Pan American Health Organization

World Health Organization
Americas

This report provides a brief overview of the colorectal cancer screening situation in the region of the Americas. It highlights the differences between North America, South America and the Caribbean, including differences in the ration of incidence to mortality. The report also includes information on the relevance of colorectal cancer screening, the status of screening programs, and examples of the feasibility of implementing programs throughout the region

Colorectal Cancer Screening in the Americas

Situation and Challenges

Colorectal Cancer Incidence and Mortality in the Americas

Colorectal cancer (CRC) is the third most common cancer among men and the second most common cancer among women, worldwide (1). In the Americas, where it is the fourth most common cancer in both men and women, there is an estimated 246,000 people newly diagnosed and approximately 112,000 people dying from the disease each year (1). Incidence and mortality rates in Latin America and the Caribbean (LAC) are generally lower than the USA and Canada, with the exception of Uruguay, Argentina, Barbados, and Trinidad & Tobago where incidence rates are similar to USA and Canada **(Fig-1)**. However, CRC incidence rates in the USA and Canada have generally stabilized in the last decade (2), whereas in LAC, CRC incidence rates are generally increasing. This is owing to demographic changes, such as increases in life expectancy, as well as changing lifestyles and dietary patterns, among other factors. The prediction is that, CRC incidence in the Americas will increase by 60% to 396,000 new cases by 2030, and this increase will be more dramatic in LAC, where it will be almost double the increase in the USA and Canada (1).

CRC mortality rates have been declining in the USA and Canada, whereas in many countries in LAC the mortality rates are increasing (3) **(Table 1)**. As noted by differences in the mortality to incidence ratios between LAC, and USA and Canada the chances of survival from CRC are much lower in LAC (**Table 1**). While the mortality to incidence ratio in Canada and the US are 0.30 and 0.37, respectively, in most LAC countries this ratio is on average approximately 0.60. This difference between Canada and the US with the rest of the countries in the Americas serves as an indication of differences that may exist in health care, including CRC screening, early detection and treatment. There are perhaps lessons that can be learned from the USA and Canada experiences with CRC programs that can be used to address the growing burden of CRC in LAC.

Strategies to Reduce CRC Incidence and Mortality

Age, family history, race or ethnic background are among the main non-modifiable risk factors for CRC; while diet, physical activity, weight, smoking and alcohol consumption are modifiable factors that can reduce risks for colorectal cancer. **Primary prevention** strategies that include public policies and individual behavior change that support healthy dietary patterns, regular physical activity, maintaining a healthy body weight, not smoking and not drinking alcohol are important strategies for colorectal cancer prevention, as well as prevention of other noncommunicable diseases (4). S**econdary prevention** is feasible for colorectal cancer through screening with tests that include flexible sigmoidoscopy or colonoscopy, which detect colorectal polyps, that can be surgically removed before they develop into

CRC (5). Other tests include guaiac-based fecal occult blood test (gFOBT) or fecal immunochemical tests (FIT) are used to look for signs of colorectal cancer in stool. **Tertiary prevention** includes the treatment of the invasive colorectal cancer, based on its stage, and involves surgery and chemotherapy, and sometimes radiotherapy. When CRC is diagnosed at an early stage, the overall survival rate can be over 90%, whereas when diagnosed at a late stage, there are considerably low chances of survival (6).

Screening for colorectal cancer is an effective strategy to reduce mortality, by an estimated 20% (7, 8). The time between the appearance of colorectal polyps and the onset of CRC is estimated to be about 10-15 years (5, 9), which makes CRC suitable for population screening (9). Screening programs in USA and Canada have contributed to reducing their CRC mortality. However, most countries in LAC have not yet established CRC screening programs (10) and where screening exists, the coverage is quite low **(Table 1)** . There are several barriers to establish CRC screening programs in LAC, including their economic situation, weak health systems, limited healthcare infrastructure, limited trained health providers, and low awareness of the disease (11).

What Are The Current CRC Screening Guidelines?

The Pan American Health Organization (PAHO)/World Health Organization (WHO) guide on *Cancer Control: Early detection* recommends colorectal cancer screening only when resources permit, but PAHO/WHO does not have a specific guideline for CRC screening, at present. The International Agency for Research on Cancer, a specialized agency of WHO, has developed the European Commission's *European Guideline for Quality Assurance of Colorectal Cancer Screening (12)*, which includes an evidence review of screening strategies. Several national professional associations have issued guidelines, and a review of various guidelines was recently published (13). The review includes the CRC screening guidelines of the World Gastroenterology Association (14), the American College of Gastroenterology (9), the American Cancer Society/US Taskforce/American College of Radiology (15), the Argentinian National Consensus Program (16) and the American College of Physicians (17). In general, these guidelines recommend the range of screening tests available and offer different strategies for the average population and the at risk population. The decision of which populations are at higher risk is generally made by the attending physician (17) based on family history of colorectal cancer, ethnicity or race, previous history of inflammatory disease, and exposure to other risk factors (14).

Regarding age to initiate population based CRC screening, current guidelines are to begin at age **50 years for average risk populations,** and to begin at age **40 years for high risk populations.** Some guidelines recommend to stop screening in people **75 years** of age (17). The intervals of screening vary

according to the screening test used, and range from every year when using the fecal blood test to every 10 years when using colonoscopy.

Regarding **recommended screening tests,** no one test is recommended over another, as each has it's pros and cons, and the selection of test will depend on available resources and feasibility to implement (14, 15). Colonoscopy, however, is the standard test most widely used. Some recommend first testing with the fecal blood test and then triage those with abnormal results to colonoscopy for further evaluation. Regardless of the screening test, an organized program with quality assurance that reaches a high screening coverage, particularly of the high risk population, and high follow up treatment rate, is needed.

CRC Screening Programs in the Americas

The status of CRC screening guidelines and programs in the Americas is summarized in **Table 2** (10). Twelve countries report having national guidelines for CRC screening, and fourteen countries report having either a population based CRC screening program (3 countries) or opportunistic screening (11 countries). **Canada** (with the exception of its three territories) has an organized CRC screening program, reporting a screening coverage of 43% nation-wide. In the **USA,** although most of the CRC screening programs are opportunistic there are some examples of successful population based CRC screening programs organized by both private and public institutions (18).

In Latin America, only Brazil (in the Sao Paulo region), Chile and Argentina have developed population-based CRC screening programs. However, these programs are reported to be in pilot phase and cover only urban areas (18). Cuba, Ecuador, Mexico, Puerto Rico and Uruguay report opportunistic programs (table 2).

In the non-Latin Caribbean countries, organized CRC screening is uncommon. Some countries including Antigua and Barbuda, Bahamas, Barbados, Jamaica and Trinidad and Tobago report having opportunistic CRC screening **(Table 2)**.

Experiences with CRC Screening in LAC

Given this situation, CRC screening programs need to become a higher public health priority and investments in developing quality programs is urgently needed. Some LAC countries are demonstrating that this is feasible. In Brazil, for example, a large CRC screening program was initiated. It involves an education campaign, screening asymptomatic average risk population with an fecal occult blood test (FOBT) and referral for diagnosis and treatment (19). In this pilot program, good coverage of 54.8% was achieved, and its long term results have not been analyzed yet.

In Chile, in 7 cities in a population 50 years of age and older, screening with FOBT was initiated, and those with abnormal results are referred for colonoscopy (20). Although it was a successful pilot project, there were issues with quality assurance with colonoscopy. However, these issues are being addressed as part of another screening project, called PRENEC, organized in collaboration with the Tokyo Medical and Dental University (TMDU) in Tokyo, Japan, as part of an international collaboration (21). The algorithm to treat patients were the same than in the previous study but in this case double blind studies were introduced in order to assess the interpretative quality of colonoscopy achieved by the Chilean doctors, as compared to their Japanese counterparts. The project's impact was not only with earlier detection of colorectal cancer, but also an increase in the health workers' capacities and improvements in the quality of colonoscopy. The PRENEC program has been extended to other Chilean hospitals and is currently being implemented in Paraguay.

In Uruguay, also in collaboration with Japan, a similar pilot project was conducted to evaluate the feasibility of colorectal cancer screening, using immunochemical fecal occult blood tests in an average-risk population (22). This study, recruited patients through mass media campaign and screened more than 11,000 people.

In Mexico, a CRC screening program was initiated in 2009, using colonoscopy in an asymptomatic population of 40- 79 years of age (23).

Barriers for Establishing CRC Screening Programs in LAC

The economic circumstances of countries in LAC, coupled with often weak health systems, limited health human resources, and low awareness and demand for CRC screening are some factors that inhibit successful development and implementation of programs in LAC (18). In addition, there are barriers to achieve high screening coverage that include limited locations for CRC screening and diagnosis, out of pocket expenses for tests, long wait times for medical appointments and test results, among others (11, 24).

Population awareness about colorectal cancer is key to ensure a high screening coverage and compliance with further evaluation and treatment. In this regard, many countries such as Venezuela, Peru, Bolivia, Costa Rica and Colombia report low awareness and need to increase public awareness of CRC (11, 18).

The efforts to lift the barriers described in this section do not require great technological resources and they can be carried out at any level of the health service, from primary, in small health centers, to tertiary, in large hospitals. Considering that their execution is simple and that their impact on mortality

is so positive, new campaigns should be encouraged so that more and more people can be educated on how important prevention and screening are, health providers can be trained and new infrastructure provided in the health system.

Cost-effectiveness of CRC Screening in LAC

Cost-effectiveness analyses are important to convince decision-makers to invest in any new health program, especially in limited resource settings. Several studies have concluded that CRC screening is a cost effective intervention (25-27). This is not surprising given the high incidence of the disease in some countries and the high cost of cancer treatment. However, most of the evidence on cost-effectiveness of CRC screening is based on studies in high resource countries. The evidence from low- and middle-income countries is limited, although some studies support the cost effectiveness of CRC screening in LMIC (28). A study in Colombia (29) compared six different screening strategies and concluded that only one of them (FOBT every two years) was cost-effective for the country. Similar conclusions were obtained in Argentina where the fecal occult blood test, every year, was considered the most cost effective strategy (30). Regardless of the test used for screening, the health system must ensure availability of colonoscopy and cancer treatment, otherwise CRC screening will not be effective.

Conclusions

- CRC incidence and mortality are increasing in LAC, where mortality to incidence ratios are much higher than in the USA and Canada.
- Screening for CRC can effectively reduce mortality, but organized CRC screening programs with quality assurance processes are lacking in many countries in the region.
- Some demonstration projects and research studies have been carries out in LAC and demonstrate the feasibility of establishing CRC screening programs in these settings.
- The barriers for establishing CRC screening programs include economic circumstances of the country, weak health systems, limited health human resources, limited infrastructure, and low awareness of CRC among providers and the public.
- More advocacy, information and education and investments in CRC screening and treatment are urgently needed in the region.
- More research is needed on how to implement affordable and effective CRC screening programs in limited resource settings.
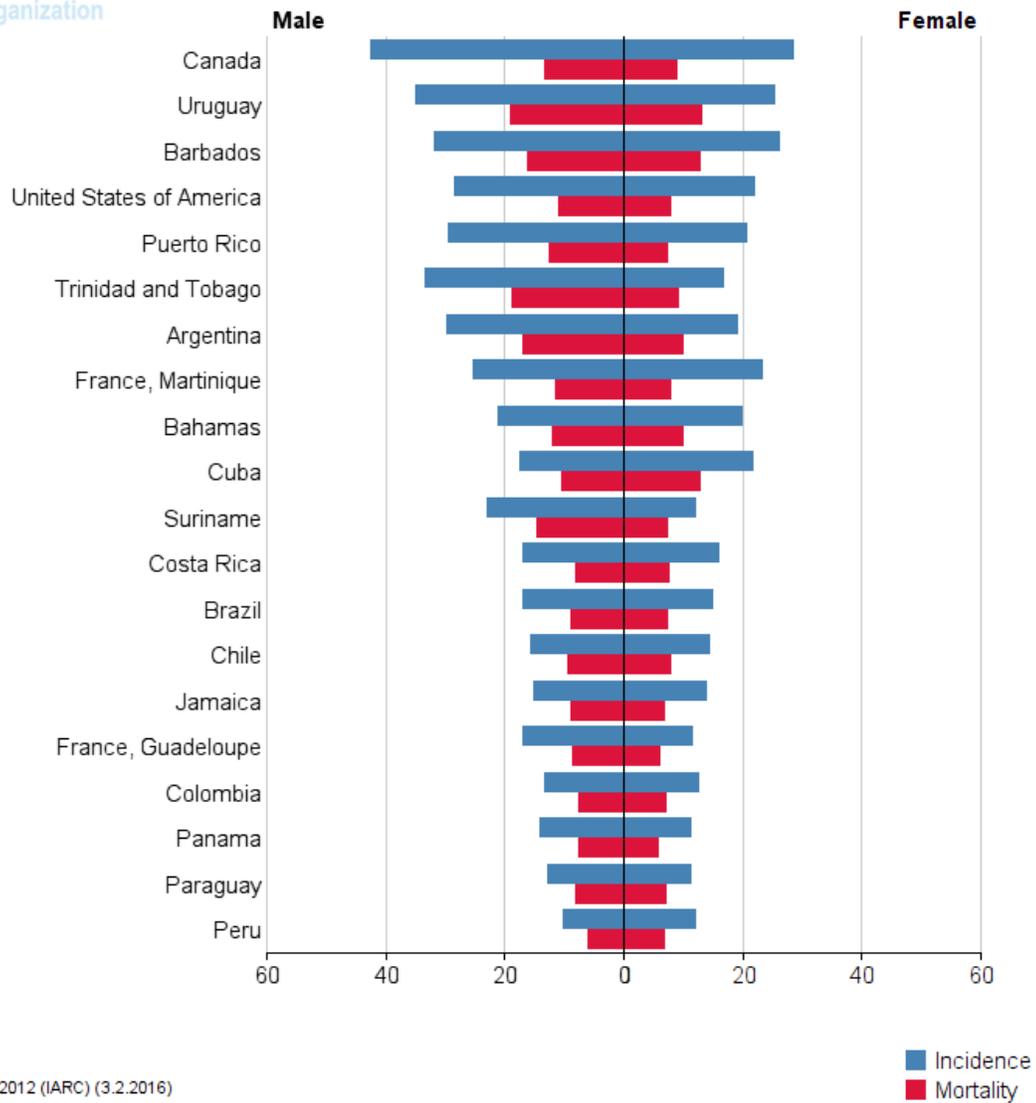
Figure 1. Incidence and Mortality of Colorectal Cancer in the Américas.
Source: GLOBOCAN 2012 (IARC)

	TABLE 1: Colorectal Cancer in the Americas						
Country	Population [a]	Population [a] >50 years old	Number of CRC new cases	CRC incidence rate (per 100,000)[b]	Number of CRC deaths	CRC mortality rate (per 100,000)	annual % change in mortality [c]	Mortality to incidence Ratio
Antigua y Barbuda	92,000	21,436	No data	No data	No data	No data		No data
Argentina	43,847,000	10,961,750	13,558	23.8	7,949	13.0	0.12	0.55
Bahamas	392,000	98,784	79	20.3	42	10.8		
Barbados	285,000	98,040	127	28.4	66	14.1		0.53
Belize	366,000	48,678	21	9.0	13	5.6	No data	0.62
Bolivia*	10,848,000	1,785,632	673	9.1*	424	5.7	No data	0.63
Brazil	209,567,000	48,409,977	33,949	15.8	17,607	8.0	-0.01	0.51
Canada	36,286,000	13,679,822	23,769	35.2	8,107	10.8	-0.97	0.30
Chile	18,131,000	5,203,597	3,582	15.0	2,152	8.6	0.95	0.57
Colombia	48,654,000	10,606,572	5,633	12.9	3,207	7.2	2.24	0.56
Costa Rica	4,857,000	1,194,822	819	16.4	396	7.8	1.79	0.48
Cuba	11,392,000	4,009,984	3,896	19.7	2,476	11.6	0.39	0.59
Dominica*	73,000	13,286	No data	No data	No data	No data		No data
Dominican Republic	10,648,000	1,991,176	987	10.2	607	6.0	No data	0.59
Ecuador	16,385,000	3,080,380	1,504	10.7	945	6.4	3.23	0.59
El Salvador	6,146,000	1,235,346	524	8.5	326	4.9	0.24	0.58
Grenada	107,000	21,186	No data	No data	No data	No data		No data
Guatemala	16,672,000	2,134,016	428	4.3	299	2.9	No data	0.67
Guyana	770,000	156,310	57	9.3	38	6.3	No data	0.68
Haiti	10,848,000	1,518,720	487	6.8	369	5.2	No data	0.76
Honduras	8,189,000	1,146,460	373	6.9	248	4.5	No data	0.65
Jamaica	2,803,000	650,296	439	14.4	257	7.9	No data	0.55
Mexico	128,632,000	23,925,552	8,651	7.8	4,694	4.1	1.33	0.53
Nicaragua	6,150,000	959,400	331	7.9	237	5.5	0.00	0.70
Panama	3,990,000	825,930	454	12.5	247	6.6	-0.41	0.53
Paraguay	6,725,000	1,123,075	644	12.1	408	7.5	2.24	0.62
Peru	31,774,000	6,100,608	3,053	11.1	1,806	6.4	3.17	0.58
Puerto Rico	3,680,000	1,170,240	1,490	24.6	632	9.6	1.34	0.39
Saint Kits and Nevis*	55,367	12,181	No data	No data	No data	No data		No data
Saint Lucia	186,000	44,640	No data	No data	No data	No data		No data
Suriname	547,000	115,964	89	16.7	56	10.3	No data	0.62
Trinidad and Tobago	1,364,000	379,192	357	23.5	197	13.1	No data	0.56
Uruguay	3,444,000	1,046,976	1,752	29.5	1,058	15.7	No data	0.53
USA	324,118,000	113,765,418	134,349	25.0	55,259	9.2	-2.81	0.37
Venezuela*	31,518,000	6,114,492	10.7	11.5	1,671	6.1	-2.75	0.53

Sources: [a]http://populationpyramid.net/, [b]Globocan, 2012, [c] PAHO Country profiles 2013.

**This value is obtained from several; East Caribbean countries

TABLE 2: Colorectal Cancer Screening Program Characteristics in the Americas					
Country	Is there a CRC screening guideline?	Recommended ages (years)	Test/interval	Type of Program	Screening Coverage
Antigua and Barbuda	Yes	---------	Colonoscopy	Opportunistic	---------
Argentina	Yes	50-70	FT	Opportunistic	10-50%
Bahamas	No	---------	---------	Opportunistic	---------
Barbados	No	---------	---------	Opportunistic	---------
Belize	No	---------	---------	---------	---------
Bolivia	---------	---------	---------	---------	---------
Brazil	Yes	>50	FT/every year	Population-based	---------
Canada	Yes	50-74	FT/ every 2 years	Population-based	42.8%
Chile	Yes	>50	FT/every year	Population-based	---------
Colombia	Yes	>50	FT or colonoscopy /every 2 years	---------	---------
Costa Rica	No	---------	---------	---------	---------
Cuba	Yes	>50	FT	Opportunistic	>70%
Dominica	No	---------	---------	---------	---------
Dominican Republic	No	---------	---------	---------	---------
Ecuador	Yes	50-74	FT	Opportunistic	<10%
El Salvador	No	---------	---------	---------	---------
Grenada	No	---------	---------	---------	---------
Guatemala	No				
Guyana	No	---------	---------	---------	---------
Haiti	No	---------	---------	---------	---------
Honduras	No	---------	---------	---------	---------
Jamaica	No	---------	---------	Opportunistic	---------
Mexico	Yes	>50	FT/every year	Opportunistic	---------
Nicaragua	No	---------	---------	---------	---------
Panama	No	---------	---------	---------	---------
Paraguay	No	---------	---------	---------	---------
Peru	No	---------	---------	---------	---------
Puerto Rico	Yes	50-75	FT, sigmoidoscopy or colonoscopy	Opportunistic	
Saint Kitts and Nevis	No	---------	---------	---------	---------
Saint Lucia	No	---------	---------	---------	---------
Suriname	No	---------	---------	---------	---------
Trinidad and Tobago	No	---------	---------	Opportunistic	---------
Uruguay	Yes	>50	FT/every 2 years	Opportunistic	
USA	Yes	50-75	FT, sigmoidoscopy or colonoscopy		58.6%
Venezuela	No	---------	---------	---------	---------

FT: Fecal Occult BloodTest

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