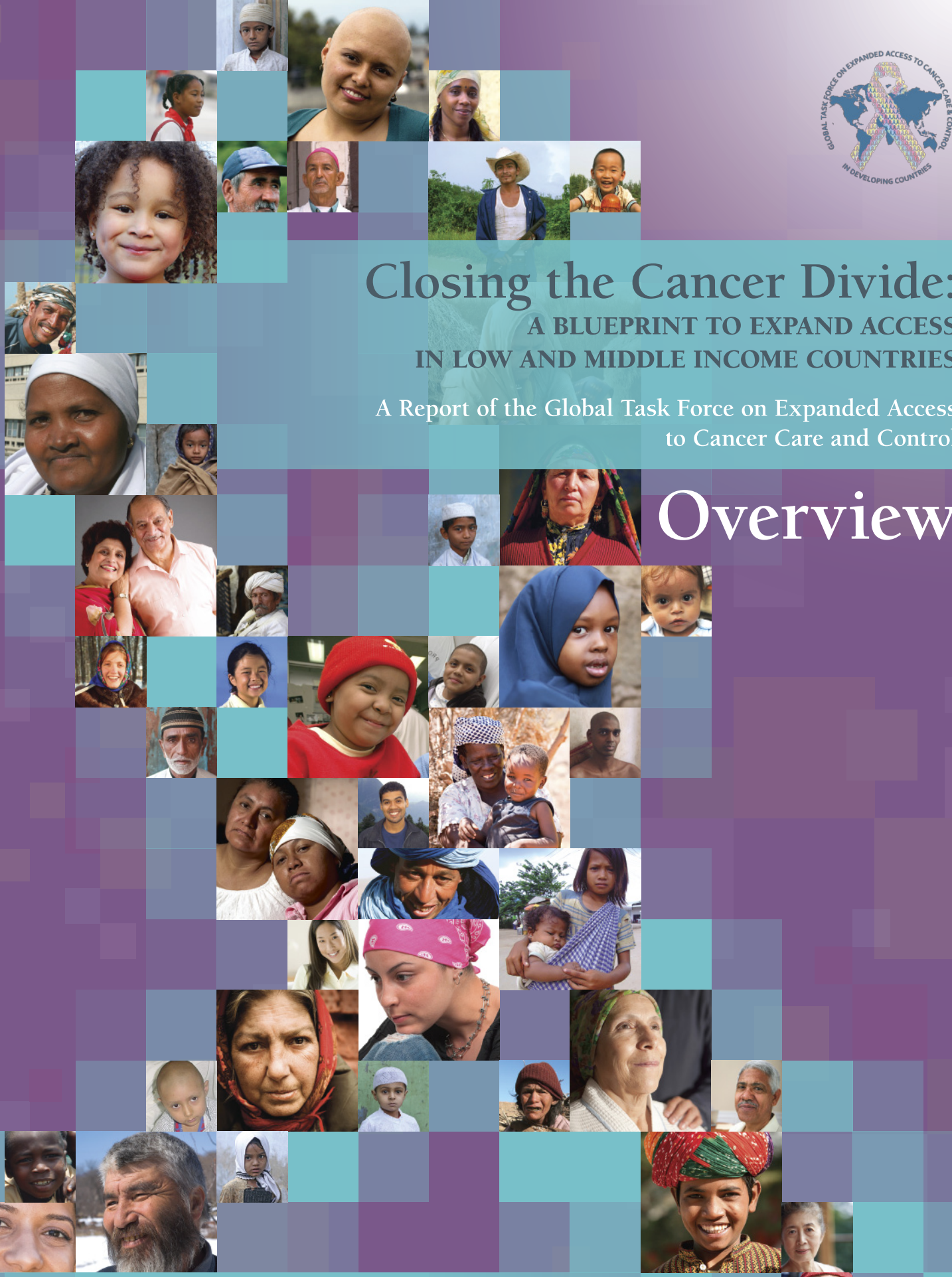

# Closing the Cancer Divide:

## A BLUEPRINT TO EXPAND ACCESS IN LOW AND MIDDLE INCOME COUNTRIES

A Report of the Global Task Force on Expanded Access to Cancer Care and Control

# Overview

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# Closing the Cancer Divide:

## A BLUEPRINT TO EXPAND ACCESS IN LOW AND MIDDLE INCOME COUNTRIES

Global Task Force on Expanded Access
to Cancer Care and Control
in Developing Countries

# Closing the Cancer Divide:

## A Blueprint to Expand Access in Low and Middle Income Countries.

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# Preface

## Global Task Force on Expanded Access to Cancer Care and Control in Developing Countries

The mandate of the **Global Task Force on Expanded Access to Cancer Care and Control in Developing Countries (GTF.CCC)** is to design, promote, and evaluate innovative, multi-stakeholder strategies for expanding access to cancer prevention, detection, and care in low and middle income countries (LMICs).

Working with local partners, the GTF.CCC participates in the design and implementation of innovative service delivery models to scale up access to cancer care and control (CCC) and to strengthen health systems in developing countries.

The Harvard Medical School, the Harvard School of Public Health, the Dana-Farber Cancer Institute, and the Harvard Global Equity Initiative convened the GTF.CCC in November 2009. GTF.CCC is composed of 30 members, and assisted by a Technical Advisory Committee, Private Sector Engagement Group, and Strategic Advisory Committee; the Task Force brings together cancer and global health leaders from all regions of the world. Further, the GTF.CCC includes researchers, members of civil society, patients and family members, and the private sector, in addition to clinicians and policy makers who contribute invaluable support to advocacy, research, and action.

The GTF.CCC is co-chaired by Julio Frenk, Dean of the Harvard School of Public Health, and Lawrence Shulman, Chief Medical Officer and Senior Vice President for Medical Affairs at the Dana Farber Cancer Institute. Her Royal Highness Princess Dina Mired of the Hashemite Kingdom of Jordan and Lance Armstrong serve as honorary co-Presidents. The Harvard Global Equity Initiative, under the direction of Felicia Knaul, serves as the Secretariat.

In addition to strongly supporting efforts to prevent the cancers of tomorrow by reducing risk factors, especially tobacco use, the GTF.CCC proposes and supports actions to improve treatment and palliation.

The GTF.CCC applies the knowledge and ability of its members, combining expertise in global health and cancer, to:

- Raise awareness of the impact of cancer on developing countries at the global, regional, and national levels through an evidence-based call-to-action;
- Expand the stewardship and evidence base for implementing the most efficient approaches to CCC in low and middle income countries;
- Identify suitable packages of essential services and treatments to provide care in low-resource settings for cancers that can be cured or palliated with currently available therapies;
- Reduce human suffering from all cancers by promoting universal access to pain control and palliation, and increased access to the best treatment for cancer through the procurement of affordable quality assured drugs and services;
- Support development and implementation of multi-sectoral, multi-stakeholder plans to expand access to CCC through health systems that provide comprehensive health coverage;
- Develop and evaluate innovative service delivery models that effectively utilize existing human, physical and technological resources in different economic and health system settings, and to share the lessons and evidence gained.

The GTF.CCC is predicated on the conviction that solutions to access barriers exist and that the reasons for scaling-up cancer care rapidly are compelling enough to merit an immediate and vigorous global response. Many of these solutions can be built into existing programs and platforms by harnessing health systems and involving multiple stakeholders.

## The History of this Report

In 2010 **The Lancet** published "Expansion of cancer care and control in countries of low and middle income: a call to action¨ signed by the members of the GTF.CCC. The paper argued that much could be done to prevent and treat cancer by deploying primary and secondary caregivers, using global financing mechanisms effectively, making off-patent drugs available and all drugs and inputs more affordable, and by using global and regional procurement mechanisms. Further, the paper argued, increasing access to CCC can strengthen health systems to also meet the challenges of other diseases.

This Report, **Closing the Cancer Divide: A Blueprint to Expand Access in Low and Middle Income Countries**, is a product of the first two years of work of the GTF.CCC and a response to the Call-to-Action published in 2010. The Report aims to present the evidence that supports the case for expanded access to CCC, describe innovative models for achieving this goal, and provide a blueprint for future action in resource-constrained settings as part of efforts to improve health systems strengthening.

The Report draws on the work of more than 115 authors and contributors, including members of the GTF.CCC and its Technical Advisory Committee, as well as patients and representatives of academic, civil society, private sector, multi-lateral and govern mental institutions from countries at all resource levels. It is the product of virtual and in-person discussions with members of the GTF.CCC and of meetings in February of 2010, June of 2010, November of 2010 and May of 2011, as well as on-going bilateral exchanges with the Secretariat.

The Report summarizes information from 56 countries. The analysis is based on work with clinicians, researchers, policy makers, and civil society organizations in, or working with institutions from LMICs that span all regions of the developing world. While this is not an exhaustive account of the innovative projects and programs that are currently underway, it offers a large and encompassing sample and a wealth of lessons learned.

The research also draws on an extensive literature review based on more than 400 search terms that uncovered close to 2850 published reports, journal articles, books, and web-based information. A list of search topics is available at the GTF.CCC web site (gtfccc.harvard.edu). Several earlier reports provided a basis from which to develop much of the analysis including the Institute of Medicine of the National Academies 2007 "Cancer Control Opportunities in Low and Middle Income Coutries", and the World Health Organization "Global Status Report on NCDs: 2010".

## Organization of the Report

Closing the Cancer Divide: A Blueprint to Expand Access in Low and Middle Income Countries is organized in three parts:

- Part I: **MUCH SHOULD BE DONE**;
- Part II: **MUCH COULD BE DONE**; and
- Part III: **MUCH CAN BE DONE.**

The main text and analysis of the Report is reinforced by material contained in text boxes and panels. Each section begins with a summary of key messages.

The first part of the Report, "Much should be done," is divided into three sections. Part I, including the overview, presents the overarching arguments that support a call for action. The second section demonstrates that preventing, treating, and palliating cancer is an equity imperative. The third section identifies the significant economic costs of failure to act.

The second part of the Report, "Much could be done," also describes the diagonal approach to health system strengthening across the cancer care control continuum, with a focus on chronicity, and outlines possible strategies and core elements for CCC programs in LMICs.

The third part of the Report, "Much can be done," offers responses to the fundamental barriers to expanding CCC in a framework of universal coverage: limited access to services, inefficient and inequitable use of global resources, overreliance on out-of-pocket payments, lack of evidence and information on cancer and CCC, and the dearth of global and local leadership. Through an analysis of cases based on both primary in-country research and existing literature, this part of the Report identifies opportunities to reduce cancer incidence, mortality, suffering, and impoverishment in LMICs. This section of the Report also highlights a series of interventions in each of the six areas of the CCC continuum.

The information in the third part is organized in five sections that correspond to each of the areas where the Task Force identified opportunities for action: innovative delivery; pricing and procurement of drugs and services; novel global and national financing; improving evidence; and, strengthening stewardship and leadership. Each section draws on global and national experiences and lessons learned. Most of these are described in summary cases and text boxes. The findings detail the benefits of involving all stakeholders, including the private sector, civil society, patients, academia, bilateral and global institutions, donor organizations, and national governments. Each section concludes with a set of recommendations specific to the five areas of action.

The work of the GTF.CCC and this Report concentrate on aspects of secondary prevention, treatment, and palliation that have been largely ignored in the literature and policy spheres. In contrast, as a wealth of convincing evidence already exists, the Report does not dwell on population-based primary prevention programs associated with tobacco control, physical activity, and nutrition. However, the need for continued and increased investment in these efforts is emphasized throughout the Report.

Using the evidence garnered for the Report, the GTF.CCC developed recommendations and lessons for resource-constrained settings; some of which should also prove useful in high resource settings.

As the principal author of this Report, I offer my thanks to the members of the GTF.CCC and the Technical Advisory Committee, and especially to Honorary co-Presidents HRH Princess Dina Mired of the Hashemite Kingdom of Jordan and Lance Armstrong, and co-Chairs Drs. Julio Frenk and Lawrence Shulman for their dedication, encouragement, investment, and belief in this project. I am most grateful to those who accompanied me closely in preparing the Report: George Alleyne, Rifat Atun, Paul Farmer, Mary Gospodarowicz, Julie Gralow, Nancy Keating, Ana Langer, Peter Piot, Peggy Porter, Jonathan Quick, Magdalena Rathe, and David Scheer. It is impossible to adequately express my thanks in these short paragraphs to our staff, the Secretariat, based at the Harvard Global Equity Initiative and the Department of Global Health and Social Medicine of the Harvard Medical School, and my collaborators at the Mexican Health Foundation and Tómatelo a Pecho. This includes Héctor Arreola-Ornelas, Amanda Berger, Afsan Bhadelia, Kathy Cahill, Grace Cho, Isabel Davis, Courtney Dickerson, Emily Durrant, Debra Keaney, Oscar Méndez, Sophia Michelen, Gustavo Nigenda, Sonia Xochitl Ortega, Maja Pleic and Jennifer Puccetti, as well as collaborators Zaid Bitar and Claire Neal. My personal thanks also to all those listed in the Acknowledgments and particularly supporting institutions Harvard University and Lance Armstrong Foundation which are represented on the GTF.CCC.

On behalf of the members of the GTF.CCC, I thank each and every one of the many people and institutions that contributed to making this Report a reality, especially those who did so while facing the adverse effects of illness. The Task Force also recognizes with great respect and admiration the work of the many patients whose experiences provided invaluable insights, as well as that of the healthcare providers based in LMICs who struggle daily to expand access to CCC in resource-constrained environments.

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November, 2011.

# Overview

# Overview

Low and middle income countries (LMICs) share a common, emerging, and largely unrecognized challenge: the burden of increasingly prevalent chronic and non-communicable diseases. This emerging challenge compounds the difficulty of responding to the backlog of disease and illness associated with poverty and "underdevelopment" often associated with preventable infections and reproductive health problems.[1] Cancer –itself a complex set of devastating diseases– epitomizes the complexities and inequities of the epidemiological challenge faced by LMICs.

Cancer is also a challenge to economic and human development, as it is both a cause and an effect of poverty. The long-term disability and ongoing health care costs of cancer impoverish families and health systems, and contribute to social exclusion. At the same time, poverty, lack of access to education and health care, and discrimination expose populations to additional risks for presenting and dying from many cancers.

There are glaring disparities between rich and poor in incidence and death from preventable cancers and death from treatable cancers, as well as in the pain, suffering, and stigma associated with the disease. These disparities constitute a cancer divide and demonstrate that increasing access to cancer care and control is also an issue of equity.

Yet, many believe –and these myths persist– that meeting the challenge of cancer in LMICs –with the exception of some basic prevention– is unnecessary, unaffordable, unattainable, and –perhaps the most pernicious– inappropriate because such an effort would take away resources from other high burden, communicable diseases. These four myths plague and undermine the work of the global community in cancer care and control (CCC), as well as on other non-communicable disease (NCD) and chronic illness.

The facts that disprove the four myths that undermine efforts to narrow the cancer divide by increasing access to CCC in LMICs:

- **CCC is unnecessary because the burden of cancer is not large in LMICs.**
  - Each year over half of all new cancer cases and two-thirds of cancer deaths occur in LMICs.
  - Tobacco, which accounts for at least 30% of all cancer deaths, will kill one billion people in the 21st century based on current trends – the vast majority in LMICs, where 80% of today's smokers live.
  - Breast cancer is the second leading cause of death among Mexican women aged 30 to 54. For children aged 5-14, cancer is the third leading cause of death in upper-middle, fourth in lower-middle, and eighth in low income countries.
  - Just two cancers – breast and cervical – account for almost the same number of deaths among women in reproductive age in LMICs as maternal mortality (see Section 2 of the Report).

- **CCC is unaffordable for most LMICs.**
  - Too little –only 5%– of global spending on cancer is in LMICs, although these countries account for almost 80% of the global cancer burden, resulting in a staggering 5/80 cancer disequilibrium.
  - The global value of lost productivity from cancer outstrips the estimated cost of prevention and treatment. Further, cancer is a disease that drives families into poverty.
  - The total economic cost of tobacco alone reduces gross domestic product by as much as 3.6% per year. Between 2020 and 2030, the global economic costs of tobacco are expected to double. Yet accelerated implementation of tobacco control would cost less than $US 0.16 per person per year for countries like China and India.
  - Many CCC interventions are less expensive than assumed: 26 of the 29 key agents for treating many of the most prevalent, treatable cancers in LMICs are off-patent, making drug treatment relatively low cost at less than $US 100 per course of treatment for most drugs. The total cost of covering drug treatments for unmet needs for cervical cancer, Hodgkin's lymphoma, and acute lymphoblastic leukemia in children 0-14 in LMICs is approximately $US 115 million. Reductions of 90% in the price of HPV and hepatitis B vaccines have been achieved for low income countries.

- **CCC is unattainable because LMICs do not have adequate human or physical resources to support treatment and care.**
  - Early detection programs for breast and cervical cancer can be integrated into anti-poverty, maternal and child health, sexual and reproductive health, and HIV/AIDS programs.
  - The King Hussein Cancer Center in Jordan is Joint Commission certified as a specialty treatment center.
  - Telemedicine has been effectively used to expand capacity for treatment of cancer and especially children's cancers in LMICs. In El Salvador, links between St. Jude hospital in Memphis and local hospitals helped achieve an increase in survival rates for children with acute lymphoblastic leukemia from 10% to 60% during the first five years of collaboration.
  - In extremely resource-poor settings such as Haiti, Malawi and Rwanda, primary and secondary care providers and facilities with no on-site oncologist can safely provide some chemotherapy with links to specialists and specialty centers.
  - Since including childhood cancers in Seguro Popular in Mexico to eliminate financial barriers to accessing treatment, 30-month survival has increased from approximately 30% to almost 70%.
  - For the estimated 5.5 million terminal cancer patients who needlessly suffer moderate to severe pain with no pain control, effective national programs can increase availability and accessibility of this essential and inexpensive intervention.

- **CCC is inappropriate in LMICs because it takes resources away from high burden diseases that have proven treatments and interventions.**
  - Expanding CCC can strengthen health systems in ways that benefit all populations and increase capacity to respond to a wide variety of health needs. An example is pain control, which is crucial for many patients, and for undertaking surgery.
  - The distinctions between communicable and non-communicable disease are increasingly irrelevant. Many cancers that burden LMICs are associated with underlying and unresolved infections associated with poverty: KS (HIV/AIDS); cervical cancer (HPV), liver cancer (hepatitis B); gastric cancer (H-pylori); bladder cancer (schistosomiasis).
  - Failure to protect populations from preventable health risks associated with cancer and other chronic illness will detract from both economic development and social well being, placing countries at further risk of failing to meet many Millennium Development Goals.
  - 50-60% of cancer mortality in LMICs is avoidable by applying country-specific strategies for prevention and treatment. Deaths from cancers that strike children and young adults account for many years of healthy life unnecessarily lost.

Indeed, these four myths are familiar to the global health community because they were the arguments used only a decade ago as justifications for inaction for HIV/AIDS. Fortunately, they went unheeded and each of the myths has been dispelled in the case of HIV/AIDS, which has now been transformed from an acute and fatal disease to a chronic illness.[2]

This Report takes issue with each of these myths and proves that they do not apply for many cancers and for many types of interventions. Control of risk factors and prevention of cancer are of the highest priority in LMICs. Treatments, care options, financial protection programs, and delivery models exist and can be applied in resource-constrained settings. Pain control should and can be managed in all settings. Further, many of these findings also apply to a broad range of NCDs and chronic illness.

### *Francine's Story*

*Francine was 11 years when she arrived at Rwinkwavu Hospital in Rwanda in 2005. This was just a few months after the hospital opened with support from Partners In Health.*

*She and her father had traversed Rwanda looking for a cure for the enormous tumor protruding from Francine's right cheek. It was obvious that left untreated the cancer would eventually take her life. In Francine's own words, "My parents had nearly given up hope". Before coming to Rwinkwavu, the family consulted numerous physicians and traditional healers. But lacking diagnostic equipment or expertise in oncology, the medical community could offer few answers. And even when a doctor did make a tentative diagnosis, Francine's family –poor, subsistence farmers– could not afford the fees for treatment.*

*At Rwinkwavu, Francine sat in the pediatric ward for months as her tumor grew and as hospital doctors and nurses tried to determine if cancer treatment, never before provided there, was possible in their small, rural hospital. Eventually, treatment was made possible through links with colleagues at institutions in the US. A tissue sample was sent to the Centres for Disease Control and Prevention laboratory for diagnosis, a pediatric oncologist at Dartmouth-Hitchcock Medical Center advised on creating a treatment regimen that was safe in the local setting, and Partners In Health purchased chemotherapy and other medications.*

*After several family meetings and training of local staff by a PIH pediatrician on site –Dr. Sara Stulac, who is also the author of this summary of Francine's story– she began receiving chemotherapy. Her tumor shrank each week, and after nine weeks of chemotherapy, she was able to have surgery to remove the residual tumor. The surgery was performed at Rwanda's national referral hospital.*

*Francine subsequently returned to Rwinkwavu for a total of 48 weeks of chemotherapy. Her father was employed at the hospital farm and so was able to support his family even during his daughter's lengthy hospitalization. The hospital doctors, nurses, and social workers developed close relationships with Francine and her family as they accompanied her through treatment.*

*As of 2011, 6 years after her arrival at Rwinkwavu, Francine remains cancer-free, and is a happy and healthy student at her local elementary school. She returns often to the Rwinkwavu Hospital pediatric ward to visit patients and her friends among the hospital staff, and often mentions how important it is that other kids who are suffering find access to medications just as she did.*

*Francine's story continues to provide inspiration and guidance for programs to expand access to cancer care and control in LMICs.*

At the same time, developing programs to meet the challenge of cancer and other NCDs in low resource settings is even more complex than was the case with HIV/AIDS. There are major differences in cancer programs because of the complexity of care, the many specialists and medications involved, and the special procedures that are required. Pathology, for example, is a huge hurdle to overcome in many settings. For this reason, this Report, like earlier documents, focuses on the many compelling opportunities that exist for reducing cancer incidence, improving survival and survivorship, and offering better palliative care.[3] The evidence in the Report steers policy toward all that can, rather than detracting resources towards what cannot be accomplished in countries at different resources levels.

The **High-level Meeting of the General Assembly of the United Nations on the Prevention and Control of Non-communicable Diseases** (UNHLM on NCDs), held in September of 2011, set the stage for the action that is required to reduce the global inequities in access and outcomes in prevention and care for NCDs. The Declaration agreed upon at the UNHLM positions NCDs as a priority for development, as well as for health. It also places new focus on the importance of research, and international cooperation, including trade. The lead-up and the meeting involved a myriad of actors. This is reflected in the high level of participation by heads of state and governments, as well as through the incorporation of many recommendations made by civil society.[4]

While the Declaration falls short of establishing necessary targets and goals for reducing the burden of NCDs, it does set out specific short-term tasks. In particular, the development of a comprehensive global monitoring framework that includes voluntary global targets and national indicators, and proposals for carrying forward multisectoral action by the end of 2012; strengthened multisectoral national policies by 2013; and a report on commitments by 2014.[5]

This Report follows on the global milestone of the UNHLM on NCDs. It seeks to contribute to the process of establishing the global monitoring framework and the partnership for multisectoral action that are outlined in the Declaration.

To move forward, the GTF.CCC suggests that appropriate and effective evidence-based policies –blueprints for action– must be identified, developed, evaluated, and scaled up by involving all participants in inclusive, multi-stakeholder programs and forums. The Report offers blueprints for action for cancer that can also augment the agenda on NCD and chronic illness.

There are reasons for **emphasizing cancer within the NCD agenda**. First, an effective response to cancer requires developing the capacity to offer prevention and treatment. This **capacity-building around cancer can strengthen health systems overall**.

Further, cancer advocacy can reinforce the global health and NCD agenda. One of the obstacles to promoting action and financial commitment is that advocacy around NCDs and chronic illness is often not inspirational and does not create a sense of urgency. This is especially true when compared with communicable diseases, especially HIV/AIDS.[6,7] History demonstrates, though, that cancer advocacy to galvanize communities through movements led by patients and their families can be highly effective.[8] Indeed, cancer advocacy mobilizes stakeholders and constituencies in unique ways that can be leveraged to bridge the false divide between communicable diseases and NCDs.

Cancer is in fact a "communicable" NCD - it is one of the diseases for which **effective communication can catalyze a global movement**.[9] Advocacy and activism around cancer, if positioned with an agenda for health system strengthening, can provide a human face to NCDs and convert cancer and other chronic illness into a priority for global and national health agendas.

Advocating for increased access to CCC in LMICs need not, and should not, be at the expense of meeting other health priorities.[10] The evidence presented in this Report demonstrates that CCC can be designed to reinforce health systems in ways that support efforts to meet the challenge of NCDs, achieve the Millennium Development Goals (MDGs), and promote a broad economic and human development agenda.

**Controlling risk factors must be at center stage of any NCD control effort in LMICs**. Evidence clearly signals that a set of high-priority, effective, low-cost interventions must be put in place immediately to avoid an impending crisis, and massive increases in the toll of NCDs on health, as well as social, economic and human development. Tobacco control is key and requires an accelerated implementation of the WHO Framework Convention on Tobacco Control (FCTC) as indicated in the Declaration of the UNHLM on NCDs. In addition, preventing harmful alcohol use and promoting healthy diet and physical activity are priorities for LMICs.[11-13] These are important lessons for both high and lower income countries.

At the same time, an approach focusing solely on the management of risk factors is not sufficient to respond to the challenge of cancer in LMICs. Many cancers are not associated with known risk factors, especially in the case of children. Thus, in addition to strongly supporting efforts to prevent the cancers of tomorrow by reducing risk factors, the GTF.CCC calls for the **immediate action required around early detection, diagnosis, treatment, and palliation**.

This Report takes issue with the prevention-only, minimalist view of what can be done for cancer. The assumption that cancers will remain untreated in poor countries must be challenged, just as was done more than a decade ago with similarly unfounded arguments against provision of treatment for HIV/AIDS. In the case of cancer, just as was the case with HIV/AIDS, prevention is critically important, but so are treatment, survivorship, and palliation. The following was written about HIV/AIDS in 2001, and continues to apply to HIV/AIDS as a chronic illness, as well as to cancers: "The belief that treatment may be reserved for those in wealthy countries whereas prevention is the lot of the poor might be less repugnant if we had highly effective preventive measures".[14] In fact, expanded access to prevention and care for HIV/AIDS has to be considered one of the greatest achievements in the history of global health.

**"The belief that treatment may be reserved for those in wealthy countries whereas prevention is the lot of the poor might be less repugnant if we had highly effective preventive measures."[14] Paul Farmer, et al.**

The either-or debates –prevention or treatment, infectious or non-communicable disease– provide excuses for inaction and generate barriers. The current debates place cancer in a position that pits communicable against non-communicable, and fosters competition, rather than complementarity, in the face of scarce resources, and detracts from effective communication of the urgent need for action.

Global health requires a framework that embraces the neglected area of work on NCDs and at the same time bridges the false divide between communicable and non-communicable disease.[15] This framework must also encourage and facilitate work across NCDs, something that is important in both wealthy and lower income countries.

The **diagonal approach** put forward in this Report offers such a framework.[16] It moves away from misunderstandings that currently detract from effective action and promotes a "Yes, we can" response emphasizing what can be done rather than what cannot be done. The diagonal approach transforms zero-sum debates about what to deny poor patients with cancer into a search for opportunities that will strengthen health systems for all.

The **diagonal approach** is a strategy in which priority interventions drive necessary improvements into the health system. Rather than focusing on disease-specific vertical programs or on horizontal initiatives that address system-wide constraints, a diagonal approach seeks to do both.[17]

Applications of the diagonal approach to CCC include: tobacco control to help prevent certain cancers as well as reduce cardiovascular and respiratory diseases; promoting increased physical activity and healthy eating to reduce the risk of several NCDs; empowering women through better knowledge of cervical cancer prevention and early detection of breast cancer with interventions implemented through sexual and reproductive health programs; and, strengthening health systems to support access to pain control medication for all patients (see Section 4 of the Report).

**Closing the Cancer Divide: A Blueprint to Expand Access in Low and Middle Income Countries*** demonstrates that health systems should, could, and can be strengthened to respond to the complex array of diseases, epitomized by cancer, that today characterize the epidemiological profile of all countries, rich and poor alike.

* Full Report available at gtfccc.harvard.edu

# I.i. MUCH SHOULD BE DONE:
## CLOSING THE CANCER DIVIDE IS AN EQUITY IMPERATIVE AND A PRIORITY FOR ECONOMIC AND HUMAN DEVELOPMENT

The cancer landscape has changed dramatically in less than a generation. While the challenge of cancer is far from met, the horizon is promising. Many cancers once considered a death sentence can today be prevented or cured. For a number of patients, cancer is a chronic illness, one that they "live with" rather than "die from."

Survivorship is an emerging dimension of cancer care. This is because for some –though unfortunately not all– cancers, a large proportion of patients survive both the disease and the treatment to enjoy a healthy life. In the face of these successes the stigma of the "C Word" has faded, thanks largely to the efforts of the flourishing survivorship movement. Both the gains in survival and the reductions in stigma are revolutionary for a disease that, not too many years ago, was universally synonymous with suffering, stigma, and death for people at all income levels.[18]

Yet, the improvements in the opportunity to survive and the reduction in the hardships faced in trying to do so are far from universal. Successes are restricted primarily to wealthy countries and individuals. **Too few of the benefits of progress in understanding, preventing, treating,** and **caring for people with cancer have reached LMICs**.

However, it is precisely in LMICs that more than half of newly reported cancers and two-thirds of deaths occur. Once considered a problem exclusive to high income countries **cancer has become a leading cause of death and disability in the developing world**. More than 55% of the 12.7 million cancer cases and 64% of the 7.6 million cancer deaths in the world in 2008 were in LMICs.[19] By 2030, LMICs will bear the brunt of an estimated 27 million new cancer cases and 17 million cancer deaths.[20-22]

Cancer is no longer a disease confined to the wealthy, and the same is true of NCDs overall. For women 15-49 living in sub-Saharan Africa, death or disability from an NCD is four times more likely than for women who live in high income countries.[23,24]

**"The chance for a cure, the chance to live, should not be an accident of geography."**
**HRH Princess Dina Mired of Jordan.**

The motivation for action must not be based solely on absolute numbers. Increasing access to CCC in LMICs is also an **equity imperative**. While the rich are often able to live with cancer; the poor die –painfully– from the same diseases. Access to the opportunities to prevent and to survive cancer should not be determined by income or geography; yet they are.

A "protracted and polarized epidemiologic transition" –through which populations simultaneously face emerging chronic and non-communicable disease, while still battling diseases associated with poverty and underdevelopment–[25] is also occurring in cancer. This **cancer transition** is further spreading the already gaping divide between rich and poor (see Section 2 of the Report).

Preventable cancers, such as cervical, liver, and lung cancers that are declining in incidence in high income countries are far from controlled in LMICs. Simultaneously, cancers historically less common in those countries, such as breast cancer, are increasing in incidence. As policies to control risk factors, access to vaccination, and early detection become universal in high income countries, the concentration of these cancers in LMICs will become more evident. This backlog of preventable yet unaddressed cancers is combining with the emerging challenge of all other cancers that cannot be prevented, only appropriately treated or palliated. This is creating a **double cancer burden for LMICs**.

The disparity –referred to in this Report as the **cancer divide**– in cancer outcomes between rich and poor directly relates to inequities in access to health care and to differences in underlying socio-economic, environmental, and health conditions (see Section 2 of the Report).[26] The cancer divide is caused and fueled by concentrating preventable risk, disease, suffering, impoverishment from ill health, and death among poor populations. Further, the divide is likely to continue to widen and deepen over the coming decades if the fruits of progress in science and medicine continue to be largely unavailable in LMICs.

### Five facets of the cancer divide

1. Risk factors associated with cancers amenable to prevention through behavior change (e.g. smoking and lung cancer) or reduced exposure to environmental risk (e.g. indoor air pollution and lung cancer).
2. Preventable infections for which no vaccine exists that are associated with cancer (e.g. HIV/AIDS and KS), and infections that can be prevented through vaccination or detected and controlled in pre-cancerous stages (HPV and cervical cancer).
3. Cancers for which treatment exists and is often made more effective by early detection (e.g. breast cancer).
4. Suffering associated with the social and psychological aspects of disease or survivorship, including discrimination and stigma.
5. Pain and physical suffering associated with all cancers, including those for which neither effective treatment nor prevention is possible.

*(See Section 2 of the Report)*

The divide affects the full range of cancers: those amenable to prevention with behavior change or reduced exposure to environmental risk; cancers for which preventable infection is the origin and cancers for which effective treatment exists, especially with early detection (some of these cancers are also preventable).

For survivorship and palliative care and pain control, the divide applies to all cancers. Access to services, state-of-the-art treatment, advocacy, and financial protection create an environment in rich countries where healthy survivorship is now possible for many cancers. The opposite is true in developing countries where cancer is still seen as a death sentence and the stigma around the disease and the effects of treatment –compounded by discrimination associated with gender, ethnicity, and socio-economic status– too often prevent care-seeking, almost guaranteeing a fatal outcome even where cure is feasible and affordable.

**Pain control, an issue for all cancers and many other diseases, offers the most distressing and insidious example of the cancer divide**. Controllable pain is considered unacceptable in most high income countries, at least for the wealthy. Yet, and despite the generally low cost of pain control, many populations lack access to this fundamental health intervention, one that might well be considered a basic human right.

When quantified, these disparities are appalling. Approximately 90% of cervical cancer occurs in LMICs. It is also the case that more than half of women with breast cancer in LMICs die from their disease, compared to less than a quarter of women in the developed world. In Canada, some 90% of children with acute lymphoblastic leukemia are cured, but in the poorest countries of the world the inverse is true: more than 90% of children will die of the disease. High income countries account for less than 15% of the world population, yet more than 94% of global morphine consumption.[27] Sub-Saharan Africa records 1.1 million deaths in pain and yet consumes enough medicinal opioids to treat just 85,000 people.[28]

### *The breadth of the cancer divide in prevention, treatment, and pain control*

*Global disparities in outcomes for preventable and treatable cancers, and in access to even the most basic reprieve from suffering, pain control, are enormous. Cervical cancer mortality, the ratio of mortality to incidence for childhood cancers and breast cancer, and non-methadone opioid consumption per death from HIV/AIDS or cancer in pain, each illustrates the breadth of the cancer divide. These disparities are evident both within countries and across regions, as well as by income.*

*For the poorest decile (10%) of countries of the world, the average mortality rate for adult women from cervical cancer –which is highly preventable if detected in precancerous stages– is 36 compared to 3 in the richest decile of countries. The lethality (approximated by mortality/incidence in a given year)[29] of both childhood cancers and breast cancer is much higher for the poorest countries. A child diagnosed with cancer who lives in one of the poorest countries has an 80% probability of dying, compared to less than 30% in one of the wealthiest countries. The spread in access to pain control is tremendous: ranging from 54 milligrams per death in pain from HIV/AIDS or cancer in the poorest decile to almost 97,400 in the richest decile of the world's countries.*

*Within income regions, the differences are also large. This indicates that the level of economic development is not the only determinant of outcomes or access. It also suggests that some countries, despite low income, are better able to meet the challenge of cancer. The average for the five low income countries with the highest mortality rate for cervical cancer is 57, compared to 6 for the five low income countries with the lowest mortality rate. For lethality of childhood cancers the spread is 0.9 compared to 0.42: 90% of children are likely to die from the disease in the countries with the worst outcomes, compared to 40% in other low income countries where treatment options are likely to be more available. Access to pain control is 31 milligrams compared to over 500.*

*Even within high income countries there is considerable variation in performance. For cervical cancer mortality, the figures are 16 compared to 1; for lethality of childhood cancers they are particularly wide with a 16-fold difference; and, for breast cancer 0.61 to 0.14. This suggest that some high income countries have mortality to incidence ratios for childhood and breast cancers that are similar to those of the poorest nations of the world. The extreme variation in milligrams of pain control medication reflects lack of access, but also very high levels in a few high income countries.*

*For LMICs across geographic regions, the patterns also demonstrate that the cancer divide is large. In the African region, all of the averages are relatively poor. Even in the countries with the best outcomes, 70% of children with cancer and almost 50% of women with breast cancer are likely to die, and access to pain control is below 1,750 milligrams for patients with HIV/AIDS who will experience pain in death. In Asia, the spread in the indicators is especially large for cervical, breast and childhood cancers. For childhood cancers, the five countries with the highest lethality for childhood cancer average 0.94, suggesting that almost all children die from their disease. Even in the five countries with the best indicators, more than 40% of children die from the disease. For breast cancer, the figures range from 25% to almost 60%. For the Eastern Mediterranean region, cervical cancer mortality is relatively low. All the other indicators are poor. The ratio of mortality to incidence for childhood cancers is 0.82 for the five countries with the highest rates, and 0.71 for the five countries with the lowest rates. For breast cancer, the figures are 0.62 and 0.45. Pain control medication access varies from 422 milligrams to just over 7,100 milligrams. For the LMICs of the European region, the probability of surviving childhood cancer is more than three times as high in the best performers compared to those countries with the worst outcomes. For breast cancer, the difference is more than double. In Latin America and the Caribbean, levels and differences in cervical cancer mortality are high and lethality varies by a factor of more than 2 for childhood cancers. For breast cancer, the levels and spread tend to be lower. For pain control, there is also less variation, but the average level even for the countries with the highest consumption is only 6,600 milligrams per death from cancer or HIV/AIDS in pain.*

Table 1

# Cervical cancer mortality, ratio of mortality to incidence for childhood and breast cancer, and non-methodone opioid consumption per death from HIV/AIDS or cancer in pain; averages by income[a] and geographic region

| | | | Cervical cancer[b] (15 or more years of age) | All cancers in children (0-14 years of age)[b] | Breast cancer (40 - 69 years of age)[b] | Non-methadone opioid consumption[c] (morphine-equivalents) |
|---|---|---|---|---|---|---|
| | | | Mortality (rate per 100,000) | Mortality/ Incidence | Mortality/ Incidence | Per death from HIV or cancer in pain (mg)[c] |
| Country Income | Decile 1 (poorest 10% of countries) | | 36 | 0.80 | 0.60 | 54 |
| | Decile 10 (most wealthy 10% of countries) | | 3 | 0.28 | 0.25 | 97,396 |
| | Low income | Average of Bottom 5 | 57 | 0.9 | 0.7 | 31 |
| | | Average of Top 5 | 6 | 0.42 | 0.35 | 522 |
| | Lower middle income | Average of Bottom 5 | 35 | 0.98 | 0.64 | 148 |
| | | Average of Top 5 | 1 | 0.29 | 0.30 | 4,716 |
| | Upper middle income | Average of Bottom 5 | 24 | 0.88 | 0.56 | 964 |
| | | Average of Top 5 | 4 | 0.19 | 0.25 | 8,970 |
| | High income | Average of Bottom 5 | 16 | 0.83 | 0.61 | 7,456 |
| | | Average of Top 5 | 1 | 0.05 | 0.14 | 150,869 |
| Geographic Region | Africa | Average of Bottom 5 | 57 | 0.93 | 0.66 | 19 |
| | | Average of Top 5 | 13 | 0.69 | 0.47 | 1,724 |
| | Asia[d] | Average of Bottom 5 | 25 | 0.94 | 0.58 | 358 |
| | | Average of Top 5 | 7 | 0.42 | 0.25 | 9,656 |
| | Eastern Mediterranean[d] | Average of Bottom 5 | 15 | 0.82 | 0.62 | 422 |
| | | Average of Top 5 | 2 | 0.71 | 0.45 | 7,136 |
| | Europe[d] | Average of Bottom 5 | 16 | 0.61 | 0.53 | 330 |
| | | Average of Top 5 | 5 | 0.20 | 0.30 | 11,332 |
| | Latin America and the Caribbean[d] | Average of Bottom 5 | 29 | 0.68 | 0.39 | 748 |
| | | Average of Top 5 | 10 | 0.30 | 0.25 | 6,612 |

[a] World Development Indicators, 2008. World Bank. (http://data.worldbank.org/data-catalog/world-development-indicators/).

[b] Source for cervical cancer mortality 15+; M/I cancers in 0-14; M/I breast cancer 40-69; and M/I NHL 15+ Globocan 2008; http://globocan.iarc.fr/. Taken directly from the online data base.

[c] Source for opioid consumption per capita and per HIV or cancer deaths: GAPRI methodology available at (http://www.treatthepain.com/methodology) and University of Wisconsin Pain & Policy Studies Group (http://www.painpolicy.wisc.edu/). See Appendix 1, Section 2 of the full Report and full GAPRI methodology available at (http://www.treatthepain.com/methodology).

[d] Excluding high-income countries.

These differences between rich and poor are hardly surprising given that only 5% of global spending on cancer is in LMICs. These countries account for almost 80% of the global cancer burden in terms of years of life lost to cancer, resulting in a staggering **5/80 cancer disequilibrium** in global investment in prevention, treatment, palliation, and research on cancer.[30,31]

As a result, **LMICs face a severe shortage of human and physical infrastructure to confront cancer**.[32-35] In Honduras, for example, fewer than twenty oncologists are available for a country with a population of eight million. In Ethiopia, four oncologists care for more than 80 million people.[36]

Similar shortages are faced in other specialty services that are essential to treat cancer such as pathology, and in access to tertiary centers where diagnosis, surgery, and specific treatments such as radiation therapy are performed. According to the International Atomic Energy Association, high income countries account for 70% of the world's radiation facilities, and 30 countries, half of them in Africa, do not have a radiation therapy machine. In North America, there are 6 megavoltage units per million inhabitants, compared to 0.5 in LMICs. These inequities tend to disproportionately affect women who constitute the majority of patients requiring radiotherapy.[37]

**Treating health as an investment rather than a cost** is now the predominant philosophy that inspires human, economic, and environmental development agendas (see Section 3 of the Report). Illness, especially chronic and catastrophic diseases such as cancer, reduce productivity and drive families into poverty as well as detracting from economic growth and human development.[38] Still, this investment framework remains largely ignored in global and national policy-making surrounding cancer and other chronic illness.

Human life and well being have an intrinsic and incommensurable value, including an economic dimension related to the stream of income individuals would generate if they survived and the contributions they make to family and community well-being and productivity.

**"Most countries in the developing world lack the infrastructure for quality cancer treatment and are struggling with the high costs of cancer drugs. Prevention and early detection programs in these countries are virtually non-existent. This is why today the cost of cancer in the deve-loping world is actually paid in human life." -HRH Princess Dina Mired of Jordan.**

The World Economic Forum (WEF) considers **chronic disease one of the three leading global economic risks** based on the potential impact of these diseases on global productivity and economic growth.[39] WEF cautions against taking a short-term view of the benefits of investing in chronic disease prevention and management. Failure to protect populations from preventable health risks associated with chronic illness will inevitably and severely detract from both economic development and social well being.[40] **Ignoring NCDs actually places countries at further risk of failing to meet many Millennium Development Goals** (MDGs).[41]

Further, **cancer, chronic illness, and NCDs, are both an outcome and a cause of poverty**. As Amartya Sen observes: "The poorest groups not only bear higher risks for non-communicable diseases but, once they develop such a disease, they also face larger medical and economic adversity. The poor have less resources and less access to medical care, and often have delayed diagnosis. Diseases like cancer tend, as a result, to progress to more advanced states than in the case of the rich, and this leads to higher levels of mortality and disability. The costs and economic handicaps related to these diseases are also a major cause for tipping already poorer households further into abject poverty."[42]

**"The poorest groups not only bear higher risks for non-communicable diseases but, once they develop such a disease, they also face larger medical and economic adversity. The poor have less resources and less access to medical care, and often have delayed diagnosis. Diseases like cancer tend, as a result, to progress to more advanced states than in the case of the rich, and this leads to higher levels of mortality and disability. The costs and economic handicaps related to these diseases are also a major cause for tipping already poorer households further into abject poverty." -Amartya Sen. Nobel Laureate in Economic Sciences, 1998.**

The cancer divide will further worsen the economic disparities between and within countries. Each year, new cases of cancer in the world –close to 13 million and growing– bring an enormous burden, not only in terms of years of life lost and human suffering, but also in economic terms.[43] The economic consequences of each cancer case include the direct and indirect costs of treatment, the income forgone by patients and their families as a result of being unable to work during treatment, and, more importantly, the lost productivity of the patient and the family from premature death and disability and the demands of caregiving that often fall hardest on young women.

**Tobacco is a huge economic risk for LMICs**. Tobacco's estimated $US 500 billion drain –mainly from tobacco-related illness and treatment costs– exceeds the total annual health expenditure of all LMICs. Tobacco's total economic costs reduce gross domestic product by as much as 3.6% per year. Further, the future does not portend well if trends in smoking continue. Between 2020-2030, the global annual economic costs of tobacco are expected to reach $US 1 trillion.[44]

Unlike in the case of HIV/AIDS, cancer is a complex set of many diseases and several types of cancers are not treatable, or even preventable with existing medical knowledge. Yet, the evidence presented in this Report paints a clear picture of the subset of cancers that can be prevented or treated successfully in low resource settings. For LMICs, a focus on the subset of cancers that can be prevented or treated using current knowledge and medical advances could reduce mortality significantly.

Based on an analysis of avoidable mortality undertaken for this Report, **between 2.4 and 3.7 million avoidable deaths from cancer occur each year**.[45] LMICs account for approximately 80% of this avoidable mortality. These estimates consider only those cancers for which prevention or treatment can produce cure or substantially increase healthy life expectancy.

### The economic cost of cancer and the benefits of care and control

- Between 2.4 and 3.7 million avoidable deaths from cancer occur each year; 80% are in LMICs.
- Deaths from cancers that strike children and young adults account for many of the years of healthy life unnecessarily lost.
- Tobacco use is a huge and preventable economic risk that reduces gross domestic product by as much as 3.6% per year in LMICs, according to the American Cancer Society.
- The economic cost of productivity losses combined with treatment costs for cancer is close to $(2010) US 1.16 trillion, which is approximately 2% of total global GDP.
- The value that individuals place on the losses they experience from cancer due to income not earned, out of pocket spending on health, and pain and suffering totals $(2010) US 2.5 trillion, or more than 4% of global GDP, according to estimates published by the World Economic Forum.
- WHO estimates that the cost of reducing risk factors such as tobacco and harmful alcohol use is $US 2 billion per year, for all LMICs – less than $US 0.40 per person.
- WHO also demonstrates that including a limited set of individual interventions for NCDs –such as Hepatitis B immunization to prevent liver cancer, and measures to prevent cervical cancer– costs less than $US 1 per capita in low income, $US 1.50 in lower-middle income, and $US 3 in upper-middle income countries.
- The economic value of productivity lost due to preventable cancer deaths exceeds the cost of cancer care and control by more than $US 130 billion. Potential savings are much higher –between $US 540 billion and $(2010) US 850 billion– taking into account the individual perception of the value of lost income and suffering.

*(See Section 3 of the Report)*

A larger proportion of deaths from cancer are avoidable in LMICs. Depending on the income region, 50-60% of cancer mortality in LMICs is avoidable, compared to 35% in high income countries.

Deaths from cancers that strike children and young adults account for many years of healthy life unnecessarily lost. Wealthy countries have been able to prevent many of these deaths, while lower income countries have not. These **"candidate cancers"** make ideal targets for advocacy and action in LMICs.

The total productivity cost of premature death and disability from cancer in the world is estimated at $(2010) US 921 billion.[46] This figure is based on the total Disability Adjusted Life Years (DALYs) lost and the value of lost individual productivity from early death.

The global economic cost of new cancer cases, including medical costs, prevention costs, and the time of caregivers and transportation to treatment facilities, and prevention is $(2010) US 310 billion dollars.[47]

The value that individuals place on lost income, out-of-pocket spending on health, and pain and suffering is $(2010) US 2.5 trillion – more than 4% of global GDP. This estimate is based on a Value of Statistical Life (VSL) approach.[48] A more conservative estimate, combining costs of treatment and productivity losses places the total annual economic cost of cancer at close to $(2010) US 1.16 trillion, which is approximately 2% of total global GDP. This figure does not include the substantial longer-term costs to patients, families and caregivers that are not directly related to the period of treatment.

For all estimates, the **economic value of the human life that could be saved exceeds the cost of CCC**. The driving factor in these calculations is the value of lost years of healthy, productive life to both the economy and the individual. A reasonable estimate of what the world could have saved in 2010, based on the economic value of lost DALYs and by investing in CCC, is $US 131 billion. Estimated savings are much higher –between $US 543 billion and $US 850 billion– taking into account the value reported by individuals of lost income and suffering.

Expanding coverage of prevention, detection, and treatment, especially in LMICs, requires additional investment. This investment will be more than compensated for by the projected reductions in the economic burden of the disease. Indeed, the future total economic burden from chronic disease overshadows any health costs yet experienced –including that from HIV/AIDS, tuberculosis and malaria– if the growth of NCDs is not halted.[49]

Findings from a WHO study indicate that the price tag for scaled-up implementation of a core set of NCD interventions and strategies is comparatively low. The cost of reducing risk factors, such as tobacco and harmful alcohol use is estimated at $US 2 billion per year for all LMICs –less than $US 0.40 per person. Including a limited set of individual interventions– in the case of cancer – Hepatitis B immunization to prevent liver cancer, and measures to prevent cervical cancer– the cost increases to $US 9.4 billion per year. Overall, this amounts to an annual per capita investment that is less than $US 1 in low income, $US 1.50 in lower-middle income, and $US 3 in upper-middle income countries.[50]

Yet, neither the costs of prevention nor treatment should be taken as fixed over time. Scientific innovations for preventing and treating cancer, while often costly, emerge quickly, changing both the field and the cost structure. Thus, the current price tag on the total cost of prevention and treatment for cancer care for incident cases is highly permeable, even with the increasing costs of new technologies and drugs. The **economics of hope** suggests a future where prevention and treatment become more accessible to patients and health systems in LMICs.

### Successes in lowering the cost of vaccines for LMICs

- **Hepatitis B vaccine:** The decline from a launch price in 1982 of over $US 100 to $US 0.20 a dose has enabled developing countries to dramatically increase vaccination rates with support from the Global Alliance for Vaccines and Immunizations (GAVI).
- **HPV vaccine:** Before 2011, prices ranged from $US 30 to $US 100 per dose in LMICs. Through the Pan American Health Organization Revolving Fund, prices decreased from $US 32 per dose in January 2010 to $US 14 per dose in April 2011 for eligible countries. As a result of effective work through the GAVI Alliance, in June 2011 Merck offered the vaccine at $US 5 per dose for low income countries.[51]

*(See Section 7 of the Report)*

Closing the cancer divide is an equity imperative. Yet, the very existence of that divide remains shrouded by ignorance. Even the global health community is just becoming aware of its existence.

One of the goals of this Report and the GTF.CCC is to remove that shroud and reveal the looming challenge of cancer for global health. The world faces a huge cost from failure to address the challenge of cancer in LMICs. This challenge requires an immediate and large-scale global response.[52]

## I.ii. MUCH COULD BE DONE: A SOLUTION-ORIENTED FRAMEWORK

In the face of the growing burden of chronic disease, epitomized by cancer, health systems must reinvent themselves. This means replacing the conventional either-or model of treating only specific diseases with **interactive and synergistic health systems**. Reinvented health systems will be strengthened as they adapt and adopt new methods of delivery, pricing, procurement, and financing. Indeed, the 2010 Lancet Series on chronic illness argues that investment in a systems approach to chronic diseases in LMICs is strategic.[53]

Improving access to CCC and strengthening health systems are mutually reinforcing. Strong health systems are needed to prevent, diagnose, and treat cancer and other chronic illness. At the same time, expanding CCC can be accomplished in a way that strengthens health systems overall.[54] This Report proposes a **diagonal approach** to health care to mutually reinforce CCC and health system strengthening by simultaneously considering the overall goals of a health systems and disease-specific priorities and interventions (see Section 4 of the Report).[55,56]

### Expanded CCC can contribute to health systems strengthening and to economic and social development

- **Prevention – healthy lifestyles:**
  - Tobacco control is key to preventing certain cancers as well as reducing the risk of cardiovascular and respiratory diseases.
  - Promoting healthy lifestyles reduces the risk of cancer and of many other NCDs.
  - Anti-tobacco and health promotion activities are an integral component of education, anti-poverty, economic, and human development policy programs.

- **Early detection – secondary prevention:**
  - Early detection programs for breast and cervical cancer empower women and contribute to poverty reduction, overall health, child health, and controlling specific diseases such as HIV/AIDS.
- **Diagnostics and treatment:**
  - Establishing the telecommunications systems needed for teleoncology facilitates diagnosis and treatment for other diseases and health conditions, and for training and capacity building.
- **Treatment:**
  - Basic inputs like pulse oximeters improve the effectiveness of surgery for cancer, as well as for other diseases and conditions.
  - Establishing stringent procedures to prevent infection and manage waste and toxic substances for CCC will benefit all patients by helping to reduce the risk and incidence of infections acquired in health facilities.
- **Survivorship:**
  - Efforts to reduce stigma around cancer empowers communities to reduce discrimination suffered by other groups –including patients with HIV/AIDS or tuberculosis, women, and families living in poverty– and promotes social cohesion and reduces the exclusion of marginalized populations.
- **Pain control and palliation:**
  - Strengthening health systems to increase access to pain control medication is essential for cancer, for many other diseases, and for surgery.

*(See Section 4 of the Report)*

The diagonal approach argues that expanding cancer treatment can improve the capacity of health systems in LMICs to deal with all diseases and health problems. Strong health systems are needed to treat cancers effectively, and expanding CCC can strengthen health systems. An example is pain control, which is crucial for cancer palliation and for many other patient needs, but often is not available despite its low-cost.

The distinctions between chronic and acute, and communicable and non-communicable that have been used for decades are increasingly irrelevant. These false dichotomies that shaped public health in the past place a heavy burden on research and on policy. The nomenclature stifles the most effective translation of research into evidence, advocacy, and policymaking. Health systems must not become trapped in static thinking and fail to respond to epidemiological change, medical breakthroughs, or opportunities for innovation in delivery and financing of care.

Health systems in LMIC were largely designed to respond to acute illness, and consequently tend to treat chronic disease as a series of unrelated episodes of illness, not as a single disease with continuing and long-term care needs. The current approach must be reformulated to respond to the ongoing needs of cancer and other chronic conditions. Health system innovations must address the six overlapping **components of the cancer-control continuum** and develop integrated programs that incorporate all six: primary prevention, early detection, diagnosis, treatment, survivorship, and palliation.

This Report presents and applies the diagonal approach across the cancer care continuum to respond to the challenges of **chronicity.** One of the key benefits of this approach is to use existing horizontal, population-wide systems and programs –such as education, infrastructure, reproductive health initiatives, regulatory structures for pain control, health insurance, and surgical equipment– in ways that also respond to the health needs of different disease groups.

The evidence suggests that much should and could be done in LMICs. At the same time, because resources are scarce, identification of the most effective treatments and the cancers most susceptible to these treatments is needed in order to set priorities. This defines a set of **candidate cancers and compelling CCC opportunities** for immediate action to expand prevention and/or treatment (see Section 5 of the Report). Resource stratification aids in defining the interventions most useful and appropriate at different income levels, and a careful analysis should be applied to each cancer for each country setting.[57,58]

### Candidate cancers and compelling CCC opportunities

- **Prevention**
  - Lifestyle related
    - Tobacco: lung cancer, head and neck cancer, bladder cancer, throat cancer; increased risk from secondhand exposure
    - Alcohol: hepatocellular carcinoma
  - Infection related
    - HPV: cervical cancer
    - Hepatitis B: hepatocellular carcinoma
    - H pylori: stomach cancer
- **Early detection and treatment**
  - Cervical cancer
  - Breast cancer
  - Retinoblastoma in children
- **Treatment based primarily on systemic therapy**
  - Burkitt's lymphoma (particularly childhood)
  - Hodgkin's lymphoma
  - Childhood acute lymphocytic leukemia
  - Non-Hodgkin's lymphomas
- **Life extension and palliation with systemic therapy**
  - Kaposi's sarcoma
  - Chronic myelogenous leukemia
- **Survivorship**
  - All cancers and population groups
- **Pain palliation**
  - All cancers

*(See Section 5 of the Report)*

A particular challenge in cancer treatment is the recognition that **treatments span a spectrum from highly effective, low-cost options to minimally effective, and sometimes even experimental or unproven high-cost treatments**. This contrasts with the scale-up of HIV medications where most of the applicable medications had rapid and visible initial efficacy, and the problem was one of driving costs down to the point where scale-up was possible. In high income countries minimally effective drugs are often the newest and thus most expensive, sometimes extending life only a few weeks and with serious side effects and catastrophic financial implications for families and health systems. Cost of surgery has also spiraled for reasons that often have little to do with improved patient outcomes. Indeed, futile care and treatments can detract from palliative care that could improve the quality of life for the patient and the family, and sometimes even prolong survival.[59]

Saddling LMICs with minimally effective solutions at great cost would not be sound public health policy and should be avoided. Thus, this Report focuses on determining how to **choose effective cancer treatment regimes in LMICs that respond to the complex issues of equity and resource allocation**.

The lessons that can be learned from the innovations in delivery that are proposed for LMICs could indeed also be of use in high income countries. Some of these innovations are low-cost, basic, and increasingly proving to benefit all patients. One example is the surgical checklist.[60]

The analysis and recommendations around core elements of a CCC strategy for LMICs are anchored in five key assumptions:

1. Many cancers are preventable through infection control, risk factor reduction, and lifestyle modifications, especially eliminating the use of tobacco.
2. An accurate cancer diagnosis is critical to determine an appropriate and successful treatment plan.
3. Many cancers are highly curable with affordable drugs and add many years of life, which means
   - Denial of therapy for diseases for which effective, affordable treatments exist is unacceptable.
   - Treatment of more complex, less curable diseases requires evaluations specific to each country and available resources.
4. Palliation of pain and suffering from cancer is a basic human right. Such programs should not be based on cost-benefit calculations that are measured in extending life. Dignity and equity are equally as important as efficiency.
5. Understanding the magnitude of the cancer burden and the potential impact of CCC interventions requires reliable data.

Based on resource availability and the cancer burden, specific strategies and an appropriate set of candidate cancers must be defined by each country. Priority setting should be laid out in **a national cancer strategy or plan** that also identifies the investments needed for research and to build an evidence base. A country-specific strategy can clearly identify the cancers most amenable to interventions along the continuum of care and control.

This Report provides a framework to help countries develop cancer plans by delineating the foundations of adequate CCC and the core components for basic, effective cancer control that can apply even in settings of resource scarcity. This is coupled with a description of the core elements for a subset of cancers that are among the most significant challenges to health in low income countries.

National cancer plans should apply a diagonal approach and be well-integrated into horizontal health system programs. Further, cancer plans should be part of national strategies around NCD and chronic illness that take full advantage of opportunities to apply a diagonal approach.

An adequate cancer plan should include improved options for diagnosis through better pathology, as well as surgery and radiation treatment for the cancers where these are essential. This requires linkages and referrals to a center of excellence. International agencies can play an important role, as has been demonstrated by the International Agency for Atomic Energy through the Program of Action for Cancer Therapy.[61]

While a goal should be to establish a national center of excellence in each LMIC, this will take time in many countries. Examples from several countries provide both lessons and encouragement. The Cancer Institute at Chennai in India, the Ocean Road Cancer Institute in Tanzania, and the National Institute of Neoplastic Disease of Peru have been highlighted.[62] This Report adds the examples of the King Hussein Cancer Center and Foundation of Jordan, the Uganda Cancer Institute, and the network in Mexico of the National Cancer Institute of Mexico and regional centers such as the Jalisco Cancer Institute.

To bridge the gap, this Report proposes a series of innovations in delivery, including international partnerships and twinning using information and communications technology and telemedicine such as telepathology. A set of models exist, many of which are derived from pediatric oncology. If shared globally and well-evaluated, these models can provide the necessary lessons for scale-up.

The identification of candidate, priority cancers and interventions in low income settings does much to dispel the myth that "little can be done". The Report identifies a substantial set of candidate cancers for which important opportunities exist for prevention, diagnosis, treatment and palliation in LMICs. For example, 26 of the 29 key agents for treating many of the most prevalent, treatable cancers in LMICs are off-patent, making drug treatment relatively low cost.

The **cost of increasing access to treatments in LMICs that can most help to close the cancer divide may be far less than many fear**. The cost of curative or life-extending cancer medicines is less than $US 500 per patient for cervical cancer, Kaposi's sarcoma, and Burkitt's lymphoma (primarily a childhood cancer endemic in Africa). Most of the off-patent generic cancer medicines required for LMICs are available for less than $US 100 per course of treatment, and nearly all for under $US 1,000.

In addition, this Report estimates, based on Globocan 2008 data, that the total cost of covering drug treatments in LMICs for unmet needs for cervical cancer, Hodgkin's lymphomas, and acute lymphoblastic leukemia in children 0-14 is approximately $US 115 million, and for one year of incident cases is $US 280 million. While this does not include diagnostics, surgery, or radiation therapy it is still a relatively low figure. Breast cancer treatment, by contrast, is orders of magnitude more costly, especially if highly effective, on-patent drugs are used for HER2 positive cases. Yet, in the case of breast cancer early detection, which is much less costly, not only increases the probability of cure or lengthening healthy life expectancy. It also significantly reduces the requirements for, and hence the total cost of, medicines and other interventions (see Sections 5 and 7 of the Report).

### The cost of treatments that can close the cancer divide may be far less than many fear

- Observed reductions of 90% in the price of HPV and hepatitis B vaccines have been achieved for low income countries.
- Early detection of breast cancer substantially increases healthy years of life, and reduces the requirements for, and hence the total cost of, medicines and other interventions.
- 26 of the 29 key agents for treating many of the most prevalent, treatable cancers in LMICs are off-patent.
- Most of the off-patent generic cancer medicines required for LMICs are available for less than $US 100 per course of treatment, and nearly all for under $US 1,000.
- The cost of curative or life-extending cancer medicines is less than $US 500 per patient for cervical cancer, Kaposi's sarcoma, and Burkitt's lymphoma.
- The total cost of covering drug treatments for unmet needs for cervical cancer, Hodgkin's lymphoma and acute lymphoblastic leukemia in children 0-14 in LMICs is approximately $US 115 million. The cost of drug treatment for one year of incident cases is $US 280 million.

*(See Section 5 and 7 of the Report)*

An array of opportunities exists for actions that can be taken to close the cancer divide, and the cost of many of the necessary interventions is relatively low. **Prevention of risk factors beginning with tobacco control** is a high priority for all countries and all income levels. **Several cancers affecting children, youth, and women that are highly curable, and cancers associated with preventable infections** are among the most obvious and frequent candidate cancers for action. **Reducing stigma, improving survivorship, and providing pain control and palliative care** are necessary and feasible for all patients. Interventions in all of these areas and cancers are mutually reinforcing, will benefit other patients and population groups, strengthen health systems and promote economic and human development.

Based on the findings outlined above, GTF.CCC members propose five overarching recommendations to improve global equity and to close the cancer divide:

1. **PROMOTE prevention policies** that reduce cancer risk.
2. **EXPAND access** across the cancer care control continuum through **universal financial protection for health**, an **explicit package of guaranteed benefits**, and **efficient use of all levels of care**.
3. **STRENGTHEN national health systems** to respond to cancer and other chronic illness by integrating interventions into existing programs and institutions and by translating evidence into policy through strong information systems, research, and monitoring and evaluation frameworks.
4. **LEVERAGE global institutions** and in particular those that could offer financing, pricing and procurement, evidence generation, capacity building, and stewardship and leadership for cancer care and control.
5. **MOBILIZE all public and private stakeholders in the cancer arena**, through new and existing global and national forums and networks dedicated to improving health outcomes and equity.

## 1.iii. MUCH CAN BE DONE

The GTF.CCC Report outlines specific actions in five strategic areas where a diagonal approach can significantly narrow the cancer divide. The proposals in each of the strategic areas for action are designed around the five overarching recommendations outlined above.

### The strategic areas for action are:

- **Innovations in delivery** that optimize the use of human and physical resources, utilize information and communication technologies both across and within countries, and involve the primary and secondary levels of care to the fullest extent.
- Improve **Access to affordable medicines, vaccines, and health technologies for cancer** through global and national strategies that reduce price and non-price barriers.
- **Innovations in financing** that take advantage of both local and global opportunities to expand social protection in health that incorporates cancer care and control.
- Production and application of more and better **Evidence for decision-making** through enhanced health information systems and research, frameworks for monitoring and evaluation, and performance measures that promote accountability and results.
- More effective **Stewardship and leadership by national and global actors** to take full advantage of the energy generated by the UN High-level Meeting on NCDs and galvanize multi-stakeholder action, including communities, patients, and the private sector, through effective national cancer plans.

Each strategic action area is discussed in a section of the final part of the Report and includes a set of specific, enabling recommendations. The core ideas and recommendations of each section of the Report are summarized below.

## Innovative delivery

The GTF.CCC identified a number of innovative service delivery models and mechanisms, which could be implemented in LMICs to improve the delivery of CCC. The Task Force concluded that, even where specialized services are not available, a range of CCC interventions could be offered using innovative delivery strategies. Examples from Mexico, Uganda, Jordan, Partners In Health and the St. Jude International Outreach Program demonstrate some of these innovations. Examples of innovations in high income countries where populations live far from specialty services provide additional evidence. The examples are supported by a comprehensive literature review on innovative delivery for other diseases and health services (see Section 6 of the Report).

Non-specialized medical personnel must be trained in order to shift substantial components of CCC to less specialized facilities. Use of telecommunications and other formal and informal links with specialized centers in high and middle income countries around the world, as well as in urban centers in LMICs, can enhance the potential and capacity of the non-specialized health personnel and infrastructure available in LMICs. This strategy can bridge the distance between the patient and the point of care to ensure accessibility and acceptability.

### Breast and cervical cancer: examples of innovative delivery

- **Prevention – healthy lifestyles:**
  - Integrating health promotion activities including tobacco control and healthy lifestyles into anti-poverty and social welfare programs.
  - Promoting HPV vaccination through adolescent, sexual and reproductive, and maternal and child health programs.
- **Early detection – secondary prevention:**
  - Integrating early detection programs for breast and cervical cancer into anti-poverty, maternal and child health, sexual and reproductive health, and HIV/AIDS programs.
  - Training expert patients, community health workers, nurses, and primary care physicians to provide early diagnosis especially for high-risk women.
- **Diagnosis:**
  - Using telemedicine to expand capacity for breast imaging by linking specialists and specialty centers to primary and secondary providers of health care for diagnosis, and training.
  - Where pathology processing facilities exist, strengthening these by using telemedicine for pathology consultation.
- **Treatment:**
  - Training primary and secondary care providers and facilities to safely provide some chemotherapy and adjuvant therapy with a strong link to specialists and specialty centers, thus reducing costs for patients, the need for young women to leave children for long periods, and the demand placed on tertiary facilities.
- **Survivorship:**
  - Training expert patients, community health workers, nurses, and primary care physicians to provide long-term emotional support, guidance in symptom management, and patient navigation including knowledge of rights and health care benefits.

  **Pain control and palliation:**
  - Putting systems in place to enable the safe and effective management of pain medications at the primary and secondary care levels, including administering drugs through simpler presentations.

While much more can be accomplished with available resources, it is also evident that to diagnose and treat most cancers additional investment is required, particularly in low income countries. Building human resource capacity is crucial in many areas. Further, on-site facilities are essential to improve diagnostic capacity especially in processing pathology. While telemedicine can help to build this capacity, basic investment is also required on-site.

Pilot projects must be evaluated formally so that the most promising can be scaled-up to demonstration programs that will provide the necessary evidence to show that innovative delivery is consistent with high-quality care, effectiveness, and reduced costs, both for the patient and the health system. These lessons may prove useful in high income countries where the cost of care is especially high and very focused on specialty services. An international data bank of experiences and lessons learned from projects undertaken by government, international agencies, the private sector, and civil society is a much needed input to promote more effective action.

## Access to affordable medicines, vaccines, and health technologies

High cost and poor availability of cancer medicines, vaccines, and health technologies constitute significant barriers to cancer prevention, detection, diagnosis, treatment, and palliation in many low and middle income countries. Expanding access to these technologies requires a pharmaceutical systems approach that links cost-effective selection, vigorous price reduction, transparent information on prices and sources, reliable procurement, assured quality, engagement of key stakeholders, actions to address barriers to palliation and pain control, and "frugal" innovation (see Section 7 of the Report).

Barriers can be overcome in a number of ways. For example, most chemotherapy and hormonal medicines considered essential for low-resource settings are off-patent. For these products, the best price and quality will be obtained through competitive, pooled procurement/bulk purchasing from qualified suppliers by a reliable procurement and supply organization. Low income countries regularly receive reductions of more than 90% from the launch price in the purchase price for drugs for other diseases.

Expanded access to cancer medicines, vaccines and health technologies in LMICs requires:

- Three vital levers: financial resources, political will, and a health-systems approach.
- "Frugal innovations" such as new bioavailable oral chemotherapy and low-cost radiation therapy.
- International guidelines for all components of CCC and an expanded WHO model list of essential medicines and vaccines.
- Optimal pricing to reduce the variations faced by LMICs for off-patent generics.
- Transparent, web-based information on prices and sources of CCC inputs.
- For off-patent chemotherapeutic agents, engaging middle income country producers of both finished products and active pharmaceutical ingredients.
- For on-patent cancer agents, differential pricing by companies and sustained targeted donations.
- An expanded range of cancer agents for global, regional and national procurement agencies.
- National CCC plans and programs that work systematically to adapt global guidelines, strengthen procurement and distribution systems, ensure regulation of quality and safety, and establish effective regulatory strategies for pain medicines to break down non-price barriers.
- Joint efforts by multilateral agencies, the international community, national governments, the private sector, civil society and patient groups.

## Innovative financing

Innovative global financing and domestic health system funding are two potential sources of new revenue that need to be explored to meet the growing burden of cancer and other NCDs and chronic illness (see Section 8 of the Report).

### Expanding and improving global financing

To date, international donor support for cancer and NCDs has been far too limited compared to the rapidly increasing health burden in LMICs. Mobilization and investment of new international funding is required for CCC, focusing on low income countries where domestic financing is most lacking. New funding should be:

- **Additional** to existing international and domestic investments for CCC;
- **Supplementary** to local alternatives when these have been exhausted and used in ways that do not diminish local efforts;
- **Synergistic and non-duplicative** by being channeled through existing innovative global financing mechanisms to reduce costs and create synergies by leveraging investments for both disease control and health system strengthening using the diagonal approach; and,
- **Stable** and predictable over time.

### Innovative global financing that focuses on non-traditional approaches to external donor financing for health provides potential solutions

- The Global Alliance for Vaccines (GAVI) provides a powerful tool for ensuring better prices and access.
- Innovative, integrated financing mechanisms that have worked at scale for disease- and population-specific initiatives, such as the Global Fund and GAVI, could be utilized to create synergies for CCC.
  - The Global Fund will have to continue to invest in health systems to manage HIV/AIDS as a chronic illness.
  - The Reproductive, Maternal, Newborn and Child Health (RMNCH) initiative is an example where synergies have been achieved. Significant growth in financing since 2006 has come not from targeted investments, but through cross-investments largely driven by GAVI and the Global Fund.
  - GAVI and the Global Fund financing mechanisms have been able to channel large amounts of funding to LMICs to strengthen health systems in ways that benefit cancer and other NCDs and chronic illness.
- The newly established Health Systems Funding Platform, which includes the Global Fund, GAVI, the World Bank, and WHO, provides an opportunity to invest in health systems in a coordinated manner and NCD-related health outcomes.
- New financing commitments for RMNCH announced at the 66th UNGAS and the Pink Ribbon Red Ribbon initiative on cancer and HIV/AIDS provide additional opportunities for engagement and for channeling new funds.
- The UN Secretary General's Every Woman Every Child strategy provides a commitment-based model that could be adopted for increasing funding for CCC and NCDs to bring together stakeholders –national governments, international agencies, bilateral donors, private foundations, the private sector and civil society– and highlight the significant inves-tments that are already being made by many countries, especially high and middle income countries.

## Strengthening domestic financing

Domestic funding finances the majority of health in almost all LMICs and much of this is out of pocket and leads to financial catastrophe for families, especially in the case of chronic illness like cancer. Stronger health financing mechanisms are needed to introduce, or to expand existing packages, of cost-effective interventions that include CCC.

Several LMICs have taken on the challenge of providing universal financial protection through significant investment in health that includes CCC. The level of investment made by many LMICs contrasts starkly with the lack of global financing for cancer and other NCDs.

It also contrasts with the lack of financial protection available to low income groups in certain high income countries. Indeed, LMICs that are successfully working to offer financial protection that includes catastrophic diseases like cancer, offer lessons for those high income countries that maintain systems with differential access to insurance.

Important lessons can be learned from the experiences of a select group of countries that have embarked on achieving universal health coverage with financial protection. This Report reviews lessons from Mexico, Colombia, China, Taiwan, India, the Dominican Republic, Peru and Rwanda. The successful inclusion of cancers in the package of covered services could be replicated in other countries.

Innovative domestic financing examples that include CCC demonstrate that:

- Social protection in health based on pre-payment and pooling reduces catastrophic health spending by families.
- CCC can be effectively integrated into broader health insurance initiatives using the diagonal approach.
- Establishing entitlements around a guaranteed benefits package that includes cancer leads to improved access.
- Domestic financing should balance prevention, early detection and treatment and focus on cost-effective interventions across the CCC continuum.
  - Investing in treatment is made much less effective if prevention and early detection are neglected.
  - Separate funds for personal versus catastrophic health services should be established.
- Financial protection for health care is less effective if other financial and non-financial barriers –transportation costs, care-giving for the patient, and stigma– are neglected.
- A strong evidence base, including rigorous evaluation, is needed for developing innovative financing mechanisms for CCC.

## Evidence for decision making

High quality evidence that is relevant to decision-making is essential to closing the cancer divide and to improving CCC. Both global and local evidence is needed to help decision-makers allocate resources among competing needs and priorities. Evidence also provides the core of accountability (see Section 9 of the Report).

Yet, most LMICs lack both the health information systems (HIS) and the research to generate the kind of evidence needed for effective decision-making on cancer. The divide between rich and low-resource settings is not only in treatment and specialty care but also in the availability of data and research.

The Declaration of the High-level Meeting of the UN General Assembly on the Prevention and Control of NCDs (UNHLM) highlights the importance of research on all aspects of prevention and control, as well as for innovation and science technology. It also reflects the gap that must be filled by translating this research into knowledge and evidence that can be used for action. Additional investment by global and national actors is required to make this possible.

Several strategies can be followed to improve evidence for decision-making for CCC in LMICs by strengthening HIS and the research base. These will contribute to the global monitoring framework that must be developed in response to the UN HLM on NCDs:

- Increase the availability of global and domestic funding for HIS and for research on cancer in LMICs.
- Strengthen cancer registries in LMICs through additional investment by IARC, participating states, and/or bi-lateral agencies.
- Expand training opportunities for researchers, evidence-builders, and decision-makers based in LMICs.
- Extend free access to journals and public digital libraries.
- Apply novel methodologies and metrics to research on cancer, including pain relief, and institutionalize these analyses in LMICs to support better decision-making.
- Expand the capacity and funding for evaluation, health system, and implementation research of CCC projects.
- Establish a clearinghouse of programs, policies, and projects that acknowledges the multiple stakeholders and providers (governmental, civil society, and private sector), and the opportunity to promote global learning by making this information free and easily accessible to stewards of health systems in LMICs.
- Ensure that national cancer plans include specific indicators and time-bound targets for reducing morbidity and mortality and that these are tied to the global monitoring frameworks of the UNHLM Declaration and to health system performance.

These strategies are low-cost and will produce several global public goods that should be financed by international and bi-lateral agencies. Further, cancer has a privileged position among NCDs as the International Agency for Research on Cancer (IARC) exists and can be strengthened alongside the World Health Organization (WHO) to produce, manage, and disseminate global evidence. New initiatives such as the US National Cancer Institute's Center for Global Health have much to contribute in this area.

By the end of 2012, the Declaration of the UN HLM charges WHO with developing a comprehensive global monitoring framework and recommendations for a set of voluntary, global targets for the prevention and control of NCDs. Measurable health system performance targets directly related to cancer are needed to develop these global and national frameworks for monitoring progress. These must be disease-specific, yet also integrated into health information systems and linked to horizontal health system goals.

The World Cancer Declaration of the Union for International Cancer Control (UICC) provides a base for establishing these target and goals.

The lessons learned from frameworks for accountability on investment in women's and children's health can, and should, be applied to work on cancer and NCDs. This will encourage global and national players to establish and meet specific time-bound targets for reducing cancer mortality and closing the cancer divide.

Academic, research, donor, and national and international agencies should work together to ensure that these targets and measures are developed. Local policy and academic institutions can and should play important roles, and this will serve to build national capacity.

## Stewardship and leadership

One of the most important limitations, both globally and locally, to increasing access to CCC in LMICs is a dearth of leadership in health systems. This limitation has hindered the production and dissemination of essential global and local public goods, such as knowledge and information. Yet, recent advances in knowledge, and the expansion of institutions, collective action, and international interest offer significant new opportunities to strengthen the production of local and global public goods for cancer, as well as for other NCDs and chronic conditions (see Section 10 of the Report).

Improved stewardship and leadership are essential for implementing the recommendations of this Task Force. Stronger stewardship will be accomplished by leveraging global institutions and national health systems, and by mobilizing stakeholders through new and existing global and national forums and networks dedicated to improving health outcomes and equity.

The global cancer arena appears well poised to take off, based on the surge of institutional activity around chronic illness, combined with the opportunities that have presented themselves with the UN High-level Meeting on NCDs. This surge provides an opportunity to advocate for better and more effective individual and institutional leadership to engage a broader set of participants. However, to establish global leadership capacity in cancer, disease-specific cancer organizations must work together and with government and the private sector, reaching out to the communicable disease community to seek joint and mutually beneficial solutions.

Both at the national and international levels, new players have emerged who are actively and successfully swaying leaders. The key to moving forward and taking full advantage of this opportunity for generating stable and sustainable programs will be identifying institutional spaces for collective action.

The announcement of the 2011 UN High-level Meeting on NCDs led to many breakthroughs. One of the most noteworthy is the formation of the NCD Alliance, in which the Union for International Cancer Control actively represents the interests and contributes the know-how of players from the cancer community.

The Declaration that came out of the meeting provides a host of recommendations and proposals to improve global stewardship and leadership. The focus is rightly on the World Health Organization as the global entity charged with health. Yet, an effective response must be whole-of-government and whole-of-society, as the Declaration states. The Declaration calls for proposals by the end of 2012 for partnerships that will strengthen and facilitate global, multisectoral action. This means that in the future, all relevant international and national organizations should be more involved to ensure that NCDs are treated as an integral part of a development agenda.

The Declaration calls for establishing or strengthening national multisectoral policies and plans by 2013. This should include engaging all relevant stakeholders and will likely be disease-specific and then work across diseases with proposals that are integrated into health systems. The cancer community, because of the leadership that can be played in advocacy, can be catalytic in galvanizing awareness, interest, and action to establish these multi-stakeholder platforms and partnerships.

The following actions will strengthen the cancer community and enable it to play a leadership role in implementing the proposals set out in the Declaration of the UN HLM on NCDs:

- Strengthen the capacity of WHO to work as the steward of the global cancer agenda, and of IARC to provide evidence for decision making.
- Strengthen the capacity and recognition of UICC as a global umbrella and stewardship organization.
- Engage the multilateral agencies, the Global Fund and GAVI in CCC and promote better coordination among international agencies and the UN system.
- Engage actors related to specific cancers such as UNICEF and the children's rights community for childhood cancers, and women and health, empowerment, sexual and reproductive health and maternal and child health programs for cancers of women.
- Encourage and support governments to integrate cancer into national health plans and to formulate national cancer plans.

- Actively engage the private sector in the production of solutions, knowledge and in opportunities to implement results.
- Encourage and support in-country, multi-stakeholder commissions on CCC that can be linked to other disease groups and system-wide initiatives and can contribute to monitoring performance in achieving specific goals.
- Identify agencies, working with IARC and WHO, to develop a system of measurable and implementable targets and goals specific to cancer that can be integrated into global targets for NCDs.
- Establish a multi-stakeholder partnership within the cancer community to monitor the goals and targets on cancer.

## 1.iv. Moving forward

This GTF.CCC Report identifies key elements and examples that together form a blueprint for expanding access to CCC in low and middle income countries. In resource-constrained countries without specialized services, experience has shown that much can be done to prevent and treat cancer by training and deploying primary and secondary caregivers, using off-patent drugs, and applying regional and global mechanisms for financing and procurement.

To achieve an effective response to the burgeoning cancer burden, GTF.CCC members believe that concerted action is needed from the global health community, together with the participation of national and local governments and expanded primary health-care networks. The agenda for action should catalyze expansion of cancer care, control, and prevention through strategies that are appropriate to the health systems of LMICs. Achieving an effective response requires the coordinated efforts of multiple stakeholders, including government, the private sector, civil society, professional medical associations, academic institutions, patient groups, and international agencies.

The authors of this Report share with the global community a number of conclusions:

i. It is necessary and feasible to extend the opportunities to meet the challenge of cancer to the poor.
ii. If people in rich countries have the opportunity to live healthy and productive lives after cancer, those same opportunities should be extended to people living in poor countries.
iii. As survivorship is the standard of care in developed countries, survivorship also should be the standard of care in poor countries.

Kofi Annan, then UN Secretary General, made the following statement in reference to HIV/AIDS: "People no longer accept that the sick and dying, simply because they are poor, should be denied drugs which have transformed the lives of others who are better off."[63] The same should be true for cancer and all other diseases for which effective, known options for prevention or treatment exist.

**"People no longer accept that the sick and dying, simply because they are poor, should be denied drugs which have transformed the lives of others who are better off."[64] -Kofi Annan. 7th Secretary General of the United Nations, 1997-2006.**

The evidence presented in this Report demonstrates that there are many necessary, affordable, feasible, and appropriate ways to reduce the burden of cancer in LMICs. The world can and we must respond to the moral, equity, and economic imperative of closing the cancer divide.

## The GTF.CCC proposes the following specific and immediate activities to narrow the Cancer Divide

1. ***PROMOTE*** **prevention policies** that reduce cancer risk.
   - Early detection saves lives. In LMICs, many barriers to access to early detection exist, but the greatest is stigma and ignorance. At a minimum, all countries should develop knowledge and awareness campaigns to reduce stigma and increase cancer awareness.
   - Effective management of behavioral and environmental risk factors should be top priority for countries and donors, beginning with full implementation of the Framework Convention for Tobacco Control.
   - Global donors should fully support financing through the GAVI Alliance for hepatitis B and HPV vaccines in low income countries.

2. ***EXPAND*** **access** across the cancer care control continuum through **universal financial protection in health**, an **explicit package of guaranteed benefits,** and **efficient use of all levels of care.**
   - National insurance or social protection programs in LMICs should include a basic CCC package for selected cancers that are preventable and treatable.
   - Countries should be encouraged and supported to implement health financing models that promote social protection in health for cost-effective packages of services that include at least the core elements of CCC for candidate cancers.
   - Countries should create multi-stakeholder cancer commissions to work with government to develop, implement, and monitor national cancer and NCD plans.

3. ***STRENGTHEN*** **national health systems** to respond to cancer and other chronic illness by integrating interventions into existing programs and institutions and by translating evidence into policy making through strong information systems, research, and monitoring and evaluation frameworks.
   - Innovative delivery models for CCC should be developed, evaluated, scaled up and shared to accelerate expanded access.
   - CCC should be integrated into health programs that serve women, children, and people at risk or living with HIV/AIDS. These populations are vulnerable to a set of cancers that can be prevented or treated.
   - Access to pain control that avoids preventable suffering should be considered a basic human right and countries and the global health community should strive to fulfill this right.
   - Aggregated procurement channels are required to help countries achieve volume discounts on purchases of drugs and other inputs. CCC should be included in existing revolving fund and regional and global purchasing mechanisms.

- Countries should invest in cancer registries and in knowledge sharing, and the Interna-tional Agency for Research on Cancer should be strengthened to provide more support to LMICs.
- Standard treatment guidelines and an expanded list of essential medicines should be developed by WHO as these are essential to expand CCC in LMICs. Rigorous standards of cost-effectiveness should be incorporated to locate medicines on a spectrum that enables countries to identify the most useful strategies.

4. ***LEVERAGE*** **global institutions** and in particular those that could offer financing, pricing and procurement, evidence generation, capacity building, and stewardship and leadership platforms for cancer care and control.
   - Donors and global financing institutions should increase investments to encourage countries to implement innovative delivery models that include the private sector and civil society and strengthen health systems by using a diagonal approach.
   - The Global Fund mechanisms that promote health system strengthening should be fully supported and expanded.

5. ***MOBILIZE*** **all stakeholders in the cancer arena, public and private,** through new and existing global and national forums and networks dedicated to improving health outcomes and equity.
   - A commitment-based funding initiative, similar to the UN Every Woman Every Child initiative, should be established for cancer and other NCDs, building on existing investments by large LMICs that can attract additional donors and funds.
   - Donors should invest in health services and implementation research to evaluate models and a global database of programs and projects should be developed. IARC, WHO and the new US NCI Centre for Global Health should take up this charge.
   - The NCD monitoring framework to be developed by WHO in response to the Declaration of the UN HLM should include specific and time-bound goals to reduce mortality, and should be linked to global and national health system performance targets.
   - The private sector should be included in the solution process and be encouraged to share knowledge and participate in developing solutions, especially through demonstration projects in their countries.
   - To strengthen stewardship and leadership capacity, global cancer civil society organizations should support the development of country-led civil society groups. UICC is ideally placed to undertake this role.
   - The application of the proposals set out in the Declaration of the UN HLM on NCDs should be fully supported by the global cancer community.

# References


1. Frenk J, Bobadilla JL, Sepúlveda J, Cervantes ML. Health transition in middle-income countries: new challenges for health care. **Health Policy and Planning** 1989;4(1):29.
2. Atun R, Bataringaya J. Building a Durable Response to HIV/AIDS: Implications for Health Systems. **Journal of Acquired Immune Deficiency Syndrome** 2011; 57(Suppl 2):S91-S95
3. Sloan FA, Gelband H (Eds.). **Cancer control opportunities in low-and middle-income countries**. Washington DC: National Academy Press, 2007.
4. Beaglehole R, Bonita R, Alleyne G, Horton R. NCDs: celebrating success, moving forward. **Lancet** 2011; 378(9799):378.
5. Ibid.
6. Stuckler D, Basu S, McKee M. Commentary: UN high level meeting on non-communicable diseases: an opportunity for whom? **British Medical Journa**l 2011;343:d5336.
7. Reardon S. A world of chronic disease. **Science**. 2011; 333(6042);558-559.
8. Mukherjee S. **The emperor of all maladies: a biography of cancer**. New York: Scribner, 2010.
9. Judt T. Night. Letter. **The New York Review of Books**, 2010.
10. Institute of Medicine. **The US Commitment to Global Health: Recommendations for the public and private sectors**. Washington, DC: The National Academies Press, 2009.
11. U.N. General Assembly, 66th Session. Political declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases: Draft resolution submitted by the President of the General Assembly (A/66/L.1). 16 September 2011.
12. World Economic Forum and the Harvard School of Public Health. **From Burden to "Best Buys": Reducing the Economic Impact of Non-Communicable Diseases in Low- and Middle-Income Countries**. Geneva, Switzerland: World Health Organization. 2011.
13. World Health Organization. **Global Status Report on noncommunicable diseases 2010**. Geneva, Switzerland; World Health Organization. 2011.
14. Farmer P, Léandre F, Mukherjee JS, et al. Community-based approaches to HIV treatment in resource-poor settings. **Lancet** 2001;358:404-409.
15. Knaul F, Frenk J. Strengthening Health Systems to Address New Challenge Diseases (NCDs). **Harvard Public Health Review**. Fall 2011. http://www.hsph.harvard.edu/news/hphr/fall-2011/new-challenge-diseases.html (accessed October 15, 2011).
16. Sepúlveda J, Bustreo F, Tapia R, et al. Improvement of child survival in Mexico: the diagonal approach. **Lancet** 2006; 368(9551): 2017-2027.
17. Ibid.
18. Mukherjee S, 2010.
19. GLOBOCAN 2008. Cancer fact sheet: all cancers (excluding non-melanoma skin cancer) incidence and mortality worldwide in 2008, 2010**.** http://globocan.iarc.fr/factsheets/cancers/all.asp (accessed July 23 2011).
20. Sloan FA, Gelband H (Eds.), 2007.
21. Beaulieu N, Bloom D, Bloom R, Stein R. Breakaway: the global burden of cancer-challenges and opportunities. Economist Intelligence Unit. 2009.
22. Kanavos P. The rising burden of cancer in the developing world. **Annals of Oncology** 2006;17(Suppl 8): viii15-viii23.
23. Stuckler D, Basu S, McKee M, 2011.
24. Alwan A, Galea G, Stuckler D. Development at risk: addressing noncommunicable diseases at the United Nations high-level meeting. **Bulletin of the World Health Organization** 2011; 89(8):546-546a.
25. Frenk J, Bobadilla JL, Sepúlveda J, Cervantes ML. Health transition in middle-income countries: new challenges for health care. **Health Policy and Planning** 1989;4(1):29.
26. International Atomic Energy Agency. Inequity in cancer care: a global perspective. Vienna, Switzerland; International Atomic Energy Association. 2011.
27. Liberman J. O'Brien M, Hall W, Hill D. Ending inequities in access to effective pain relief? **Lancet**. 2010;376(9744):856
28. O'Brien M. Global Access to Pain Relief Initiative. Presentation for the Union of International Cancer Control. http://www.africacncl.org/HIV_AIDS/initiative_activities/NCD_Session_3_Obrien.pdf (accessed September 20, 2011).
29. Knaul F, Frenk J, 2011.
30. Farmer P, Frenk J, Knaul FM, Shulman LN, Alleyne G, Armstrong L, et al. Expansion of cancer care and control in countries of low and middle income: a call to action. **Lancet** 2010 Aug 13; 376(9747):1186-93.
31. Sloan FA, Gelband H (Eds.), 2007.
32. Frenk J, Chen L, Bhutta ZA, et al. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. **Lancet** 2010; 76(9756):1923-58.
33. World Health Organization. **The World Health Report 2006: working together for health**. Geneva, Switzerland: World Health Organization, 2006.
34. Ferlay J, Shin H, Bray F, Forman D, Mathers C, Parkin D. GLOBOCAN 2008: cancer incidence and mortality worldwide. **International Journal of Cancer**. 2010; 127(12):2893-917.
35. Joint Learning Initiative, Global Equity Initiative. Human resources for health: overcoming the crisis. The President and Fellows of Harvard College 2004. http://www.who.int/hrh/documents/JLi_hrh_report.pdf (accessed October 4, 2011).
36. American Society of Clinical Oncology/Health Volunteers Overseas. International Cancer Corps Needs Assessment Reports on Honduras. 2008.
37. International Atomic Energy Agency, 2011.
38. World Health Organization. **Macroeconomics and health: Investing in health for economic development**. Report of the Commission on Macroecono-mics and Health. Geneva, Switzerland: World Health Organization, 2001.
39. World Economic Forum. **Global Risks 2010: A global risk network report**: Geneva, Switzerland: World Economic Forum, 2010.
40. Ibid.
41. WHO. **Global Status Report on noncommunicable diseases 2010**. 2011.
42. Amartya Sen. Personal communication, October 17th, 2011.
43. John RM, Ross H. **The global economic cost of cancer**. The American Cancer Society and LIVESTRONG, 2010. http://www.cancer.org/acs/groups/content/@internationalaffairs/documents/document/acspc-026203.pdf (accessed July 30, 2011).
44. Shafey O, Eriksen M, Ross H, Mackay J. **The Tobacco Atlas**, Third Edition. American Cancer Society. 2009. http://www.tobaccoatlas.org/downloads/TobaccoAtlas_sm.pdf (accessed September 27, 2011).
45. Castelli A, Nizalova O. **Avoidable mortality: What it means and how it is measured**. Centre for Health Economics (CHE) Research Paper 63. 2011. http://www.york.ac.uk/media/che/documents/papers/researchpapers/CHERP63_avoidable_mortality_what_it_means_and_how_it_is_measured.pdf (accessed September 27, 2011).
46. John RM, Ross H, 2010.
47. Beaulieu N, Bloom D, Bloom R, Stein R, 2009.
48. Bloom DE, Cafiero ET, Jané-Llopis E, et al. **The Global Economic Burden of Non-communicable Diseases**. Geneva, Switzerland: World Economic Forum. 2011.
49. WHO. **Global Status Report on noncommunicable diseases 2010**. 2011.
50. World Economic Forum and the Harvard School of Public Health. **From Burden to 'Best Buys': Reducing the economic impact of non-communicable diseases in low- and middle-income countries**, 2011.
51. Global Alliance for Vaccines and Immunization. GAVI welcomes lower prices for life-saving vaccines. Press Release; 6 June, 2011. http://www.gavialliance.org/media_centre/press_releases/vaccine_prices.php (accessed June 10, 2011).
52. Farmer P, Frenk J, Knaul FM, Shulman LN, Alleyne G, Armstrong L, et al. 2010.
53. The Lancet. Chronic Disease and Development Series. 2010. http://www.thelancet.com/series/chronic-diseases-and-development# (accessed October 15, 2011).
54. Institute of Medicine, 2009.
55. Sepúlveda J, Bustreo F, Tapia R, et al. Improvement of child survival in Mexico: the diagonal approach. **Lancet** 2006; 368(9551): 2017-2027.
56. Frenk J. Bridging the divide: global lessons from evidence-based health policy in Mexico. **Lancet** 2006; 369(9539): 954-61.
57. Sloan FA, Gelband H (Eds.), 2007.
58. Anderson BO, Yip CH, Ramsey CD, et al. Breast Cancer in Limited-Resource Countries: Health Care Systems and Public Policy. **The Breast Journal** 2006;12(Suppl. 1): S54-S69.
59. Sullivan R, Purushotham A. The Goldilocks' problem of cancer medicines. **Lancet Oncology** 2010;11(11):1017-8.
60. Gawande A. A challenge for practitioners worldwide: WHO safe surgery saves lives. Journal of Perioperative Practice. 2009;19(10):312.
61. International Atomic Energy Agency. Programme of Action for Cancer Therapy (PACT). 2011. http://cancer.iaea.org/ (accessed October 15, 2011).
62. Sloan FA, Gelband H (Eds.), 2007.
63. Médecins sans Frontières South Africa, the Department of Public Health at the University of Cape Town, the Provincial Administration of the Western Cape, South Africa. Antiretroviral therapy in primary health care: Experience of the Khayelitscha programme in South Africa: Case Study. Genva, Switzerland; World Health Organization. 2003.
64. Ibid.

The mandate of The Global Task Force on Expanded Access to Cancer Care and Control in Developing Countries (GTF.CCC) is to design, promote, and evaluate innovative strategies involving multiple stakeholders. The GTF.CCC supports the work of partners in low and middle income countries to test and scale-up new approaches to service delivery that can increase access to cancer care and control and, at the same time, strengthen health systems.

This Report provides a blueprint for expanding acess in low and middle income countries to reduce the immense disparities in outcomes that constitute the cancer divide. In three sections, the Report outlines what should, what could, and what can be done to close this divide. The proposed strategies can strengthen health systems in ways that will benefit all countries.

The GTF.CCC logo is a multicolor ribbon-of-ribbons that represents both all cancers, and the links between cancer and other diseases. It symbolizes the importance of building strong health systems to meet the challenge of cancer and, at the same time, of the potential contributions of expanding cancer care and control to strengthen health systems in ways that benefit all patients. The ribbon is transparently laid out over a map of the world to visually demonstrate that cancer is a global problem, affecting countries at all levels of development.

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