

Chapter 12: The Rising Cancer Pandemic in Latin America: Major Cancer Problems and Prospects for Prevention

Michail K. Shafir

In Latin America and the Caribbean there are striking differences among nations regarding the stage of disease and time of diagnosis as well as the incidence and survival. These differences depend on ethnicity, race, and socioeconomic status. Hence, Michail Shafir examines the very different scenarios that can be encountered by pointing to challenges—worsened by the COVID-19 pandemic—in realizing prevention, monitoring the incidence of specific cancers (i.e., breast, gastric, and cervical), tracing the uneven presence of cancer registries, strengthening the healthcare systems, providing healthcare services, and addressing social and national inequities in access to healthcare.

Globally, cancer is a leading cause of death in 134 countries. An estimated 19.3 million new cancer cases are diagnosed across the world each year and this number is expected to rise to 24 million by 2035. Most of this increase will occur in low- and middle-income countries, which are the least capable of confronting the cancer pandemic or affording costly therapies, often due to important lack of infrastructures.

Cancer is the leading cause of death in the Americas. In 2008, cancer accounted for 1.2 million deaths, 45 percent of which occurred in Latin America and the Caribbean. The projected number of cancer deaths in Latin America and the Caribbean would rise from 1.2 million to 2.1 million from 2008 to 2035. The International Agency for Research on Cancer (IARC) predicted that the cancer burden will increase by 55 percent by 2040, affecting 6.23 millions of people, if no further action is

taken to prevent and control it.¹ However, in 2019 the Pan American Health Organization (PAHO) provided some encouraging signs by showing a decrease in mortality for cancers in twelve Latin American countries: Argentina 17 percent; Colombia 8.2 percent; Chile 12 percent; Brazil 18.8 percent; Peru 20.6 percent; El Salvador 6.5 percent; Costa Rica 7 percent; Paraguay 7.7 percent; Honduras 9.8 percent; Panama 17.3 percent; Nicaragua 4 percent; and Mexico 15.2 percent.²

About a third of all cancer cases could be prevented by avoiding key risk factors. These include tobacco use, harmful consumption of alcohol, unhealthy diet, and physical inactivity.³ Vaccinations and screening programs are effective interventions to reduce the burden of specific types of cancers. Many cancers have a high chance of cure if detected early and treated adequately.⁴

In Latin America and the Caribbean there are striking differences regarding the stage of disease and time of diagnosis as well as the incidence and survival depending on ethnicity, race, and socioeconomic status. Moreover, the number of cancer programs and treatment centers is not necessarily suited to the size of the country. The largest countries are Brazil

¹ World Health Organization and International Agency for Research in Cancer, “Latin America and the Caribbean: Source: Globocan 2020,” March 2020, gco.iarc.fr/today/data/factsheets/populations/904-latin-america-and-the-caribbean-fact-sheets.pdf. See also World Health Organization and International Agency for Research in Cancer, “Global Cancer Observatory (GCO),” 2021, gco.iarc.fr.

² World Health Organization and Pan American Health Organization (PAHO), “Cancer,” 2021, www.paho.org/en/topics/cancer.

³ World Health Organization and Pan American Health Organization (PAHO), “Annual Report of the Director 2019: Advancing the Sustainable Health Agenda for the Americas 2018–2030. Executive Summary,” 2019, iris.paho.org/bitstream/handle/10665.2/51608/Annualreport2019_eng.pdf?sequence=1&isAllowed=y.

⁴ Kathrin Strasser-Weippl, Yanin Chavarri-Guerra, Cynthia Villarreal-Garza, Brittany L. Bychkovsky, Marcio Debiassi, Pedro E. R. Liedke, Enrique Soto-Perez-de-Celis, Don Dizon, Eduardo Cazap, Gilberto de Lima Lopes Jr., Diego Touya, João Soares Nunes, Jessica St. Louis, Caroline Vail, Alexandra Bukowski, Pier Ramos-Elias, Karla Unger-Saldana, Denise Froes Brandao, Mayra E. Ferreyra, Silvana Luciani, Angelica Nogueira-Rodrigues, Aknar Freire de Carvalho Calabrich, Marcela G. Del Carmen, Jose Alejandro Rauh-Hain, Kathleen Schmeler, Raul Sala, and Paul E. Goss, “Progress and Remaining Challenges for Cancer Control in Latin America and the Caribbean,” *Lancet Oncology* 16, no. 14 (2015): 1405–1438.

with a population of 213 million, Colombia (51 million), Argentina (45 million), Peru (33 million), and Venezuela (28 million). However, all these countries have scattered cancer programs, concentrated in very large cities, and only the wealthier populations have easier access to cancer care. Venezuela has a disjointed cancer care program due to an unstable political and economic climate. At the same time, a smaller country, Uruguay, with a population of 3.5 million, has a very organized national cancer program, and it offers universal cancer care.

Latin American countries participate in the CanScreen program of the International Agency for Research on Cancer (IARC), launched in 2019.⁵

Other data help us to characterize the current Latin American context regarding cancer.

The most frequently diagnosed types of cancer among men are: prostate (21.7%), lung (9.5%), colorectal (8%), bladder (4.6%) and stomach (2.9%). Among women, the types of cancer with the highest incidence are: breast (25.2%), lung (8.5%), colorectal (8.2%), thyroid (5.4 %) and cervical (3.9%).⁶

Moreover,

The lifetime risk of being diagnosed with cancer ranges from 26% (1 in 4 persons) in Uruguay to 11% (1 in 10 persons) in Guyana. The corresponding cancer mortality risk ranges from 14% (1 in 7 persons) in Uruguay to 7% (1 in 15 persons) in Mexico. There are

⁵ World Health Organization and International Agency for Research in Cancer, "Canscreen 5," 2019, canscreen5.iarc.fr. See also Vijay Shankar Balakrishnan, "COVID-19: Cancer Care at Stake in Low- & Middle-Income Countries," *Oncology Times* 43, no. 8 (2021): 33, doi.org/10.1097/01.COT.0000749948.96214.8e.

⁶ World Health Organization and Pan American Health Organization (PAHO), "World Cancer Day 2020: I Am and I Will," 2021, www3.paho.org/hq/index.php?option=com_content&view=article&id=15687:world-cancer-day-2020-i-am-and-i-will&Itemid=39809&lang=en. See also World Health Organization and International Agency for Research in Cancer, "Latin America and the Caribbean: Source: Globocan 2020."

marked variations in the incidence and mortality rates of specific cancers across countries: for example, cervical cancer varies sixfold for incidence, from 39 per 100,000 in Bolivia to 7 in Guadeloupe, and a striking 15-fold for mortality, from 19 in Jamaica to 1 in Martinique. While the highest prostate cancer incidence rates are seen in the Caribbean, with 189 per 100,000 in Guadeloupe, the lowest are estimated in Honduras (25). In Bolivia, the most common cause of cancer death is gallbladder cancer.⁷

COVID-19 Pandemic and Cancer in Latin America

The Covid 19 pandemic has complicated access to care of cancer patients. In April 2021, the PAHO's survey revealed that in Latin America cancer screening and treatment were disrupted in 52 percent of countries.⁸ However, this information depends on tumor registries, which in many countries are neither accurate nor complete.⁹ For example, according to Leandro Colli, MD, PhD, and Medical Oncologist at University of Sao Paulo in Brazil, the northwest of the country was affected by COVID-19 harder than the south since the public health system is imbalanced across the country and is severely challenged in poorer regions. He added that the government is not being transparent with the health data, and this lack of transparency worsens the nation's ability to address the complexity of the health situation.¹⁰ Moreover, since the start of the COVID-19 pandemic, the average number of cancer diagnoses has plummeted considerably in all Brazilian regions, resulting in approximately 1,500 undiagnosed cancer cases per month.¹¹

⁷ The Cancer Atlas, "Latin America & the Caribbean," 2021. See also World Health Organization and Pan American Health Organization (PAHO), "Annual Report of the Director 2019."

⁸ World Health Organization and Pan American Health Organization (PAHO), "World Cancer Day 2020."

⁹ Strasser-Weippl et al., "Progress and Remaining Challenges for Cancer Control in Latin America and the Caribbean."

¹⁰ Personal Interview.

¹¹ Balakrishnan, "COVID-19: Cancer Care at Stake in Low- & Middle-Income Countries."

As the COVID-19 pandemic continues, it becomes even more critical to ensure continuity of cancer care. PAHO issued a guidance aimed at reorienting cancer services, prioritizing those people with cancer amenable to treatment, avoiding any cumulative delays in treatment, and preventing an increase in avoidable deaths from cancer. In particular, in order to strengthen cancer programs in Latin America post-COVID-19, PAHO recommended to:

- create national cancer plans with adequate financing, human resources, management, and sufficient monitoring;
- improve screening programs and cancer registries, including creating these registries where they are not available yet or improving their accuracy, when the data gathered are inaccurate or insufficient, by training cancer registrars and sharpening quality indicators;
- strengthen screening and early detection of cervical cancer in women, by striving to eliminate the occurrence of this cancer, which is preventable but very lethal;
- insure sufficient human resources and sufficient infrastructures, including education, to foster the capabilities of all health providers;
- invest in more accurate and widespread pathology services, efficacy, and affordability of cancer drugs, as well as diagnostic and therapeutic technologies;
- develop capabilities for palliative care.¹²

In addition, PAHO presented an overall plan for establishing:

- a national control of cancer for each country in Latin America and the Caribbean;
- primary prevention strategies by developing programs to eliminate tobacco use, limit consumption of excessive alcohol, decrease the consumption of red meat in diets, as well as smoked meat and fish and increase the intake of fruits and vegetables, increase physical activity, promote vaccination programs against papilloma virus and hepatitis B;
- screening and early detection for cervical cancer, breast cancer, and colorectal cancer;

¹² World Health Organization and Pan American Health Organization (PAHO), “Cancer.”

- greater opportunities to diagnose and treat by offering anatomopathology services, surgery facilities, radiation therapy, and chemotherapy, including programs for pediatric oncology;
- palliative care services and access to opioids for pain control in advanced painful cancers.¹³

For PAHO, implementing these plans and achieving these goals depend on national, institutional commitments, but the involvement of communities is needed to strengthen the overall quality of care available to each citizen.

“Best Buys”: Techniques for Cancer Prevention and Early Detection

In addressing the complexity of cancer prevention and early detection in Latin America, a survey of the existing literature stresses the following successful practices:

- cervical cancer tests (Papanicolaou, HPV, and iodine) should be performed in all women starting at age 30;¹⁴
- HPV vaccination should be made available for girls and boys starting at early adolescence. In women, this vaccination will decrease the incidence of cervical cancer by 90 percent when vaccinated against HPV by age 15. In boys, when vaccinated before the age of 15, it will reduce penile cancer by 90 percent;
- mammograms and sonograms should be performed starting at age 40-50 to reduce the incidence of breast cancer; • tests aimed at detecting occult blood in stool should be performed beginning at age 50 to address the risk of colorectal cancer. Further investigations require rigid sigmoidoscopy and colonoscopy;
- digital rectal exam should be performed beginning at age 50 to monitor the prostate.

¹³ World Health Organization and Pan American Health Organization (PAHO), “Annual Report of the Director 2019.”

¹⁴ HPV means Human Papilloma Virus.

What Is the Cancer Reality in Latin America?

In the Latin American continent, there is a marked inequality in cancer care and access to diagnostic and treatment centers, due to poor education and high incidence of poverty. Specific issues deserve particular attention.

Cancer Registries in Latin America

In 2011, only 21 percent of countries in Latin America had a population-based cancer registry, though in only 7 percent the quality of the information gathered was high. As a result, accurate estimations of cancer burden and risks faced by different countries are not possible. The 2013 Lancet Oncology Commission on cancer control in Latin America and the Caribbean showed the shortage of local scientific evidence and economic data regarding cancer prevention and control.¹⁵ Moreover, the authors reported that cancer control programs faced inadequate structural funding, inequitable distribution of resources and services, and insufficient care for many populations based on socio-economic, geographical, and ethnic factors. Accurate, updated, and comparable data are essential to measure effectiveness of health programs. Because of the absence of a real priority assigned to cancer control, the dearth of development of cancer registries is unsurprising. Thus, because of insufficient effective cancer control programs, what concerns cancer registration can be thought of as the tip of the iceberg.¹⁶ More positively, in the past few years cancer registries were added in Argentina, Brazil, Chile and Colombia.¹⁷

Well-functioning registries provide accurate data regarding incidence, prevalence, mortality, and information efforts to reduce the cancer burden

¹⁵ Paul E. Goss et al., "Planning Cancer Control in Latin America and the Caribbean," *Lancet Oncology* 14, no. 5 (2013): 391–436.

¹⁶ Silvina Arrossi, "Cancer Registration and Information Systems in Latin America," *Lancet Oncology* 16, no. 14 (2015): 1400–1401.

¹⁷ Marion Pinerós, M. Graciela Abriata, Les Mery, and Freddie Bray, "Cancer Registration for Cancer Control in Latin America: A Status and Progress Report," *Pan American Journal of Public Health (Revista Panamericana de Salud Publica)* 41 (2017): e2, doi.org/10.26633/RPSP.2017.2.

on individuals and on the whole society. Moreover, registries should also provide data regarding the proportion of the population surviving a cancer, the years of life lost due to cancer death, and the years of life with disability following the initial diagnosis by detailing the type and stage of cancer.¹⁸ Finally, in Latin America, the mortality of pediatric cancers is among the highest in the world.¹⁹

Breast Cancer in Latin America

The incidence of breast cancer in Latin America is increasing yearly, disproportionately when compared to Europe and the United States. The number of cases is unevenly distributed in different countries in Latin America and even within regions of the same country. Women in larger cities have better access to care than those in smaller towns or rural areas. Several studies—conducted in 2006, 2010 and 2013—concluded that breast cancer is the most frequent cancer in the continent and kills more women than any other cancer. The economic burden and inequalities in access to care, particularly in lower socioeconomic strata, result in late diagnoses and unequal therapeutic outcomes. For instance, in the United States 60 percent of breast cancers are diagnosed at earlier stages. Conversely, in Brazil and Mexico only 20 percent and 10 percent respectively are diagnosed at an early stage. The cancer mortality-to-incidence ratio for Latin America is 0.59, compared to 0.43 for the European Union, and 0.35 for the United States.²⁰

¹⁸ Pineros, Abriata, Mery, and Bray, “Cancer Registration for Cancer Control in Latin America: A Status and Progress Report.”

¹⁹ Scott C. Howard, Raul C. Ribeiro, and Ching-Hon Pui, “Strategies to Improve Outcomes of Children with Cancer in Low-Income Countries,” *European Journal of Cancer* 41, no. 11 (2005): 1584–1587.

²⁰ The mortality-to-incidence ratio is generally used as a high-level comparative measure to identify inequities in cancer outcomes, and it “can serve as an insightful indicator of cancer management outcomes for individual nations.” See Eunji Choi, Sangeun Lee, Bui Cam Nhung, Mina Suh, Boyoung Park, Jae Kwan Jun, and Kui Son Choi, “Cancer Mortality-to-Incidence Ratio as an Indicator of Cancer Management Outcomes in Organization for Economic Cooperation and Development Countries,” *Epidemiology and Health* 39 (2017): e2017006, doi.org/10.4178/epih.e2017006.

In the case of breast cancer, these differences are mainly related to the lack of national regulations and guidelines requiring screening mammography. Because of insufficient political commitment, what results is the low rate of mammographic screening particularly among the poorer and more rural women, affecting early detection and causing a lack of adequate epidemiologic data. Moreover, the possibility of testing hormone receptors and molecular markers is not available to all patients. In an important number of cases, instead of more focused surgical procedures, mastectomy appeared to be the operation of choice, usually performed by gynecologists or general surgeons. Some countries in Latin America are making more progress, mostly because of implementing universal care, improving cancer registries, and promoting public health education, particularly in Argentina, Uruguay, and Costa Rica.²¹

Gastric Cancer in Latin America

Gastric cancer is a highly lethal disease. In Central and South America, stomach cancer mortality rates are among the highest in the world. Examining forty-eight population-based registries in thirteen countries and data regarding nation-wide cancer deaths obtained from the mortality database of the World Health Organization in eighteen countries reveals that the highest incidence of this cancer is in Chile, Costa Rica, Colombia, Ecuador, Brazil, and Peru. Males in Chile and females in Guatemala are affected with some of the highest mortality rates in the world. Between 1997 and 2008, the incidence rates declined by 4 percent annually in Brazil, Chile, and Costa Rica. Between 1997 and 2008, the mortality declined 4 percent annually in Chile and Costa Rica. Cancers of the cardia region are less frequent than non-cardia cancers.²² These differences in cancer types and incidence may be related to differences in prevalence of *Helicobacter*

²¹ See Eduardo Cazap, "Breast Cancer in Latin America: A Map of the Disease in the Region," *American Society of Clinical Oncology Educational Book* 38 (2018): 451–456.

²² The gastric cardia is the area of mucosa located distal to the anatomic gastroesophageal junction.

Pylori and other risk factors such as diet.²³ A high incidence and mortality is noted in high altitude Andean countries, such as Chile and Colombia, related to smoke-cured preserved meat and fish, and to reuse cooking oil (which is high in carcinogens such as nitrosamines) added to a high prevalence of *Helicobacter Pylori*.²⁴

Cervical Cancer in Latin America

In Latin America and the Caribbean there is a very high incidence of women diagnosed with cervical cancer, and a large percentage of them die prematurely. This cancer, however, could be prevented. Early diagnosis would prevent the occurrence of advanced cases and significantly decrease mortality. Despite prevention and screening efforts, cervical cancer remains one of the leading causes of cancer mortality in Latin America, with incidence percentages two to four times higher than in high income countries and with even higher rates in women who do not live in urban settings or are less educated and suffer because of poverty or low income.

Most cervical cancers (i.e., 70 percent in Latin America) are caused by the Human Papillomavirus, mainly subtypes 16 and 18, which are covered by the available HPV vaccines. In order to prevent cervical, penile, and oral cancers, these vaccinations should be administered to preadolescent girls and boys, before their first sexual encounter. Through the auspices of the Pan-American Health Organization, the HPV vaccines are available in most Latin American countries at deeply discounted prices. Initially,

²³ See Maria Del Pilar Diaz, Gloria Icaza, Loreto Nunez, and Sonia A. Pou, "Gastric Cancer Mortality Trends in the Southern Cone: Disentangling Age, Period and Cohort Patterns in Argentina and Chile," *Scientific Reports* 10, no. 1 (2020): 1526, doi.org/10.1038/s41598-020-58539-w.

²⁴ See Monica S. Sierra, Patricia Cueva, Luis Eduardo Bravo, and David Forman, "Stomach Cancer Burden in Central and South America," *Cancer Epidemiology* 44, Suppl. 1 (2016): S62–S73; Javier Torres, Pelayo Correa, Catterina Ferreccio, Gustavo Hernandez-Suarez, Rolando Herrero, Maria Cavazza-Porro, Ricardo Dominguez, and Douglas Morgan, "Gastric Cancer Incidence and Mortality Is Associated with Altitude in the Mountainous Regions of Pacific Latin America," *Cancer Causes Control* 24, no. 2 (2013): 249–256; Michail Shafir, "Gastric Cancer Prevention Proposal for Pilot Study" (Master of Public Health, Icahn School of Medicine at Mount Sinai, 2016).

Argentina, Mexico, Panama, and Peru started a national vaccination program in 2011. The counterpoint is that a few countries—e.g., Bolivia, Nicaragua, Venezuela, and Honduras—have been unable to implement a national vaccination program due to limited infrastructure and support staff, as well as insufficient political will. Even in countries with a national vaccination program, only about 50 percent of adolescents received both doses. There have also been religious organizations that did not approve of the vaccinations, alleging that they would lead to promiscuity.

Screening is a complicated issue. In urban settings, relatively well-to-do women have access to cytology studies with Papanicolau smears as well as HPV DNA determination. Among poor and rural women, cytology has been unreliable due to lack of supportive facilities. Hence, for this population a simple screening by staining the cervix with Lugol iodine and/or white vinegar could lead to requiring cryotherapy of any suspicious lesions. This simple screening method is available and practiced, and many Latin American countries have adopted it. However, paradoxically, not even this simple method is available in the public sector in Brazil, Chile, Cuba, Dominican Republic, Ecuador, Honduras, Panama, Paraguay, Peru, and Uruguay. These countries should be encouraged to implement these programs for rural, indigenous, and poor women.

In conclusion, HPV vaccination programs should be encouraged, introduced in the nations where they are not yet available, and administered by relying on health personnel working in schools. In other words, the HPV vaccine should be administered in ways similar to the other vaccination programs already in place, like those for avoiding measles and diphtheria.²⁵

Focusing on Healthcare Systems in Latin American Countries

In most Latin American countries, there is a marked inequality in income

²⁵ See Brittany L. Bychkovsky, Felicia M. Knaul, and Gilberto de Lima Lopes Jr., “Cervical Cancer in Latin America,” *ASCO Connection*, July 26, 2017, connection.asco.org/blogs/cervical-cancer-latin-america.

and access to care. Public hospitals are often inadequate and poorly staffed, and cancer care is often insufficient and inefficient. Private hospitals deliver adequate care, but only a small percentage of cancer patients can afford care in these private facilities.

Bolivia has a health law that covers all maternal-child care until the child is 5 years old. Health care is free in public hospitals for all adults after the age of 50, but neither health issues that depend on roadside accidents are covered, nor diseases between the ages of 5 to 50. In Santa Cruz, the wealthiest city in Bolivia, the Cancer Institute is private. Most patients cannot afford to be treated there, although non-governmental organizations provide financial support. On the high Bolivian Andes mountains, cancers are caused by environmental pollution. Silver miners are exposed to the toxic arsenic and mercury, and they develop skin, lung, and bladder cancers. In the Amazonian northeast of the country, leather factories discharge cadmium and manganese into the nearby rivers. Consequently, in the neighboring population there is a high incidence of esophageal and gastric cancers.

Paraguay has a public Cancer Institute that provides free cancer care. However, it has limited resources and is in a rural area, two hours away from the capital city. Some private hospitals provide a very limited free cancer care. A recent law was passed by Congress to develop a national comprehensive cancer program.

Uruguay has the most developed social program, and it has a satisfactory cancer registry. In many instances cancer care is offered at low cost or free.

In 1936, Chile established free public hospitals for indigent patients, a first in Latin America. These hospitals were also teaching hospitals and trained medical students and residents. In particular, the National Cancer Institute was affiliated with a free university hospital. Another Cancer Institute is private but provides free cancer care to indigents, including surgery, radiation, and chemotherapy. After the 1973 military coup by Army General Augusto Pinochet (1915–2006), public hospitals were no longer financed, and health care was mostly provided by a proliferation of private hospitals. Several decades later, in 2005, after the end of the

Pinochet dictatorship, a social health program, called AUGE, was developed to provide free medications for noncommunicable diseases, including cancer drugs, and an attempt was made to revitalize public hospitals.²⁶

As indicated earlier, the lack of adequate national cancer registries is negatively affecting cancer care. Death certificate data are often unreliable because the needed health information is incomplete. A few examples are needed. In Chile there are three provincial cancer registries: one in Antofagasta in the north, and Bio Bio and Valdivia in the continental south. There is no centralized national cancer registry. In Cuba, all medical care is free for the entire population. However, there are scarce data on cancer statistics. In Venezuela, the statistical data on cancer were missed for several years, and the quality of delivery of cancer care is unknown.

Conclusion

Latin America sees an increasing incidence of many cancers. Many of these cancers are preventable, particularly those that are caused by tobacco use, pesticides, alcohol abuse, *Helicobacter Pylori*, and HPV—in case of cervical, penile, and oropharyngeal cancers. Public health environmental issues should be urgently addressed. Education regarding HPV vaccines in adolescents should be promoted, leading to vaccination campaigns that could prevent cervical, penile, and oropharyngeal cancers. While these educational and vaccinal efforts appear to be feasible in public schools, they might still be more complex in religious schools because of misconception regarding the relation between this vaccine and sexual

²⁶ “AUGE is a universal health plan which provides explicit healthcare guarantees (garantías explícitas de salud, GES) with regard to coverage for 80 health problems which have been established by law. All Chilean men and women, whether they are in the public healthcare system ... or have a private health insurance plan ... are guaranteed coverage for these health problems. These guarantees constitute a right which must be granted whenever any Chilean is diagnosed with one of these pathologies and meets the requirements set for each one.” Government of Chile, “10 Years of Auge: Achievements, Guarantees and How the Health Plan Works,” 2015, www.gob.cl/en/news/10-years-of-augeachievements-guarantees-and-how-the-health-plan-works/.

behaviors. Campaigns offering regularly free tests, which could detect breast cancer and cervical cancer at early developing stages, are essential to improve early diagnosis and consequently improve mortality rates. Finally, to establish national cancer registries appears to be of fundamental importance for promoting cancer prevention and treatment programs.

.....

Michail K. Shafir, MD, MPH, FACS, is Clinical Professor of Surgery and Oncological Sciences at the Ruttenberg Cancer Center at the Icahn School of Medicine at Mount Sinai and attending surgeon at the Mount Sinai Hospital, New York. Former President of the New York Cancer Society and member of the Executive Council of the New York Surgical Society, he is also a member of major surgical and cancer societies, such as the American College of Surgeons and the Society of Surgical Oncology, as well as a core member of the Surgery Committee of the Cancer and Leukemia Group B (CALGB), a major national cooperative group for clinical trials in cancer.