The Mwanza Cancer Project

Cancer is rapidly becoming a serious health burden in sub-Saharan Africa, with basic components of cancer care either inadequate or absent. Dino Amadori and others discuss their experience of setting up a cancer centre at the Bugando Medical Centre in Tanzania.

For more on **cancer incidence in Africa** see *Lancet Oncol* 2008; **9:** 683–92

For more on **cancer care in Africa** see *Lancet* 2010; **376:** 1186–93

For more on **treatment of cancer in sub-Saharan Africa** see **Series** *Lancet Oncol* 2013; **14:** e158–67

For more on **improving access to care** see *BMC Health Serv Res* 2013; **13:** 304

For more on **capacity building** see *Nat Rev Clin Oncol* 2014; **11:** 251–59

For more on **cancer control programmes** see **Series** *Lancet Oncol* 2013; **14:** e189–95

In Africa, the incidence of cancer is increasing rapidly and efforts to establish minimum services for the prevention and treatment of the disease still meet with enormous difficulties. The basic components of cancer control are especially inadequate in sub-Saharan Africa, where survival remains lower than in all other low-income countries. The main challenges stem from the scarcity or absence of cancer control programmes, qualified staff, diagnostic and treatment capacity, cancer care funding, and political commitment. Policies devised to overcome these problems include capacity building in health planning, provision of technical and financial support to create sustainable national cancer control programmes, promotion of horizontal integration of cancer control programmes with other health services, establishment of regional referral centres, creation of telemedicine infrastructures, support of drug donation initiatives worldwide, and establishment of international partnerships between national governments, non-governmental organisations, foundations, higher education institutions, associations of health-care professionals, and industry. In the past few years, these principles have been integrated into comprehensive strategic plans designed for each area of cancer control, some of which were published in 2013. Several years before their publication, a strategy closely resembling those proposed in the 2013 articles was used as the theoretical basis for the Mwanza Cancer Project, a collaborative initiative undertaken by a pool of Italian cancer research centres, cancer volunteer associations, and scientific societies in collaboration with Tanzanian political and health authorities, and health-care professionals at the Bugando Medical Centre (BMC) of Mwanza in northwest Tanzania. Its objective was to establish a comprehensive centre for cancer care and control in the region. The idea for the project came from the members of the Vittorio Tison Association, founded in 1999 in memory of the late Vittorio Tison, an esteemed Italian pathologist whose compassion and dedication led him to provide voluntary medical assistance in the Mwanza region. Creation of a comprehensive cancer centre in Mwanza became firmly established as the Association's primary mission and was based on several basic principles (panel).

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The Mwanza Cancer Project was designed as a three-stage programme. The first stage was the creation of a pathology service and an inpatient and outpatient medical oncology unit at the BMC, with an essential labour force. This stage represented a starting point to influence local public agenda and attract increased financial backing from the rest of the country and abroad. The second stage involved the active procurement of funding from local, regional, and national governments and Italian public health-care providers. Stage 2 aimed to complete the cancer centre, to rapidly procure the provision of a number of basic services, and to offer health-care workers improved job satisfaction. In turn, such an improvement was hoped to reduce migration to richer countries and make the development of the labour force increasingly cost-effective. In the steady-state stage of the project, which is currently underway, more efforts are being made to implement higher-level needs, such as family support services, tutoring, monitoring, and research activities.

During the establishment of the pathology service, volunteer Italian pathologists offered their services for 3–5 months between 2000 and 2008, during which time they trained local staff and set up a pathology laboratory meeting the basic required standards. During this time, the Istituto Scientifico Romagnolo per lo Studio e

***Panel:* The Mwanza Cancer Project**

- Appropriate policies to increase community education and awareness of cancer in the region need to be developed
- Epidemiological and clinical data need to be collected to optimally plan public health and clinical services
- Pathology services are a core element of cancer care and control
- Improved access to screening and early clinical detection is essential to reduce the effect of cervical cancer and breast cancer on women's health in the region
- Development of an essential labour force together with the establishment of a regional centre of excellence offering improved job satisfaction would reduce the risk of losing health-care workers to higher-income countries than Tanzania
- Sustainable capacity-building research programmes focused on local priorities are needed to guide cancer control planning
- Cancer control activities need to be integrated with other community-based health services
- The use of off-patent drugs and reuse of dismantled technical equipment in good condition from hospitals in developed countries could be a solution to overcome health-care budget constraints
- Scientific organisations in high-income countries could assist by offering tutoring and continuing education programmes and access to research programmes
- Use of the internet and electronic medical technology could help to improve the delivery of cancer care in developing countries; the former also permits data to be uploaded at the local level and downloaded remotely, which facilitates audit schemes and data inclusion in international research projects

la Cura dei Tumori (IRST) also found partners for the project, including the Istituto Oncologico Veneto, a cancer research centre in northern Italy, and the Istituto Oncologico Romagnolo, a non-profit cancer association located in the same catchment area as the IRST.

In 2008, Nestory Masalu—a Tanzanian physician funded by Vittorio Tison Association to complete his postgraduate studies in medical oncology in Italy—became a candidate for the post of Director of the cancer care and control activities at the BMC. Between 2008 and 2009, local authorities firmly committed to investing in cancer services. The Pathology Service was taken under the management of the BMC and a memorandum of understanding outlining a detailed personnel training programme was signed between the BMC and the Italian partners. In January, 2009, the medical oncology unit was opened, with Masalu appointed as Director.

In 2010, the first Italian volunteer oncologist arrived in the BMC Medical Oncology Unit. Since then, 23 medical oncologists, one pharmacist, three nurses, and one data manager have offered their services for varying periods of time to train local staff. Between 2009 and 2014, the availability of health-care resources at the unit greatly increased (table), and the pathology service has had a key role in this increase. Because of the high incidence of cervical and breast cancer, female patients seen at the BMC are mainly adults, whereas males are almost equally distributed between paediatric and adult age groups.

In 2011, the Tanzanian Central Government committed to the construction, within 24 months, of a US$7 million radiotherapy facility with six bunkers, a treatment planning room, a mould room, consultation rooms, a library, a conference room, a molecular biology laboratory, and an operating theatre. The facility, inaugurated in November, 2013, will be equipped with two ^{60}Co machines, a dosimetry and computer planning system, a conventional simulator, a CT-based simulator, a high-dose rate brachytherapy system with digital c-Arm radiography, and a 250–300 kV orthovoltage unit. The central government has already funded the procurement of the two ^{60}Co machines. In addition, a linear accelerator machine has been donated by the IRST, the installation of which is underway.

The pilot phase for a cervical cancer screening scheme was recently completed in seven districts. The pilot was launched in 2012 after a community-level information and education campaign. Women aged 15–64 years were encouraged to attend the service for a visual inspection of the cervix with acetic acid. The programme was based in local health centres, the intermediate health posts in the district health system. A study is ongoing to identify the factors associated with cervical cancer and the population subgroups at highest risk of the disease. A palliative care programme has been developed to integrate hospital-based and community-based services. The community-based approach uses the existing home-care service for HIV/AIDS, diabetes, and stroke, showing that integration of cancer control activities with other community-based health services is realistic and feasible. We endorse the view that health services research agendas should cover the full scope of chronic conditions afflicting low-income countries.

Because the duration of cancer treatments causes high rates of school dropout, a school for paediatric patients was opened within the BMC with a dedicated teacher assigned by the central government. A second supportive service provides transport to and from the hospital for paediatric patients and is funded by the non-governmental organisation Hope for Life. In general, supportive services are implemented in the later stages of a cancer centre project. The fact that we have started to work on these services suggests that the Mwanza Cancer Project is now moving into its consolidation phase. In 2013, the electronic clinical records system in use at IRST was modified, translated into English, and installed in the computers of the BMC Medical Oncology Unit. The software provides information on standard treatment schedules for defined conditions, and allows calculation of treatment dose and duration.

A theoretical and practical course in oncology (A) and the Vanda screening project (B)

	2009	2014
Histological examinations per year	~200	~4000
Hospital beds dedicated to oncology	16	40
Oncology consultations per week (new patients plus follow-up)	30	80
Day-hospital admissions per week	25	70
Inpatient admissions per month	8	30
Annual inpatients	1320	3360
Annual outpatients	2100	3100

Table: **Resources and services at the medical oncology unit at the Bugando Medical Centre in 2009 and 2014**

For more on **improving access, quality, and efficiency** see *BMC Int Health Hum Rights* 2010; **10:** 24

For more on the **improvement of pathology in sub-Saharan Africa** see **Series** *Lancet Oncol* 2013; **14:** e152–57

For more on the **challenges and opportunities in cancer control in Africa** see **Series** *Lancet Oncol* 2013; **14:** e142–51

Unloading radiotherapy equipment (A) into the new building (B)

For more on **breast cancer in Tanzanian patients** see *BMC Res Notes* 2014; **7:** 399

In 2015, an intercontinental telematic platform shared by the BMC and IRST was implemented to support telemedicine and permit the remote extraction of data from the BMC electronic clinical records system. Medical training needs have recently been reassessed. Present human resources include a medical oncologist, surgical oncologist, gynaecological oncologist, radiation oncologist, medical physicist, nuclear medicine physician, medical physicist, three nuclear medicine technicians, three radiation technologists, four oncology nurses, four nurses with in-house training, a data manager, and a social worker. As stipulated in the memorandum of understanding, three physicians will specialise in paediatric oncology, interventional radiology, and medical oncology in Italy after completion of training courses in paediatrics, radiology, and general medicine in Tanzania. In 2012–13, the BMC and IRST agreed to undertake studies for the characterisation of cervical cancer, breast cancer, and Burkitt's lymphoma in Tanzanian patients. About ten research projects are underway at the BMC, including clinical studies, oncology health services research studies, and a pilot study in the area of cancer registration.

The partnership with IRST is no longer an exclusive one, indicating the increasing capacity of the Medical Oncology Unit to function autonomously. The increasing interest shown by the Italian oncology community in the creation of research opportunities in Africa has led to the foundation of the African Italian Cooperative Oncology Group and to the formation of a dedicated working group within the Italian Association of Medical Oncology. Thanks to such initiatives, African oncologists are likely to become increasingly involved in the research agenda of their Italian colleagues, which, we believe, will be mutually advantageous.

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Obviously, many problems remain to be resolved. First, two pressing issues are the lack of a full quota of medical staff and the need for a new cancer ward building to render effective measures to improve accessibility to services. Second, the need for a multidisciplinary approach to cancer care is still a poorly understood concept. Third, an urgent need exists to improve patient awareness of the importance of post-treatment follow-up in cancer care. Finally, drug costs remain a burden for patients. However, the economic transition being experienced by sub-Saharan countries is expected to have positive effects on health-care spending.

Although the Mwanza Cancer Project was begun a few years before publication of a series of articles in which guidelines were formally and comprehensively developed to establish a basic cancer control programme in Africa, it almost wholly adheres to these recommendations, conferring validity in terms of feasibility, sustainability, and efficacy. For these reasons, our initiative qualifies as a demonstration and evaluation project. It would be useful if the results of our project were confirmed by similar experiences on the setting up and running of a comprehensive cancer centre in sub-Saharan Africa.

We agree with the view that the assumption that cancer will remain uncontrolled in developing countries should be challenged, and that similarly unfounded arguments were made in the past against the provision of HIV treatment. Our experience shows that the removal of obstacles to a sustainable cancer programme in sub-Saharan Africa can be achieved by using a clear vision and well-defined strategies, and by establishment of collaborations at a regional, national, and international level.

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We declare no competing interests.