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# Gynecologic Oncology Reports

journal homepage: [www.elsevier.com/locate/gynor](http://www.elsevier.com/locate/gynor)

## Development of a comprehensive and sustainable gynecologic oncology training program in western Kenya, a low resource setting



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### A B S T R A C T

To provide information on the development of a gynecologic oncology training program in a low-resource setting in Kenya.

This is a review of a collaboration between Kenyan and North American physicians who worked together to develop a gynecologic oncology training in Kenya. We review the published data on the increase of cancer incidence in sub-Saharan Africa and outline the steps that were taken to develop this program.

The incidence of cervical cancer in Kenya is very high and is the leading cause of cancer mortality in Kenya. WHO identifies cancer as a new epidemic affecting countries in sub-Saharan Africa. In Kenya, a country of 45 million, there is limited resources to diagnose and treat cancer. In 2009 in western Kenya, at Moi University there was no strategy to manage oncology in the Reproductive Health department. There was only 1 gynecologic oncologists in Kenya in 2009. A collaboration between Canadian and Kenya physicians resulted in development of a gynecologic oncology clinical program and initiation of fellowship training in Kenya. In the past 4 years, five fellows have graduated from a 2 year fellowship training program. Integration of data collection on all the patients as part of this program provided opportunities to do clinical research and to acquire peer reviewed grants.

This is the first recognized fellowship training program in sub-Saharan Africa outside of South Africa. It is an example of a collaborative effort to improve women's health in a low-resource country. This is a Kenyan managed program through Moi University. These subspecialty trained doctors will also provide advice that will shape health care policy and provide sustainable expertise for women diagnosed with a gynecologic cancer.

### 1. The problem

It is well documented that cancer incidence and mortality are increasing more rapidly in low and middle-income (LMIC) compared to high-income countries (Farmer et al., 2010). By 2020 it is predicted that 70% of all new cancers will occur in LMIC (Farmer et al., 2010).

International Agency for Cancer Research, Globocan, WHO and Global Cancer Statistics (Torre et al., 2015; World Health Organization, n.d.; International Agency for Research on Cancer, n.d.) estimate that there were approximately 850,000 new cancers in Africa in 2012 and that this number will grow to 1,056,000 by 2020. In sub-Saharan Africa the mortality rate for those diagnosed with a cancer is estimated to be 72%, which is almost double, the rate for developed countries. In addition to a lack of resources, the high mortality rates in sub-Saharan

Africa are also related to a lack of awareness among some policy makers and the general public (Jemal et al., 2012). Over the last 30 plus years' in Africa, public health priorities have focused on infectious diseases including HIV/AIDS, tuberculosis and malaria. The WHO has now identified non-communicable diseases including cancer as a new epidemic in sub-Saharan Africa (Jemal et al., 2012). They also identified that there is a severe shortage of health professional in sub-Saharan Africa, which has 24% of the world's health burden and only 3% of the World's Health Care workers (The World Health Report 2006-Working Together for Health).

This paper is focused on Kenya, an East African country where the incidence of cervix cancer is high and is the leading cause of cancer mortality in women. The age-adjusted incidence of cervix cancer in Kenya is 40.1 per 100,000 (International Agency for Research on

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<http://dx.doi.org/10.1016/j.gore.2017.06.014>

Received 24 March 2017; Received in revised form 26 June 2017; Accepted 29 June 2017

Available online 20 July 2017

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Cancer, n.d.), and the mortality is 21.8 per 100,000 women. In contrast the age-adjusted incidence and mortality in North America is 6.6 and 2.6 respectively (International Agency for Research on Cancer, n.d.). This discrepancy in incidence between these regions is related to a lack of screening, a limited awareness of cancer in the general population and avoidant behavior associated with a fear of cancer and a stigma that is associated with it (Jemal et al., 2012). The high cervical cancer mortality rate in Kenya is related to the fact that most women present with advance stage of their cancer, to limitations in treatment capacity, lack of facilities, lack of medical expertise, and an extreme shortage of radiation therapy (Orang'o et al., 2016b; Abdel-Wahab et al., 2013). In Kenya, a country of 45 million people, there is only 1 functional public radiation machine (cobalt-60) (Grover et al., 2014). This facility is located in Nairobi and its accessibility for the majority of women is extremely limited where patients wait as long as 6–12 months for treatment. Lack of access to radiation influences treatment strategies for cervical cancer patients in low resource settings. Both incidence and mortality are also related to the high incidence of HIV/AIDS in western Kenya (Jemal et al., 2012; Wools-Kaloustian et al., 2006). Other gynecologic cancers also need treatment and include ovarian, vulvar, endometrial cancer and uterine sarcomas. Gestational trophoblastic neoplasia, is another common cancer in western Kenya and can be cured if treated correctly.

In 2009 there were no trained gynecologic oncologists in western Kenya and only one or two in Nairobi who had been trained many years prior to 2009. General gynecologists in Kenya had little understanding of oncology. They may have seen many cancer patients during their training but they never spent much time caring for these women, as almost all were palliative when they presented to the hospital. In western Kenya neither the government nor the hospital, had a strategy for cancer care. At our institution Moi Teaching and Referral Hospital (MTRH) most women diagnosed with cervix cancer presented to the emergency departments with symptoms including bleeding, discharge and pain and almost all had advanced stage 3B or worse disease. Many present with very low hemoglobins and symptoms of anemia. Their treatment consisted of a blood transfusion if necessary, after which they were discharged home. They were offered appointments but no treatment was available and few returned for their appointments.

The problem in Kenya in 2009 was a high incidence and mortality of gynecological cancers and the complete absence of effective screening and treatment in an environment of very limited resources. The gap between patient needs and physician and hospital capability was very large. This paper describes our efforts over the past 8 years to improve this situation and train gynecologist to deliver comprehensive cancer care to women.

## 2. The solution: development of a gynecologic oncology program

In 2008 the University of Toronto joined the AMPATH (Academic Model Providing Access to Healthcare) organization and became the North American lead in Reproductive Health at Moi University. AMPATH is a consortium of North American universities and medical schools led by Indiana University and in collaboration with Moi University and Moi Teaching and Referral Hospital they provide access to health care in western Kenya whose population is approximately 5 million. Through grants from PEPFAR, USAID and others AMPATH has established a network of clinics that provide HIV care to thousands of people in western Kenya. AMPATH is viewed as being one of the most successful HIV/AIDS programs in Africa (Wools-Kaloustian et al., 2006).

AMPATH's organization enabled the gynecologic oncology program to develop without needing to reinvent the wheel, and without having to navigate different political aspects to delivering healthcare. Gynecologic oncology was able to use and leverage the AMPATH infrastructure in building the cervical cancer-screening program in a similar fashion to how the program in Zambia was developed (Parham

et al., 2015).

### 2.1. Initial phase

In 2009, a cervical cancer screening study was initiated at MTRH to compare Pap smear, testing to VIA (visualization and Inspection with Ascetic acid) (Grover et al., 2014). This study offered screening only to HIV women attending the center for their monthly examination and anti-retroviral medications (Khozaim et al., 2014). In 2008 a gynecologist from MTRH visited the University of Toronto as an observer and the following year a gynecologic oncologist visited MTRH with the objective to teach the gynecologists how to do a LEEP excision on women who were identified with cervical abnormalities during screening in the outpatient clinic.

Two observations resulted in clinical changes at MTRH, which in retrospect were the initial steps to developing a gynecologic oncology program. The first was identification that there was no coordinated approach to manage cancer patients at MTRH. This led to a recommendation that the gynecologist start a specific oncology clinic. In that clinic all gynecologic oncology patients were seen by the same two gynecologists, which provided them the opportunity to gain experience through their consistency in following up and consulting on new patients. The second change was to convince the hospital and AMPATH to initiate a cervical cancer-screening clinic that would extend past the completion of the study and include both HIV affected and non-affected women. This required both to commit resources for cervical cancer screening. Over the last 6 years VIA screening has expanded to include more than 60,000 women (Orang'o et al., 2016a) (Fig. 1).

#### 2.1.1. Surgical training

In the first year they screened 1000 new patients, using VIA, and they began to identify women with early stage (stage 1) cancers that could be treated surgically. Identifying stage 1 cervical cancers was new to these gynecologists something they had not seen and something we did not anticipate in advance. This was a tipping point because no one at MTRH knew how to do a radical hysterectomy and in fact none had even seen one being done.

The two Kenyan gynecologists working in the oncology clinic wanted to learn how to do a radical hysterectomy so that they could treat the women identified with early stage disease. It was an exciting time for them because for the first time they saw an opportunity to cure patients with cervix cancer. Teaching modules were developed by The Society of Gynecologic Oncology of Canada, as power point presentations to address every step of the surgery including management of complications (Elit et al., 2010). Over the course of two weeks, the two designated gynecologists learned how to do a radical hysterectomy and pelvic node dissection and together with their mentor they did 7 procedures over that time period.

The surgical training was very structured. At the completion of each surgical procedure a detailed debriefing was undertaken to review the performance of each of the trainees. This evaluation was very practical and assessed their skill as

- a. unable to do the procedure
- b. able to complete the procedure with a lot of assistance

Year	Screened	VIA positive	Colposcopy	Cryotherapy	LEEP
2009-10	1724	256	218	0	87
2011	6422	1115	665	292	64
2012	8830	1279	721	590	114
2013	6789	644	724	121	150
2014	6735	613	412	93	111
2015	16855	943	412	63	105
2016	13388	886	493	63	97
Total	60,743	5,736	3,645	1,222	728

Fig. 1. Cervical cancer screening.

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