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Linacs to Narrow the Radiotherapy Gap

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By 2040, the annual global incidence of cancer is expected to rise by more than 40% from the current 19.3 million to 27.5 million cases, corresponding to approximately 16.3 million deaths. Sadly around 70% of these new cases will be in low and middle-income countries (LMICs), which lack the healthcare programmes required to effectively manage their cancer burden. While it is estimated that about half of all cancer patients would benefit from radiotherapy (RT) for treatment, there is a significant shortage of RT machines outside high-income countries.

More than 15,000 electron linear accelerators (LINACs) are currently used worldwide to treat patients. However, only 10% of patients in low-income and 40% in middle-income countries who need radiotherapy have access to it.

The idea to address the need for a novel medical LINAC for challenging environments was first discussed in a workshop hosted by CERN and sponsored by the International Cancer Expert Corps (ICEC), and has led to the creation of the STELLA project (Smart Technology to Extend Lives with Linear Accelerators) project.

A novel, robust, modular linear accelerator that requires fewer staff and less maintenance while delivering state-of-the-art treatment is at the heart of the STELLA projects, which will also make use of artificial intelligence and deep learning to enhance the capability of the LINAC and to incorporate imaging and biological information into patient management as well as training and guiding the experts needed on the ground. For the whole project to work, the key element is a robust programme of mentorship to help train, educate and sustain on-site expertise and treatment.

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