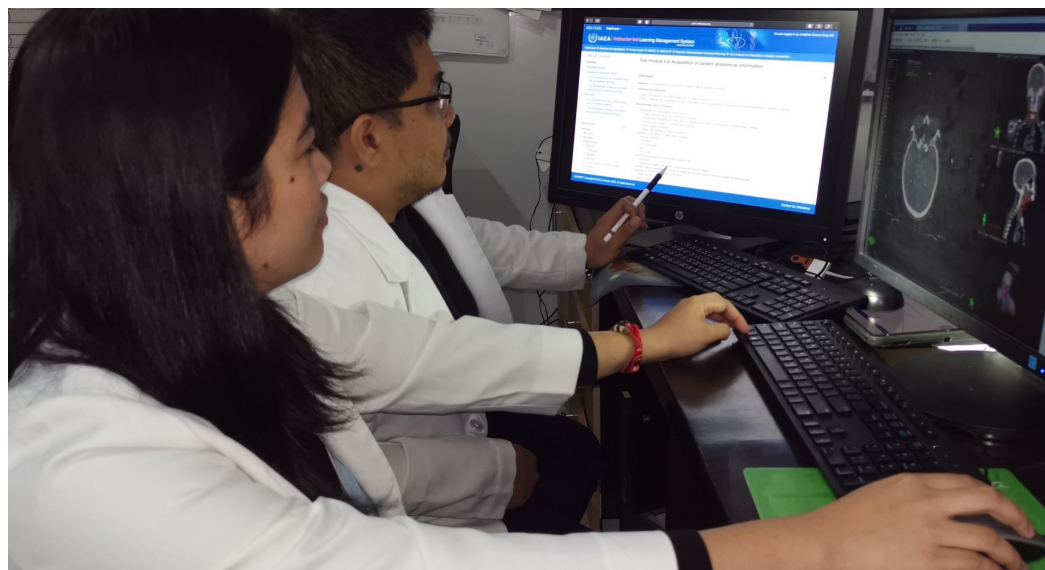


# Embracing mobile and online technology to reshape cancer care and education

By Joanne Liou



(Photo: J. Corpuz/Southern Philippines Medical Centre)

The ubiquity of mobile phones and internet access has enhanced the ability to acquire information — consolidating a wealth of information into a compact gadget at one's fingertips. For more than a decade, mobile applications have effectively simplified daily life, and they have now extended into the world of cancer care.

“Information and mobile technologies are increasingly used by the IAEA to deliver innovative and cost-effective educational opportunities to people worldwide,” said May Abdel-Wahab, Director of the IAEA's Division of Human Health. “By developing resource-sparing tools and services, opportunities are not limited by geography, availability of resources or financial constraints, so we are able to further support countries in expanding professional development for cancer care globally.”

As technologies continue to transform lives and society, the increasing use of mobile apps, e-learning platforms, and information and communication technology-based tools, is influencing cancer care, from assisting diagnostic imaging interpretation and educating practitioners to guiding treatment decisions. Some of the IAEA's freely available applications and e-learning courses are highlighted here.

## TNM and FIGO cancer staging applications

The TNM Cancer Staging App is a mobile app that provides navigable information to help physicians determine the level of treatment and prognosis for cancer patients, based on the extent of the tumour (T) and lymph node spread (N) and the presence of growths from the primary cancer site — metastasis (M). The TNM staging system is a recognized standard used to record the anatomical extent of the disease. The classification system, which is updated on a regular basis, was developed by the Union for International Cancer Control (UICC), and it is also used by the American Joint Committee on Cancer (AJCC) and the International Federation of Gynaecology and Obstetrics (FIGO).

The app, developed by the IAEA in cooperation with India's Tata Memorial Centre and All India Institute Of Medical Sciences (AIIMS), lists 65 cancer types and covers more than 100 different types of tumours. “The app condenses a 1000-page book and puts it into the hands of patients, doctors and practitioners,” said Diana Paez, Head of the Nuclear Medicine and Diagnostic Imaging Section at the IAEA. Users can enter a patient's details, such as the size of a mass, or the presence or absence of lymph nodes, to help them identify a specific treatment.

“Books containing such information are expensive and are not always available when you are in the clinic with the patient,” said Palak Bhavesh Popat, a radiologist at the Tata Memorial Hospital in India. “Having an offline and free app available on the phone, even in remote areas, further increases its utility.”

Since the app’s launch in 2015, it has been downloaded more than 52 000 times.

In 2016, the IAEA launched a similar app specifically focused on gynaecological cancers. The FIGO Gyn Cancer Management app was developed by the IAEA in partnership with Tata Memorial Centre and AIIMS, and in cooperation with the FIGO. The FIGO app — which has reached nearly 10 000 downloads — evaluates the extent of cancer in female reproductive organs for the staging and management of gynaecological cancers. In April 2019, the app’s staging and management flows were updated for cervical cancer.

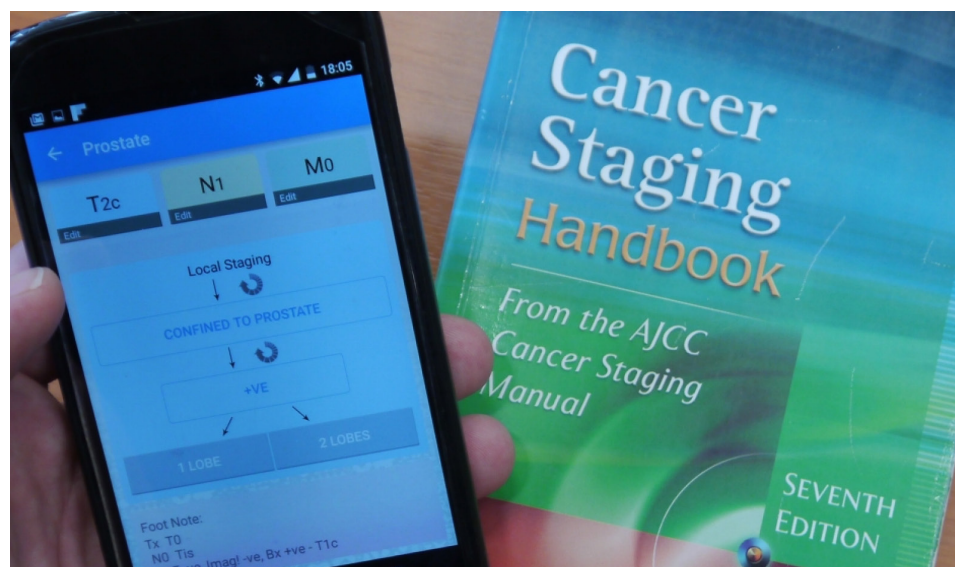
New versions of the TNM and FIGO apps based on clinical updates are expected to be released in October 2020. The two apps, which are available in the Android and Apple app stores, have been most downloaded in Brazil, India, Japan, Mexico, Thailand and the United States.

“These apps reflect the cooperation between the IAEA and professional organizations, and they offer a way to allow free access to high-level, scientific content,” Paez explained. “Despite a limited budget, we have been able to increase impact and reach through these mobile tools.”

### Distance assisted training and e-learning tools

Before branching into apps, the IAEA had embarked on an extensive project to develop training modules for distance-learning in the field of nuclear medicine. The development of the IAEA’s distance assisted training began in the 1990s and has evolved from CDs and DVDs to the Distance Assisted Training Online (DATOL) platform, which has been available online since 2009. The platform’s content is regularly updated to stay relevant and to reflect developments in the field.

The DATOL curriculum consists of 39 subjects representing approximately 900 hours of study along with a formal assessment and certification. It can be completed within two to three years when



pursued part time. Accreditation is granted by a nationally recognized body when the DATOL programme is implemented locally using the educational materials developed by IAEA experts and with the support and supervision of the IAEA.

“In the past, nuclear medicine technologists were trained on the job without formal education,” Paez explained. “DATOL helps people complete a structured training programme with access to local tutors, presentations, case studies and assessments.”

About 700 professionals have completed the programme from more than 30 countries across Africa, Asia, Europe and Latin America. The programme, which is available in English and Spanish, has been adopted in Argentina, Colombia and Thailand as an official training tool for nuclear medicine technologists.

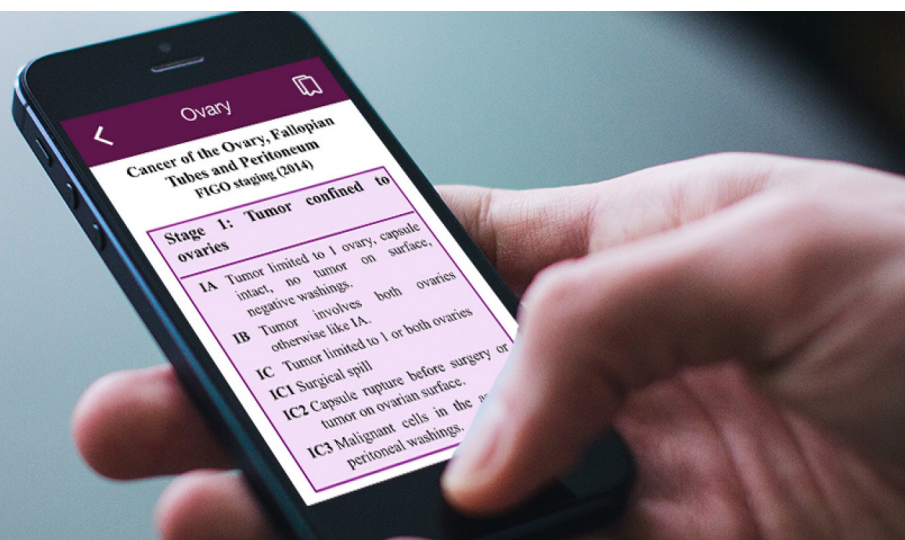
### Expanding online resources

The IAEA has continued to expand its online offerings through e-learning tools that help promote IAEA publications and resources. “It’s a continuation and complement to our work; our approach is to start from IAEA published guidelines and disseminate them through training courses during which we develop material to be used for e-learning,” said Giorgia Loreti, training officer in medical physics at the IAEA. The IAEA develops online courses to facilitate access to best practices in clinical applications of radiation medicine in, for example, the field of medical physics.

“We spend a lot of time testing the e-learning modules and performing extensive quality

### TNM Cancer Staging App

(Photo: V. Fournier/IAEA)



### FIGO Gyn Cancer Management

(Photo: V. Fournier/IAEA)

control before we release them,” Loreti said. “E-learning is a flexible tool that allows accessible, structured yet self-paced learning. It adds value to the learning experience through making it interactive.”

For example, to complement the IAEA publication, *Introduction of Image Guided Radiotherapy into Clinical Practice*, released in 2019, an e-learning course was produced based on a training course run jointly with the International Centre for Theoretical Physics (ICTP). The e-learning course, intended for postgraduate medical physics students and professionals, comprises eight modules with videos, slides and self-assessment tests, which provide an overview of the physics and technologies related to image guided radiotherapy.

“We know students on e-learning courses may not have access to the practical sessions

given in a typical medical physics course nor to the interaction with the lecturers,” Loreti said. “We have developed specific self-assessments to ensure topics are understood in-depth before the student can proceed to the next module.”

### Supplementing training

Following the success of AMPLE — the Advanced Medical Physics Learning Environment for Asia and the Pacific — the IAEA is working on a similar tool for radiation oncologists. Expected to be released in 2020, the Advanced Radiation Oncologist Education Platform (AROLE) will be used to supplement residency training in areas with limited access to experts and educational resources.

“We realize that we are facing a shortage of radiation oncologists, especially in lower income countries. The capacity to produce radiation oncologists is currently very small and expertise is limited, so there is a need for students to be trained more efficiently and for experts to support them without having to travel long distances,” said Ben Prajogi, an associate education officer in the IAEA’s Applied Radiation Biology and Radiotherapy Section. “In collaboration with academic institutions and professional societies, we will provide access to high-quality learning resources to support the implementation of a global competency-based curriculum.”

To access the IAEA’s free e-learning courses, users need internet access with a web browser and a Nucleus account, which can be created at [nucleus.iaea.org](http://nucleus.iaea.org).



## IAEA’s first virtual conference

Finding new ways to embrace the power of information and communication technologies is helping to further the reach of nuclear sciences and applications. In September 2019, the IAEA hosted its first virtual conference: the International Virtual Conference on Theranostics (iViCT 2019). Theranostics is an area of medicine that couples diagnostic and therapeutic uses of radiopharmaceuticals to diagnose and treat cancer (read more on page 8).

The conference leveraged multiple online platforms to connect nuclear medicine experts with a global audience. Interactive case presentations and an international panel supplemented lectures covering prostate cancer, neuroendocrine tumours and differentiated thyroid cancer patients. Participants were able to interact via the IAEA App, the official conference hashtag #iViCT and WhatsApp, and Q&A sessions were supported by WebEx.

“The virtual conference is a platform and a means that gives us the opportunity to significantly increase the reach of nuclear science and applications, allowing us to support the process of continuing medical education and helping us optimize the available resources,” Paez said. The conference was livestreamed at two separate times to accommodate different time zones, and recordings were made available online after the conference.