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EDITORIAL

Cancer prevention in developing countries: a vision for preserving health in Mexico

Magnitude of societal and economic burden of unhealthy lifestyles predisposing to cancer and other non-communicable chronic diseases

Non-communicable chronic diseases (NCDs) are the single greatest threat to global public health and national prosperity. Populations around the world are rapidly aging and experiencing an increase in the incidence of age-associated diseases such as cancer, heart disease and Alzheimer's. By 2025, approximately 1.2 billion individuals will be 60 years of age or older. The world population has also experienced economic development and modernization which have improved the quality of life for many, but which have also enabled increasing adoption of unhealthy lifestyles. Notably, approximately 10% of the global population is now considered obese and at least one billion people worldwide use tobacco.¹

The cancer burden resulting from aforementioned constellation of changes is estimated to dramatically increase in the next few decades, with low-to middle-income countries expected to bear the majority of the burden.^{2,3} The potential economic and societal costs associated with this increased cancer burden are profound. The total global economic cost of cancer in 2010 was estimated at \$1.16T.¹ The human costs of physical, emotional, and interpersonal and social suffering are incalculable. Risk factor control, screening and early detection, active disease management, and survivorship programs are critical to minimizing the profound costs extracted by cancer and other NCDs.

Like many other countries, Mexico has undergone recent developmental transformations contributing to this scenario.^{2,4} In 1990, diarrheal diseases and lower respiratory infections accounted for the top two causes of premature death (as quantified by years of life lost) in Mexico.⁵ Twenty years later, in 2010, the two top spots

were claimed by ischemic heart disease and diabetes, together accounting for nearly 15% of the total years of life lost in Mexico.⁵ And as a testament to the rapid modernization that the country has undergone, malnutrition, which was the 11th cause of premature mortality in Mexico in 1990, has seen the steepest decline among the top 25 causes of premature death over the last two decades, falling 67% to the 24th position.⁵ Indeed, the country is now facing an epidemic of over-nutrition (or more accurately 'energy imbalance'), with high body mass index contributing to the greatest proportion of NCDs in the country.

Mexico's cancer burden is expected to dramatically increase and mirror that seen around the world. Approximately 148 000 new cases of cancer were diagnosed in Mexico during 2012; and this is projected to increase to approximately 290 000 new cases in 2035, representing a doubling of incidence.³ And mortality is expected to increase by even more in the same time period.³ Notably, these numbers are based only on changing demographics and do not take into account potential increases in risk factors.

Importance and benefits of prevention, early detection and active disease management

Cancer prevention will be critical to address the growing challenge now facing Mexico. Prevention offers the most cost-effective long-term strategy for the control of cancer by minimizing human suffering, saving lives and money.⁶ Comprehensive cancer control includes interventions to address tobacco prevention and cessation, proper nutrition and physical activity, and UV exposure; as well as attention to evidence-based preventive vaccines, medications, and screening. According to the Union of Cancer Control, investing \$11.4 billion

dollars in a set of core prevention strategies in LMICs can yield savings of up to \$100 billion dollar in cancer treatment costs.¹

Data from countries in later stages of development suggest that nearly half of cancer deaths are preventable based on lifestyle modification, prevention, and screening actions. Growing evidence from large U.S. and European cohorts supports this notion, demonstrating significant reductions in cancer risk as well as all-cause, cardiovascular- and cancer-related mortality in those adhering to cancer prevention recommendations.⁷⁻⁹ Risk factor control and active disease management through Healthy Community-type initiatives and workplace health promotion programs offer tremendous potential for prevention on all fronts. Lessons from initiatives like “Shape Up Somerville” demonstrate the ability of communities to foster positive changes in attitudes and behaviors that impact the public health and quality of life of their citizens.¹⁰ And health promotion programs in workplaces can reduce medical costs by \$3.27 per \$1 spent and can decrease costs of absenteeism by \$2.37 per \$1 spent, in addition to positively impacting employee satisfaction.¹ Recent data suggest that at least one-third of employees do not return to work following cancer treatment, and that the drop in labor force participation due to cancer can be significant, estimated at about 10%.¹

Positive strides taken to date by Mexico in tobacco, salt, HPV vaccine

Through risk factor control, Mexico is actively addressing the rising prevalence of NCDs within the country. It has made significant progress in addressing tobacco use among its population, although much still remains to be done. In 2002, after a national survey revealed an increase in tobacco prevalence, tobacco control was established as a national priority. In 2004, Mexico ratified the WHO Framework Convention on Tobacco Control and it went into force a year later.¹¹ Improvements in tobacco control since then include a 100% smoke-free ordinance in Mexico City, raised taxes on cigarettes, which now account for approximately two-thirds of the final price to the consumer, and stronger health warnings and advertising restrictions, among others.¹² Based on 2012 data, Mexico now has the lowest smoking prevalence among Latin American countries; and is one of just four countries that have reduced smoking by more than half in both men and women since 1980.¹³ Nevertheless, smoking remains a major preventable health risk of concern wherever it occurs, most especially in particular segments of the population. In 2010, amazingly more than 20% of physicians in Mexico still smoked, and that permissive attitude towards tobacco consumption

among this influential group remains today. Given the strong association between tobacco use and NCDs, the ability of Mexico to adequately address NCDs will be dependent upon accelerating the progress it has made thus far in tobacco control.

Mexico’s public health actions around HPV vaccination are also significant and represent an important area where Mexico has surpassed the U.S., highlighting the importance bi-directional exchanges of ideas and best practices in NCD prevention and control global partnerships. Mexico began with a targeted approach in 2008, introducing the quadrivalent vaccine in 125 municipalities with the lowest human development index and the highest incidence of cervical cancer.¹⁴ A year later, this effort was expanded to 182 municipalities and an extended dosing schedule was implemented. Available data for Mexico from 2010 suggest 67% of targeted girls received the first two doses (three-dose coverage is not yet available due to the extended dosing schedule).¹⁴ The vaccine is now available nationwide through school-based vaccination of all girls aged 9.¹⁴ In Australia, where a similar school-based strategy was undertaken, the prevalence of cancer-related HPV vaccine genotypes and genital warts have dropped significantly, as have detection rates of high-grade cervical abnormalities and high-grade cytology on Pap testing.¹⁵⁻¹⁷

Mexico is also beginning to address the issue of overconsumption of sodium within the country. Salt is the primary source of sodium in the diet, and with economic development, Mexican diets have shifted towards high-fat, high-salt, processed foods, putting millions at increased risk of hypertension, heart disease, stroke, and gastric cancer. The WHO recommends less than 5g of salt per day –just under a teaspoon– for the average adult. WHO member states, including Mexico, have agreed to reduce global salt consumption by 30% by 2025 as one part of the “Global action plan to reduce noncommunicable diseases”.¹⁸ One initiative from the state of Coahuila seeks to replace salt shakers in restaurants with “virtual salt shakers” that contain facts related to the risks of ingesting too much sodium. Reducing salt intake to the recommended level is one of the most cost-effective methods to improve population health and could prevent an estimated 2.5 million deaths each year globally.

Future plan to enhance health in Mexico

Mexico has also taken a number of other positive steps in recent years to put them on the path towards progress in NCD control, including cancer prevention.⁴ While Mexico has had a NCD control plan in place for some time, they have only recently launched their National Cancer Control Plan (NCCP), laying the foundation

for coordinated cancer prevention and control efforts throughout the country.¹⁹

MD Anderson's partnership with Mexico has grown out of its Global Academic Programs, which facilitates and administers the largest global network of cancer centers working collaboratively on research and education, and its Moon Shots Program, a goal-oriented, multi-disciplinary effort harnessing conceptual breakthroughs and disruptive technologies to dramatically reduce cancer mortality through prevention, early detection and curative treatments. The relationship is directly supported by the moon shots' Cancer Prevention and Control Platform (CP and CP), which seeks to develop and implement evidence-based interventions in the areas of public policy, public and professional education, and community-based clinical service delivery. Together, we aim to strengthen the positive steps already taken by Mexico, to complement their NCCP, and to enable MD Anderson and Mexican partnering institutions to better serve Spanish-speaking populations through cancer control actions.

Currently, the focus of the partnership rests on tobacco control, in order to accelerate our joint progress in this area, and on addressing energy balance risk factors, as elevated body mass index, high fasting plasma glucose and dietary risks are the top three risk factors accounting for the majority of the NCD burden in Mexico and in subsets of the American population.⁵ The CP and CP is working with INCan and government health officials to develop and implement impactful cancer control actions in these two areas, initially focused on public education, professional education, and INCan-based services and policies which might advance population-based efforts through leadership, advocacy and modeling.

In the area of public education, the partnership will explore the implementation of a comprehensive early childhood and youth health promotion and cancer prevention educational program tailored to Mexican school children. One potential program is the school-based Coordinated Approach to Child Health (CATCH) program to address physical inactivity and obesity in youth. CATCH is supported by 25 years of scientific research and has been implemented in more than ten-thousand educational settings across the U.S. It has been shown to result in significant reductions in the onset of childhood overweight and obesity^{20,21} as well as resulting in durable improvements in physical activity and dietary habits.^{22,23} Moreover, a cost-effectiveness study has demonstrated that it is an excellent public investment.²⁴ The partnership will also leverage MD Anderson's interactive, evidence-based ASPIRE program as a core resource for tobacco prevention and support for cessation among select middle and

high school students.^{25,26} To maximize impact, these initiatives will be coupled to mass-reach health communications campaigns. Mobile-enabled mechanisms to drive consumer-level and employer-level wellness and proactive disease management will also play a role. As an example, Project Diabetes Obesity Control (DOC), initiated under the University of Texas System in the lower Rio Grande Valley, seeks to improve the health of diabetes patients (largely Mexican American) by enhancing access to care, empowering better self-management and promoting healthier living. With nearly 30 percent of South Texans diagnosed with diabetes, there is a great need to impact behavior through culturally and socially customizable technology. Through this project's mobile app, patients receive reminders on their cell phones to take and track medications, and much more.

Regarding professional education, MD Anderson has partnered with colleagues from our sister institutions in Colombia and Mexico (i.e., IDC and InCan), as well as with colleagues from the Ministry of Health of Medellín (Colombia), *Universidad de Antioquia* (Colombia), *Instituto Nacional de Salud Pública* (Mexico), and *Instituto Nacional de Enfermedades Respiratorias* (Mexico) to launch Project Colombia and Mexico Against Tobacco (COMET). The long-term goal of this project is to change tobacco culture and norms in cancer care facilities by establishing institutional capacity to promote relevant tobacco prevention and cessation services integrated into oncology practice. It includes an assessment of the prevalence of tobacco use among both cancer patients and cancer care providers and will identify the best opportunities for delivering a tobacco prevention and control program for cancer patients in these oncology settings. At the same time, we are developing an innovative and sustainable training program based on information technologies that will increase the overall knowledge of healthcare providers and their ability to engage cancer patients to become tobacco free. We anticipate using the knowledge gained from Project COMET to replicate this contemporary and culturally adapted model in other countries in Latin America. Through this effort, we plan to facilitate and support oncologists and other healthcare professionals in providing evidence-based tobacco prevention interventions and cessation therapies to their patients, while fostering collaboration among healthcare specialists in the region who, although located in different countries, confront similar challenges.

Conclusion

Successful cancer control programs typically involve comprehensive, multi-dimensional, and multi-level efforts in implementation and dissemination of evidence-

based public policies, public and professional education, and community-based services to reduce risk factors, incidence, and mortality in the intended population. Cancer centers play an important role in promoting healthy behaviors that reduce cancer risks through efforts in cancer control, and by serving as institutional examples, as reflected by their own priorities and practices. Our partnership with Mexico leverages the strengths of two cancer centers to serve the Spanish-speaking populations of both communities, working collaboratively with other public health agencies, private foundations, industry partners, and community representatives as opportunities arise. MD Anderson welcomes the opportunity to work with Mexico and to share best practices in cancer and NCD prevention across institutions, as together we seek to reduce the burden of chronic diseases for all.

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