

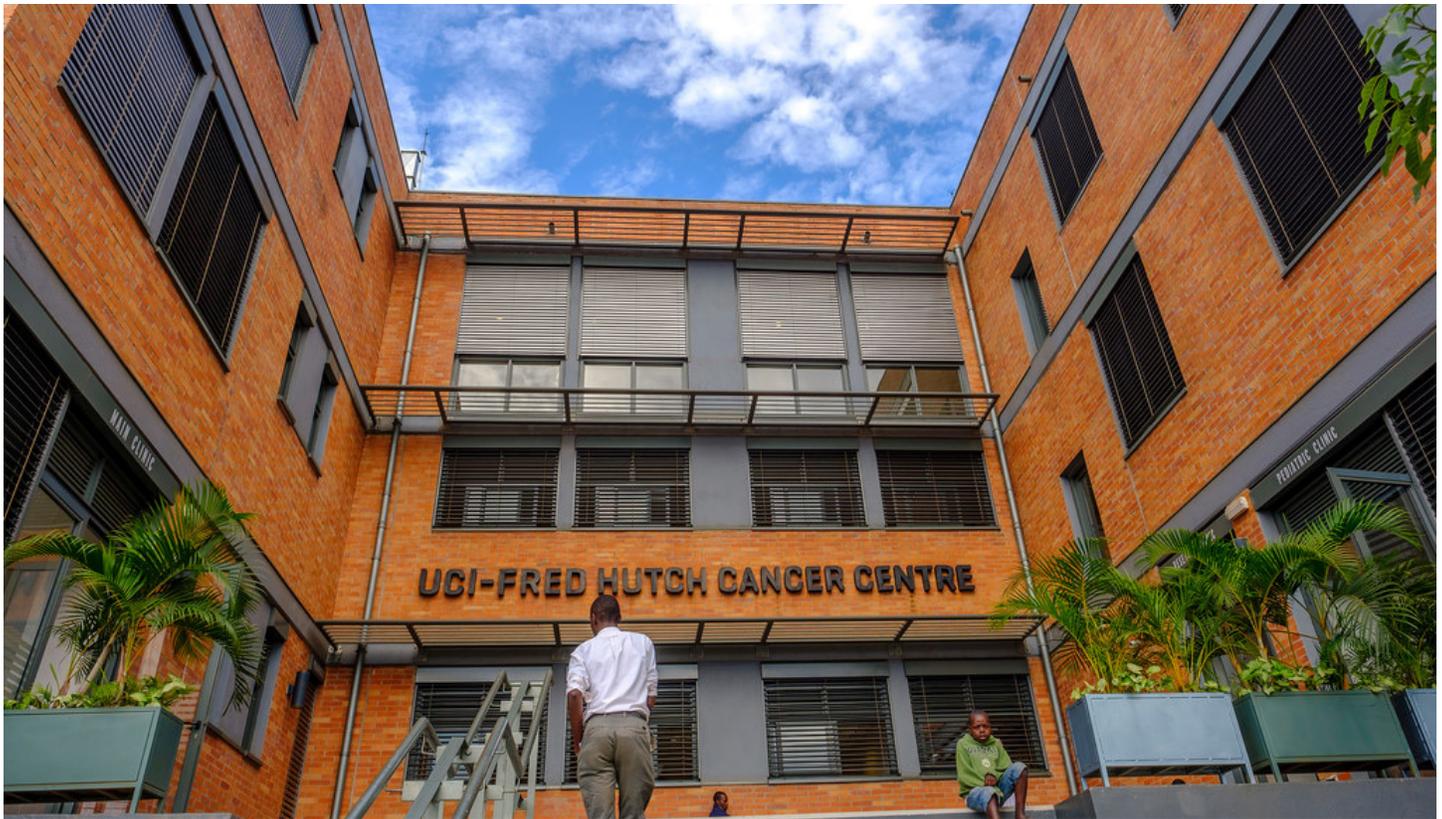
FRED HUTCH®

Global Oncology

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Uganda Cancer Institute-
Fred Hutch Cancer Centre



UCI-Fred Hutch Cancer Centre, Kampala, Uganda. Photo by Jiro Ose for Fred Hutch

A Collaboration Built on Research

UCI-FRED HUTCH CANCER CENTRE

Global Oncology at Fred Hutchinson Cancer Research Center, a world leader in cancer and infectious disease research, conducts research and training initiatives to address the rising global burden of cancer in low- and middle-income countries. The foundation of the program is its collaboration of more than a decade with the Uganda Cancer Institute in Kampala, Uganda. An internationally recognized regional center of excellence, the UCI was the first comprehensive cancer center in Uganda to provide clinical care, research and training. Fred Hutch and the UCI partner to conduct cancer and infectious disease research and to support capacity building in research and clinical care at the UCI. The collaboration is led by Dr. Edus H. Warren, Global Oncology head, Dr. Thomas Uldrick, deputy head

of Global Oncology, and Dr. Jackson Orem, executive director of the UCI.

Fred Hutch and the UCI conduct their laboratory-based research, clinical research and training activities at the state-of-the-art UCI-Fred Hutch Cancer Centre on Mulago Hill in Kampala, Uganda. Opened in May 2015, the \$10 million, three-story, 25,000 square-foot facility features biomedical laboratories and facilities for training and outpatient care. The construction of the facility came to fruition through investments by Fred Hutch and the U.S. Agency for International Development and with support from the government of Uganda. With the UCI-Fred Hutch Cancer Centre, Fred Hutch Global Oncology is advancing cancer research and capacity building to reduce the global burden of cancer.

RESEARCH CLINIC AND BIOMEDICAL LABS

At the UCI-Fred Hutch Cancer Centre, Global Oncology is advancing its research to improve the lives of cancer patients. To date, Fred Hutch and the UCI have conducted pioneering research on five cancers — Kaposi sarcoma, Burkitt lymphoma, cervical cancer, breast cancer and Hodgkin lymphoma — and five associated viruses — HIV, human herpesvirus-8, Epstein-Barr virus, human papilloma virus and hepatitis B virus. Further, Global Oncology aims to build a comprehensive genomics center at the UCI-Fred Hutch Cancer Centre and develop new cancer diagnostics and therapies suited for low-resource settings. For example, the UCI and Fred Hutch are evaluating whether a diagnostic tool for breast cancer in Uganda performs

as well as the method used in high-income countries for determining a tumor's hormone receptor status and other factors that guide treatment. The study also will assess the feasibility of a three-drug chemotherapy regimen that breast cancer patients will be able to take orally rather than intravenously.

The UCI and Fred Hutch will also conduct a clinical trial to optimize a scalable treatment regimen for patients in Uganda with Burkitt lymphoma, diffuse large B-cell lymphoma or Castleman disease. Investigators anticipate the study will provide novel scientific observations and drastically improve cure rates and survival of patients with the most common cancer in African children, as well as children and adults with other aggressive lymphomas.

The UCI-Fred Hutch Cancer Centre's key features are described below.

MOLECULAR DIAGNOSTICS LABORATORY

- Has high-throughput, real-time PCR capability, allowing for investigation of rapid diagnostics for common cancers and infectious diseases, including quantitative HIV, cytomegalovirus, EBV, HHV8, and HPV genotyping.
- Currently is developing the capacity for cutting-edge next-generation sequencing with an Illumina MiSeq sequencer.
- Has conducted more than 75,000 PCR tests; undergoes regular quality control audits by Fred Hutch.
- Collaborates with one of only three College of American Pathologists [CAP]-certified labs in Africa: the Makerere University-Johns Hopkins University Collaboration Core Laboratory.
- Houses a GeneXpert instrument for HER+ testing and additional tests that are provided for clinical prognosis.

HISTOPATHOLOGY LABORATORY

- Accommodates all histology functions and is equipped with multiple pieces of histology equipment, including a tissue processor, embedding center and microtome.
- Has in-house, cutting-edge instruments to allow for faster diagnostic turnaround time and appropriate quality control measures for samples and processes.
- Elevates the ability to diagnose many cancer types according to the standard of care in the U.S. and other high-income countries.
- With an Aperio CS2 slide imaging system, or eSlide capability, allows for greater peer review and expert input and for more accurate diagnosis by the local pathologist.



TOP: Diana Basemera, histology technician, examines a tissue sample at the UCI-Fred Hutch Cancer Centre, November 2016. Photo by Robert Hood / Fred Hutch. ABOVE: Dr. Charles Babutunga examines Brenda Nakimera, 9, in November 2016 at the UCI-Fred Hutch Cancer Centre as her mother Leticia Nakayenga looks on. Photo by Jiro Ose for Fred Hutch.

SPECIMEN PROCESSING/ BIOREPOSITORY

- Has expanded specimen biorepository capacity and specimen-processing capability.
- Allows for additional sample processing with increased square footage and instrumentation.
- Uses a secure database system to manage laboratory results and specimen storage data.

IMMUNOLOGY LABORATORY

- Will be equipped for antigen and antibody testing and immune function assessment.
- Will feature a flow cytometer and cell sorter, which will be used for diagnosis of hematologic malignancies and to support research, in addition to a 10x Genomics instrument.

BIOSAFETY LEVEL 2 LABORATORY

- Houses a research laboratory that will be essential to continue learning how infectious diseases contribute to the cancer burden around the globe.
- Adopted the recommendation from the National Institutes of Health and the Centers for Disease Control and Prevention for the use of a BSL-2 facility with BSL-3 practices and containment when activities involve producing research laboratory-scale quantities of HIV or SIV, manipulating concentrated virus preparation, or conducting procedures that may produce droplets or aerosols.

CLINICAL CARE

In 2016, the UCI moved its pediatric outpatient clinic and two adult outpatient clinics (gynecologic oncology and Kaposi sarcoma) into the UCI-Fred Hutch Cancer Centre, enabling the UCI to complete up to 16,000 outpatient visits annually. The building features four new clinical



Lazarus Okoche prepares a specimen at the UCI-Fred Hutch Cancer Centre's molecular diagnostic lab. Photo by Jiro Ose for Fred Hutch

exam rooms, 12 curtained infusion bays and four infusion chairs. These clinical-care features double the capacity of the original site, which had been in use since 1967. The facility also has a clinical laboratory and two pharmacies (retail and research).

TRAINING AND CONFERENCE FACILITIES

The building is equipped with training facilities and a conference room that facilitate domestic and international collaboration. These features support the initiatives of the UCI and Fred Hutch to train local researchers, research staff and health care professionals to promote a sustainable approach to reducing the cancer burden in Uganda and other countries.

REDUCING THE CANCER BURDEN

At the UCI-Fred Hutch Cancer Centre, Fred Hutch and the UCI have demonstrated the feasibility of conducting

scientifically excellent biomedical research and high-quality oncology training and cancer care in sub-Saharan Africa. Fred Hutch Global Oncology, together with the UCI and other partners, is at the forefront of developing new methods for cancer diagnosis and therapies in low-resource settings.

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