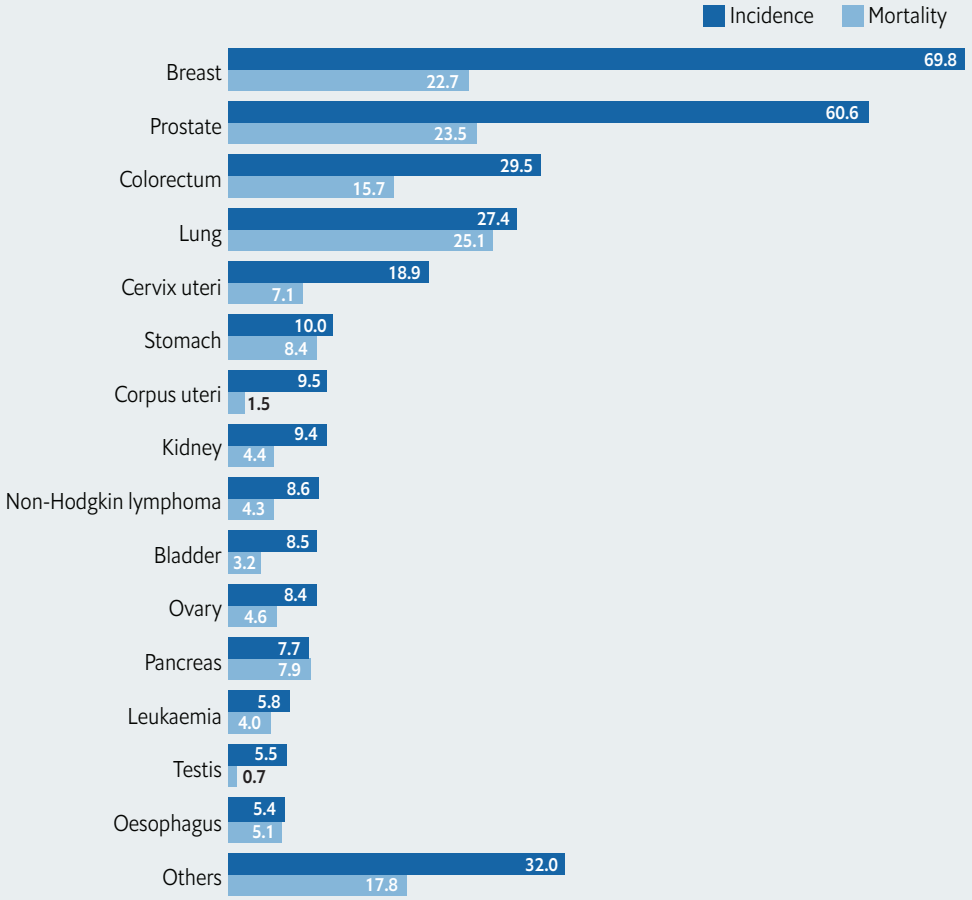
Adding to the complexity, the extent of the epidemiological transition is highly uneven across the region. Uruguay, for example, is considered to have largely completed the switch for over two decades; incidences of breast, prostate and colorectal cancer far exceed those of the stomach or cervix, although incidences of the latter two are still noticeably higher than equivalent figures in the US and Europe, for example. By contrast, according to IARC data, Bolivia's cancer burden is much closer to that of a developing country (see charts 8 and 9). Unpublished data from the new registry in Bolivia's capital, La Paz, support this. Milton Soria, head of the pathology unit at Bolivia's Instituto Nacional de Laboratorios en Salud, explains: "We have the lowest cancer incidence in Latin America, but 25-30% of it is cervical cancer." Such differences are almost unsurprising, given that Uruguay's GDP per capita is five times that of Bolivia's.

Pronounced variations even within countries

Compounding the difficulties for policymakers, there are also pronounced differences in the kinds of cancer that affect populations within many countries. Jorge Jimenez, professor of public health at the Catholic University of Chile and a former health minister, explains that the overall increase in crude cancer incidence in the region and individual countries "hides big disparities related to cancer type, gender, socioeconomics, ethnic and environmental factors". In his own country, for example, the two established population-based registries "show very different mixes of cancer types related to different environmental risks, such as greater exposure to arsenic in the north, with greater levels of poverty in the south helping to explain higher stomach-cancer incidence."

Chart 8

Incidence and mortality of selected cancers in Uruguay, 2012 (age-standardised for both sexes)



Source: IARC, Global Cancer Observatory, Cancer Today.

Similarly, in Costa Rica, which has the lowest cervical-cancer incidence in Latin America, there are wide variations between individual provinces. In relatively poor and rural Guanacaste, incidence (52.38 per 100,000, partially adjusted for population structure) is 86% higher than in the more urbanised and economically advanced San José Province, which includes the national capital (28.19 per 100,000).[17] The result is a much more difficult environment for cancer policy. As Dr Murillo notes: "We need different approaches for different populations."

Part of the explanation for this diversity in incidence within countries is that the impact of economic development on social change, and therefore on cancer risk, has been slower in certain areas, notably the countryside. For example, in most study countries rural fertility rates remain much higher than urban ones. Equally striking, the percentage of adolescent women who have children is also frequently higher, helping to explain why the average age of first birth in these countries is closer to that in Africa and developing Asia than North America and Europe.[18,19] An early age of first

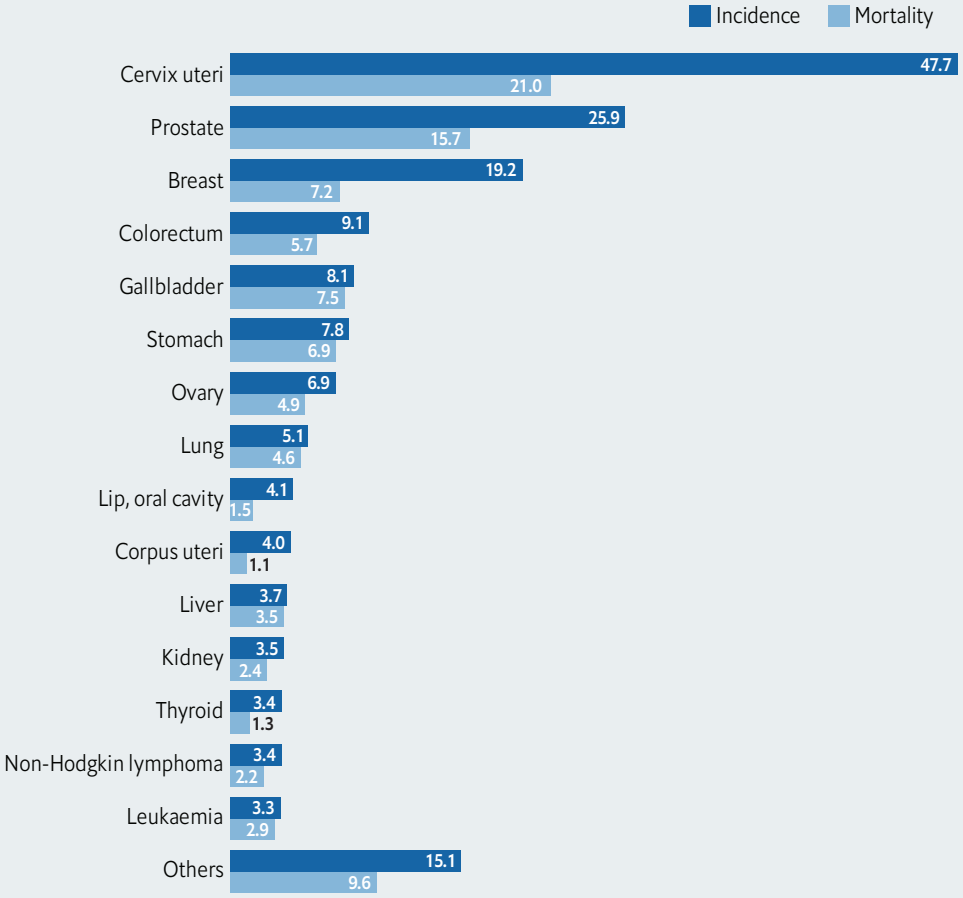
17. I Quirós Rojas, "The cervical cancer prevention programme in Costa Rica", *Ecancermedicalscience*, 2015; 9: 578.

18. Population Reference Bureau, "The Urban-Rural Divide in Health and Development", Data Sheet, 2015. Available at: http://www.prb.org/pdf15/urban-rural-datasheet.pdf.

19. UN Population Division, *World Fertility Report 2013: Fertility at the Extremes*, 2013.

Chart 9

Incidence and mortality of selected cancers in Bolivia, 2012 (age-standardised for both sexes)



Source: IARC, Global Cancer Observatory, Cancer Today.

birth, despite posing other potential health challenges, reduces breast cancer risk. For reasons such as this, Colombia's situation is not unusual. "We have a growing problem with breast cancer in urban areas, but not a big one in rural areas," observes Dr Murillo.

At the same time, the benefits—including for healthcare—of economic development have been much slower to reach some parts of Latin America. As Professor Knaul notes: "This is one of most inequitable regions in world." It is not surprising that the cancers of poverty remain common in specific sub-national areas.

Finally, the region throws up still-unexplained cancer anomalies. Chile, for example, has some of the highest incidences of gallbladder cancer in the world, with an age-standardised rate in 2012 of 12.8 per 100,000 population for women and 6.3 for men, compared with global averages of 2.3 and 2.1 respectively. Bolivia also has elevated levels of incidence for this cancer, but the rest of the region

is much closer to global norms. The reasons are not fully understood, although social and ethnic differences again appear implicated: in Chile, those who develop the condition are 26 times more likely to be from the poorer inland region of the country's south than the coastal north. Moreover, at the individual level, poverty, living in cities and being an ethnic Mapuche are all associated with higher risk.[20]

An issue of increasing political salience

The political will to address the evolving cancer challenge has grown in Latin America—not just in Uruguay, where the re-election as president of a trained oncologist, Tabaré Vázquez, in 2015 is likely to maintain cancer's high policy profile. At the regional level, an important sign of progress has been the existence since 2011 of the Red de Institutos Nacionales de Cáncer (RINC), a body for co-ordination and co-operation in the fight against cancer made up of representatives from the health ministries and national cancer institutes of the 12 member states of the Union of South American Nations (Unión de Naciones Suramericanas, UNASUR) and five Central American countries. According to Walter Zoss, executive manager at RINC, the organisation is already "a prime example of how regional collaboration allows countries to accelerate progress and improve outcomes by synergising efforts, technical expertise and financial resources."

Meanwhile, at the national level, Mr Zoss believes that "some countries have demonstrated strong political commitment and made substantial improvements," citing as examples important initiatives in Brazil, Colombia, Ecuador and Peru, to name a few. Eduardo Cazap, founder and first president of the Latin American & Caribbean Society of Medical Oncology, agrees: "In the last 15-20 years the political environment has changed in several countries. For many years, cancer was not on the political or even the Ministry of Health's agenda. Cancer is very expensive, and other diseases were a priority." Now, in parts of the region at least, there are signs that cancer is getting more attention.

In contrast to Uruguay, Paraguay's president, Horacio Cartes, owns that country's largest cigarette manufacturers, with predictable results for anti-tobacco efforts. In Bolivia, notes Dr Soria, "there is concern about, and awareness of, the disease, but no political will to deal with cancer control."

Such concerns are at least having an impact in parts of Latin America in ways that may further strengthen political resolve. "In recent years public pressure has been building. Usually cancer NGOs [non-governmental organisations] are weak in our region. That is changing. Some are more and more powerful," according to Dr Cazap, and engaging increasingly in advocacy. A good example is the recent creation of the Red Nacional de Organizaciones de Pacientes Oncológicos in Ecuador, a coalition of a dozen cancer NGOs in the country with the aim of changing the political profile of the disease. "Our real goal," says Wilson Merino Rivadeneira, the network's co-ordinator, "is to change the vision of the problem."

Again, the transition is only partial and still in its early stages. Alessandra Durstine is a principal at Catalyst Consulting and previously led the American Cancer Society's efforts to support the

[20] M Andia *et al*, "Geographic variation of gallbladder cancer mortality and risk factors in Chile: a population-based ecologic study", *International Journal of Cancer*, 2008 Sep 15;123(6):1411-6.

advocacy movement in Latin America. She explains that although the situation has evolved somewhat, most patient groups are small, reliant on individual leaders and focused on providing support services for other patients. Only relatively few—generally involved in breast, haematological and paediatric cancers—have begun to campaign on political matters. They are, however, impeded by difficulties in fundraising, their small size and the need to develop managerial and advocacy skills. Perhaps most difficult of all, "advocacy groups are viewed with suspicion by politicians and don't represent large numbers of votes," Ms Durstine concludes.

Unequal health outcomes point to the need for better access to cancer control

How well national health systems are responding to cancer is almost as varied as the challenge itself. A very rough but commonly used indicator of success is the ratio of age-standardised mortality to age-standardised incidence, the M:I ratio (see chart 10). It relies on the assumption that, given a similar cancer load, a country with a more successful cancer-control programme will see fewer deaths. Although in some ways simplistic—different cancers have different survival rates and not every country sees the same types of cancer predominate—it has been shown to be a reasonable proxy for five-year survival in many cases.[21] Moreover, unlike many of the data we would like to have on cancer, the figures to calculate the ratio are readily available.

With these caveats in mind, national M:I ratios reveal a substantial range of outcomes in Latin America. Costa Rica's ratio of 0.47, the best among the study countries, is not that far off the figure for the EU (0.40), although still well behind that of North America (0.33). At the other extreme in the study group, Bolivia's ratio of 0.63 is far more similar to the ratio in South-east Asia (0.67), although still comfortably ahead of that for Sub-Saharan Africa (0.75). This does not surprise Gilberto de Lima Lopes, medical director for international programmes and associate director for global health at the Miller School of Medicine at the University of Miami: "In general, the cancer situation in Latin America is kind of middling between the US and Europe on the one hand, and lower-income areas on the other." This applies to effort as much as to health outcomes. Dr Cazap believes that "with the exception of Europe and North America, the region that is most active in cancer-control initiatives is Latin America, with naturally all the attendant conflicts and challenges."

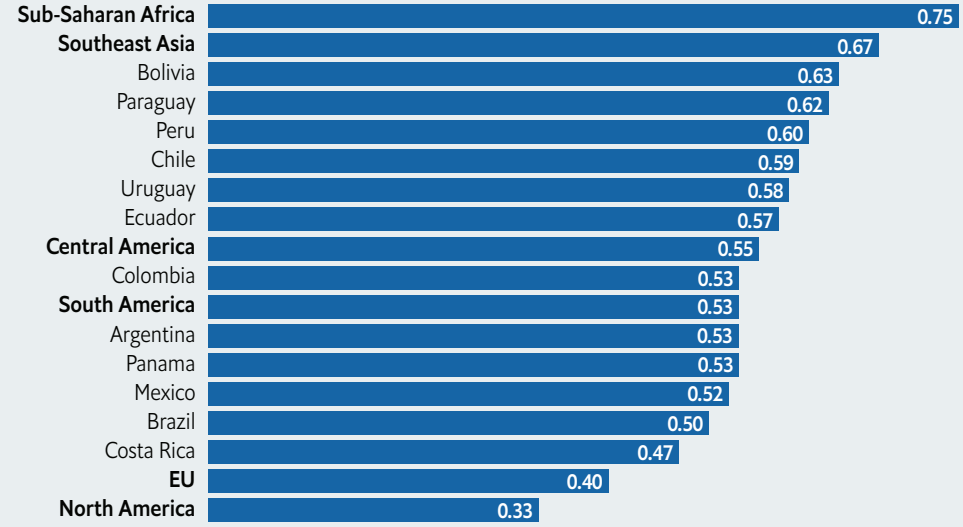
However, the disparities between the best and worst cancer control within the region remain stark, with fatal consequences. Bolivia, with the highest M:I ratio, has the second-lowest age-standardised incidence among the study countries, but comes eighth in terms of mortality. These differences—like those for cancer incidence—also exist within countries. Professor Knaul explains: "Those with access can get care that rivals the best available anywhere in the world, but in many countries this is available only for very few people."

The 12 countries in this study, and those in Latin America overall, face a rapid increase in crude cancer incidence, a profound but uneven change in the kind of cancers that make up that burden,

[21] F Vostakolaei *et al*, "The validity of the mortality to incidence ratio as a proxy for site-specific cancer survival", *European Journal of Public Health*, 2011.

Chart 10

Ratio of age-standardised overall mortality to age-standardised incidence (M:I ratio) in selected countries and regions, 2012



Source: IARC, Global Cancer Observatory, Cancer Today.

and an increasing level of political and popular will in much of the region to address the challenge. Whether they respond effectively will depend on the extent to which they can reduce inequality of access and expand the benefits of cancer control across the entire population. This cannot simply be limited to medical treatment, as important as that is. Such access must also encompass cancer prevention, screening and survivor or palliative-care services that meet the needs of the wider population.

Accordingly, in the first chapter we will look at how well the study countries are doing to promote cancer control, based on the results of The Economist Intelligence Unit's Latin America Cancer Control Scorecard (LACCS). The scorecard focuses on policies and programmes designed to reduce inequality in cancer care access in the region. Subsequent chapters will examine five priority areas revealed by the LACCS: 1) national cancer control plans; 2) cancer data; 3) prevention, screening and early detection; 4) budgets and cancer control resources; and 5) overcoming inefficiencies and inequalities.

Inevitably, much of the analysis will require a close look at the situation in specific countries—a degree of detail that is well beyond the scope of this regional report. Individual country reports on each of the 12 study countries will therefore be available separately.

CHAPTER 1
THE LATIN AMERICA CANCER CONTROL SCORECARD (LACCS): WHAT DOES GOOD CANCER CONTROL LOOK LIKE?

Controlling cancer is a multifaceted issue that requires a multifaceted solution. Funding for treatment is obviously necessary, but certainly not sufficient. Spending itself has to be appropriate, covering a variety of specialist and primary-care activities to be made available for the widest possible range of people. Moreover, population-wide access to cancer care requires planning and co-ordination, adequate data collection so that health authorities know which interventions deserve priority, and prevention activities and screening services that have the broadest possible reach.

None of these requirements is dispensable, and none happens by accident. They are the result of active policy choices. Accordingly, an examination of how well countries are addressing them allows a very general comparison of the extent to which their policies are likely to promote access.

The scorecard

To facilitate this, The Economist Intelligence Unit has created the Latin America Cancer Control Scorecard (LACCS), a unique scorecard that covers policies and programmes designed to reduce inequality in cancer-care access. The six domains of the LACCS are as follows.

- **Strategic plan:** In particular, whether an up-to-date cancer plan exists and whether it specifically addresses unequal access.
- **Monitoring performance:** The extent of high-quality cancer registration, data from which are essential in shaping effective policy.
- **Medicines availability:** The availability of a representative group of key cancer drugs.
- **Radiotherapy availability:** The availability of radiotherapy overall and in the public health system.
- **Prevention and early detection:** The existence and extent of prevention and, where appropriate, screening programmes and early detection.
- **Finance:** The provision of financial support and investment to help people meet the costs of cancer care.

For each of these domains, data were collected on a number of indicators that were thought most

likely to reflect national performance. For monitoring, for example, these included the existence of a registry or registries, the extent of the population covered, and the quality of data. For each indicator, scores were assigned. These were turned into a combined score out of five for each domain. These domain scores, in turn, were aggregated to create an overall country score (see chart 11). A more detailed description of the methodology is given in the appendix to this study.

Inevitably, the results of such an exercise are rough, but a precise ranking of each country is not the aim. Instead, the purpose is to sketch, using broad brushstrokes, the relative strengths and weaknesses of the study countries and the region as a whole. In this way, the results become a useful point of departure for the discussion of cancer control and access to cancer care in Latin America.

Chart 11

The Latin America Cancer Control Scorecard (LACCS), 2017

	Plan strategically Score	Monitor performance Score	Medicines availability Score	Radiotherapy availability Score	Prevention and early detection Score	Finance Score	Country Score (max 30)
Uruguay	4	5	3	4	3	4	**23**
Costa Rica	5	5	2	4	2	4	**22**
Chile	3	2	3	5	4	2	**18**
Mexico	3	3	3	2	4	2	**17**
Brazil	4	3	3	1	3	3	**17**
Colombia	4	3	2	1	3	3	**16**
Panama	2	4	2	4	3	2	**16**
Peru	4	4	2	1	2	2	**15**
Ecuador	3	3	2	3	3	2	**15**
Argentina	1	4	3	3	3	1	**14**
Paraguay	3	2	1	2	2	2	**9**
Bolivia	2	1	2	1	1	1	**7**
Domain Score (max 60)	**38**	**38**	**25**	**31**	**33**	**26**	

Note: Raw scores for each domain have been normalised to a scale of 1-5 (with 1 being the worst and 5 the best) to enable comparisons across domains. Maximum total country score is 30. Maximum total domain score is 60.
Source: The Economist Intelligence Unit, The Latin America Cancer Control Scorecard (LACCS), 2017.

The country reports will go into more detail about the strengths and weaknesses of each country's policies related to cancer control. However, three general points are worth mentioning. First, money helps, but policy choices matter. Second, even countries which are doing well have something to learn. And third, despite significant variations in cancer-control efforts, many countries show a similar overall performance.

Money helps, but…

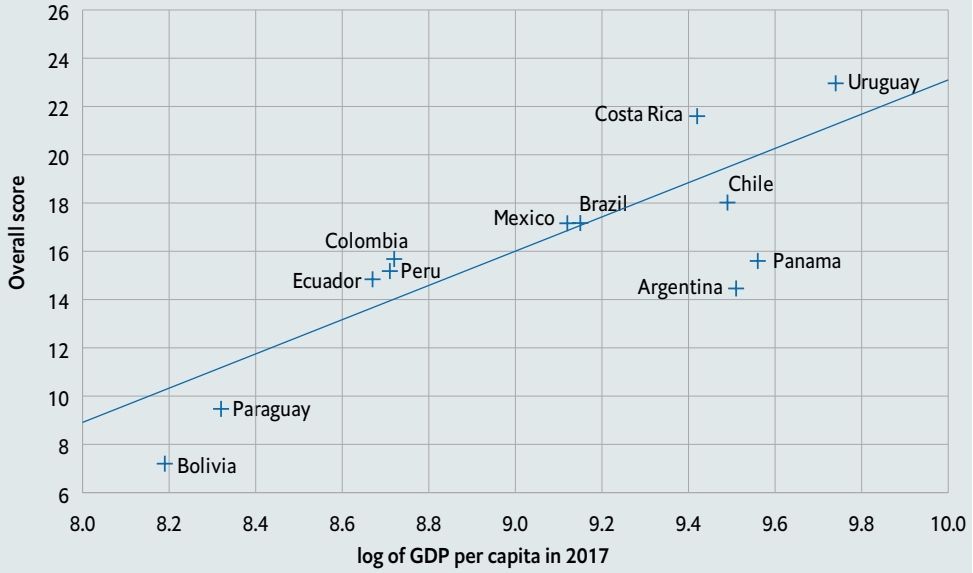
Policy choices matter. The LACCS scores correlate to a statistically significant degree with national income. The accompanying chart, which plots country results against the logarithm of 2016 GDP per capita, makes this clear.[22] This is not surprising. Health systems of countries with larger economies

[22] It is common in the social sciences to use the logarithm of income, as this adjusts for the often huge impact of very small rises in income for those with highly constrained finances. The scorecard results and ordinary GDP per capita are also correlated.

are more likely to have the funds to be able to do some of the things rewarded by the scorecard, such as providing radiotherapy machines. The more remarkable insight, revealed in chart 12, is that GDP need not dictate success in cancer control.

Chart 12

GDP per capita and LACCS results



Source: The Economist Intelligence Unit, The Latin America Cancer Control Scorecard (LACCS), 2017.

Both Peru and Colombia do much better on the scorecard than would be expected from their GDP per capita (as shown by their distance above the fitted line). Equally striking, they have about the same overall score as Panama and Argentina, even though these two have roughly more than double the GDP per capita. As will be discussed below, Peru and Colombia are outliers because "cancer is a priority for the national government," as Mr Gaviria says of Colombia. Accordingly, both states have developed and gone some way towards implementing high-quality cancer-control policies.

Nobody is perfect

Without a caveat it might be all too easy to misinterpret the LACCS scores. The exercise is one of benchmarking against others in the region, not against some global ideal. Thus, a score of five in any one domain should be read as a sign that the country performs well compared with its peers, not that it is flawless in this area.

Uruguay's and Costa Rica's overall scores of 23 and 22, respectively, out of a possible 30 need to be seen in this context. These are strong results, consistent with the widespread praise of cancer control in these countries by experts interviewed for this study. Nevertheless, if benchmarked against higher-income states, these countries' scores might well differ.

Moreover, even when compared with regional neighbours, countries finishing at or near the top of the LACCS have weaknesses to address. Second-place Costa Rica, for example, does not do as well as many others on prevention. "Our country is one of the best [in Latin America], but we could be better if we took better measures to comply with the international recommendations for prevention and early diagnosis in medium-resource countries," notes Gonzalo Vargas, co-ordinator of the Costa Rican Consenso Nacional de Especialistas en Cáncer. Similarly, Chile, although it comes third, has data issues.

Another striking result of the scorecard is the appearance of three clear groupings. At the top come Uruguay and Costa Rica and at the bottom Paraguay and Bolivia. Few points lie between the bulk of the study countries in the middle of the LACCS, with just four points separating eight countries. This suggests that, apart from the few leaders and stragglers, most of the region is in more or less the same place when it comes to cancer control. However, the scores for overall performance mask major differences between countries in individual scorecard results for the six domains.

"The cancer situation in our region is improving," says Dr Cazap, "although there are still many gaps and duplications, frequently even within the same country." Others see a similar picture. A 2015 study in the medical journal *Lancet Oncology* found a degree of progress, even in the preceding two years, in various aspects of cancer control that surprised the previously sceptical authors, although they noted many remaining challenges.[23] The scorecard and additional desk research also repeatedly turn up this pattern: valuable progress in different domains combined with ongoing, substantial needs. As Professor Jimenez puts it, in Latin America "there are lights and shadows in the problem of cancer."

A closer look at five specific issues of broad relevance across much of Latin America illustrates both where things are getting better and the extent to which change is still needed.

[23] K Strasser-Weippl *et al*, "Progress and remaining challenges for cancer control in Latin America and the Caribbean", *Lancet Oncology*, 2015 Oct;16(14):1405-38.

CHAPTER 2
NATIONAL CANCER CONTROL PLANS: A TOOL NOT FULLY USED

The WHO defines a National Cancer Control Plan (NCCP) as "a public health programme designed to reduce the incidence and mortality of cancer and improve the quality of life of cancer patients ... through the systematic and equitable implementation of evidence-based strategies for prevention, early detection, treatment, and palliation, making the best use of available resources".[24] This description points to the comprehensive nature of NCCPs, and the word "equitable" in the middle underscores the need for plans to provide widespread access to prevention and care.

An idea gaining in popularity

NCCPs, ideally, are not standalone, says Professor Knaul. They need to integrate with, and be strengthened by, related health plans, including national and sub-national plans and programmes for specific forms of cancer; those targeted at specific, at-risk population groups and risk factors common to a range of non-communicable diseases (NCDs), such as obesity and tobacco use; those for access to pain control and palliative care; and, very importantly, those policies and reforms aimed at expanding or universalising healthcare more generally. "You want to have NCCPs embedded in overall health-system strengthening, not just providing funding for cancer."

Although not sufficient on their own, for cancer control NCCPs are, as Dr Lopes puts it, "of paramount importance. Without them you don't know where to go and cannot move forward." Dr Murillo adds that a plan is also essential for getting at all aspects of the cancer challenge. For example, tobacco control involves legislation that is often more outside of healthcare than within it. "If we want to affect some of these issues, we have to have a broad control policy." And according to Dr Mohar, one of the "major strengths" of a current advanced draft for a national cancer control plan for Mexico is the fact that it would, if adopted, enable the government to speak on cancer with the "homogenous message" that the public needs—another result of the multi-sectoral view of cancer issues that NCCPs give. Finally, a formal plan is invaluable in maintaining funding for cancer control and can, adds Dr Mohar, "optimise the use of scarce resources." In other words, inequality will not be addressed by accident.

Cancer planning in Latin America has seen improvement in recent years. "Historically," notes Andre Medici, senior health economist at the World Bank, "in most cases health systems in Latin American countries have not had good cancer planning processes, but many governments and public institutions have started to be aware of the negative implications." As late as 2013 most countries in the region still lacked a cohesive NCCP, although a number were in preparation, and sub-national plans, as well as those focused on specific cancers, existed in several countries.[25]

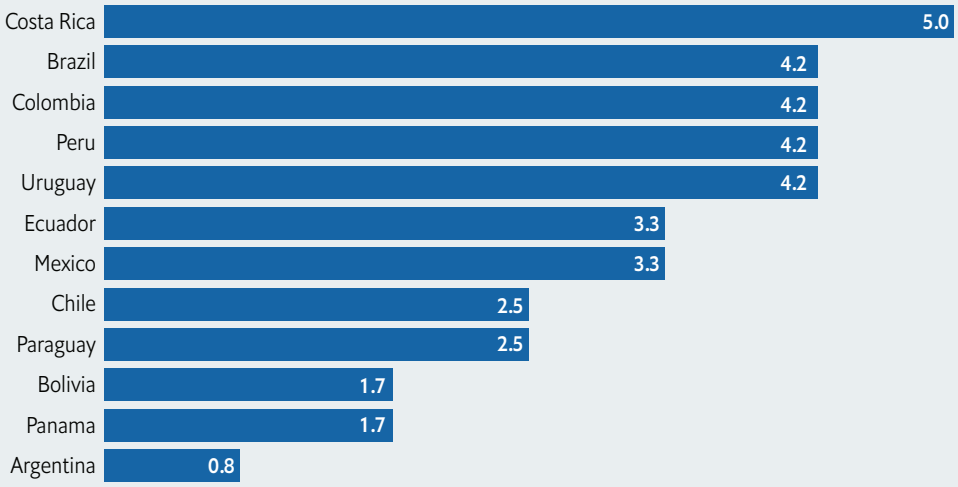
[24] WHO, *National Cancer Control Programmes: Policies and managerial guidelines*, 2002.

[25] Paul Goss *et al*, "Planning cancer control in Latin America and the Caribbean", *Lancet Oncology*, 2013 Apr;14(5):391-436.

In our research, though, currently five of the 12 study countries have comprehensive NCCPs (with Costa Rica having the most comprehensive one) or, in the case of Brazil, a plan to tackle non-communicable diseases with detailed anti-cancer provisions (see chart 13). Mexico's NCCP, meanwhile, is awaiting approval. Peru's health ministry is reviewing the results of its recent plan in order to draft another. Panama is in the midst of revising its plan. Ecuador's national cancer plan has also been approved by the health ministry.[26] Similarly, a recent study in the *Lancet Oncology*, drawing on WHO survey data with a more inclusive definition of cancer plans than ours, found that in 2010 nine of the 12 study countries had them, but by 2014 this had risen to ten.[27]

Chart 13

LACCS "Strategic plan" domain results, 2017



Note: This domain examines the strategic plan in place for cancer services, including whether it makes special provision for tackling inequality. Raw scores for each domain have been normalised to a scale of 1-5 (with 1 being the worst and 5 the best) to enable comparisons across domains.
Source: The Economist Intelligence Unit, The Latin America Cancer Control Scorecard (LACCS), 2017.

This is not surprising. Dr Trimble has seen "a growing interest within countries in developing cancer plans". In Ecuador, an NGO even tried to jump-start the process. Mr Merino explains that his patient advocacy coalition created a ten-point National Accord Against Cancer, which covers areas such as improvements to monitoring, research, prevention, treatment, equity in care and patient support—in other words, the core of an NCCP. The organisation sought commitments of support from all the candidates in the recent Ecuadoran presidential election and received several, including from Lenín Moreno, the eventual winner. Mr Merino explains that "the state has not taken charge because it does not have enough information. Thus, the co-ordinated work of patient organisations is fundamental." Soon after the 2017 election Ecuador's Ministry of Public Health published an NCCP covering many of these areas, although there is no evidence to show that the plan and the national accord are linked.

[26] Ministerio de Salud Pública, *Estrategia Nacional para la atención integral del cáncer en el Ecuador*, April 2017. Available at: https://aplicaciones.msp.gob.ec/salud/archivosdigitales/documentosDirecciones/dnn/archivos/ac_0059_2017.pdf

[27] Strasser-Weippl *et al*, "Progress and remaining challenges".

According to Nilda Villacres, executive director of Ecuador's national health council (Consejo Nacional de Salud), the new cancer plan's main points of focus are to improve preventive measures, with increased screening and early detection, and to promote evidence-based treatment, rehabilitation and palliative care. "The strategy gives a strong framework for integrated healthcare, with priority given to health promotion and early detection," she says. "The impact will be in quality of life and resources saving."

Growing international support

Amid the growing interest, the countries that are developing or improving NCCPs within the region have been able to draw on increasing international support. The Pan American Health Organisation (PAHO), for example, has provided assistance in Mexico, Panama, Honduras and Nicaragua.[28]

Meanwhile, the Programme of Action for Cancer Therapy (PACT) of the International Atomic Energy Agency (IAEA) has since 2011 had ImPACT missions in Bolivia, Colombia, Panama and Peru. These are designed to give a comprehensive overview of the national cancer-control situation as a tool in the development of better strategies, usually embodied in NCCPs.

Moreover, the US National Cancer Institute's Centre for Global Health has held cancer control leadership forums for Latin America and worked to support NCCP development in Peru and Mexico, for example.

All three institutions have helped to found the International Cancer Control Partnership, established with the express purpose of assisting in the creation of well-funded, effective cancer-control planning. Professor Knaul notes that "many global institutions and actors have been investing a lot of good work in providing the technical support needed for NCCPs in Latin America. This is exactly the kind of global public good that allows countries to develop and implement high-quality, wide-ranging, successful cancer plans."

This activity matters. Where NCCPs have been thoroughly planned and implemented, they have supported important improvements. Mr Zoss, for example, says that Colombia's NCCP, which covers the period 2012-21, along with legislation setting standards for comprehensive cancer-control services, has brought "significant progress in the past few years". Dr Murillo adds that the introduction of an HPV vaccination programme in 2013 as well as improved tobacco-control measures—including a recent tax increase that will triple the price of tobacco products—are "two major benefits arising from the plan".

Looking beyond specific accomplishments, one of the plan's great strengths has been that "it has helped to focus the efforts of all agents in a complex and decentralised system," according to Mr Gaviria.

Another commonly cited example of an effective NCCP in the region is Peru's Plan Esperanza. Although its detailed agenda ended in 2016, its overall aims were to reduce drastically late-stage

[28] PAHO, *Accomplishments with Countries in Latin America and the Caribbean: Highlights of Region-Wide Activities.* Available at: http://www.paho.org/panamericanforum/wp-content/uploads/2013/02/s-cancers.pdf

cancers through enhanced prevention and improved screening, as well as to provide better treatment. The latter was to be achieved through the appropriate training of primary-care workers and the expansion of specialist services and infrastructure. At the same time, Plan Esperanza sought to expand access in two ways. First, it provided greater funding for cancer care to the public health system, which cares for a majority of the population, including covering all treatment and drug costs for the relevant cancers. However, in common with much of the region, Peru is slow to approve novel therapies, thus limiting access. Second, Peru expanded its pre-existing efforts to decentralise cancer care to increase provision beyond Lima, the country's capital.[29, 30, 31]

Room for improvement

This is what can happen when an effective NCCP has political support and funding. Unfortunately, as Carlos Vallejos, director of the Oncosalud Clinic in Peru, points out, Plan Esperanza "is unique and probably the strongest in this part of Latin America". Elsewhere, the use of plans in much of Latin America is suboptimal.

To begin with, the existence of an NCCP does not guarantee that it is appropriate. Dr Cazap believes that "in much of the region, there is no clear understanding of what an NCCP is. Some countries have programmes for individual cancers and think that is a plan; others think this is relevant only to the health ministry. There remains a problem in the understanding of the real needs and relevance of NCCPs."

Nor are existing plans always current. Professor Jimenez observes: "Some countries have old, dated plans that do not reflect newer realities in cancer control." For example, Dr Soria says of his own country: "In Bolivia there is an old, written plan, but it is not updated. We have been trying to do cancer control, but without a comprehensive focus, just treatment. There is a real problem making people understand that there should be a control programme." Even countries with more effective NCCPs come up against the need for continuous review. Despite the benefits of Plan Esperanza, its detailed agenda ended in 2016. No follow-on plan has yet been released because officials are still studying the results of earlier efforts, which explains why the LACCS does not give Peru full marks in this domain.

Even where they are up-to-date and appropriate, plans are not always acted on. Dr Lopes explains: "The biggest problem with NCCPs in the region is that they get planned and then often go into a drawer." Similarly, Dr Trimble notes that "it has been a struggle, particularly with the financial downturn in the early part of this century, to find the money to implement" the growing number of NCCPs. Ecuador's new plan, for example, while highly detailed, gives scant space to how it will be financed, merely saying the funds will come out of various general public-health budgets. Although this may take place, previous problems with cancer funding in the country raise questions-marks.[32] Nor is it easy to track how, or whether, formally budgeted money is actually being used on

[29] T Vidaurre *et al*, "Plan Esperanza: A model for cancer prevention and control in Peru", *Cancer Control*, 2015.

[30] C Vallejos, "National Plan for Prevention, Early Detection, and Cancer Control in Peru", *American Society of Clinical Oncology Educational Book*, 2013.

[31] Peru Ministry of Health, *Plan Esperanza: Plan Nacional Para la Atención Integral del Cáncer y el Mejoramiento del Acceso a los Servicios Oncológicos en el Perú*, 2012.

[32] N Villacrés, "Análisis del financiamiento de la atención del cáncer en el Ecuador: un reto para el Sistema Nacional de Salud", *Revista de la Facultad de Ciencias Médicas (Quito)*, 2016.

[33] L Malajovich *et al*, "Budget transparency on maternal health spending: a case study in five Latin American countries", *Reproductive Health Matters*, 2012 Jun;20(39):185-95.

[34] Strasser-Weippl *et al*, "Progress and remaining challenges".

healthcare in the region. For example, a study which tracked spending on the implementation of maternal-health policies in five Latin American countries, including Costa Rica, Panama and Peru, found that only in the latter was most relevant information publicly available.[33]

Indeed, a lack of demonstrated results so far caused the Lancet Oncology Commission for Latin America in its October 2015 report to reserve judgment on the increasing number of NCCPs in the region. It said: "Information is scarce with respect to the implementation, success and shortcomings of such plans. Additionally, many NCCPs do not have a comprehensive, systemic approach."[34] Implementation cannot simply be assumed based on good intentions.

As highlighted by the LACCS, in several countries a larger issue still is the absence of any substantial plan at all, with the disease folded into provision for other health issues, such as NCDs in general. Although at least cancer is receiving attention in these countries, as Dr Vallejos points out, being "just one more NCD is not beneficial for the management of cancer". Just as important for improving access, although cancer plans (and more general plans) in the region almost always mention issues of equity, only four give it sufficient attention to earn full points for this sub-category in the "strategic plan" domain.

Structural and practical matters get in the way of plan creation and implementation. In Argentina, healthcare is the constitutional responsibility of the 24 provincial governments. "The main problem for the national minister of health," says Dr Pradier, "is to convince different provinces to go along with government policies." Such challenges can vary substantially by country, given differences in governance, health systems and even the size of the country. Dr Cazap notes about cancer planning and control more generally: "In small, unitary countries such as Uruguay or Costa Rica, with fewer than 10m people, it is easier to create a co-ordinated, integrated system. In Brazil, Argentina or Mexico, with large populations and a federal structure, when you scale up, it is much more complicated." Finally, adds Professor Jimenez, the problem of fragmented healthcare provision—discussed in Chapter 6—makes "co-ordination and unified planning difficult".

A final problem in the region, however, which may explain some of the weaknesses in the creation and implementation of NCCPs, is that while they have grown in number, the intellectual case for them has not been universally won. This is particularly worrying given the importance of these plans, as discussed above. Dr Cazap points out that to develop and implement plans "you need political decisions and funding; that does not always happen in our region." He recalls that in Argentina, the National Cancer Institute's efforts to promote an NCCP were stymied because "colleagues did not believe we need one because we have a National Cancer Institute and good programmes for different cancers. We were not able to convince them that it was more than a list of programmes and actions limited to ministers of health."

In conclusion, NCCPs are essential to good cancer control and, as Peru has shown, a potentially important key to facilitating access to care. In much of the region, however, they need strengthening and genuine implementation if cancer control is to be accessible to the many who need it.

CHAPTER 3
CANCER DATA: SOME PROGRESS BUT A VERY LONG ROAD AHEAD

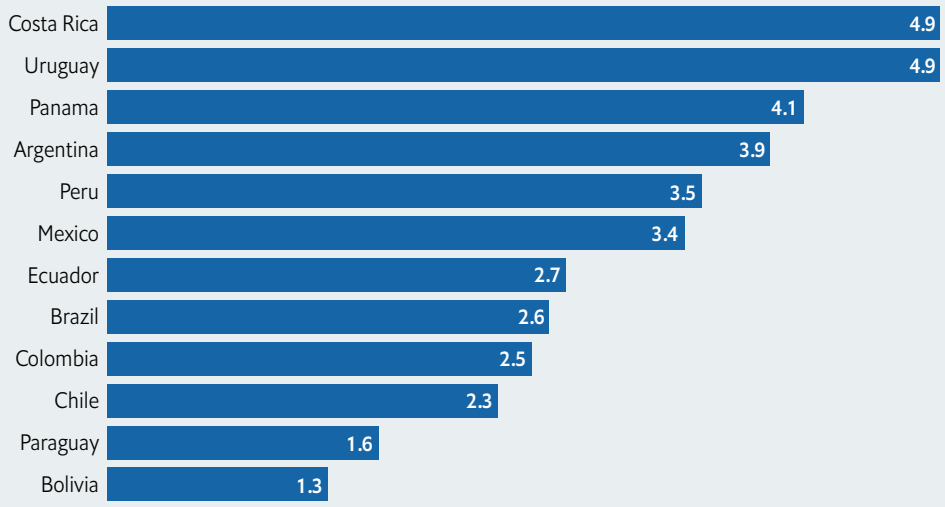
The link between the potentially dry issue of statistical analysis and the intrinsically emotive one of ensuring access to life-saving cancer care may not seem immediately obvious. It is nonetheless profound: understanding the extent of the problem is essential for addressing it effectively.

What Professor Jimenez says of Chile could apply to much of Latin America: "We know that cancer is growing, but we have many uncertainties in data gathering and reliability. Therefore, we are uncertain where and how to put in effort in planning and providing services. This leads to late diagnosis and ineffective treatment." Chile actually has several good individual cancer registries at present, although they cover only a small part of the population (which explains its weak score for monitoring performance in the LACCS, see below). Other countries in the study are worse off.

The data picture also has a bright side. The LACCS indicates that cancer data monitoring is an area of relative strength for cancer control, with the 12 study country achieving an aggregate score of 38 out of 60—the joint-highest score (along with the "strategic plan" domain) among all six domains (see chart 14). As with NCCPs, this reflects undeniable progress in Latin America in recent years. Nevertheless, it is important not to overstate how far these countries have come. As Professor Jimenez says, the implications of the ongoing uncertainty around the cancer picture in Latin America remains one of its "heaviest cancer control problems".

Chart 14

LACCS "Monitoring performance" domain results, 2017



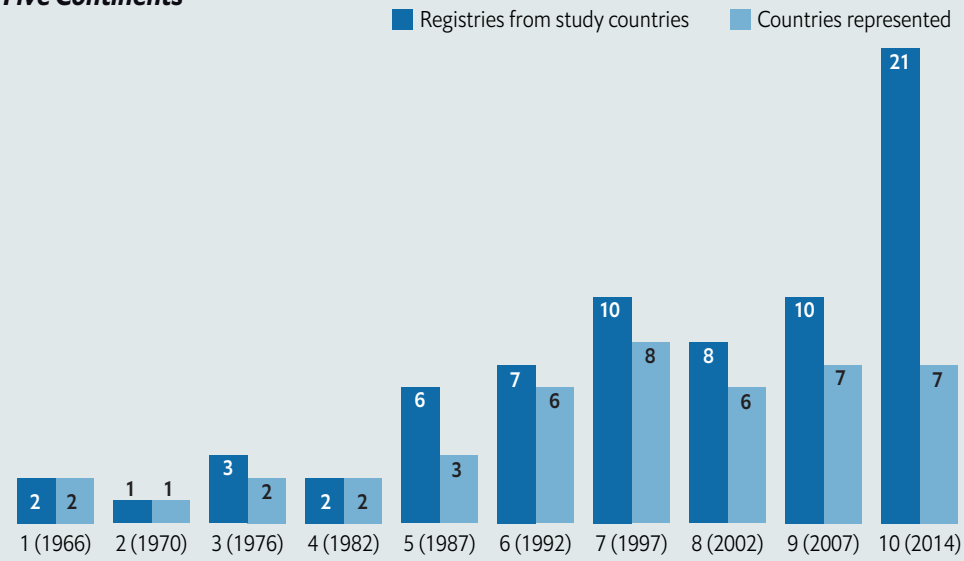
Note: This domain examines the quality and quantity of cancer-related data collected by registries. Raw scores for each domain have been normalised to a scale of 1-5 (with 1 being the worst and 5 the best) to enable comparisons across domains.
Source: The Economist Intelligence Unit, The Latin America Cancer Control Scorecard (LACCS), 2017.

Numerous signs of progress

According to Dr Trimble, "most countries in Latin America are working to strengthen cancer registries and links with death registries." The data bear him out. *Cancer in Five Continents* (CI5)—the IARC's periodic, detailed assessment of cancer incidence, mortality and prevalence worldwide—contains information from only those registries that meet the IARC's exacting quality standards. The latest issue, Volume 10, includes 21 registries from the study countries, more than double the number in any of the three preceding volumes (see chart 15).

Chart 15

Registries from study countries represented in each volume of *Cancer in Five Continents*



Source: IARC, *Cancer in Five Continents.*

This actually understates the progress achieved so far. Although published in 2014, Volume 10 covers data only up to 2007. Since then the number of registries has expanded further. For example, Bolivia established its first ever population-based registry in La Paz in 2011. Mexico has set up a limited, population-based registry in Jalisco state and a full population-based registry facility in Mérida, the capital of the state of Yucatán. It also aims to create other full registries, including in Guadalajara, Monterrey and Puebla. Looking ahead, Paraguay has begun work on developing a national registry this year, says Julio Rolón, director of Paraguay's National Cancer Institute, INCAN. Panama, meanwhile, has been actively addressing problems with its national registry that kept the data out of CI5. In 2012 a new, electronic registry was put in place, and other improvements have been ongoing. Arturo Rebollon, the director of the national registry, says that "the current goal is to have up-to-date, high-quality data by 2018 to be included in the IARC's next report."

Colombia, for its part, is trying to use a wider range of sources than just registries to better understand its cancer challenge. In 2012 it created the Colombian Observatory on Cancer, which combines data from the country's five registries. They cover around 12% of the population, with

countrywide data from a variety of government sources. These are fed into a new national system, SISPRO, which integrates information relating to social protection. Sources include the department of vital statistics, various targeted health programmes (such as those focused on breast and cervical cancer), and payment information from the country's High Cost Diseases Fund (CAC, which pays for treatment for a variety of common cancers).[35]

In 2014 this was bolstered by the creation of a new registry, managed by the CAC itself. All insurers and healthcare providers in the country must report to it. Currently, says Mr Gaviria, the registry collects 183 variables on each case, including sociodemographic, clinical and administrative information.

The potential is huge. Now, in theory, every case of cancer should end up being reported in detail, allowing a Colombia-wide view of the disease. Teething problems, though, have been significant. In particular, the government data show a much lower incidence rate—in some cases merely one-eighth of that recorded in the registries. This is the case even though four of Colombia's five cancer registries are of sufficient quality to be in the most recent CI5.[36] Dr Murillo notes: "At the moment the system needs to improve a lot, but in the long term it may become an important source of information for cancer control."

Increased international co-operation to boost data quality

The region is also seeing meaningful international co-operation to enhance data quality. This does not require purely importing knowledge from outside: Latin America has centres of excellence of long standing. The registry in Cali, Colombia, for example, dates back to 1962 and is the only one in the developing world which has contributed data to all ten CI5 volumes. Costa Rica's cancer registry, meanwhile, has had nationwide coverage since 1980.

Over the past few years efforts to share best practice from within and outside the region have included RINC's creation of a Working Group for Cancer Registries in 2013. This proved a precursor to the Global Initiative for Cancer Registry Development (GICR)—an IACR-led, multi-stakeholder group—establishing the Latin American Hub for Cancer Registries in August 2016. One of several regional hubs, this also has the active participation of RINC and PAHO and will provide technical assistance and training to improve cancer registries in the region. The initiative, co-ordinated by Argentina's National Cancer Institute (NCI), is one of the reasons why the NCI's director, Dr Pradier, believes that, on cancer data, "the situation in Latin America is changing. I am optimistic."

Still far to go

This undoubted progress, however, should not obscure the ongoing challenges in the area of monitoring and using cancer data in the region. To begin with, recent improvements have taken place in the context of very sparse earlier efforts. As Mr Zoss explains: "Cancer data must be

35. ML Ospina *et al*, "Observatorio Nacional de Cáncer Colombia", *Revista Facultad Nacional de Salud Pública*, 2015.

36. L Eduardo Bravo, "Estimating the incidence and mortality of cancer in Colombia: What are the best data for public policies?", *Colombia Médica*, 2016 Apr-Jun; 47(2): 71–73.

interpreted with caution in Latin America because, traditionally, governments have paid little attention to implementing systems." As late as 2011 only 21% of countries in the entire region, including the Caribbean, reported any population-based cancer registry, a figure which had risen to 67% by 2014.[37]

The existence of institutions, however, does not necessarily translate into practical coverage. Overall, in 2014 only 20% of people in Latin America lived in areas with a population-based cancer registry of any kind, and just 7% lived in an area that was deemed to be high-quality; by contrast, in North America the figure is 83%, and in Europe it is 60% and increasing.[38,39]

Analysis for the LACCS shows that only four of the 12 study countries had national population-based cancer registries (Argentina, Costa Rica, Panama and Uruguay), while an additional three had national hospital-based registries (Ecuador, Mexico and Peru). Data for 2014 show that just three countries had more than roughly 10% of their population covered by high-quality, population-based registries. Furthermore, the overall proportion of the total population of these 12 countries covered by such facilities was around 7%.[40] As a result, in the "registry coverage" sub-category in the LACCS "monitoring performance" domain, only Costa Rica, Panama and Uruguay get the highest scores. Dr Lopes believes that "we still don't have all the population-based registries that we require. There is a huge need for improvement at all levels."

Another issue which cannot be solved—at least not immediately—by recent growth in the number of registries is continuity of data. Dr Cazap notes: "You need good, reliable data for a long time period [to understand the cancer situation]. Until even a couple of years ago, this was a problem. If you were looking for data covering the last 20 years, they would not exist at a country level, although at a city or province level there were some." The IARC has long-term time series data from only four registries in the region. Although a greater number of these facilities should help this issue diminish with time, there is no guarantee: of all the 32 registries from these 12 countries which appeared in any CI5 volume, 11 are no longer included, indicating that either their quality standard fell or that they ceased operating.

Finally, mortality data are as important as incidence data in understanding the exact nature of the challenge cancer poses in a given country. However, the collection of these data is usually the responsibility of those who collect vital statistics rather than of those who are primarily responsible for cancer control. Here too, much of the region needs work. Of the 12 countries in this study, the IARC ranks only Mexico as having high-quality mortality data. Four countries have low-quality data, and Bolivia has no reliable information at all (see table 5). In the LACCS "monitoring performance" domain, only Costa Rica and Uruguay get the highest scores for the "data quality" sub-category (assessing the quality of both incidence and mortality data). Dr Murillo's summary is apt: "Most Latin American countries need to make an effort to get not only better incidence but also national mortality data. The region can improve a lot."

37. Strasser-Weippl *et al*, "Progress and remaining challenges".

38. M Piñeros *et al*, "Cancer registration for cancer control in Latin America: a status and progress report", *Revista Panamericana de Salud Pública*, 2017.

39. A Forsea, "Cancer registries in Europe – going forward is the only option", *Ecancermedicalscience*, 2016.

40. M Piñeros *et al*, "Cancer registration for cancer control in Latin America".

Table 5: Globocan Cancer Atlas assessment of mortality data quality

Mexico	**High** quality complete vital registration
Brazil	**Medium** quality complete vital registration
Chile	**Medium** quality complete vital registration
Colombia	**Medium** quality complete vital registration
Costa Rica	**Medium** quality complete vital registration
Panama	**Medium** quality complete vital registration
Uruguay	**Medium** quality complete vital registration
Argentina	**Low** quality complete vital registration
Ecuador	**Low** quality complete vital registration
Paraguay	**Low** quality complete vital registration
Peru	**Low** quality complete vital registration
Bolivia	**No data**

Source: IARC, Globocan database.

Some of the difficulties in improving registration are similar to those that are impeding NCCPs. To begin with, smaller countries have an advantage with cancer registries. Both Costa Rica and Uruguay have national ones, which cover 100% of the population and appear in the CI5 study, a group that Panama hopes to join soon.

Physically larger, more populated countries simply have a harder time gathering data. Part of the reason, again, is overcoming geographical distance, according to Professor Jimenez. The challenges of governmental fragmentation in larger states is also at play. Dr Pradier explains that of Argentina's 24 provinces, 23 have at least one population registry. In aggregate, these cover about 30% of the population, but unfortunately they don't all collect the same data, nor do they structure their data the same way, even if they are the same data. Their quality standards also vary, and even whether cancer is a legally reportable disease depends on provincial, not national, regulation. Getting a countrywide picture is therefore very difficult, notes Dr Pradier. Argentina does collate data from hospital registries nationwide, similar to the US National Cancer Database. This, however, "is not useful for incidence information, but for quality of care".

Inequalities in who gets measured

In looking to improve, countries need not aim for complete data coverage. As Professor Knaul puts it: "You don't need to include every city, but you want information from key places that enable you to project needs and progress for the country." The fundamental question is whether the data that are available are sufficiently representative and granular. Although some countries in the region have a defensible balance, too often problems remain. In Chile, for example, no matter how representative the current registries are, because they cover just 7% of the population, national incidence estimates are often based on mortality data instead.[41]

Meanwhile, Ecuador's two registries—in Quito and Cuenca—cover about one-eighth of the population, higher than all study countries except the three with nationwide registries. Both of Ecuador's facilities, however, cover predominantly urban residents, whereas more than one-third of the country's population is rural.

Moreover, registries do not always gather key information on certain groups, such as indigenous people, for example, who collectively make up 8% of the Latin American population. As studies in Chile show, for some cancers indigenous ancestry correlates with risk.[42] Nevertheless, a 2014 study

41. Jimenez de la Jara *et al*, "A snapshot of cancer in Chile: analytical frameworks for developing a cancer policy", *BioMed Central*, 2015.

42. M Andia *et al*, "Geographic variation of gallbladder cancer mortality and risk factors in Chile: a population-based ecologic study", *International Journal of Cancer*, 2008.

found that in the countries it surveyed only several Brazilian registries definitely gathered data on whether patients were of indigenous ethnicity, even though indigenous people make up a smaller percentage of the Brazilian population than in most other countries in the region. In Argentina, Bolivia, Colombia, Ecuador and Peru, the study found, such data were definitely either not collected or reported, and with the possible exception of Chile they did not appear to be gathered anywhere else.[43]

Just as worrying is the fact that current surveillance systems seem to be missing some cancers among those of lower socioeconomic status, highlights Dr Medici. "Coverage and registration of cancer cases are increasing, but the number of cancer cases among the poor should be bigger, which is not the case with the middle class."

[43] S Moore *et al*, "Cancer in indigenous people in Latin America and the Caribbean: a review", *Cancer Medicine*, 2014.

CHAPTER 4
PREVENTION, SCREENING AND EARLY DETECTION: PROGRESS AND STASIS

Prevention, screening and early detection have overlapping goals: either avoiding cancer altogether or treating it when the odds of success are highest. Despite common purposes, they take diverse forms. Prevention can be primary, to stop the disease from beginning to develop, or secondary, to eliminate known cancer precursors. Similarly, screening can be for early changes that can develop into cancer or for the disease itself. Finally, early detection might involve population-based screening, policies of opportunistic examination by health professionals, or even sensitisation of the public to potential signs of cancer. Each has its role and attendant costs and benefits.

Dr Medici points out that the current economic difficulties facing many Latin American countries are already "challenging health spending overall and probably could affect programmes associated with cancer control". An important part of the solution, whenever the benefits outweigh the expense, is to increase spending on "cancer education, prevention and early detection priorities in primary-healthcare systems. The costs incurred on these are peanuts compared with the higher costs for treatment."

To some extent, this is happening. Key aspects of prevention are improving in many countries in Latin America, notably tobacco control and an increase in HPV vaccination. This is a domain with moderate overall scores in the LACCS (see chart 16). Once more, though, the picture is mixed. Important elements of this field, such as addressing the region's growing obesity challenge or making existing screening programmes serve whole populations effectively, remain substantial challenges.

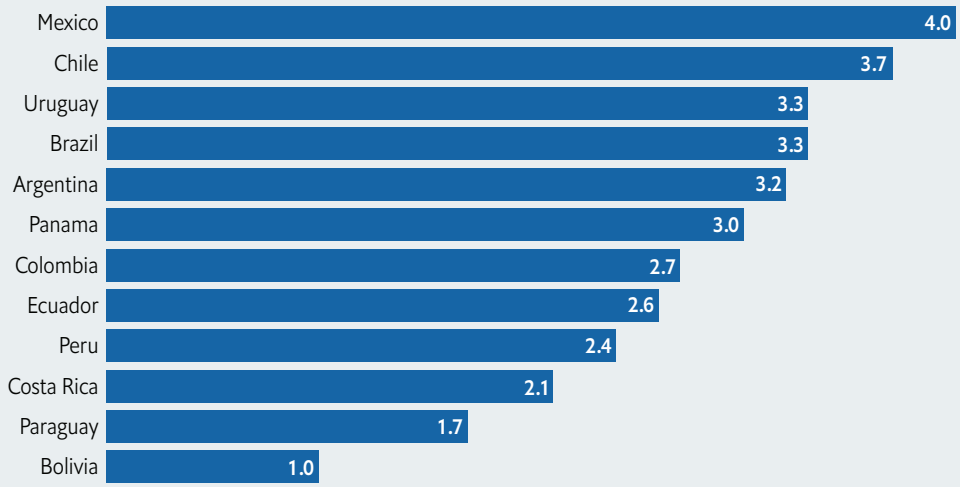
Public education and awareness

A well-informed population is the most effective tool for preventing cancer and increasing the disease's early detection. It assists in everything from risk reduction through encouraging investigation of potential symptoms to attending a screen.

In Latin America, information programmes certainly exist, with national breast- and cervical-cancer education programmes common. Unfortunately, any education efforts have at most had a limited impact. Such data as exist on public understanding of cancer in Latin America are worrying. For example, a survey of female university students in Colombia—who should be better informed than the population as a whole—found that fewer than 10% recognised alcohol, lack of exercise or smoking as being associated with greater risk of breast cancer; this was markedly lower than the

Chart 16

LACCS "Prevention and early detection" domain results, 2017



Note: This domain examines the extent to which the health system has moved away from focusing on diagnosis and treatment towards prevention, screening and early detection. Raw scores for each domain have been normalised to a scale of 1-5 (with 1 being the worst and 5 the best) to enable comparisons across domains.

Source: The Economist Intelligence Unit, The Latin America Cancer Control Scorecard (LACCS), 2017.

average for their peers in the 24 low- and middle-income countries covered.[44] Similarly, in a study at a Brazilian university "the level of knowledge on oral cancer found was not at all satisfactory".[45]

Other research paints a more positive picture. In a survey of adult females in the relatively well-to-do Brazilian city of Florianópolis respondents had a widespread understanding of the basics of mammography, but even here nearly one-half of those below the age of 60 thought—incorrectly—that the test would protect them from cancer, and 93% believed that it was important only for those with a family history of breast cancer.[46] This, however, may even overestimate the level of knowledge within the population, as various studies in the region show that wealth and knowledge about cancer correlate strongly.[47]

Looking at the region as a whole, Dr Lopes notes: "The educated have a better idea around risk factors, but a lot of misconceptions exist [among all groups]. The link between infection and disease is not well known, for example, and people think organic food will protect them." Indeed, in a global survey of breast-cancer specialists, those from Latin America were more likely to point to the need for greater public education than their peers in any other region.[48] The misunderstanding is not limited to the general public, adds Mr Zoss: "There is also a lack of information and education regarding cancer even among general physicians at the primary-healthcare level on things like early symptoms."

Perhaps the worst aspect of this lack of understanding is that, as Mr Zoss explains, "cancer still has the stigma of a death sentence to a large part of the population". Consequently, as an article in the *Lancet Oncology* puts it, there remains "a pervasive, deeply rooted cultural view of cancer as taboo".[49]

44. K Peltzer and S Pengpid, "Awareness of Breast Cancer Risk among Female University Students from 24 Low, Middle Income and Emerging Economy Countries", *Asian Pacific Journal of Cancer Prevention*, 2014.

45. C Comunian *et al*, "Basic knowledge on oral cancer among a specific Brazilian population", *Revista Odontologia Clínico-Científica*, 2011.

46. I Schneider *et al*, "Knowledge about mammography and associated factors: population surveys with female adults and elderly", *Revista Brasileira de Epidemiologia*, 2013.

47. A Ferreira de Araújo Jerônimo *et al*, "Risk factors of breast cancer and knowledge about the disease: an integrative revision of Latin American studies", *Ciência & Saúde Coletiva*, 2017.

48. J Bridges *et al*, "Identifying important breast cancer control strategies in Asia, Latin America and the Middle East/North Africa", *BMC Health Services Research*, 2013.

49. Goss *et al*, "Planning cancer control in Latin America".

This, along with a lack of knowledge about cancer to begin with, impedes willingness to engage in screening—or even to see a doctor, which helps to explain the high rates of late-stage presentation in the region. [50] By contrast, a review of various cost studies of breast-cancer interventions in Mexico found that the most cost-effective would be an outreach and mass-media awareness campaign for mammography.[51] As Dr Lopes points out: "There is still a huge need to improve cancer awareness."

Population prevention

Education is not the only way to discourage people from engaging in activities with elevated cancer risk. Appropriate regulation—typically labelled population prevention—has become increasingly attractive to public-health officials worldwide frustrated at the inability of information campaigns on their own to affect behaviour.[52] This approach has the advantage of being inexpensive—indeed, it can be revenue-raising—and reducing inequality. It improves the health of the population as a whole rather than just the privileged socioeconomic classes.

One striking example in Latin America has been a series of increasingly stringent national anti-smoking efforts since the entry into force of the World Framework Convention on Tobacco Control in 2005. Inevitably, efforts vary by country: Argentina, the only country not to sign the convention, and Paraguay, for example, tend to lag behind because of politically powerful domestic tobacco industries. Nevertheless, the large majority of study countries have greatly strengthened legislation in the field. Smoke-free public transport is now the norm, and bans on smoking in public places are the rule rather than the exception.[53, 54] Meanwhile, Argentina, Brazil, Bolivia, Chile, Paraguay, Peru and Uruguay, through the regional trade body MERCOSUR, are working to reduce crossborder tobacco advertising and smuggling.[55] Even some of the less active countries on tobacco control have made a degree of progress: Argentina increased restrictions in 2011, and more recently, by raising taxes, saw the price of cigarettes rise by 50% at the start of 2017.

Not surprisingly, the number of smokers has dropped noticeably in all 12 study countries between 2000 and 2015. At an extreme, in Panama they declined by over one-half (from 15.4% of adults to 6.6%). Even Argentina saw a decline from 38% in 2000 to 23% in 2015, and Paraguay from 30% to 18% in the same period, suggesting something more than policy is helping to drive an important social change.[56]

Partly as a result of these efforts, only four countries (Bolivia, Colombia, Paraguay and Peru) do not get the highest scores in the "discourage smoking" sub-category in the LACCS "prevention and early detection" domain, based on the share of the retail price accounted for by tax.

Other growing cancer risks, however, are receiving less attention, such as the region's expanding waistlines. Some countries are addressing the issue head-on. Mexico, in particular, has a high-profile National Strategy for the Prevention and Control of Overweight, Obesity and Diabetes, which includes not just health promotion but has also led to a tax on sugary drinks. Accordingly, Mexico is among the few countries (alongside Chile) that receives top marks in the "reduce sugar

50. L Teixeira, "From gynaecology offices to screening campaigns: a brief history of cervical cancer prevention in Brazil", *História, Ciências, Saúde-Manguinhos*, 2015.

51. D Watkins *et al*, "The Cost-Effectiveness of Interventions and Policies for Noncommunicable Diseases and Their Risk Factors in the Latin America and Caribbean Region: A Systematic Literature Review", chapter 8 in PAHO, *Economic Dimensions of Noncommunicable Diseases in Latin America and the Caribbean*, 2016.

52. The Economist Intelligence Unit, *The Heart of the Matter: Rethinking prevention of cardiovascular disease*, 2013.

53. E M Sebrié *et al*, "Smokefree Policies in Latin America and the Caribbean: Making Progress", *International Journal of Environmental Research and Public Health*, 2012.

54. Strasser-Weippl *et al*, "Progress and remaining challenges".

55. "Stubbed out: Smoking in Latin America", *The Economist*, March 30th 2013.

56. WHO, *WHO global report on trends in prevalence of tobacco smoking 2015*, 2015.

consumption" sub-category in the LACCS "prevention and early detection" domain. With the highest proportion of the population overweight or obese among study countries and a diabetes prevalence that has doubled every decade since 1960, Mexico has little choice.[57] Ecuador, meanwhile, has instituted labelling for foods to alert buyers to the sugars, saturated fats and salt they contain.

That said, other study countries are not taking the initiative. Indeed, the number of countries without any policy on controlling obesity at all actually rose from three in 2011 to four in 2014.[58] More generally, the increase in the proportion of the population that is overweight (see Introduction) suggests that efforts in this area are far less effective than anti-smoking initiatives.

Part of the problem is practical. These sorts of regulation typically require co-operation across government ministries. Colombia's ending of aerial spraying of glyphosate to control coca plants, for example, while designed to reduce cancer risk, had implications that involved the security services and even the Ministry of Foreign Affairs.

Moreover, regulation can run into substantial political opposition. Dr Mohar notes that the battle with tobacco companies is now "exactly the same for the industry that makes junk food. That is a major problem." Colombia, meanwhile, saw its Congress (parliament) block a 20% levy on sugary drinks in December 2016; earlier it had blocked a complete ban on asbestos. "Facts alone are usually insufficient in these debates," says Mr Gaviria. "Industrial lobbies are powerful. Fortunately, the debates in and of themselves increase public awareness."

Another challenge for population prevention is that regulation, while a powerful tool, is rarely sufficient in itself. In practice, population prevention works best when it helps people to change behaviour which they know to be unhealthy. In other words, it needs to work with education, not instead of it.[59]

This will be relevant for the regulation of sugar and other cancer risks. Understanding of the dangers of tobacco is widespread. However, Mr Zoss notes that lack of understanding of the cancer implications of diet "is also a major problem in the region". Dr Trimble adds: "People understand the importance of diet and exercise as a risk for diabetes, but there is not necessarily a recognised link in the popular mind with cancer. There is a need for more public education." Even where health benefits in other areas are clear, populations may not be ready to accept regulatory "help" in changing their behaviour.

Impeding infectious disease

Another key potential area for prevention is addressing the infectious conditions that lead to more than one in six cancers in Latin America. Suitable interventions do not always exist. For example, stomach cancer, an ongoing problem in the region, might theoretically be reduced by eradicating helicobacter pylori infection in the population. Studies in Asia show that this is potentially promising, but it has yet to be demonstrated conclusively that such an approach would be effective, let alone cost-effective, in Latin America.[60]

[57] R Meza *et al*, "Burden of Type 2 Diabetes in Mexico: Past, Current and Future Prevalence and Incidence Rates", *Preventative Medicine*, 2015.

[58] Strasser-Weippl *et al*, "Progress and remaining challenges".

[59] The Economist Intelligence Unit, *The Heart of the Matter: Rethinking prevention of cardiovascular disease*, 2013.

[60] A Ford *et al*, "Helicobacter pylori eradication therapy to prevent gastric cancer in healthy asymptomatic infected individuals: systematic review and meta-analysis of randomised controlled trials", *BMJ*, 2014.

By contrast, the region has long had a valuable tool that prevents some liver cancers. Hepatitis B vaccination was introduced in Latin America in the 1980s and 1990s. Now 90% or more children receive the full dose in nine study countries, and in the other three—Ecuador, Mexico and Panama—over 70% do. Conclusive evidence of a strong impact on liver-cancer incidence in the region is lacking, although it fell after the vaccination programmes began.[61, 62] That said, the relatively low incidence of this type of cancer in the study countries compared with the global average means that improvement, although welcome, would have limited public-health benefits.

The potential impact of vaccines against HPV is far greater. Cervical cancer remains the second-biggest cancer killer among women in Latin America, and this intervention could prevent the HPV genotypes which cause 70% of this burden. Not surprisingly, notes Dr Cazap, "the vaccine was introduced easily in region." Since 2008 ten study countries have started offering it to girls as part of national public vaccination programmes.[63] Of the others, Bolivia will begin HPV vaccinations this year, says Dr Soria, leaving Costa Rica the sole holdout. Brazil and Argentina, meanwhile, are rolling out the vaccine for boys as well, and Panama plans to do so soon.

Despite strong political support for the vaccine, some practical matters still require attention. In particular, where countries have data, the percentage of the target population receiving the first dose of the vaccine is very high, usually over 90%. By the third dose, however, it drops significantly, to around 50-67%. One strategy, being adopted by Argentina, is to use a two-dose rather than three-dose protocol—an approach recommended by the WHO if the recipient is under 14 years old.[64] Whatever the best answer, this is an issue that public-health authorities will have to address if the vaccine is to live up to its potential.

Latin American countries are likely to be able to work out these practical difficulties. Although not perfect, the region's many effective national vaccination programmes for a range of diseases, including HPV, have been held up as global role models, and according to one estimate, childhood-immunisation efforts alone have increased life expectancy in Latin America by 15 years.[65, 66, 67] Using existing infrastructure or expanding it to deliver HPV vaccination should therefore not be an excessive burden, and the cost of the vaccination itself has declined. Moreover, it is a discrete process: once two, at most three injections are delivered, it is complete. This is the kind of medical intervention of which Latin American health systems have proved themselves capable in the past.

Screening and early detection

The same record of relative success does not apply to cancer screening, because its markedly different requirements run into long-standing and deep structural weaknesses in the region's health systems. On the one hand, notes Dr Murillo, "you can't ensure early diagnosis without some type of screening." On the other hand, selecting an appropriate one can be complex, depending on the type of cancer. To begin with, effective population screening requires a minimally invasive process that detects a disease or its precursors with reasonable accuracy; a sufficient proportion of the population affected by a condition to make screening worthwhile; the ability of the health

61. WHO, WHO-UNICEF estimates of HepB3 coverage, 2016. Available at: http://apps.who.int/immunization_monitoring/globalsummary/timeseries/tswucoveragehepb3.html

62. Sierra *et al*, "Cancer patterns and trends in Central and South America".

63. B Bychkovsky *et al*, "Cervical Cancer Control in Latin America: A Call to Action", *Cancer*, 2016.

64. Ibid.

65. R Ulloa-Gutierrez, "Vaccine-preventable diseases and their impact on Latin American children", *Expert Reviews Vaccines*, 2011.

66. S Trumbo *et al*, "Vaccination legislation in Latin America and the Caribbean", *Journal of Public Health Policy*, 2013.

67. "Affordable vaccines key to scale up HPV vaccination and prevent thousands of avoidable cervical cancers", IARC, Press Release 250, February 2nd 2017. Available at: http://ecancer.org/news/10959-affordable-vaccines-key-to-scale-up-hpv-vaccination-and-prevent-thousands-of-avoidable-cervical-cancers.php

system to intervene if the screen is positive; and sufficiently cheap detection and early-treatment interventions so that the overall cost is less than treating the full-blown disease directly.

In practice, even in developed countries, the requirement for accuracy restricts the use of screening to a few main cancer sites. The most common internationally are the cervix, breast, colorectum and stomach. Next, as Dr Murillo explains, "screening is expensive, and we have to base its use on cost-effectiveness." Mr Zoss agrees: "Some screening methods that are valuable in high-income countries simply cannot be applied in settings of limited resources." It is hard to overstate the effect economics has on policy in the region. Dr Murillo, for example, notes that one of the biggest recent challenges to Colombia's screening programmes has been the drop in the value of its currency against the US dollar, in which much of the machinery used is priced. "You can plan, but if your budget decreases by 30% in this way, you can't do anything."

One clear example of how cost makes screening prohibitive is stomach cancer, of which Central and South America has some of the highest incidence rates in the world.[68] No country in the region has a population-wide programme for this, even though a study in Costa Rica using X-ray detection found that it could reduce mortality by one-half.[69] The high cost, however, makes the intervention unsustainable, except for targeted populations, such as Chile's programme to screen those over 40 with a family history of the disease and a current ulcer.[70]

To date, cost considerations have also affected the response to colorectal cancer, which increases markedly with the adoption of a developed-world lifestyle. Currently, says Dr Murillo, "doing colorectal screening would not be cost-effective for most countries in the region, but they need to begin thinking about the right moment to start"—both because risk within these populations is growing and because rising GDP makes the intervention more affordable. Among the study countries only Uruguay and Argentina have so far organised national colorectal-cancer screening programmes, although Brazil, Chile and Ecuador have conducted pilots.[71] Paraguay has begun a single such test programme this year as well, say Dr Rolón. This is a clear example of how good registry data are needed for good policy.

In practice, screening in Latin America largely relates to cancer of the cervix and to a lesser but still significant extent to that of the breast. A closer look at both reveals the problem and potential of screening in the region.

Screening for the two most common female cancers in Latin America holds out obvious substantial potential. Unfortunately, too often current programmes fall short. Studies from specific institutions in Brazil, Colombia and Chile, for example, found that the proportion of women presenting with cervical cancer at stage 1—when treatment outcomes are best—was typically around 20%, equivalent to about one-half of the global figure of 42%.[72]

Each of the 12 study countries has an established national cervical cancer screening programme, with all providing the traditional screening technique, called the Pap test, through the public health system. A more recent method is Visual Inspection using Acetic Acid (VIA). The latter is less common

68. Monica Sierra *et al*, "Stomach cancer burden in Central and South America", *Clinical Epidemiology*, 2016.

69. Y Yuan, "A survey and evaluation of population-based screening for gastric cancer", *Cancer Biology and Medicine*, 2013.

70. Ibid.

71. M Sierra and D Forman, "Burden of colorectal cancer in Central and South America", *Cancer Epidemiology*, 2016.

72. Bychkovsky *et al*, "Cervical Cancer Control in Latin America."

in the region, although Bolivia, Colombia and Peru have trial "see and treat" programmes in remote areas, while this type of screening is available in the public sector in Argentina and Costa Rica as well.[73]

Mortality from cervical cancer has been decreasing in the region, but the contribution of these programmes to that result is difficult to gauge and at best uneven. To begin with, uptake of this universally free service is often poor. LACCS data show that, on average in the study countries, only about one-half (51%) of the target population has been screened in recent years. In four study countries—Bolivia, Costa Rica, Ecuador and Panama—coverage is just 35% or less, even though some have long-established screening programmes.

Poor-quality patient service and integration with the rest of the health system do much to explain these figures. For example, in Costa Rica women typically need to make their own appointments for screening, rather than the health authorities contacting the target population.[74] Meanwhile, in Brazil, 10% of Pap smears are unreadable.[75] Moreover, across the region the cervical-cancer screening infrastructure remains skewed towards urban areas and the well-off.

More striking is the impact of poor integration within health systems. Dr Murillo notes that Colombia "has almost 80% Pap smear coverage, but about 30-40% of lesions are not treated because the women do not have access to confirmatory diagnosis or treatment. Colombia has decreased cervical cancer mortality, but mostly among women of high and middle socioeconomic status." Such problems are not limited to Colombia. Although data on clinical follow-up to positive tests are scant, Bolivia and Mexico also appear to have problems in this area.[76] (Access to treatment is discussed in Chapter 6.)

The issues around breast-cancer screening differ in detail, but the big picture is similar. In all 12 study countries mammography guidelines exist. Such screens are free in all but Panama and Paraguay.[77] The WHO estimates that to make a difference, such programmes need to reach around 70% of the target population. Among those study countries where data are available, none comes close. In Colombia the figure is 54%, but in Chile, Costa Rica and Argentina it is between 32% and 46%, while in Mexico it is just 22%.[78] "That is why we still see large numbers of women dying of breast cancer and of cervical cancer in Mexico," Dr Mohar explains.

Problems with programme structure, service quality and lack of infrastructure again undermine effectiveness. In the region, breast-cancer screening typically depends on individuals asking for it from healthcare providers.[79] Dr Pradier says that even Argentina, with a relatively advanced programme for Latin America, "has a lot of work to do in terms of accuracy and evaluation," and Dr Mohar notes that Mexico needs more trained radiologists and technicians. Meanwhile, in the region mammography equipment is often in short supply, and in some areas up to 20% of machines require repair. [80]

73. Ibid.

74. I Quirós Rojas, "The cervical cancer prevention programme in Costa Rica", *ecancermedicalscience*, 2015.

75. Bychkovsky *et al*, "Cervical Cancer Control in Latin America".

76. R Murillo *et al*, "Cervical cancer in Central and South America: Burden of disease and status of disease control", *Cancer Epidemiology*, 2016.

77. S Luciani *et al*, "Cervical and female breast cancers in the Americas: current situation and opportunities for action", *Bulletin of the World Health Organisation*, 2013.

78. A Di Sibioa *et al*, "Female breast cancer in Central and South America", *Cancer Epidemiology*, 2016.

79. G Nigenda *et al*, "Breast cancer policy in Latin America: account of achievements and challenges in five countries", *Global Health*, 2016.

80. Goss *et al*, "Planning cancer control in Latin America".

The resultant inequalities—substantial differences in uptake between the poor and the well-off, who have better access to care—are predictable. As with cervical cancer, the rest of the health system responds slowly to breast-cancer screening: in both Mexico and Brazil the median waiting time between first contact with the health service and initial treatment is seven months, with most of that time taken up by waiting for confirmation of the diagnosis.[81, 82, 83, 84, 85] Finally, late presentation—a problem that screening is supposed to address—remains a major issue. Several studies in Brazil, Chile and Colombia have found that around 20% of women or fewer present with breast cancer at stage 1. In Mexico, the figure is roughly 10%.[86] In developed countries it is typically 40-50%.[87, 88]

The notable exception among the study countries is Uruguay. Arguably the birthplace of the modern mammogram, the country was definitely a pioneer in the population-based use of the technique, with an organised programme dating back to 1990. It is of high quality and well-funded but probably attracts most attention internationally through being perhaps the only screening programme in the world which, since 2006, has been legally required for women who wish to work. Although they do not release data, health ministry officials do not believe that the decree making participation mandatory has had much effect as coverage was already high in 2005 (75% of the target population). Whatever drives participation, Uruguay shows that screening can have an impact in Latin America: 40% of its breast cancers are diagnosed at stage 1.[89]

Overall, then, the Latin American countries in this study have seen important progress on specific aspects of prevention. Nevertheless, substantial gaps remain, and those related to screening, in particular, show that wider health-system weaknesses need to be addressed.

81. Strasser-Weippl *et al*, "Progress and remaining challenges".

82. Nigenda *et al*, "Breast cancer policy in Latin America".

83. A Amadou, "Breast cancer in Latin America: global burden, patterns, and risk factors", *Salud Pública de México*, 2014.

84. S Sosa-Rubí *et al*, "Práctica de mastografías y pruebas de Papanicolaou entre mujeres de áreas rurales de México", *Salud Pública de México*, 2009.

85. Goss *et al*, "Planning cancer control in Latin America".

86. N Justo *et al*, "A Review of Breast Cancer Care and Outcomes in Latin America", *Oncologist*, 2013.

87. J Iqbal *et al*, "Differences in Breast Cancer Stage at Diagnosis and Cancer-Specific Survival by Race and Ethnicity in the United States", *JAMA*, 2015.

88. S Walters et al, "Breast cancer survival and stage at diagnosis in Australia, Canada, Denmark, Norway, Sweden and the UK, 2000-2007: a population-based study", *British Journal of Cancer*, 2013.

89. E Dowling *et al*, "Breast and cervical cancer screening programme implementation in 16 countries", *Journal of Medical Screening*, 2010; Sophie Arie, "Uruguay's mandatory breast cancer screening for working women aged 40-59 is challenged", *BMJ*, 2013.

CHAPTER 5
BUDGETS AND CANCER-CONTROL RESOURCES—NOT ENOUGH FOR WHAT LIES AHEAD

Even more than other areas, cancer-control budgets and resources vary markedly across the countries in this study: some do reasonably well, others much less so. However, they have several significant problems in common, including relatively low spending on health and cancer control, deficiencies in cancer-control infrastructure, and insufficient human resources. Overall, the budgets, personnel, equipment and other resources for cancer control still need bolstering to meet current needs. With the number of cases in the region growing rapidly, Dr Mohar warns that "there are not enough human and other resources to cope".

Low spending on health and cancer control

Rather than looking at cancer spending in isolation, Professor Knaul says: "One needs to ask, 'Do we have an underfunded health system?' After all, effective cancer care and control requires strong health systems to fullfil the core functions of stewardship, financing, delivery and human-resource generation." In the study countries, the question whether they are underfunded depends on the benchmark against which they are being measured.

A 2017 study in *The Lancet* looked in detail at changes over time in healthcare funding in 184 countries.[90] At first glance, looking through the prism of broad World Bank income categories, most of the 12 study countries do well compared with their peers. As table 6 shows, the study's upper-middle- and lower-middle-income countries—barring Peru—spend more per capita on health than other states in these income categories worldwide. These study countries also have a similar split with their peers in terms of state spending compared with out-of-pocket spending.

Table 6: National health spending and its sources, 2014

	Total health spending per capita (US$)	Total health spending as % of GDP	Government health spending as % of total	Prepaid private spending as % of total	Out-of-pocket spending as % of total	Development assistance as % of total
Lower-middle-income state						
Bolivia	404	6.3%	70.2%	3.4%	23.1%	3.3%
Global lower-middle-income average	*267*	*4.3%*	*35.9%*	*3.1%*	*58.0%*	*3.0%*
Upper-middle-income states						
Argentina	1,322	4.8%	55.8%	13.2%	30.9%	0.0%
Brazil	1,357	8.3%	45.9%	28.5%	25.5%	0.1%

[90] J Dieleman *et al*, "Evolution and patterns of global health financing 1995–2014: development assistance for health, and government, prepaid private, and out-of-pocket health spending in 184 countries", *The Lancet*, 2017.

Table 6: National health spending and its sources, 2014 (continued)

	Total health spending per capita (US$)	Total health spending as % of GDP	Government health spending as % of total	Prepaid private spending as % of total	Out-of-pocket spending as % of total	Development assistance as % of total
Colombia	975	7.2%	71.9%	9.5%	15.3%	3.2%
Costa Rica	1,418	9.3%	73.1%	1.8%	25.0%	0.0%
Ecuador	1,071	9.2%	48.8%	2.2%	48.5%	0.5%
Mexico	1,088	6.3%	51.7%	4.2%	44.0%	0.1%
Panama	1,743	8.00%	72.50%	4.50%	22.30%	0.80%
Paraguay	863	9.8%	45.6%	4.6%	49.3%	0.5%
Peru	626	5.20%	63.30%	6.30%	30.00%	0.40%
Study upper-middle-income average	1,163	7.57%	58.73%	8.31%	32.31%	0.64%
Global upper-middle-income average	*914*	*5.90%*	*57.20%*	*8.70%*	*33.80%*	*0.30%*
High-income states						
Chile	1,780	7.8%	49.5%	19.0%	31.5%	0.0%
Uruguay	1,837	8.6%	71.2%	13.2%	15.6%	0.0%
Study high-income average	*1,809*	*8.2%*	*60.4%*	*16.1%*	*23.6%*	*0.0%*
Global high-income average	*5,221*	*11.7%*	*63.4%*	*22.7%*	*13.9%*	*0.0%*

Source: Dieleman *et al.*, "Evolution and patterns of global health financing 1995–2014", *Lancet*, 2017

There are several problems, though, with such a reassuring conclusion. The first is that, in absolute terms, even the global upper-middle-income average health spending per capita (US$914) is not large. The high-income average ($5,221) is over five times greater, and the amount spent by the two study countries which are now in this category—Chile and Uruguay—is currently only equivalent to around one-third of the amount spent by their wealthy peers. There is no getting around the fact that, in all the study countries, the size of the healthcare funding pot is highly constrained compared with developed countries, which have their own struggles with funding cancer care.

Moreover, World Bank income groups are broad categories. The authors of the *Lancet* article found that total health spending and the sources of healthcare funding each changed markedly and predictably with economic development: wealthier countries tended to pay out more per capita, and wealthier governments tended to take a larger part in doing so. Based on worldwide data over two decades, they created an economic model that mapped how these shifts occurred, on average, with growth. Using this model, they then compared each country's actual situation with what might be expected given its current level of GDP. This gives a more accurate impression of where the study countries stand given their income level.

Table 7: National health spending and its sources relative to the modelled share, 2014

	Total health spending relative to modelled total health spending (%)	Share of total health spending that is from the government, relative to the modelled share (%)	Share of total health spending that is prepaid private, relative to the modelled share (%)	Share of total health spending that is out-of-pocket, relative to the modelled share (%)	Share of total health spending that is development assistance, relative to the modelled share (%)
Argentina	65.2%	77.2%	475.9%	124.3%	30.8%
Bolivia	110.7%	128.8%	225.1%	59.0%	68.2%
Brazil	131.4%	70.0%	1104.9%	81.0%	33.1%
Chile	111.6%	70.8%	693.3%	115.4%	3.3%
Colombia	118.8%	113.1%	394.1%	46.0%	586.2%
Costa Rica	147.8%	112.5%	71.1%	78.0%	8.3%
Ecuador	153.4%	78.5%	96.8%	139.9%	59.0%
Mexico	97.7%	77.9%	161.4%	142.9%	45.1%
Panama	116.5%	104.8%	163.9%	79.6%	758.5%
Paraguay	169.9%	77.2%	239.1%	133.7%	25.0%
Peru	87.6%	101.4%	276.0%	87.0%	48.7%
Uruguay	126.1%	103.3%	485.1%	55.2%	6.8%
Study average	119.7%	93.0%	365.6%	95.2%	139.4%

Source: Dieleman *et al*, "Evolution and patterns of global health financing 1995–2014", *The Lancet*, 2017.

In table 7, if a country's total health spending and the sources of funding for it matched the global norms associated with its level of GDP, all its results would be 100%. This is far from the case in the study countries. Instead, the results—while varying sometimes greatly between countries—lead to several broad conclusions.

The first is that, given levels of GDP, the total amount of money going into healthcare in these countries is on average about 20% more than one would expect. The problem is that this does not arise from state spending, which accounts for only 93% of the contribution associated with current levels of economic development in the study countries. Instead, an outsized—given global norms—private insurance market plays a major funding role. The government spending figure includes both funding of public healthcare and of social security systems, which provide the majority of care in the study countries. This suggests an important funding inequality: most patients will be getting access to fewer healthcare resources than one might foresee given these countries' levels of economic development, but the minority with insurance will have access to substantial resources.

Also noteworthy is that the study countries are split into two groups in a way that appears unrelated to the level of economic development. In six of them, governments and social security systems pay a larger proportion of healthcare expenses than one would foresee, but in the other six the state covers only between 70% and 80% of the expected level.

Finally, and worryingly, over the long term most of the study countries have not been keeping up with the healthcare spending increases made by their peers. This issue is particularly relevant to the study's nine upper-middle-income states, which saw total health spending per capita rise by only 3.9% on average between 1995 and 2014, compared with 5.9% for this income group worldwide (see table 8). This is even though GDP growth over the past two decades has been substantial in the study countries and in Latin America as a whole. As Dr Cazap notes: "Issues in the region are dominated by economic considerations, and the problem is that usually health is a weak ministry in the cabinet." Dr Vargas agrees: "Countries in our region have not succeeded in engaging governments on the importance of healthcare, and bureaucracy has delayed improvement for years."

Table 8: Annualised rate of change in total health spending per capita, 1995–2014 (%)

Lower-middle-income state	
Bolivia	5.2%
Global lower-middle-income average	*5.0%*
Upper-middle-income states	
Argentina	-0.6%
Brazil	3.3%
Colombia	2.7%
Costa Rica	4.6%
Ecuador	8.0%
Mexico	2.9%
Panama	4.8%
Paraguay	4.7%
Peru	4.4%
Study upper-middle-income average	*3.9%*
Global upper-middle-income average	*5.9%*
High-income states	
Chile	4.1%
Uruguay	2.9%
Study high-income average	*3.5%*
Global high-income average	*3.0%*

Source: Dieleman et al., "Evolution and patterns of global health financing 1995–2014," *The Lancet*, 2017.

The overall size of healthcare budgets in the region is only part of the funding problem. As in much of the world, the epidemiological transition has not been matched by a corresponding shift in healthcare financing priorities towards NCDs, including cancer. Dr Lopes notes that, after decades of focusing—appropriately—on infectious diseases, "our systems and the way our public-health officials think have not moved toward NCDs," with a predictable effect on budget allocations. This issue is not unique to Latin America, observes Dr Cazap. Money is often available for NCD projects,

he says, "but if you try to introduce actions that change the structure of the health system [to better address NCDs], international funders and governments are not interested."

Part of the problem for cancer is simply cost. Ms Durstine notes that certain high-priced interventions might actually save only dozens of lives in a country. She recalls that when originally advocating for the use of the HPV vaccine at a time when it was much more expensive than today, "health ministers would say, 'Why should I spend the equivalent of the entire childhood vaccine budget on this?' Cancer is very expensive, and political decisions about it are very economics-based."

Hard data on cancer spending as a proportion of health budgets are generally unavailable, but the combined impact of small overall health budgets and the low priority given to cancer spending is clear in the money available for treatment. The average amount spent per case of the disease in the 12 study countries in 2009 was just over US$9, two orders of magnitude less than the figure for Japan or the US (see table 9).

Table 9: Medical cost per patient of new cancer cases, 2009 (US$)

Uruguay	26.63
Chile	15.09
Argentina	12.20
Mexico	11.46
Costa Rica	10.42
12 study country average	**9.29**
Panama	9.12
Brazil	8.04
Colombia	5.96
Peru	4.90
Ecuador	3.59
Paraguay	2.19
Bolivia	1.82
US	460.17
Japan	243.70

Source: Goss et al., "Planning cancer control in Latin America", 2013.

Other areas of cancer control receive small amounts as well. Chile, for example, spent US$12m on cancer research in 2012, while the US NCI's research budget was US$4.9bn, or about 6.7 times more as a proportion of GDP. Chile's government, however, is one of the more generous research supporters in the region. The governments of Bolivia, Paraguay and Uruguay spend far less in this area.[91, 92]

Some increase in spending has occurred in individual countries since the 2009 figures appeared. Peru's Plan Esperanza brought state outlays on cancer control from 2.3% of the health budget to 6%[93]—about the norm for Europe.[94] Colombia's cancer plan also had a protected budget, and according to research by The Economist Intelligence Unit for the LACCS, Colombia's health ministry says that over 17% of its spending is on cancer. Brazil and Uruguay, meanwhile, have expanded their investment in Positron Emission Tomography/Computed Tomography (PET/CT) scanners, and Brazil and Mexico have introduced increased oncology training.[95]

These isolated examples, however, have not altered the big picture. A 2015 review of cancer control in Latin America found little change in recent years as far as financing is concerned.[96] Moreover, notes Dr Medici, while in areas such as prevention governments are increasing their budgets, "the

91. Jimenez *et al*, "Snapshot of Cancer in Chile".

92. C Rolfo *et al*, "Cancer clinical research in Latin America: current situation and opportunities", *ESMO Open*, 2016.

93. Peru Ministry of Health, *Principales Resultados del INEN para la Prevención y el Control del Cáncer en el Marco del Plan Esperanza Julio 2011 - Setiembre 2016*, 2016.

94. B Jönsson *et al*, *Comparator Report on Patient Access to Cancer Medicines in Europe Revisited*, IHE Report 2016:4.

95. Strasser-Weippl *et al*, "Progress and remaining challenges".

96. Ibid.

speed of growth, efficacy and effectiveness of the expenditure is very low in most Latin American and Caribbean countries. It is probably not enough" to address the region's growing cancer burden.

Insufficient human resources

A history of limited investment has had a predictable effect on human resources. Dr Lopes notes that to people from outside the region "the lack of cancer resources is surprising. We have to do the best we can with what we have."

One problematic area is specialist human resources. While the figure of 111 new cancer cases per clinical oncologist per year in Uruguay is better than that in many developed countries, including the US, in Panama and Chile the figure is over 500. Mexico—even after a 55% increase in such specialists between 2012 and 2014—still had only one oncologist per 420 cases.[97, 98] Dr Mohar acknowledges the hard work that went into growing the number of these specialists in Mexico, but he believes that the pace of improvement is still insufficient. "Human resources are an even bigger issue than financial ones because the speed of the increase in cases is much faster. We will need to double the workforce [to meet growing needs], but to get an oncologist trained requires at least 12 years of training." Optimising human resources is therefore a major part of the country's draft NCCP, he adds.

Other skilled clinicians are also in short supply. A recent study found that every country in the study except Chile and Uruguay, which it did not cover, had insufficient radiation oncologists. With the exception of Costa Rica, all also needed more medical physicists.[99] A shortage of nurses in general is a problem in Latin America, and for specialist cancer nurses the dearth can be extreme. In Brazil, for example, between 2005 and 2013 only 150 nurses qualified as oncology specialists.[100] The US NCI estimates, however, that São Paulo alone requires 300 to deal with its cancer burden.[101]

Looking at the wider picture, Professor Jimenez says: "Surgeons properly trained for medium to complex needs are scarce, so are radiotherapists and the needed nurses and pathologists etc. My biggest frustration is that the political community does not perceive that solutions take many years—and they are postponing initiatives and legislation."

Deficiencies in cancer-control infrastructure

The availability of radiotherapy is a proxy for cancer-control infrastructure investment, and only few countries perform very well in this LACCS domain (see chart 17). As Mr Zoss observes: "The physical and technological resources and machines commonly used to diagnose and provide cancer care are quite insufficient in Latin America."

The availability of radiotherapy technology is a key element in the treatment of many cancers. As table 10 shows, in 2013 study countries had far fewer radiotherapy devices per 1m people than developed states.

97. Ibid.

98. EIU calculations based on data from Jimenez *et al*, "Snapshot of Cancer in Chile".

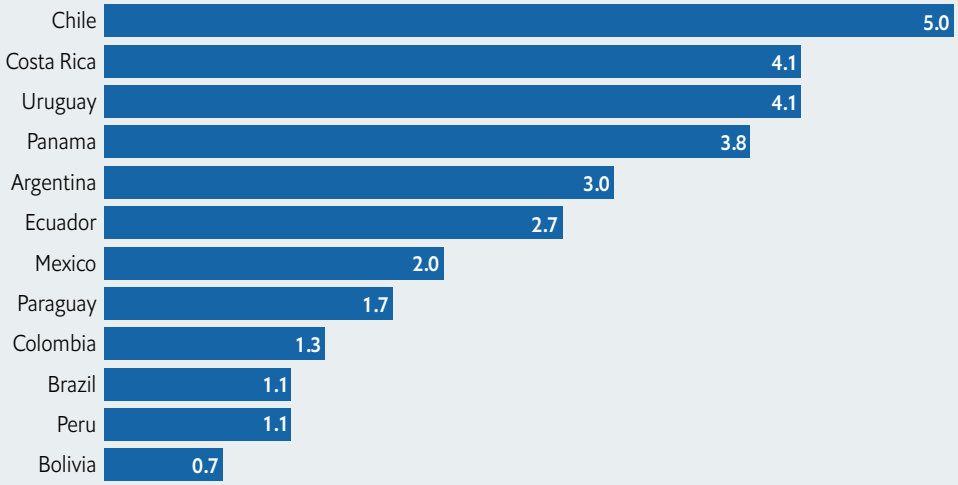
99. N Datta *et al*, "Radiation Therapy Infrastructure and Human Resources in Low- and Middle-Income Countries: Present Status and Projections for 2020", *International Journal of Radiation Oncology*, 2014.

100. M Rivero de Gutiérrez, "The clinical practice of oncology nursing in Brazil: realities and challenges in the training of specialist nurses", *ecancermedicine*, 2014.

101. National Cancer Institute, *Human Resources for Treating New Cancer Cases in Brazil*. Available at: https://rrp.cancer.gov/programsResources/lowIncome/brazil.pdf.

Chart 17

LACCS "Radiotherapy availability" domain results, 2017



Note: This domain examines the availability of radiotherapy treatment in Latin America. This is of particular regional importance as late diagnosis increases the need for curative and palliative radiotherapy. Raw scores for each domain have been normalised to a scale of 1-5 (with 1 being the worst and 5 the best) to enable comparisons across domains.

Source: The Economist Intelligence Unit, The Latin America Cancer Control Scorecard (LACCS), 2017.

Table 10: Radiotherapy technology in selected countries, 2013

	Linear accelerators per million population	Telecobalt machines per million population	Radiotherapy units per million population	Telecobalt machines(% of all units)	Radiotherapy coverage (%)
Uruguay	2.94	0.88	3.82	23.0%	112%
Argentina	1.93	0.82	2.75	29.8%	83%
Costa Rica	1.23	1.03	2.26	45.6%	84%
Brazil	1.43	0.31	1.74	17.8%	67%
Panama	1.55	0.00	1.55	0.0%	77%
Colombia	0.75	0.70	1.45	48.3%	78%
Peru	0.82	0.30	1.12	26.8%	66%
Chile	0.68	0.23	0.91	25.3%	101%
Paraguay	0.15	0.44	0.59	74.6%	51%
Bolivia	0.09	0.47	0.56	83.9%	44%
Mexico	0.17	0.37	0.54	68.5%	70%
Ecuador	0.00	0.13	0.13	100.0%	61%
12 country study avg.	**0.98**	**0.47**	**1.45**	**32.6%**	**74%**
France	6.63	0.16	6.78	2.4%	108%
Japan	6.70	0.49	7.19	6.8%	108%
US	11.93	0.44	12.37	3.6%	206%

Sources: WHO, General Health Observatory, Available at: http://apps.who.int/gho/data/node.main.510? lang=en; A Jemal *et al*, *The Cancer* Atlas, second edition, 2014. Available at: http://canceratlas.cancer.org/data/

Again, this is appropriate to some extent. Crude cancer incidence is lower in Latin America than in wealthier countries. Accordingly, France's much higher number of cases per capita requires it to have substantially more radiotherapy units than Chile, for example, to get the same level of coverage. Nevertheless, current provision does not appear to be sufficient. The American Cancer Society's Cancer Atlas, which looks at likely need based on the number of cancer cases in a given jurisdiction and the capacity of its machines, found that just two of the study countries—Chile and Uruguay—had enough. Moreover, only two more could meet over 80% of their own needs. Another academic study used two different metrics to measure demand but came to a similar conclusion about supply. Depending on which of these approaches is used, as a whole the nine upper-middle-income states in the region—all included in this study—could provide only 59% or 76% of required radiotherapy.[102]

Latin American countries have also been slower than other parts of the world to obtain the most up-to-date equipment. In 2013, on average in the study countries, 33% of radiotherapy machines were not linear accelerators but used the old cobalt-60 technology. In upper-middle-income countries in the Asia-Pacific region this figure was just 19%, and in Africa it was 29%.[103] This may reflect a wider problem. A review of 12 quality audits of individual facilities across the region found that these documents contained "many recommendations warn[ing] governments about the evident need for allocating more budgetary resources to radiotherapy."[104]

Dr Soria highlights Bolivia's case. "Why do we have so little equipment?" he asks. "For years, people did not appreciate that we were migrating in our epidemiology, even though we had all the data. They thought that we did not need linear accelerators. We are going to have to put in money, but there is little will to do it." Unless that will appears, though, the deficit in equipment across much of the region will inevitably mean that cancer patients face long waiting times and suboptimal treatment.

Limited access to medicines

Another area of treatment affected by constrained cancer-control budgets is access to innovative drug therapies. Regulatory approval of new cancer therapies can be slow. As the most common cancer in Latin America is lung cancer, LACCS researchers looked at the covered treatments for lung cancer in Australia, Canada (province of Ontario), France, Germany and the UK to identify a sample of key commonly recommended older, newer and novel anti-cancer drugs. Almost every study country was found to have put on its formulary the four older drugs, all dating from the 1990s. However, of the three newer drugs—dating from the middle of the past decade—eight study countries had approved none, and only in Chile were all of them available. Just as striking is a look at the status of three novel anti-lung cancer drugs. At the time of writing no study country had approved for sale any of the three drugs. This explains why the "medicines availability" domain is among the weakest in the LACCS (see chart 18).

102. E Zubizarreta *et al*, "Need for Radiotherapy in Low and Middle Income Countries –The Silent Crisis Continues", *Clinical Oncology*, 2015.

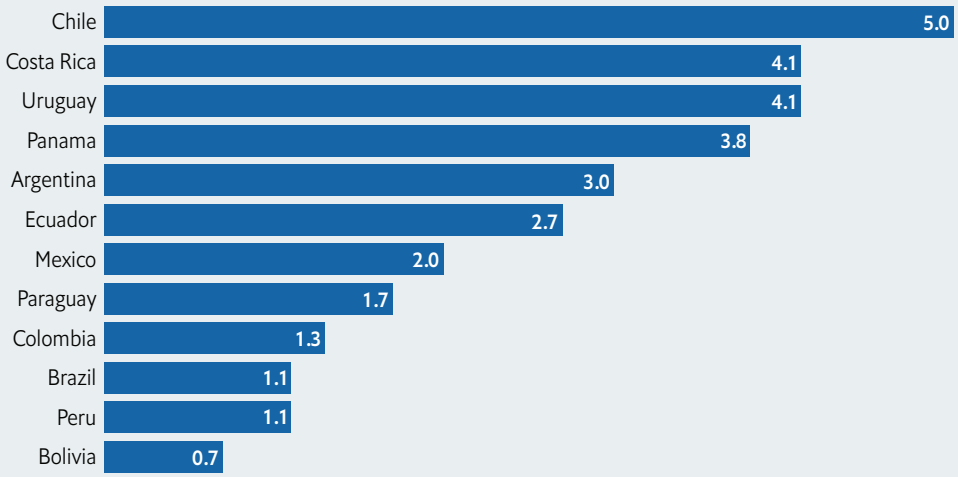
103. Ibid.

104. E Rosenblatt *et al*, "Quality audits of radiotherapy centres in Latin America: a pilot experience of the International Atomic Energy Agency", *Radiation Oncology*, 2015.

Although cost is often cited as a reason for slow cancer-drug approval, a lack of capacity to judge the value of, and assess an appropriate price for, new medication slows the adoption of novel therapies as well. Health technology assessment (HTA) bodies to provide advice on cost-effectiveness have emerged in the region, albeit slowly, over the past two decades—whether in the form of state agencies, such as Brazil's National Committee for Health Technology Incorporation (CONITEC) and Mexico's National Centre for Health Technology Excellence in Health (CENETEC-SALUD); NGOs, such as Argentina's Institute for Clinical Effectiveness and Health Policy (INAHTA); or public-private partnerships, such as Colombia's Institute of Health Technology Assessment (IETS). Presumably, the spread of such HTAs could give health systems a better idea of which new health technologies are cost-effective and worth approving and could therefore speed up decision-making.

Chart 18

LACCS "Medicines availability" domain results, 2017



Note: This domain examines the availability of selected anti-cancer drugs and morphine for pain relief. The most common cancer in Latin America is lung cancer. The recommended treatments in the UK, Australia, Canada (Ontario province), France and Germany were used to identify a sample of key commonly recommended older, newer and novel anti-cancer drugs. Drug availability involved searching major formularies. Consumption of morphine is included as a proxy indicator of supportive and palliative care. All scores are raw and have not been normalised. Raw scores for each domain have been normalised to a scale of 1-5 (with 1 being the worst and 5 the best) to enable comparisons across domains.

Source: The Economist Intelligence Unit, The Latin America Cancer Control Scorecard (LACCS), 2017.

However, approval on its own does not mean access. In Brazil, the constitution recognises the right to healthcare. Once a drug is approved, private insurance schemes have to provide it, but they only cover roughly one-quarter of the population and do not always act quickly. Those reliant on the public health system often have to wait longer for it to cover new pharmaceuticals, sometimes up to a decade, according to Dr Lopes.

As a result, patients are using the courts to pursue their constitutional rights. Between 2012 and 2014, 3.9% of all privately insured cancer patients in the country obtained their medications through lawsuits, as did 3.3% of those in the public system. In an alarming development, the number of cases has risen over time. In the second half of 2014, 4.8% of all Brazilian patients used the courts to obtain the medication they needed.[105]

[105] G Lopes, "Suing the state for access to cancer medications: The Brazilian experience", *Journal of Clinical Oncology*, 2015.

The judicialisation of medicine is not limited to cancer, nor to Brazil. In Costa Rica, between 2007 and 2011 the number of lawsuits over access to drugs reached an average of around 200 a year, about one-half of which were successful. A random sampling of these actions found that just over one-half related to cancer treatment.[106] Argentina, Colombia and Uruguay have also seen substantial judicial activity of this kind.[107, 108] For people fighting a life-threatening disease where time is crucial, going to court is the last thing they need.

Palliative care is often inappropriate

A final element of cancer-control infrastructure that is lacking in many countries is palliative care. Dr Mohar notes: "In Latin America, around 60-70% [of cancer patients] are diagnosed at advanced stages and in pain. Most will eventually need palliative care." Unfortunately, the development of this discipline and appropriate facilities has been slow in Latin America as well and, in Mr Zoss's words, "erratic and with no clear pattern".

A few countries stand out as leaders. According to data from the 2012 Atlas of Palliative Care in Latin America, Chile has 30% of the region's palliative-care services, although these are needed by just 3% of its population. In terms of full palliative services per 1m population—the standard metric in this field—Costa Rica, Chile, Uruguay and Argentina would not be out of place in western Europe (see table 11).[109]

Panama, Mexico and Colombia are making efforts to catch up, having since 2010 either passed palliative-care laws or launched national policies.[110] The progress is real: Panama tripled the number of people receiving palliative care between 2010 and 2014.[111] The ongoing difficulties, however, remain substantial. As Dr Mohar reports: "In big cities in Mexico there is not optimal but adequate care. In rural and even suburban areas access to treatment is quite limited." Dr Murillo believes that "palliative care is still missing" from Colombian cancer control.

Table 11: Full palliative care services per 1m population

Chile	16.06
Costa Rica	14.65
Uruguay	7.00
Argentina	3.76
Panama	2.64
Mexico	1.06
Ecuador	0.83
Paraguay	0.61
Bolivia	0.58
Colombia	0.50
Brazil	0.48
Peru	0.42

Source: T Pastrana *et al*, *Atlas of Palliative Care in Latin America*, 2012.

The number of services is not the whole story, however. To be effective, palliative care has to be integrated into the health system. Here the region falls behind wealthier countries. According to the WHO and the Worldwide Palliative Care Alliance, only Costa Rica, Chile and Uruguay have achieved what they call "preliminary integration", which includes awareness of palliative care on the part of health professionals and local communities. Most of the others are classified as having only isolated provision (see chart 19).[112]

106. O Norheim and B Wilson, "Health Rights Litigation and Access to Medicines: Priority Classification of Successful Cases from Costa Rica's Constitutional Chamber of the Supreme Court", *Health and Human Rights Journal*, 2014.

107. R Iunes *et al*, "Universal Health Coverage and Litigation in Latin America", World Bank en breve notes number 178, 2012.

108. V Abramovich and L Pautassi, "Judicial activism in the Argentine health system: Recent trends", *Health and Human Rights Journal*, 2013.

109. C Centeno *et al*, *EPAC Atlas of Palliative Care in Europe*, 2013.

110. E Soto-Perez-de-Celis *et al*, "End-of-Life Care in Latin America", *Journal of Global Oncology*, 2016.

111. The Economist Intelligence Unit, *The 2015 Quality of Death Index: Ranking palliative care across the world*, 2015.

112. S Connor and M Bermedo (eds.), *Global Atlas of Palliative Care*, 2014.

Chart 19

End-of-life care in Latin America

Source: E Soto-Perez-de-Celis et al., "End-of-Life Care in Latin America".

Argentina and Paraguay illustrate what these numbers and rankings look like in practice. The former has the fourth-highest number of services per capita and, according to the WHO, "generalised provision". Dr Cazap explains: "We have some assets, but real integration—in the sense of starting palliative care as early as the WHO recommends—is in general poor." Many doctors are confused about its role, he adds, leading to patients not getting the relief and support they require. "Planners and experts understand the importance of palliative care, and we are in the process of trying to integrate care in a better way, but we need more—and more real—integration of all the players in cancer control."

Meanwhile, with the eighth-highest number of services per capita among the study countries and falling into the WHO's "isolated provision" category, Paraguay "has a deficit in palliative care", according to Dr Rolón. "We estimate that 20,000 people need palliative care, and we have a capacity for between 1,000 and 3,000." A new palliative medicine residency programme began training this year, but only one person is enrolled. The country, like much of the region, has far to go.

CHAPTER 6
OVERCOMING INEFFICIENCIES AND INEQUALITIES: STILL FAR TO GO DESPITE PROGRESS

The overall shortfall in resources to address cancer burdens in the region does not mean that high-quality treatment is completely unavailable. Dr Trimble notes that Latin America has "some excellent cancer hospitals that provide very good, multi-disciplinary care," citing the Mexican and Brazilian national cancer institutes as just two examples. Dr Cazap agrees: "Frequently in the region, academic institutions have top-level care." The problem, both add, is that this is not the norm. Instead, a vast disparity exists.

Limited resources complicate this problem, as do the endemic corruption and frequent waste which, Dr Lopes notes, are common in the region. However, Professor Jimenez explains that "it is not only about money. A well-organised cancer prevention, screening, treatment, survival and palliative-care network could certainly do more with the same or a very little more money."

The fundamental problem is an inefficient distribution of cancer-control assets, given the nature and location of the need. This arises from three powerful and overlapping problems: fragmentation within Latin American health systems; disparities in provision based on ability to pay; and geographical differences in provision.

Complex historical health-system legacies

Understanding these barriers to cancer control requires a brief description of healthcare systems and how they developed in the study countries. It is once again a story of substantial but far from complete progress.

It needs to begin with recognising a major inconsistency between aspiration and reality in these states. Ten of the 12 study countries enshrine a right to healthcare in their national constitutions. Of the exceptions, most of Argentina's provinces guarantee such a right, and Costa Rica is probably the country least in need of such protection, given the relatively good shape of its current health system.[113, 114]

Conversely, private funds remain a bigger contributor to health outlays in Latin America than in much of the rest of the world. In the study countries, according to World Bank data, on average 40% of healthcare spending came from private sources in 2014. In five of the 12, this figure is above 50%. Of private health spending in these countries, three-quarters (or 30% of all healthcare spending) came directly out of patients' pockets—far above the global average of 18%.

[113] T Dmytraczenko and Gisele Almeida (eds.), *Toward Universal Health Coverage and Equity in Latin America and the Caribbean: Evidence from Selected Countries*, 2015; Fernando Torres and Oscar Acevedo, *Colombia Case Study: The Subsidized Regime of Colombia's National Health Insurance System*, 2013.

[114] Abramovich and Pautassi, "Judicial activism in the Argentine health system".

This spending is often instrumental in providing cancer-treatment resources: in the seven countries for which LACCS researchers found data, for example, on average 35% of radiotherapy machines were in the private sector. This raises pressing questions about inequality of access to healthcare.

That issue is not new to Latin American governments. In all the study countries the search for expanded access began—usually in the years after the second world war—with the creation of social security-based healthcare systems funded by various combinations of deductions from employee salaries and employer contributions. Coverage would often differ depending on the nature of employment. Depending on the country, separate systems might exist for one or more of the employees and their families of private businesses, the civilian public sector, the military and the police. In Brazil, before later reforms, health systems differed by the industry in which someone worked.

Although the introduction and development of social security-based systems provided large parts of the populations' health coverage, it left out substantial sections as well, notably those on the economic margins, such as the unemployed or those in the informal sector. Since the 1990s different Latin American governments—including all 12 study countries—have at various times taken one of several paths towards providing some degree of healthcare for the entire population.

Two—Brazil and Costa Rica—have created systems consistent with common international understandings of universal healthcare. Beginning in 1990, Brazil dissolved its old network of social security-based health services, which was complex even by regional standards, and created the Unified Health System (Sistema Único de Saúde, or SUS), a tax-funded health system open to all.

Costa Rica took a different route. In the 1990s it reassigned all the health ministry's responsibilities for patient treatment, prevention and health promotion to the system run by the country's social security agency, the Caja Costarricense de Seguro Social (CCSS). The CCSS opened up eligibility for its services to include not just employees—who continue to make payroll-based contributions—but the entire population. Those who fall into this new class of members do not have to pay anything but still enjoy nearly identical benefits. This single healthcare-operating agency—a social security- and tax-funded hybrid—covers over 90% of the country's residents, with the rest opting for private insurance.

More recently, in 2008, Uruguay began moving in this direction by creating its National Integrated Healthcare System. That system's public funding body also collects social security contributions from employees and additional government funds to cover those not making such payments. By 2013 it had covered 69% of the population and looked set to grow further.

Rather than such extensive system restructuring, more typical in the region are arrangements to plug gaps left by private insurance and social security. In Colombia, since 1993 this has involved government-subsidised private insurance for those who cannot afford the regular, legally required policies. Other countries have created separate health schemes open to anyone without any other coverage, such as Mexico's Seguro Popular and Peru's Comprehensive Health Insurance, both founded in 2003. Paraguay and Ecuador, meanwhile, have tried in the past decade to fill the gap with

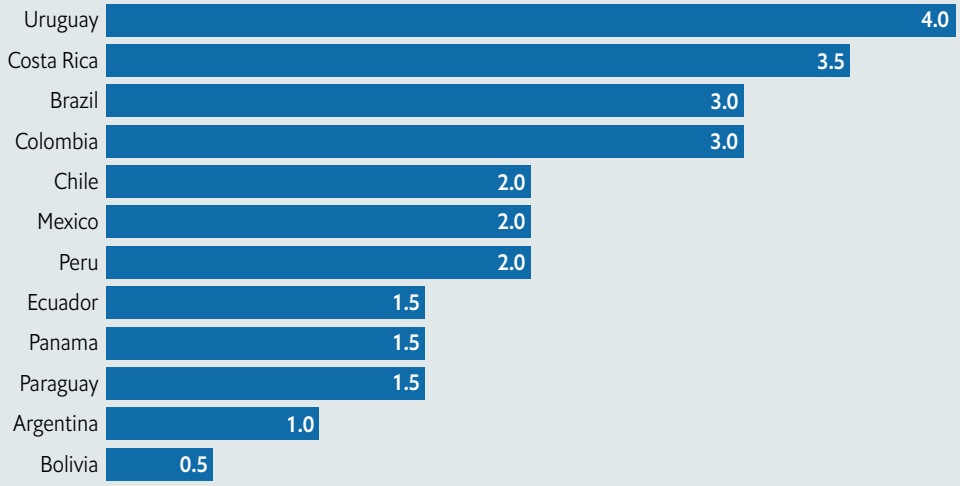
the provision of free services in the networks of state-run hospitals and clinics, which exist alongside social security-funded and privately funded networks.

These efforts are substantial. A PAHO study looking at Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru and Uruguay, along with Guatemala and Jamaica, found that collectively 46m more people had obtained some form of health insurance coverage between 2000 and 2015 alone.[115] Accordingly, in the LACCS "finance" domain, the highest aggregate scores can be found for the availability of financial support for those needing cancer treatment.

On aggregate, however, the finance domain is among the weakest of the six domains included in the LACCS—and an urgent area for policymakers to address (see chart 20). This is because other elements of financing are relatively poor, including government health spending (addressed in detail in Chapter 5) and out-of-pocket spending.

Chart 20

LACCS "Finance" domain results, 2017



Note: This domain examines what financial support and investments are in place to help people to meet the costs of cancer care. All scores are raw and have not been normalised. Raw scores for each domain have been normalised to a scale of 1-5 (with 1 being the worst and 5 the best) to enable comparisons across domains.

Source: The Economist Intelligence Unit, The Latin America Cancer Control Scorecard (LACCS), 2017.

As Dr Vargas notes of Costa Rica: "There is no doubt that universal healthcare has a great impact on cancer control." But he adds that it requires much more. The patchwork quilt of coverage across Latin America has created systems with substantial challenges as well.

The impact of fragmentation

Latin America is notoriously fragmented. An Inter-American Development Bank (IADB) study in 2014 looked only at healthcare funding and payments, not even touching care provision. For each of six attributes of health systems it found at least medium levels of fragmentation in at least one of the six countries it investigated (see chart 21).

[115] Dmytraczenko and Almeida (eds.), *Toward Universal Health Coverage.*

Chart 21

Comparative fragmentation levels in six selected Latin American countries

Dimension/ Indicator	Brazil	Colombia	Mexico	Ecuador	Chile	Costa Rica
Organisations	MEDIUM-HIGH	HIGH	MEDIUM	LOW-MEDIUM	LOW-MEDIUM	LOW
Risk Pooling	LOW	LOW-MEDIUM	MEDIUM	LOW-MEDIUM	LOW-MEDIUM	LOW
Eligibility	LOW-MEDIUM	LOW-MEDIUM	MEDIUM	MEDIUM	LOW	LOW
Benifits	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	LOW
Premiums/ Contributions	LOW-MEDIUM	LOW-MEDIUM	MEDIUM	LOW-MEDIUM	MEDIUM	LOW-MEDIUM
Payments	MEDIUM	HIGH	MEDIUM	LOW-MEDIUM	LOW	LOW

Source: T Bossert *et al*., "Comparative Review of Health System Integration in Selected Countries in Latin America," *Inter-American Development Bank Technical Note No. IDB-TN-585*, 2014.

The study's terminology used in the accompanying chart may give the impression of less fragmentation than actually exists. Ecuador, for example, with "low-medium fragmentation" for its number of healthcare organisations, has four distinct social security-based systems, a growing public health service and a small number of private insurers. Even Brazil, with its universal SUS, still has high fragmentation because of the roughly 1,600 private insurers which, in aggregate, cover about one-quarter of the population.[116]

Outside the IADB study countries, fragmentation in the region is frequently just as marked. For example, Argentina—not counting provincial health-ministry provision for people in their jurisdictions with no coverage—has six or seven systems, depending on one's definition, says Dr Cazap. Some 30% of the population has access to more than one, he adds. In Paraguay, meanwhile, the health systems for the military and for the police, as well as a hospital and clinics run by the Faculty of Medicine at the National University, are not under the control of the health ministry but of other government departments.

A large number of actors is not inevitably bad. Dr Lopes points out: "It is hard to have a system that covers 100m people, and there are strong health systems that have a combination of public and private elements." The problem is that the way in which different systems within individual countries interact interferes with effective cancer control.

The discussion so far has dealt largely with healthcare payers without addressing providers. Typically, in Latin America each large payer—whether social security system, health ministry, security service or major insurer—tends to operate its own network of healthcare providers. The

116. Bossert *et al*, "Comparative Review".

result is often the creation of parallel health systems, where benefiting from care and equipment depends on eligibility for access to a given closed network. As Dr Mohar explains of Mexico: "If you belong to one system, you have access to its specific infrastructure." Similarly, Dr Pradier notes that in Argentina "different systems take care of the population in any of our 24 provinces: public hospital for those without any health coverage; provincial or national healthcare plans; healthcare plans related to unions or employment; and private healthcare plans similar to a self-funded HMO [health maintenance organisation] in the US." Unfortunately, in a situation where cancer-control resources are in relatively short supply, this can mean survival depends on belonging to the right system.

The walls between providers are not always rigid. Colombia has a largely free-market system, where insurers contract with all types of health providers. Meanwhile, in Brazil, if someone has insurance or is willing to pay, it is possible to move back and forth between the SUS and private care. In Latin America, the difficulty in such situations is poor communication between systems. Dr Lopes says that the "biggest problem" arising from fragmentation is "that each system does not communicate well, internally or externally. Often what they share are not the real medical records."

Incentives also frequently fail to reward the integrated, patient-centred care that is the most effective way to address cancer. This is particularly noticeable with private providers. Dr Murillo explains that with multiple insurers it is difficult to co-ordinate public health programmes. A provider might say it has oncology services, "but this could just be a chemotherapy unit. There is not very much interest in providing comprehensive care or palliative care." Similarly, in Dr Cazap's experience the private sector is less focused on the area of cancer screening, let alone prevention, than the public sector.

Rearranging system incentives can have very good effects. Dr Trimble credits Chile's high success rate in dealing with paediatric cancer to the government agreeing to pay for treatment for such conditions but insisting that care takes place in one of four clinics that have high-quality, comprehensive care with standardised protocols. Colombia, meanwhile, is about to start encouraging providers to create integrated clinical units inside healthcare facilities that provide not only oncology but also related support services, such as nutrition, palliative care, rehabilitation and mental health.

Change across the region, however, is likely to be slow because systemic barriers are highly entrenched. Dr Mohar refers to a significant structural reform to cancer care which he proposed some years ago but which has not occurred: "The government committed to it, but the health system has been in place since 1942."

Inequalities in access between rich and poor

Despite recent efforts to expand healthcare access, some people fall through the resultant patchwork of provision. The PAHO still regularly cites its 2012 figure that about 30% of people lack access to healthcare for economic reasons in Latin America and the Caribbean.[117] The study

[117] PAHO, *Health in the Americas*, 2012.

countries are wealthier and on average much better off, but even in Argentina 36% have no health insurance and need to rely on public care. In Ecuador the figure is 51%, which explains its strategy of trying to provide free care through the public health ministry. Even in Mexico, despite the rapid expansion of its Seguro Popular, an estimated 8% have no coverage. [118, 119]

Moreover, the region's undoubted efforts to improve general healthcare access have had a mixed impact on cancer control. Dr Trimble notes that efforts to create more universal healthcare "do not cover all conditions. It means they pick and choose which patients can access the system."

Mexico's Seguro Popular is a clear case in point. For some it has quite literally been life-saving. Professor Knaul calls it "a luxury" to work on breast-cancer awareness in Mexico: "If I can promote early detection of breast cancer, there will be access to the drugs and care that the women need to survive the disease. Money for treatment is not the limiting factor." Dr Mohar supports this with hard numbers: before the scheme's introduction in Mexico City, he says, 30% of patients abandoned cancer treatment within 12 months; three years after the Seguro Popular covered breast cancer, the figure was just 1%.

However, coverage, although expanding, has always been restricted. When it first began in 2003, the Seguro Popular paid only for cervical-cancer treatment. The list of cancers has expanded steadily over time and now includes breast, prostate, colorectal, testicular and ovarian cancers. Nevertheless, the cancers with the fifth-, sixth- and seventh-highest incidence rate—those of the lung, stomach and liver—are still not included. Those who develop them still face potentially catastrophic costs.[120] The poor prognosis attached to the uncovered cancers, no matter what the health system, may be at play. Dr Trimble notes that as countries expand coverage of cancers, they tend to place their limited resources on ones that are more treatable.

The result of facing cancer without insurance coverage or some other safety net is as predictable as it is devastating. In Ecuador, nearly one-half of healthcare spending was out-of-pocket in 2014, and depending on how it is defined, between 7% and 16% of the population faces catastrophic healthcare spending in any given year.[121] As Mr Merino explains: "The constitution guarantees free treatment for catastrophic illness, but unfortunately the state has lagged behind in meeting its commitments." He reports that a survey conducted by his organisation of families affected by paediatric cancer found that 40% of patients drop treatment after beginning it. This is unsurprising, given that 68% of the surveyed families earn less than US$400 per month and nearly every mother had to give up employment to take care of her children.

Similarly, although Paraguay now provides free hospital care, it covers only basic anti-cancer drugs. Dr Rolón's words are worth reporting at length. "When people find out they have cancer, they despair because of the mental link between money and treatment. We have seen families ruined because they had to sell everything to buy medicines that the public-health system does not yet provide. A person with cancer alters the entire family ecosystem: because resources are limited, because the patient needs to be taken care of—and this is detrimental to time spent in work and

118. Strasser-Weippl *et al*, "Progress and remaining challenges".

119. Bossert *et al*, "Comparative Review".

120. A Aggarwal *et al*, "The challenge of cancer in middle-income countries with an ageing population: Mexico as a case study", *ecancermedicalscience*, 2015.

121. F Knaul *et al*, "Household catastrophic health expenditures: a comparative analysis of twelve Latin American and Caribbean Countries", *Salud Pública de México*, 2011.

therefore to familial finances. The family spirals down unless something, such as public-sector healthcare, steps in to stop the fall."

These are the extreme situations. More common, as the LACCS finance domain results show, is that in the study countries even those with few economic resources and no insurance or social security coverage get some cancer care. Here, however, the disparity in quality between this treatment and that received by those with access to social security-based or private systems is a substantial issue.

As Mr Zoss puts it, in many Latin American countries fragmented healthcare structures "provide minimum care for poor and unemployed people. There is biased allocation of resources and inequities in cancer care across population groups." Public networks designed to serve the poor, while certainly better than nothing, typically have far fewer resources per capita. The lack of interaction between the different health systems means that poorer patients cannot access clinicians or equipment in better-supplied ones. Julio Frenk, an academic health expert and former Mexican health minister, has characterised the situation of such parallel health networks without meaningful interaction as "medical apartheid" because of how it entrenches inequality of access.[122]

As noted above, Brazil's SUS lags behind the country's private healthcare providers in taking up new treatments. To illustrate the results, Dr Lopes contrasts the fates of his grandfather and his great-uncle. Both brothers were diagnosed with treatable cancers. His great-uncle, who had to rely on the public system, did not receive the necessary medication and died within a year. His grandfather, who could access the military health system because of his army service in the second world war, had excellent treatment and recently celebrated his 90th birthday.

More broadly in the region, the clear correlation between lower socioeconomic status and poorer cancer survival indicates that those who are less well-off simply do not receive the same quality of screening and care.[123] As Dr Medici notes, the major equity failing of cancer control in the region is that "the poorest part of the population does not have access to adequate cancer prevention, extensive health promotion measures or early detection."

Inequalities in access between city and country

Overlapping Latin America's socioeconomic disparities in cancer control are geographical ones. On average, 22% of the population in the study countries live in rural areas (see chart 22). These are typically worse off economically than cities: in the study countries for which data are available, on average 20% of the urban population live in poverty; in rural ones the figure is 33%.[124] Not surprisingly, the former have better healthcare and access to cancer treatment.

The disparity between countryside and city begins with screening. A Mexican study, for example, found low frequency of mammography and follow-up of abnormal findings in a poor rural area, largely because of a lack of medical facilities.[125] Meanwhile, in Brazil, cervical-cancer screening appears to be performed less frequently in rural provinces than in more urbanised ones.[126] At an extreme, one study calculated that between 1987 and 2008 the odds of a woman living in rural

122. R Atun *et al*, "Health-system reform and universal health coverage in Latin America", *The Lancet*, 2015.

123. See studies cited in Strasser-Weippl *et al*, "Progress and remaining challenges."

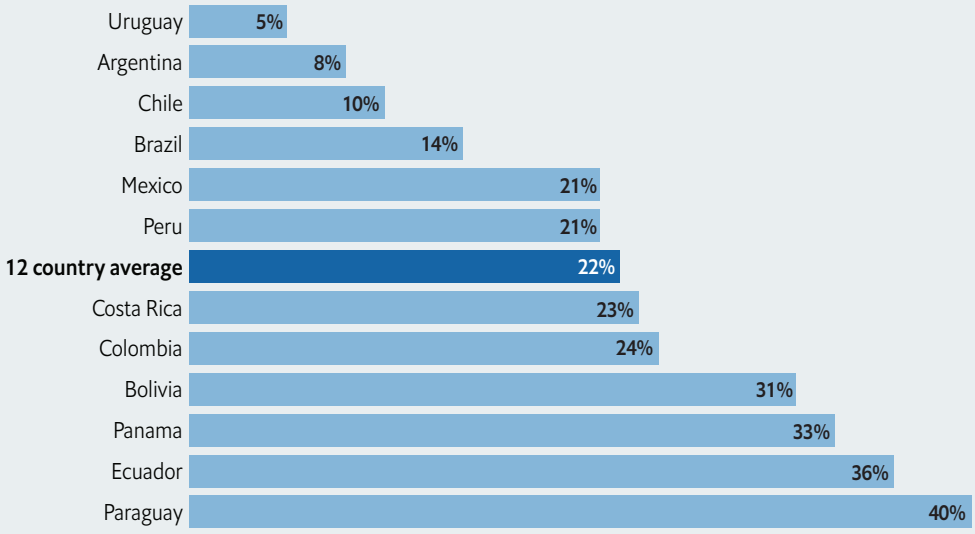
124. Economist Intelligence Unit calculations based on data from CEPALSTAT, Anuario Estadístico de América *Latina y El Caribe*, 2016.

125. S Sosa-Rubí *et al*, "Práctica de mastografías y pruebas de Papanicolaou entre mujeres de áreas rurales de México", *Salud Pública de México*, 200.9

126. Goss *et al*, "Planning cancer control in Latin America".

Chart 22

Share of the population living in rural areas



Source: The Economist Intelligence Unit calculations based on data from CEPALSTAT, Anuario Estadístico de América Latina y El Caribe, 2016.

Ecuador having a Pap smear done were only about one-half of those of a woman living in a city.[127] Quality is also a big issue. In Brazil, 10% of Pap smears are unreadable; in rural Amazonas state this figure rises to 60%.[128]

Part of the reason is the greater difficulty in reaching people who are geographically more spread out. Mr Gaviria explains that, even though the vast majority of Colombians have some form of health insurance, "an important challenge—and our main target—is to improve access to health services, mainly health promotion and prevention, to those who do not have the facilities due to either geographic or cultural barriers."

This will require new methods, says Dr Murillo: "It would be impossible to do cervical-cancer screening the same way in the Amazon region and Bogotá. Some communities are hard to reach for early detection or treatment." At the same time, the facilities which could support screening and early diagnosis are also far less helpful. For example, as Dr Mohar explains of his country: "Mexico is a middle-income country, but in rural areas it is sometimes very poor. Access to primary care is quite weak. That is why there are late diagnoses." He sees the draft NCCP as an opportunity to build up rural care.

The disparity between city and country in terms of cancer treatment is even starker than for screening. What Dr Pradier says of Argentina could apply widely: "There is a big difference between the big centres in the cities, which are well-equipped, and what is available in remote regions." For example, as table 12 shows, linear accelerators are typically much more concentrated in national

127. Soneji and Fukui, "Socioeconomic determinants of cervical cancer screening in Latin America".

128. Bychkovsky *et al*, "Cervical Cancer Control in Latin America".

capitals or other major cities that their populations would warrant. Argentina, with its provincially run healthcare, is the only one to have escaped this problem.

Table 12: Availability of linear accelerators in national capitals

	% of linear accelerators in national capital*	% of national population living in greater national capital metropolitan area
Argentina	30%	35%
Bolivia	50%	17%
Brazil*	23%	16%
Chile	50%	36%
Colombia*	60%	35%
Costa Rica	100%	24%
Ecuador	50%	11%
Mexico	32%	16%
Panama	100%	43%
Paraguay	100%	36%
Peru	59%	32%
Uruguay	66%	50%

Note: For Brazil, figures are for São Paulo and Rio de Janeiro combined; for Colombia they are for Bogotá, Cali and Medellin.
Source: Economist Intelligence Unit calculations based on IAEA, *Directory of Radiotherapy Centres*; EIU Canback, Canback Global Income Distribution Database (C-GIDD).

Human resources are also highly concentrated, notes Dr Lopes. "Most cancer specialists in Latin America are still in large, tertiary cancer centres in urban settings. In Brazilian cities you have good care, especially in the private sector, but in the Amazon there is practically no access." In Peru, meanwhile, 85% of oncologists live in the capital, while some of the country's states have none. In Colombia, meanwhile, over 60% of oncologists live in the four largest cities.[129]

Even smaller countries face this issue. Panama has the second-smallest landmass of any of the study countries. Dr Juan Pablo Barés, president of FUNDACANCER, a Panamanian NGO, and former director of the country's National Oncological Institute, believes that overall the country has the necessary human resources to address cancer. However, he adds: "Because the only public cancer treatment centre is in Panama City, access for those living in rural and remote areas is not easy, which can lead to delays in early detection and treatment."

Costa Rica also shares this issue. Dr Vargas reports that, although a national network of breast-cancer clinics has had great success, "our main [cancer-control] weakness is the need to create an oncology network which can facilitate easy and opportune accessibility to the rural population, so they have an easier transition to our main hospitals in San José."

The effect of the urban-rural divide on patients from the countryside is multifaceted. The costs of travel and time away from work for the rural poor to go to a major city are significant. Dr Vallejos explains: "Peru is too big [for care concentrated in cities to work]. We don't have good roads. From

[129] Goss *et al*, "Planning cancer control in Latin America".

the jungle, the only way to reach Lima is by airplane—and that is expensive. It would be impractical for everyone to go to a cancer institute. We have to look for the rural population and provide them with services."

The problems can go far beyond immediate costs. In Ecuador, Mr Merino says, about 30% of paediatric cancer patients in Quito's hospital are from the countryside. This practically ensures that the parent—usually the mother—who accompanies her child will lose employment. At the same time, about one-third of these children are not receiving any formal education.

Perhaps the most pernicious impact of the combined effects of health-system fragmentation and wealth and geographical disparities in cancer care is on the attitudes of those worst-served by healthcare systems. Dr Trimble notes: "In those areas that lack access to treatment and diagnostic capability, cancer generally presents late and is associated with bad outcomes." This, in turn, perpetuates stigma and fear, which delays presentation, driving a vicious circle.

To break that circle, Latin American countries will have to go beyond progress in providing more of the poor with basic healthcare access to applying limited cancer-control resources more efficiently to where they are needed. It is hard to disagree with Dr Lopes when he says: "In some of the region's healthcare systems you could have even better results spending less money if they were just better organised."

CONCLUSION: CENTRALISING AND DECENTRALISING

As far as cancer control is concerned, Latin America is truly a land of intermingled light and shadow. Important steps forward—such as widespread HPV vaccination, increasingly stringent anti-tobacco laws and growing access to some healthcare for the previously uninsured—are accompanied by enduring problems such as an accelerating obesity epidemic, "medical apartheid" that is restricting poorer citizens to less well-resourced care, and a widespread lack of palliative care. Indeed, any region where two nearby countries elect as presidents an oncologist and the scion of a cigarette-manufacturing family seems intent on defying easy generalisations about cancer control.

It would be wrong to ignore the real progress that has been made in recent years, but it would also be negligent to believe that what has been achieved so far is enough. Cancer incidence is set to rise rapidly across the region, and if nothing is done the mortality rate will rise faster, more than doubling by 2035. Meanwhile, the complexity of the challenge will also increase as the epidemiological transitions occurring at different paces between and within countries create a kaleidoscope of cancer burdens that require a wide range of responses.

Latin America is too diverse for simple prescriptions to meet this challenge to have any value. Each country has its own specific set of cancer issues, and national responses must build on the sometimes very different cancer-control assets already in place. (The country case studies accompanying this regional report will shed more light on country-specific challenges and responses.)

Nevertheless, this study shows that policymakers across the region would do well to consider five key areas.

- Cancer planning: National Cancer Control Plans have become far more common in Latin America, but in some countries they are still lacking, and in others they exist largely on paper. Policymakers need to make sure that they have an NCCP that is fit for purpose, with the resources in place for implementation.
- Data monitoring: Data registries have improved greatly in the region, but most countries still have at best only a partial idea of the cancer challenge they face and how it is evolving. Mortality data are frequently poor as well. Governments which are serious about mounting an effective response to the disease will need to invest here, so that they can understand the challenge they face.
- Building on success in prevention and early diagnosis: HPV vaccination programmes and tobacco-control legislation are important accomplishments that will save lives. Going further to address the obesity epidemic and other risks will require education to convince people of the need to give up bad habits; this might then be supported by regulation, such as sugar taxes. Effective screening, meanwhile, will not occur unless programmes are better integrated into healthcare provision overall.

- Finding the necessary tools: All governments have a wide variety of demands on their budgets, many highly worthy of attention. When balancing priorities, however, policymakers will need to understand that in order to address the current cancer burden, let alone prepare for its inevitable growth, the budgets for healthcare in general, and for specialist oncological human resources and equipment in particular, will have to grow.
- Breaking down barriers to access further: More people in the region have access to healthcare, and cancer care, than ever before. All too often, though, the poor, those living in the countryside and people in the "wrong" healthcare system are still getting insufficient access to cancer control. The region is engaged in multiple experiments to address this problem. Policymakers should remain alert for any that appear relevant to their national circumstances.

The danger of such an agenda is that it seems too much like a shopping list, with effective cancer policy reliant on a wide range of actors, not all of whom might see it as a leading priority. The need is to go beyond tightly focused programmes—which any number of Latin American countries have been able to deliver—to an integrated, comprehensive strategy.

Accomplishing this amid the region's fragmented health systems requires a change in governance. Accordingly, a growing trend in the region may show a way towards allowing further progress in the fight against cancer.

It begins with policy centralisation as a way of making sure someone is focused on the issue. Dr Vallejos explains that the key first step in putting in motion what became Peru's Plan Esperanza was "to isolate cancer management as a unique problem. One of our main strengths now is, like the NCI in the US, to have an institution that controls all the cancer policy in the country. That is an achievement we have to try to preserve." Brazil's National Cancer Institute, INCA, has always had a policy guidance role. Similarly, since 2010, Argentina's INC has provided a sense of cohesion to the country's cancer policy, launching various national vaccination, screening and palliative-care initiatives.

Others are hoping to move in this direction. In Mexico, INCan took the lead role in drafting the proposed new NCCP and would doubtless be a major player in its implementation. Professor Jimenez reports that cancer specialists in Chile have proposed a centralised agency "to devise and construct, in a participatory mode, a policy for cancer" there. Similarly, Dr Rolón reports that Paraguay's National Cancer Institute is in advance negotiations to "become the governing body of cancer policies in the country".

Accompanying this drive towards centralising policy oversight is—perhaps counterintuitively—a drive to decentralise care provision. The need is widely recognised. A key part of the Chilean proposal is to delegate the appropriate kind of interventions to the appropriate levels, be they primary, secondary or tertiary care, or even to other public agents such as schools. Similarly, Dr Barés believes that Panama "requires the decentralisation of the National Oncological Institute".

Other countries look set to take steps in this direction. A pilot programme that is part of the change at Paraguay's NCI is to help local family health units conduct colorectal-cancer screening. Mexico's draft NCCP would be implemented by a range of primary- and secondary-care actors.

Such decentralisation has been taking place in Peru, which in addition to its national cancer institute, the Instituto Nacional de Enfermedades Neoplásicas (INEN), is now building its fourth regional one. However, Dr Vallejos says that the most important part of providing more distributed care has been to harness the existing network of community health workers to provide vaccinations, health promotion and basic diagnosis and referral.

Putting a single organisation with the ability to co-ordinate actions across the health and other government services in charge of forming and overseeing cancer policy may be the way to square the circle of Latin America's complex health systems and provide the most efficient use of the limited funding and other resources available.

APPENDIX: METHODOLOGY

The aim of the Latin America Cancer Control Scorecard (LACCS) is to provide a rapid quantitative assessment of policies and programmes designed to reduce inequalities in cancer-care access in 12 Latin American countries. The Economist Intelligence Unit's healthcare team performed a rapid literature review for relevant systematic reviews in bibliographical databases and internet searches to identify priority policy areas to improve access to, and reduce inequality in, cancer care.

The domains and constituent indicators are designed to cover the most important issues for the region. Each domain is made up of one or more indicators. Because domains ranged in their constituent number of indicators, we normalised scores by standardising all scores on a 0-5 scale. Final scores are given for domains and countries. The purpose of the scorecard is not to rank countries but rather to identify opportunities for future policy development.

The six domains and how they help to reduce inequality of access are as follows:

1. Strategic plan

Cancer-control plans and strategies enable countries to understand the current situation and predict future trends in order to formulate action plans accordingly. Data were sourced from the World Health Organisation (WHO), the International Cancer Control Partnership, ministries of health and other relevant government agencies.

The indicators within this domain assessed:

a. Cancer plan existence;

b. whether the cancer plan is up-to-date; and

c. whether there is specific provision to address inequalities.

2. Monitoring performance

Registries collect data about cancer outcomes over time, enabling epidemiological research into incidence, prevalence and outcomes. They also provide data to evaluate the impact of policy changes over time. Data were sourced from the WHO, the Pan American Health Organisation (PAHO) and the International Agency for Research on Cancer (IARC).

The indicators within this domain assessed:

a. Registry existence;

b. how much of the population is covered by registries; and

c. the quality of registry data.

3. Medicines availability

Medicines are essential for cancer care. Therefore, it is important that there is access to basic, newer and novel chemotherapy drugs for lung cancer as the biggest regional killer. The anti-cancer drugs in these indicators were selected by looking at drugs that are recommended to treat lung cancer in the UK, Australia, Canada (province of Ontario), France and Germany. These countries were selected as examples of mature, well-developed and evidence-based health systems, using rigorous health technology appraisal processes to decide on whether to reimburse drugs. Morphine for pain relief is also a key part of supportive and palliative care in cancer, with an indicator exploring consumption in mg per capita. Data on availability were sourced from either national formularies or formularies with large coverage as well as the University of Wisconsin.

The indicators within this domain assessed:

a. The availability of four key older anti-cancer agents for lung cancer: docetaxel, gemcitabine, paclitaxel and vinorelbine;

b. the availability of three newer anti-cancer agents for lung cancer: gefitinib, pemetrexed and erlotinib;

c. the availability of three novel anti-cancer agents for lung cancer: ceritinib, crizotinib and osimertinib; and

d. whether morphine consumption (mg per capita) is above or below the average among the included countries.

4. Radiotherapy availability

Late diagnosis within the region makes radiotherapy important for curative and palliative care. However, there are concerns about the number of available radiotherapy units and trained personnel to operate them. Data were sourced from the WHO, the Cancer Atlas and the PAHO.

The indicators within this domain assessed:

a. The proportion of radiotherapy units that are available in the public sector;

b. the proportion of people requiring radiotherapy who can access it; and

c. whether the number of radiation oncologists per 1m population is above or below the average among the included countries.

5. Prevention and early detection

Late diagnosis is an issue for the Latin America region, leading to high mortality rates. Adjusting risk factors and detecting cancer early to improve prognosis is important for the region. Data were sourced from the WHO, the PAHO, the IARC, the Information Centre on HPV and Cancer, relevant government agencies and scientific literature.

The indicators within this domain assessed:

a. The proportion of the tobacco price accounted for by taxation;

b. whether there is a tax levied on sugary products;

c. whether an HPV vaccination schedule is in place;

d. the percentage of the target population receiving HPV vaccination;

e. whether a breast-cancer screening programme is in place;

f. the percentage of the target population receiving breast-cancer screening;

g. whether a cervical-cancer screening programme is in place; and

h. the percentage of the target population receiving cervical-cancer screening.

6. Finance

Access to insurance schemes and coverage of cancer care within insurance schemes varies between and within countries. Therefore, uninsured cancer patients may incur catastrophic out-of-pocket healthcare costs. Data were sourced from the WHO, the World Bank and interviews conducted by The Economist Intelligence Unit.

The indicators within this domain assessed:

a. Whether there is substantial funding for cancer care either within universally available healthcare systems or through specific catastrophic health expense/cancer funding for those without access to private or social security-funded healthcare;

b. the proportion of government health spending as a percentage of GDP, compared with the average among the included countries;

c. the proportion of government health spending as a percentage of GDP, compared with the OECD average;

d. the proportion of total healthcare spending that is "out-of-pocket", compared with the regional average; and

e. the proportion of total healthcare spending that is "out-of-pocket", compared with the global average.

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