Cancer Control: A comparison for progress

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# Table of Contents

Abstract  
Introduction  

*An interest in health and humanity*  
Description  
*Cancer: a global health crisis*  
Methodology  
*Cancer: the biology and genetics of an age related public health threat*  
Cancer Control in Switzerland and Yemen:  
a stark contrast  
Swiss cancer control: a successful strategy  
Swiss public health infrastructure  
Prevention  
Treatment and care  
Learning Statement  
Yemen: an insufficient response to a public health threat  
Public health infrastructure  
Prevention  
Treatment and care  
Evaluation  
An assessment of cancer control  
disproportionalities and a plan for global action  
National cancer control planning  
Epidemiology  
Prevention  
Biomedical cancer treatment  
Complementary therapy and end of life care  
Training of medical professionals  
Evaluation of these cancer control initiatives  
Cancer control frameworks and Epidemiology  
Prevention  
Biomedical cancer treatment  
Complementary therapy and end of life care  
Training of medical professionals  
Conclusions  
Learning outcomes and further research  
Acronyms used in this document  
Primary Resources  
Secondary Resources
Abstract

The cancer burden in developing countries like Yemen is significant. These countries are presently ill equipped to adequately provide quality cancer control and care because they have limited financial and medical resources. The first steps to necessary to adequately control the eminent cancer crisis in these countries is to initiate sustainable, cost-effective cancer control strategies. This includes the development of a national cancer control framework, enacting preventative educational programs, increasing biomedical treatment capacity, addressing the need for patient empowerment, and training a significant number of medical professionals. These initiatives can be successfully implemented and supported by networks between various aspects of cancer control in developing nations like Yemen and international cancer control experts, governmental and non-governmental organizations and patient services around the globe. Networking with countries that have a high quality of cancer control such as Switzerland is useful so that developing nations have a model by which to develop their own, similar cancer control strategies.

Introduction

An interest in health and humanity

I have never visited a developing nation, and I have never seen firsthand the medical, financial or social hardships that citizens of low and middle-income counties endure daily. However, I have witnessed through my program of development studies and public health in Geneva the enormous development discrepancies that exist between industrialized and developing nations, and the ethical issue that these discrepancies create has personally moved me.

The bulk of my education has been in the natural sciences and I have completed courses in the biology and genetics of cancer as a disease during my undergraduate
studies. Never until this experience have I considered the paramedical and ethical aspects of cancer, and the social and economic toll that this disease takes on a community. For communities with few medical and paramedical resources cancer treatment is functionally inadequate. The disproportionality between cancer care in developed and developing nations is a humanitarian issue. In terms of human rights, it is unethical for citizens affected by cancer in industrialized countries to have available a plethora of resources available to them while citizens of developing nations have little to no medical access.

Unfortunately, millions of people do not have access to even the most basic of sanitary conditions and medical attention throughout the world. In those countries where medical access is limited, the public health infrastructure and cancer control initiatives are severely lacking, and millions of people die every day due to these inadequacies. The inequality in health care between industrialized and developing countries is so significant that this lack of access to cancer care in developing countries becomes an ethical, humanitarian issue that I feel very passionately can be remedied by partnerships between non-governmental organizations and health professionals in industrialized and developing nations.

Through this research I have found that every aspect of cancer control and care in the developing world needs significant attention, and must utilize all available resources. Because resources are so scarce and the care system is so detrimentally unstructured, any work done must begin from the ground by building the most basic public health infrastructure and empowering patients to rally for change. These initiatives must address all aspects of cancer care, including psychological and whole-body care to integrate a human factor into the cancer care system in developing nations. This type of
humanitarianism must be formulated to address the weak areas of cancer control in developing nations without neglecting the human interests, values and the dignity of those people in developing nations. Humanitarian aid to promote this type of development must originate from partnerships for the promotion of health and development between industrialized countries, international cancer groups and developing nations.

For this project I have explored the level of cancer control in an industrialized country in comparison to that in an underdeveloped country with few resources and little public health infrastructure, using Switzerland and Yemen, respectively, as illustrations of these circumstances. Through a comparison of the cancer control situation in these two countries I will be able to identify the disproportionalities in the level of care between the two countries, and the specific areas cancer control within the Yemeni public health sector that are lacking. The ultimate goal of this project is to determine ways that countries like Switzerland and Yemen can create a bilateral relationship to allow for the capacity building in the Yemeni public health sector to improve the overall quality of cancer control and decrease cancer mortality.

**Description**

*Cancer: a global health crisis*

In the next several decades the demographic of the world’s population will significantly change. The number of people between the ages of 60 and 80 years of age will increase several fold. This shift is presently occurring in more developed nations, but is not expected to occur in developing nations for several more years. As these countries progress in development, the average life expectancy will increase significantly. As this demographic shift occurs, those countries face the burden not only of progressing
developmentally but also face the burden of an increase in the number of people suffering from chronic diseases that typically occur as the human body ages. One of the most prominent diseases, possibly the most eminent disease burden, is that of cancer.

The number of people presently living with cancer is 24.6 million\(^1\), the majority of which reside in developing nations. In 2003 the World Health Organization (WHO) released statistics that forecasted that developing countries would experience a significant increase in cancer incidence over the next fifteen years.\(^2\) As populations age and chronic diseases like cancer become progressively more prominent, these developing nations must create and manage public health initiatives and policies in response to the growing number of people suffering from the disease.

In industrialized countries, cancer is a large health concern and affects a significant proportion of the population. However, these developed countries are better equipped in terms of public health infrastructure, technology, and treatment and care to deal with the growing cancer crisis. Switzerland, an industrialized country in the heart of Europe, has a particularly successful cancer control approach. Medical access is granted to all residence through a social health policy approach, treatment methods are modern and advanced, an excess of trained cancer specialists exist and cancer care in general is a whole body approach.

Yemen, a small country in the Eastern Mediterranean Region of the globe, provides a clear illustration of a developing country dealing with the double burden of the prevalence of communicable disease like malaria as well as non-communicable diseases. At present the public health sector of Yemen is ill equipped to deal with the eminent


cancer epidemic, and has few medical resources available and very little funding allotted for prevention, treatment and public health programs.

Methodology

It is possible and efficacious to use the cancer control methodologies utilized in industrialized countries such as Switzerland as a guide to identify the deficiencies in the cancer control initiatives that presently exist in developing nations like Yemen. A comparison of the cancer control approaches of these two nations can be useful in then determining what areas of cancer control in the public health sector of Yemen need significant improvement to adequately respond to the growing and eminent cancer epidemic.

An important pillar of humanitarianism is cooperation between developed and industrialized countries to promote development. With this development comes improved health and the acknowledgement of the human aspect of health and health care. It is the responsibility of those financially and developmentally advanced countries to form cooperative humanitarian partnerships with developing nations to improve global health and humanity.

Through proactive partnership between non-governmental organizations and health care professionals it is possible for the public health sector of Switzerland to aid in the improvement of cancer mortality in developing countries like Yemen. Various actors within the Swiss public health sector can proactively share knowledge, technology, talent and public health infrastructure strategies with nations struggling to control cancer. Through a micro-study of the cancer control strategies of Switzerland and Yemen I will identify specific ways in which Switzerland and Yemen can work together to significantly reduce cancer mortality in Yemen.
It is important to recognize that there is a significant disproportionality in the level of cancer control in an industrialized country and a developing country. This is due to a large gap in the actual level of political and socioeconomic development of these nations and the quantity and quality of resources available in each nation. It is crucial to recognize that there are certain cancer control methodologies that are simply not feasible options to utilize in a developing nation because of a lack of public health financial resources available, or a lack of cancer treatment specialists or severely limited access to essential medicines. For the comparative portion of this project the successful public health infrastructure that the Swiss cancer control system operates under will be used as an example of an ideal cancer control approach. From this ideal approach it is possible to determine the inadequacies of the present cancer control system in Yemen. It is also possible to determine the most cost-efficient and realistic aspects of ideal cancer control to project as public health initiatives that will have the most significant impact on cancer morbidity and mortality in Yemen and that will preserve the dignity of the Yemeni people.

In planning cancer control partnerships, it is important also to recognize that humanitarian gift aid is counterproductive to cancer control. Aid should be planned according to a “pro-poor” growth strategy, where development assistance is geared toward providing a community with the means to facilitate their own sustainable development. In terms of cancer care and control this would include proactive pro-poor strategies including the exchange of knowledge and the training of personnel between the two countries in order for the struggling country to build its capacity to control the cancer epidemic.

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3 Prezza, Dorothy, “Evaluation criteria to evaluate project of organizations,” Federation of Swiss-Italian NGO’s, Lugano, Switzerland, 24 September 2008.
Cancer: the biology and genetics of an age related public health threat

Globally, life expectancy is expected to reach 75 years by 2050, an increase of 28 years since the 1950’s. By 2050 approximately 1.6 billion people over 60 years of age will live in the least and middle developing countries. This shift in demographics brings with it a multitude of age related diseases, shifting the public health focus from communicable diseases like malaria to acute chronic diseases such as cancer.\(^4\) Environmental factors do play a role in the development of cancer but the main risk factor of cancer is age, and as the life span of populations increase, naturally the incidence of cancer will increase.\(^5\)

Cancer is defined by an unregulated, uncontrolled proliferation of abnormal cells that have the ability to spread throughout the body. This can occur in any tissue of the body. Cancer begins as a genetic mutation in a section of DNA called a proto-oncogene or a tumor suppressor gene. A proto-oncogene is a section of RNA-encoding DNA, which, if interrupted, becomes an oncogene, or an abnormal gene, which produces excessive amounts of or abnormal forms of, proteins involved in cell proliferation and survival. Tumor suppressor genes are normal sections of RNA-encoding DNA that produce proteins that regulate cell proliferation and survival. If this section of DNA is interrupted, abnormal proteins are produced in the cell and cell proliferation and survival continues without regulation. Some cancer cells have been mutated in a way to allow the cells to divide without the presence of growth signals, or in the presence of growth inhibitory signals, or in a way that allows the cells to escape regular cell death. As a result, cancer cells proliferate unregulated and aggregate within the tissue. This

\(^5\) Interview with Dr. A. P. Sappino, medical oncologist, Hopitaux Universitaires de Geneve, Geneva, Switzerland, 14 November 2008.
aggregation is called a tumor. These aggregates build up blood supply by some unknown mechanism and thrive off of the host tissue.⁶

The genetic mechanism behind the development of cancerous cells is what makes cancer typically a disease of the aged population. Each time the cell goes through the division cycle, there is a small chance that a mutation will occur in a proto-oncogene or tumor suppressor gene. With an increase in age comes an increase in the number of cellular division cycles, and therefore an increase in the probability of a gene mutation occurring. Fortunately, cancer is a “two hit” phenomenon, and requires two gene mutations to allow the cell to proliferate uncontrollably and metastasize.⁷ The acquirement of two cancer-causing genetic mutations generally occurs over a period of several years, and consequently cancer usually occurs in older populations more frequently.

The aspect of cancer that makes it such a dangerous disease is that the process of tumor development takes place over a period of several years. The first multiplication of this cell doesn’t produce a detectable tumor, and therefore it is not until millions of uncontrolled cells develop that a tumor is visible or biologically detectable. Essentially, cancer is a disease that can be detected and treated only in later stages of the disease.⁸ If left untreated the cancerous cells will continue to multiple until the tumor mass prohibits some necessary biological function like respiration or blood circulation and the person dies.

Cancer is diagnosed according to the stage at which it is discovered. In later stages, with invasion of surrounding tissues by abnormal cancer cells or with metastases,

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⁶ Literature Review Essay: Cancer: Challenges for prevention, control, and treatment in Yemen, 3.
⁷ Dr. Roger Denome, e-mail message to author, October 3, 2008.
⁸ Interview with Dr. Daniel Speiser, Onco-immunologist, The Ludwig Institute for Cancer Research, Lausanne, Switzerland, 19 November 2008.
cancer is less amenable to treatment. These cancers require more complex, tailored chemotherapy treatment and are usually less responsive to radiotherapy treatment. The longer the time period is between the formation of the tumor and the commencement of treatment, the more difficult the cancer will be to treat. As time progresses in the development of cancer, the prospect of successful treatment of the cancer decreases.

There exist three main biomedical treatments for cancer—surgery, chemotherapy and radiotherapy. Cancer treatment typically involves a combination of these methods to successfully remove tumor mass and to kill cancerous cells. Surgery involves the removal of the tumor mass. Chemotherapy is a treatment by which cyto-toxic chemicals are introduced to the body to interfere with the cell’s ability to proliferate, killing the cells.\(^9\) Chemotherapy medications are prescribed according to guidelines specific for each tumor type, which are adapted on an individual basis.\(^10\) Radiotherapy treatment involves the treatment of the tumor directly by a beam of ionizing radiation, which causes the death of the cancer cells. Radiotherapy is given in short daily doses according to standardized protocols developed from clinical testing.\(^11\) To effectively kill cancer cells both radiotherapy and chemotherapy treatments are given in uninterrupted cycles because both treatments act on cancer cells during division, which happens more often in cancer cells than in normal tissues.\(^12\)

**Cancer control in Switzerland and the Republic of Yemen: a stark contrast**

*Swiss cancer control: a successful strategy*

Cancer control in industrialized countries is successful because of a well-established public health infrastructure, the availability of health insurance schemes,

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\(^10\) Interview with Dr. A.P. Sappino, 14 November 2008.


\(^12\) Interview with Shelley Bulling, 11 November 2008.
methods of prevention, modern and technologically advanced treatment methods, and a sufficient pool of specially trained cancer professionals. In Switzerland in particular cancer control strategies are markedly successful for various reasons.

Switzerland is a rich, developed country in the heart of Europe. Because of the level of development of this country, the shift in age demographic is presently occurring and the population as a whole is living longer. Therefore several types of cancer are noted in the top ten causes of death for all ages. In 2005, approximately sixteen thousand people died of cancer. Breast and prostate cancer caused the most significant cancer burden for Swiss women and men.\(^{13}\) Although cancer is still a significant cause of death in Switzerland, the Swiss healthcare system has been successful in responding adequately to the growing incidence of cancer because of the country’s cancer control strategies.

**Swiss public health infrastructure**

As an industrialized country, Switzerland has a particularly well-established public health infrastructure. Firstly, the Swiss healthcare system has established a system of compulsory health insurance that ensures that each person registered as a resident of any Swiss canton receives basic healthcare at a small premium. If a person is unable to afford this basic insurance government subsidies will pay for the insurance. Each person pays the same premium for the same insurance benefits.\(^ {14}\) This ensures access to essential medical services for chronic disease such as cancer, and includes services such as regular


medical consultations, chemo- and radiation therapy and diagnostic imaging and laboratory testing.\textsuperscript{15}

\textit{Prevention}

Secondly, prevention, education and early detection campaigns are successfully implemented according to existing epidemiological data that determine the most important and burdensome cancer incidences in the country. The existence of this epidemiological data, compiled based on cancer registries, is essential in planning preventative and educational campaigns to successfully decrease cancer incidence.

Prevention in industrialized countries is practiced in two different forms-primary and secondary methods of prevention. Firstly, unique to Switzerland and other industrialized countries is a type of genetic testing that identifies various genetic factors in a patient’s genetic makeup that may predispose them to developing certain types of cancer.\textsuperscript{16} The genetic factors that are identified are those mutations within tumor suppressor genes or proto-oncogenes that contribute to the development of cancer. Through this identification process a program of prevention can be enacted to stop or retard the development of cancers with those characteristic gene mutations. This is called primary prevention.\textsuperscript{17}

Various methods of secondary prevention are also successfully utilized in Switzerland and other industrialized countries. Breast self-exams, for example, are promoted by various public health campaigns. These campaigns promoted by services such as the Ligue Contre le Cancer and the English Speaking Cancer Association in Switzerland also raise awareness about the symptoms and warning signs of various

\textsuperscript{15} Interview with Marie Dominique King, oncolgic nurse, Ligue Genevoise Contre le Cancer, at the Espace Mediane, Geneva, Switzerland, 7 November 2008.
\textsuperscript{16} Interview with Dr. A.P. Sappino, 14 November 2008.
\textsuperscript{17} Ibid, 14 November 2008.
As Dr. Sappino, head of the oncology department of the Hopitaux Universitaires de Geneve (HUG) in Geneva, explained, “Mainly cancer secondary prevention [exists] for breast, cervical, colon, and skin cancer. These are campaigns that are promoted by health services…and are recommendations that are put to general practitioners… For instance, [for] breast cancer screening, there is an official campaign that promotes regular mammogram in women, between fifty and seventy…most women here in Geneva will get mammograms because their doctors will promote the realization of this test on a regular basis. The same goes for cervical cancers. Most women here have regular gynecological consultations. The same goes for colon cancer. A colonoscopy is more and more realized in the majority of the fifty-year-olds, which is a general recommendation. And also general practitioners are also aware that if you have a family history your risk is higher so either do the gene testing or do more often screening.”

In terms of promoting primary and secondary prevention strategies, hospitals, various anti-cancer leagues and support groups, and general medical practitioners are all involved. The involvement of all available resources are necessary to significantly raise awareness about the prevention of and screening for cancer in order to control the growing number of incidences. Additionally, because early stage cancers are easier to treat using standard methods and are more responsive to treatment, early screening tests like mammograms and colonoscopies to detect cancer in the earliest stage of development are essential to reduce cancer mortality.

*Treatment and care*

Treatment in industrialized countries is standardized according to medical protocols that are adapted to treat each specific type of cancer. The public health sectors in industrialized countries like Switzerland have recognized that cancer affects the biological health of the patients but also has a significant affect on the emotional well being of the patient. Many cancer treatment regimens include not only biomedical

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19 Interview with Dr. A.P. Sappino, 14 November 2008.
treatment but also psychological counseling in order to control cancer through a whole-body approach.

These types of treatments are available in two major settings—public and private. In both public and private care facilities the same types of biomedical treatments are available to patients who hold LAMAL basic Swiss insurance. A person is diagnosed with cancer through a series of tests to determine the presence, type and stage of the cancer, and then is referred to a biomedical treatment facility of their choice to obtain biomedical treatment. The only difference between public and private care is the level of comfort of the patient and the degree of individualized attention received by the patient, both of which are at a higher quality in a private setting.

In a public facility such as the HUG, a patient is treated by a team of doctors and cancer specialists to obtain well-rounded care. Included in this team is the oncologist assigned to that patient, a registered oncologic nurse and a psychologist. The patient receives nuclear imaging scans such as a CT scan of the part of the body in which the tumor is located, and from this scan and various pathology tests a treatment regimen is determined. Most hospitals have an oncology department and a radiology department that work closely together to provide treatment for patients. To determine a course of treatment in a Swiss facility, as Dr. Mahmut Ozsahin of the Centre Hospitalier Universitaire Vaudois (CHUV) explained,

“...the surgeon presents this in tumor boards for different disease types. For example for colorectal cancer, when a surgeon has the diagnosis he or she presents the patient. So we are discussing together, radiation oncologist, medical oncologist, proctologist, diagnostic radiologist, surgeon, to discuss what we will do so according to evidence based medicine we choose the best treatment. So no one can choose their own treatment.”

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20 Interview with Shelley Bulling, 11 November 2008.
21 Interview with Dr. A.P. Sappino, 14 November 2008.
22 Interview with Dr. Mahmut Ozsahin, radio oncologist, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland, 18 November 2008.
This method of treatment ensures that the most effective course of treatment is carried out.

In terms of the actual treatment methods, the Swiss have access to some of the most specialized equipment and medicines available to provide high quality treatment. For example, in the Centre de Radio-oncologie de Geneve, a private clinque in Geneva, a CT scanner, which comes at a cost to the facility of approximately 3 million Swiss Francs, is used to image the tumor prior to the administration of radiation so that “every single treatment, no matter how simple, is based on an individualized geometry,” and that “the radiation is tailored to just cover where we need to cover and not elsewhere with the idea that it could reduce the side effects.”23 This technique is used to avoid unwanted side effects and to improve the comfort of the patient. Typically in industrialized countries an external beam linear accelerator is used to deliver the radiation to the pre-determined geometrical area, which comes at a cost of approximately 4 million Swiss Francs.24 The CHUV, a public facility in Lausanne, utilizes a special form of modern radiotherapy software, previously used by the ARMY to track missiles, to optimize radiation treatment by using inhomogeneous beams. Essentially this high-tech piece of equipment plans the most effective route of radiation beams to improve the efficiency of treatment. The Swiss can also utilize basic forms of chemotherapy as well as the most advanced and modern types of chemotherapy treatment available. This includes immunotherapy and novel target therapy drugs that are developed to target specific molecular traits of cancer cells.

To provide additional comfort for the patient, agencies exist to allow cancer patients to receive certain types of treatment in their own home. Oncologic nurses accompany these patients during the day and night to provide both company and medical

23 Interview with Shelley Bulling, 11 November 2008.
supervision. Often home care is utilized during end-of-life palliative care, when a cancer is at such a late stage that it no longer responds to conventional treatment.

A third and hotly debated aspect of overall cancer care involves addressing the emotional and bodily toll that the disease takes on the patient. This includes integrating psychological and nutritional care into cancer treatment. Every health professional interviewed for this project agreed that psychological care was a necessary and perhaps underutilized aspect of cancer care. As Monique Noelte, a retired oncologic nurse and a practicing complementary therapist explained, “To treat cancer on a wide scale first is to find the origin or at least some of the factors that make the illness to declare itself. We are in a society that we treat but we don’t focus on the origin, whereas for me I think it is most important.” She believes that cancer takes an immense emotional toll on the body and mind, and that suffering can accelerate the illness. Although this may not be scientifically proven, Ms. Noelte has found through her practice that patients who receive psychological treatment have more successful cancer treatment outcomes.\footnote{Interview with Monique Noelte, retired oncologic nurse and practicing complementary therapist, in her home, Geneva, Switzerland, 12 November 2008.}

Ms. Noelte also strongly supported the notion that nutrition has a significant impact on cancer treatment outcomes. Although this was not necessarily supported by all of the interviewed cancer specialists, the issue has been debated in various sources and has gained a significant amount of support. There does exist a wealth of information to link certain substances like saturated fats to cancers of the intestine, for example, but nutritional practices have not been fully integrated into routine cancer treatment.\footnote{Dr. Jean Seignalet, \textit{L’alimentation ou la troisieme medecine}, 4\textsuperscript{th} ed. (Francois-Xabier de Guibert, 2001), 408.} To adequately address nutritional and psychological needs, complementary therapists like Ms. Noelte are available in Switzerland, and support groups and cancer organizations like
the Ligue Genevoise Contre le Cancer and the English Speaking Cancer Association (ESCA) exist to provide support throughout treatment.

Learning Statement

Because Switzerland as a society has recognized the impact that cancer has on a person and their community, the interest in oncology has increased in the past several years, and “the extra-hospital network is completely saturated” with cancer health professionals. These medical and public health professionals have succeeded in developing over time a public health infrastructure adapted to meet the medical and financial needs of cancer patients in Switzerland.

The Swiss have a very holistic approach to healthcare, and this is especially evident in the cancer care system. The healthcare system is structured so that the biomedical health needs of all Swiss patients are met, so the system can therefore focus on the whole body and the human aspect of healthcare. By providing psychological support for patients, either through hospital or facility provided care or through outside support groups, the Swiss healthcare has recognized that the individual cancer burden exceeds biomedical limits. Psychological care addresses the feelings of the patient but also indicates the need to preserve the dignity of the patient. The existence of complementary therapies provides an outlet for patients to share their experiences and to address any personal difficulties that they have had in the past that affect their present health status.

Prior to this research I focused my attention on only the biomedical aspects of the cancer burden, but I have learned that complementary therapies and a holistic approach is the most successful and comprehensive cancer control and care strategy. A person is not simply an aggregate of cells and tissues- people have interests and values, and when

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27 Interview with Dr. A.P. Sappino, 14 November 2008.
affected by a disease like cancer the whole person must be treated. Cancer takes a toll not only on the cells and the physical self; it takes a significant toll on the mind and the spirit. By providing access to individualized biomedical treatment options and by providing whole-body cancer care the Swiss system of cancer control has achieved a superior level of both quantity and quality of care that is more than adequate for responding to the number and needs of Swiss cancer patients.

_Yemen: an insufficient response to a public health threat_

Yemen is small country dealing with the double, or perhaps triple, burden of responding to outbreaks of communicable diseases such as malaria and managing the development of acute cancers, while fighting to end extreme poverty, illiteracy and hunger. Yemen and other developing countries are low and middle-income countries that have very few resources and little funding for prevention and treatment of cancer but experience a very high cancer burden. It is difficult to move cancer prevention and treatment programs to higher priority on the political agenda when over 200,000 people are afflicted by communicable malaria and pose an immediate threat to public health and safety.  

The people of Yemen generally do not have the financial resources to pay for expensive treatment, “and this is really one of the barriers for the patients because if they have to pay for a visit, for an exam, for treatment and they don’t have the resources then whatever you put in place [in terms of cancer control] nationwide would only benefit that portion of the population who is wealthy enough to afford it.” This is one of the most constraining aspects of cancer control in developing countries.

_Public health infrastructure_

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Yemen lacks the public health infrastructure and access to medicines and technology that is required to adequately respond to the needs of the a growing number of people nationwide living with cancer. A very strong political will exists in Yemen to improve the cancer control strategies, but the government has done little to generate change.

Presently there exists only one oncology hospital in the entire country of Yemen, called the National Oncology Center (NOC) in Sana’a, which was established about five years ago by the initiatives of a group of doctors and the funding of the government.\(^{30}\) There exist two cancer registries in Yemen, in the city of Aden and at the NOC in Sana’a, and enough epidemiological data exists to indicate that the two most important cancers in Yemen are breast cancer for women and head and neck cancers for men.\(^{31}\) The medical workforce in Yemen is limited and the working and financial conditions of the public health sector are poor. Oncology is relatively new to the medical field in Yemen and the number of doctors and the knowledge base of the available doctors therefore limit access to oncologic medical attention.

**Prevention**

Primary and secondary preventative measures in Yemen are sporadic and non-existent in some geographical areas. For example, the government in Yemen has signed and ratified a Framework Convention on Tobacco Control, a framework of action for governments to fight tobacco-related deaths, in 2007 but implementation of these frameworks has been inconsistent and sporadic.\(^{32}\) Additionally, tobacco consumption in the forms of cigarette smoking and chewing qat, a type of chewable smokeless tobacco, is widespread within Yemen and often begins at a very young age. The chewing of the qat

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\(^{31}\) Teleconference interview with D. Malin and M.S. de Sabata, 21 November 2008.

\(^{32}\) Teleconference interview with D. Malin and M.S. de Sabata, 21 November 2008.
plant leads to the development of head and neck cancers because of the harmful pesticides used on the plant during cultivation and as a preservative. Although these pesticides are illegal in Yemen, they are smuggled across national borders and used widely in qat fields because of a discontinuity in the policing of national borders. As a result of this lack of consistent prevention and education initiatives, the general population of Yemen is unaware of the symptoms of cancer, and by the time they seek treatment, their tumors are so advanced that they are not amenable to treatment.  

*Treatment and care*

The NOC in Sana’a offers the standard types of biomedical cancer treatment, including surgery, chemotherapy, and radiation. However, because 75 to 80 percent of patients present with such late stage cancers that would require long and complex chemotherapy treatments, surgery and radiation are utilized most often as biomedical cancer treatment. Presently nuclear imaging technology exists in the NOC to identify and plan radiotherapy treatments and cobalt-60 radiotherapy technology is utilized to deliver radiotherapy treatment. There is no concerted program for palliative care, but radiation is used as a form of palliation of late stage incurable cancers and the Yemeni government is open to the use of opiate drug derivative such as morphine for palliation of cancer-related pain. Biomedical cancer treatment obtained at the NOC is free.

Because there are so few specially trained medical professionals in Yemen and a growing number of cancer patients, medical efforts are focused on treating the maximum number of patients possible. There is a significant lack of oncologic nurses, social workers and other faculty who typically spend a lot of time with patients in treatment. Therefore, the overall Yemeni approach to cancer care does not involve a system of home

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34 Teleconference interview with D. Malin and M.S. de Sabata, 21 November 2008.
care, nutritional advising or psychological care. The focus is largely placed on the quantity of care rather than the individual quality of care because so many patients exist and utilize such limited financial and medical resources.

Evaluation

Clearly there are several areas of cancer control and care in Yemen that are detrimentally lacking and lead to inadequate cancer control. Firstly, there is a significant lack of public health infrastructure, and although the Yemeni government has acknowledged this growing cancer epidemic, they have proactively done little work to fight this battle. Prevention strategies are inconsistent and sporadic, and this leads to an increase in the number of late stage cancers that require more modern, complex treatments that simply are not available in a poor developing country. This lack of prevention necessitates the wide use of palliative radiation and the use of pain medication and is not conducive to improving cancer mortality. The Yemeni healthcare system has not addressed the biomedical aspect of cancer care and control and has not yet incorporated any kind of humanistic care into the system. The Yemeni system has not addressed the needs of the whole person. There is an obvious necessity for health policy planning and an improvement in the cancer control situation to significantly improve the quality of life for Yemeni cancer patients.

An assessment of cancer control disproportionalities and a plan for global action

The illustrations of two very different levels of cancer control that Switzerland and Yemen indicate that there are significant disproportionalities in the quality of cancer control and care in industrialized and developing countries. There are important disparities in the areas of public health infrastructure, prevention and treatment and care
methods that are clearly detrimental to the general health and socio-economic development of nations like Yemen.

National cancer control planning

In Yemen there is not yet a plan of action for cancer control that has been finalized or accepted by the government, and many other developing countries lack any kind of comprehensive cancer control scheme. National cancer control plans provide a framework of action to address all aspects of the cancer burden. Most importantly, cancer control frameworks obligate the government to identify cancer as a public health threat and to follow a set regime to fight this disease. The development and implementation of these frameworks require priority setting, the education and training of health professionals, prevention initiatives, and more importantly call for the evaluation of these frameworks to determine the relevance, cost-effectiveness, and sustainability of each action towards cancer control. The development of national cancer control frameworks is the first step toward successful national cancer control.

Planning new action to fight cancer requires the support of donor nations, development agencies and the civilian population. The most difficult challenge faced by policy makers attempting to reform cancer policy lies in the actual implementation of these new policies. A plan without implementation generates no change. In order for new policy to generate significant results, policy must be goal-oriented and realistic, comprehensive, and utilizing available resources to cover the most people possible. Plans that include cost-effective priorities with gradual, stepwise goals have a greater chance of implementation. Interaction between the policy-setting government and international

donor states or agencies and stakeholders is essential in the communication of valuable information and monetary funding.  

The WHO and the International Union Against Cancer (UICC) have published guides to aid governments and non-governmental organizations in developing national cancer control frameworks in developing countries. Together, the governments of developing nations and various non-governmental organizations can determine the cancer burden and work to build the public health capacity of these nations to improve cancer mortality and improve the quality of care for cancer patients. Developing nations can create networks between local cancer professionals and those parties involved in cancer control planning in industrialized countries, including medical professionals and non- and governmental organizations that have had successful cancer planning experiences, to develop and implement efficient cancer control frameworks. For example, cancer professionals in Yemen can work with specialists in the WHO Eastern Mediterranean Regional Office and the UICC to develop cancer control strategies.

Epidemiology

Integral in the cancer control planning process is to establish concrete epidemiological data that indicate the gravity of the issue at hand. It is only through this data that relevant cancer control strategies can be initiated. Ms. Maria Stella de Sabata, an expert on cancer control in Yemen, explained,

“It is paramount that the surveillance and the registration capacity is in hand so that you can have a more accurate idea not only of the incidence cases, the new cases, but also what happens to these people, how they are treated, what stage of the disease do they arrive. Over time you will be able to see if your interventions in other areas bring about a better awareness of the population so that they will go to a hospital earlier, so that you would find patients with a lower stage of the disease. It will also give indications if you have a hospital registry how the treatment is

37 Literature Review Essay: Cancer: Challenges for prevention, control, and treatment in Yemen, 10.
working, so that you will be able to allocate to this or this service if it is making a difference in the patients or not.”

The Swiss government has established the epidemiological data to indicate the most important cancers. From that data the public health sector has taken specific initiatives in terms of prevention and treatment to decrease the incidence and mortality due to breast and prostate cancers through programs like Bosom Buddies, a breast cancer information and support group run through ESCA. In Yemen, however, epidemiological data exists but has not been effective in illustrating the severity of the cancer burden.

It is crucial to obtain epidemiological data specific to cancer incidence and mortality *within a certain nation* to illustrate the national cancer burden. For these numbers to effectively illustrate this, they cannot include cancer incidence for international patients receiving treatment within the country. A hospital based cancer registry like that in the NOC will not effectively produce data specific to cancer in Yemen because international patients are treated at the center and are therefore registered in the system. For a country like Yemen to produce a clear illustration of the number of new cancer incidences and the mortality related to these cases a population and mortality based cancer registry must be established. This registry would produce epidemiological data that would track fluctuations in the number of new cancer cases in the population and would also, over time, produce a concrete assessment of the impact of newly-enacted preventative and treatment measured to decrease cancer mortality. This data is necessary to assess the impact and relevance of new cancer control strategies.

To proactively address this lack of epidemiological data in developing nations the International Agency for Research on Cancer in Lyon, France, holds a summer school type of learning conference in Epidemiology and cancer registration for professionals.

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each year. The course covers topics integral to establishing and maintaining epidemiological registries such as finding sources of information, the basic principle of biostatistics, and quality control and measures of comparability.\(^\text{39}\) This program is only one example to increase the epidemiological capacity of a developing country. Networks of active knowledge sharing and professional training are essential in increasing the cancer control capacity of developing countries like Yemen.

*Prevention*

Also key to cancer control and clearly lacking in developing nations like Yemen are significant and evidence-based prevention programs to prevent the initial development of cancer and therefore sustainably improve cancer mortality. It is the lack of prevention and education programs that results in high cancer mortality because patients present with late-stage, incurable cancers. For example, 50 to 80 percent of breast cancer patients in low and middle income countries were in advanced stages of cancer at the time of diagnosis, compared to only 15 percent of breast cancer patients in developed nations.\(^\text{40}\) It is important when planning preventative measures to keep in mind the cultural and financial barriers that exist and to implement only relative and effective forms of prevention. For example, screening and early detection methods like routine mammography for patients over 50 in countries like Switzerland are utilized to identify cancer in early stages. While this seems like a cost-effective and easy method of cancer mortality prevention, a prevention method such as this is not feasible for implementation in a developing country. Mammography technology is an expensive investment that is not in the budget of a developing country, and these countries do not have specially


trained professionals to carry out these exams. Different, smaller scale types of prevention techniques must be utilized.

The most successful and feasible preventative techniques involve educating people about cancer and the risks of their lifestyle choices. Often people are unaware of the warning signs of cancer or do not know or understand the dangers of their lifestyle choices, and therefore seek diagnosis in later stages of cancer and continue to practice cancer causing habits like smoking. To prevent breast cancer, for example, an educational program can be implemented in schools to teach young adults about the symptoms of breast cancer and how to perform a self-breast exam. This will teach young adults the importance of recognizing cancer and seeking immediate medical attention. These educational programs can be developed through a partnership between school teachers and public health professionals in developing countries and organizations like the UICC to spread knowledge globally. To decrease the incidence of head and neck cancer due to pesticides used on qat, the national government of Yemen can tighten restrictions on harmful pesticides and strengthen border patrol and importation. The government can learn methods of border patrol from the border patrol force of countries like the United States, which has a particularly strong Mexico-United States border patrol. Although these types of preventative measures do not produce immediate improvements in cancer incidence, they are long-term, sustainable means for significantly improving the status of cancer in Yemen and other developing nations.

**Biomedical cancer treatment**

In industrialized countries like Switzerland, biomedical cancer treatment is standardized and typically includes a combination of surgery, radiotherapy and chemotherapy to kill the cancer cells. This is possible in more developed countries...
because the financial, technological and medical professional resources are readily available. Because of effective prevention plans, patients in more developed countries present with tumors in less advanced stages, which are more responsive to various forms of treatment, and these treatments are widely available in all forms throughout the country.

Unfortunately this situation is different in less developed nations because of financial constraints, a lack of trained medical personnel and limited access to medicines. Patients present with tumors in later stages that would require complex chemotherapy regimens. Both access to these medicines is extremely limited and medical oncologists, if available, may not be properly trained to prescribe such a complex treatment. Because chemotherapy is in many cases not a feasible option for cancer patients in resource limited developing nations like Yemen, radiotherapy is considered the most effective type of biomedical cancer treatment. Radiotherapy is significantly more cost-effective and requires less expertise to administer.\footnote{Interview with Dr. A.P. Sappino, 14 November 2008.}

There is, however, a significant difference between radiotherapy as used in developed and developing nations. Firstly, there is a difference in the type of machine used in each type of country. In Switzerland, for example, the Centre de Radio-oncologie de Geneve uses an expensive linear accelerator, which requires a stable power supply and constant, expensive maintenance. This type of machine is not typically used in developing nations because many do not have a constant electrical power supply and do not have engineers or parts available for constant maintenance.\footnote{Interview with Shelley Bulling, 11 November 2008.} Instead, cobalt machines are used. Cobalt machines approximately US$ 480000, as compared to US$1.8 million for a linear accelerator, and are mechanically and electronically simpler. A cobalt

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machine requires a new radioactive source every five years but otherwise requires little maintenance. Both machines effectively deliver radiotherapy, but the cobalt machine is less expensive and requires much less maintenance.

In a developing nation like Yemen radiotherapy is considered a more cost-effective form of biomedical cancer treatment for various significant reasons. Although the cost to initially invest in radiotherapy technology is high, a large number of patients will be treated by radiotherapy as outpatients, and the radiotherapy room and equipment can be used for many years. Therefore the actual cost per treatment or patient is very low compared to the cost of individual chemotherapy treatments. The cost per dose of radiotherapy is approximately US$4.87. Because of this low cost, a high quality treatment can be provided to a large portion of cancer patients, and significantly improve their quality of life.

Additionally, in developing nations radiotherapy is used much more frequently for palliation of incurable cancers than in developed nations because patients present with such late stage cancers. Although radiotherapy or another form of biomedical treatment cannot necessarily cure these cancers, radiotherapy can significantly reduce the pain associated with cancer and metastases. Radiotherapy is often the only option for relieving pain in incurable cancers.

Although radiotherapy is available to some extent in countries such as Yemen, there is still a need for capacity building in this area to adequately establish a radiotherapy infrastructure significant enough to satisfy the needs of the many cancer patients. Presently over 5000 radiotherapy units are needed in developing nations to meet

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44 Ibid, 588.
the needs of cancer patients but only 2200 units are installed. The establishment of treatment facilities requires governmental support, equipment specification and procurement, and installation, among various other necessities. It takes about five years to complete this process. The need for improved radiotherapy capacity in developing nations is clear, and the time to begin this process is now.

The International Atomic Energy Agency (IAEA) has launched a program called the Program of Action for Cancer Treatment (PACT), in which they network with various other anti-cancer organizations and work with the governments of various countries to improve radiotherapy treatment capacity, among other goals. The IAEA-PACT presently is working on building cancer control and treatment capacity in Yemen. The IAEA-PACT program in Yemen is a PACT Model Demonstration Site, from which other nations needing cancer control capacity building can use as a model for their work. The IAEA has involved the Yemeni Minister of Health, the NOC, the UICC, and the WHO, among other partnerships, to carry out this process. These partnerships are essential to successfully increasing treatment capacity by providing logistical and financial support and expertise, and aiding in the development of a national comprehensive cancer control framework.

Complementary therapy and end of life care

Cancer patients in nations with more developed cancer control and care have access to psychological, nutritional and complementary medical services such as that practiced by Monique Noelte because their basic medical needs are sufficiently met. In countries like Switzerland cancer prevention and screening methods exist and are practiced by the general population, biomedical treatment is available and accessible, and

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the oncology sector of public health is saturated with trained professionals.\textsuperscript{48} Therefore, focus can be shifted to areas of complementary medicine and sufficient services exist to meet these additional needs. In developing countries that lack sufficient cancer control, priority must be placed on providing adequate access to medical attention, prevention and biomedical treatment to begin to control the cancer epidemic. Unfortunately priority is not placed on psychological or nutritional services outside of biomedical cancer treatment.

It is, however, recognized by most oncology professionals that these complementary therapies play a significant role in overall cancer care, and should not be left out of a comprehensive cancer control framework. Because financial support and the attention of medical professionals must be diverted elsewhere, the cancer patients themselves must be the ones to drive these types of therapies through programs like the UICC’s Reach to Recovery International. This program is a network of advocacy, education and patient support for people with breast cancer. Essentially groups like this empower patients to help themselves and others in similar conditions.\textsuperscript{49} Networks between patients to form these types of groups are essential in providing whole-body type cancer care.

Groups like these can also aid in building the capacity for non-biomedical end of life care services. Because the attention of oncologic nurses in developing nations is required for treatment and treatment is generally an outpatient service, patients are often not accompanied during the end of life. Patient services like the National Cancer Control Foundation in partnership with non-governmental organizations can model patient

\textsuperscript{48} Interview with Dr. A.P. Sappino, 14 November 2008.
\textsuperscript{49} Teleconference interview with D. Malin and M.S. de Sabata, 21 November 2008.
service programs after successful organizations like the English Speaking Cancer Association to address discrepancies in complementary care.

*Training of medical professionals*

Few cancer control initiatives can be carried out without a sufficient number of properly trained cancer specialists. In developed nations this is less of an issue than in developing nations like Yemen. In Yemen specifically working conditions are poor, the existing staff are overworked, and there are few incentives for trained medical professionals to stay and work in the country. This drives most of the discrepancies in cancer control between developed and developing nations. In order to advance care capacity specific attention must be paid to training professionals and establishing cancer training networks to generate sustainable training system.

There needs to be a significant increase in the number of professionals training regionally in cancer so cancer professionals will remain in their country. Successful training design and implementation involves hospital administration, physicians, physicists, and oncologic support staff to work towards a common goal in their own country.\(^{50}\) Because resources are so limited, removing these staff from their positions for extended training periods is not conducive to improving cancer control. Distance learning is one of the most useful tools for training. Presently the IAEA-PACT program is working to establish a *Cancer Control International Mentorship Network*, in which mentor institutions in more advance countries will be partnered with an institution in a developing nation to exchange multidisciplinary training and research and to provide ongoing support for the institution in the developing region.\(^{51}\) This program seeks to form important networks of knowledge sharing and best-practice mentorship to improve  

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\(^{50}\) *A Silent Crisis: Cancer treatment in developing countries*, 17.  
\(^{51}\) *PACT: Building partnerships to stop the global cancer epidemic*, 8.
the cancer control situation in developing nations through the training of cancer professionals.

The IAEA-PACT program is also working to establish a Virtual Cancer Control University, to provide access to training techniques and information exchange via the Internet. This network will allow for the exchange of vital cancer control information and techniques while keeping professionals in country.\(^5^2\) This network will link international experts with local practicing cancer professionals to improve the treatment and control capacity.

Additionally, fellowships are available through organizations such as the UICC to financially support the research and training programs of practicing cancer professionals.\(^5^3\) These cancer control networks and systems of financial support are necessary to train cancer professionals that currently practice in developing countries and to encourage more aspiring medical professionals to practice in developing nations. These professionals are the people who develop and actuate cancer control initiative and ultimately are the driving force behind the improvement of cancer control capacity.

**Evaluation of these cancer control initiatives**

These cancer control initiatives are essential to significantly improve the overall cancer control situation in developing countries such as Yemen. In order for these initiatives to proactively drive change, they each must be relevant to the issue at hand, cost-effective and sustainable in the long term.

**Cancer control frameworks and Epidemiology**

The development of a comprehensive cancer control framework is perhaps the most relevant method to improve the quality of cancer control in Yemen and other

\(^{52}\) Ibid, 9.

\(^{53}\) Teleconference interview with D. Malin and M.S. de Sabata, 21 November 2008.
developing countries. The development of these frameworks requires the cooperation of all parties involved in cancer care, including the government and medical professionals, and will therefore address all aspects of cancer control. The frameworks will assess the cancer burden through epidemiological data to identify the most pertinent cancer control initiatives to carry out, and will also assign these responsibilities to working groups to actually initiate change. This is the most cost-effective method to address the cancer control issue because once epidemiological data are collected, problems and areas needing work are identified, financial support can be allocated accordingly, rather than sporadically initiating cancer control actions. Cancer control frameworks are, by definition, short- and long-term goals to successfully implement cancer control strategies, and therefore this methods are sustainable in the long term. Epidemiological cancer registries, once established, are an easily sustainable method for assessing the cancer burden and tracking the success of cancer control interventions.

**Prevention**

Because patients in developing countries seek treatment in later stages of cancer, prevention and education programs are the most relevant and effective way to control cancer. Educational preventative programs implemented in schools are low-cost and will reach large populations in a short time. Children are the target population in this case because the most sustainable prevention is to motivate lifestyle change, and this is most successful at a young age. Additionally, using school programs as a vector, the information will reach the population in a culturally appropriate manner to empower the groups at risk and to promote early detection. This method may not have an immediate affect on the cancer incidence but will have a significant affect on the number of new
cancer incidences and mortality rate in the future. Educational preventative measures therefore are relevant, cost-effective and sustainable.

*Biomedical cancer treatments*

Increasing the treatment capacity of developing nations will have an immediate affect on cancer mortality because a larger portion of the population will have access to biomedical cancer treatments. The use of radiotherapy in developing nations is the most relevant and certainly most cost effective form of biomedical treatment. Developing nations do not have access to expensive and complex chemotherapy treatments, and cancers are often found too late to cure. Radiotherapy is a low cost per treatment method of biomedical treatment that can be administered as an outpatient procedure, and therefore can be used to treat a large percent of the population of cancer patients. Additionally, radiotherapy serves an additional purpose in that it is also used in a large portion of the population to provide palliative care for cancer-related pain. Cobalt radiotherapy technology requires a substantial initial investment but requires little maintenance and is therefore sustainable in the long term.

*Complementary therapy and end of life care*

It is clear that cancer control frameworks must prioritize the needs of a population and the first actions must address the most pressing cancer control issues. It is debatable whether complementary therapies and end of life care are truly necessary aspects of overall cancer care. However, cancer control frameworks should be comprehensive and address all aspects of cancer control. Although complementary therapies and end of life care are not priorities, these aspects of cancer care can be addressed through the establishment of support groups by cancer care non-governmental organizations. This is the most relevant and cost effective way to address the needs of the population because
this method does not require the work of those dedicated to providing biomedical
treatments. Once the cancer patients are empowered to help each other, they will drive
their own sustainable networks.

*The training of medical professionals*

The existence of trained medical professionals is a vital part of controlling the
cancer epidemic. These professionals are not only the people responsible for delivering
cancer care but make up a large portion of the driving force for the improvement of
cancer care capacity. Without trained medical professionals cancer treatment would not
be possible. The training of professionals through in-country networking with
international experts allows for the exchange of technique and knowledge and allows
those professionals to continue to deliver their vital services. This is the most beneficial
way to address the lack of trained professionals in developing nations. More people will
be encouraged to join the cancer control force once obtaining training becomes easier and
less costly.

**Conclusions**

These global public health partnerships are only the first steps towards holistically
improving cancer control and care in developing nations. These initiatives require
valuable humanitarian cooperation between industrialized nations, international
organizations and developing nations to globally reduce the cancer burden. It is the
human aspect of humanitarianism that creates the global responsibility to respond to and
improve the global cancer crisis.

These public health initiatives are essential to successfully meet all of the needs of
cancer patients in developing countries. These initiatives empower cancer patients and
integrate a systematic pro-poor growth strategy so that humanitarian type aid from more
developed nations preserves the dignity of the Yemeni people. It is difficult in a crisis situation for a government to admit that their efforts are lacking or insufficient to meet the grave needs of their people. By working in partnership with international agencies and by receiving guided assistance and not gift aid, the Yemeni government, health professionals and the general population learn to proactively improve their cancer burden.

This plan for action includes partnerships and initiatives to address the comprehensive needs of the cancer patient in developing nations like Yemen. Because resources are so limited, cancer control and care in resource-poor nations often focuses on providing only the essential biomedical treatments to try to cure the illness. From the illustration of the Swiss healthcare system it is clear not only that curing the illness should not be the only goal, and also that cancer care involves more than biomedical treatment. The Swiss example of cancer control and care indicates in its success that each aspect of the human must be appropriately addressed and treated during the course of the illness, and this includes treating the mind and spirit. Successful cancer care must focus on treating the whole human, and not on individual parts. These cancer control and care initiatives are sensitive to the holistic needs of cancer patients and utilize available resources to help cancer patients empower each other and improve their own health status.

Most importantly, these cancer care and control initiatives address the global humanitarian responsibility to respond to the eminent cancer crisis. It is our responsibility as human beings to take interest and action in the sufferings of others, and this is the basis for cancer control humanitarian action. Industrialized countries with successful cancer control strategies like Switzerland have a humanitarian responsibility to share these strategies with countries struggling to provide care for cancer patients and to assist in the
development of cancer control strategies in developing nations. These partnerships are essential for knowledge sharing to improve the global cancer control status and to spread successful cancer control initiatives to developing nations to improve the overall global cancer burden. International cancer control organizations such as the IAEA or the UICC are integral to the formation of these partnerships and essentially facilitate the progression of cancer control.

**Learning outcomes and further research**

Prior to this project my education in the topic of cancer focused on the scientific aspects of cancer as a disease and biomedical cancer treatments. I had never done research in the areas of complementary therapy or looked at the socioeconomic aspect of the cancer burden. Through this research and particularly through my interviews with Monique Noeltte and Daniel Malin and Maria Stella De Sabata I have been exposed to these alternative and important aspects of cancer control. Cancer control and care must be a holistic type of treatment because cancer as a disease affects more than just the physical being. If we approach cancer care with a whole body treatment approach we create a unique way to fight the disease burden. If we cannot biomedically treat and cure the disease, we can still treat the other aspects of the individual and significantly improve the quality of life for the patient. I think that perhaps this perspective is absent from a lot of cancer control strategies, but that this perspective is particularly important and valuable, especially in treating a disease like cancer. Biomedical treatment alone does not address the entirety of the disease burden. In the future I would like to continue to research complementary therapies and the role they play in comprehensive cancer care, and ways to significantly improve the psychological well being of cancer patients in both developed and developing nations.
I have also learned that there are significant disproportionalities that exist between developed and developing nations in terms of cancer control and care, and most importantly that public health infrastructure is the most basic necessity to treat a disease like cancer. Developing nations are so resource-poor that they lack the public health structure to put forth any initiatives to respond to health crises, regardless of their will. Essentially these structures must be built from the ground up, starting with the most basic structure to build upon to successfully erect a public health sector. These structures as well as disease control initiatives must be build in small successive steps to have significant future impact. This is the reason why humanitarian gift-type aid does not establish sustainable change. This learning outcome is valuable in planning humanitarian development strategies. We must work together to respond to development and health crises. Successful disease care and control initiatives must come from our humanitarian responsibility to assist each other.
Acronyms Used in this Document

CHUV- Centre Hospitalier Universitaire Vaudois
ESCA- English Speaking Cancer Association
HUG- Hopitaux Universitaires de Geneve
IAEA- International Atomic Energy Agency
NOC- National Oncology Center
PACT- Program of Action for Cancer Treatment
UICC- International Union Against Cancer
WHO- World Health Organization
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