# ESTABLISHMENT OF A NEW ACCELERATOR FACILITY FOR MEDICAL APPLICATIONS: NIGERIA AS A CASE STUDY

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* **Background**

Nigeria is Africa's most populous country, as well as the continent's second-largest economy, third-largest military power, and top oil producer (10th oil producer in the world). Nigeria is home to more than one million people in each of its seven largest cities, and the country accounts for roughly one out of every two West Africans [1]. Nigerian Nuclear Medicine (NM) planners estimated that the country would need a minimum of 10 NM centers to offer equitable access to NM services as part of the country's national strategic health plans. The 10 NM centers were located in tertiary hospitals that will deliver radiation oncology services, based on their intuition. However great this country is, it depends on other nations such as South Africa for its radioisotope production for medical applications. With more than 6,000 patients in the last 11 years who needed bone scans to rule out bone metastases, routine PET/CT imaging is not yet accessible.

Recent activities of Boko Haram, a Nigerian extremist group, raise fears of a nuclear terrorist attack. Nuclear medicine (NM) relies on the timely delivery of radioactive sources, but its beneficial use is supported by a strong security structure that ensures public safety. Because NM radionuclides have short half-lives, they pose a negligible risk of terrorism. However, in order to implement a strict nuclear security regime, their importation and delivery in Nigeria are subjected to undue scrutiny. These actions obstruct the timely delivery of radionuclides, which has a direct impact on the quality and economic viability of nuclear medicine [2]. Against this backdrop this paper explores the possible economic benefits of an accelerator facility for radioisotope production in the country.

There are many factors that will ensure socioeconomic benefits from the application of accelerator for sustainable development. Some of which:

* + - * Clinical effectiveness
      * Job Opportunities

In 2006, Nigeria set up its first NM center after receiving a funding from the IAEA. It is situated in Nigeria's earliest tertiary hospital and oldest medical school, in the country's southwest region. The second center opened in 2007 in the nation's capital city, which is located in the country's northern central region [3]. The first centre (A) is more established with only four radiopharmacists, a specialized medical physicist, and two gamma cameras—including West Africa's sole hybrid single-photon emission computer tomography/computer tomography (SPECT/CT) scanner. Furthermore, it was designed specifically to house two PET scanners and a cyclotron (not yet installed), and it recently enlarged from two to 10 isolation rooms for radionuclide therapy.

TABLE 1. COMPARISON OF NIGERIA’S CENTRES WITH THE CENTRE IN SOUTH AFRICA

|  |  |  |
| --- | --- | --- |
| Centre A | Centre B | iThemba Laboratory |
| 5 staff | 4 staff | 270 staff |
| 0 students | 0 students | 90 MSc & PhD students  15 postdoctoral |

The second center (B) has a double-head SPECT camera and two radiopharmacists as well as two NM physicians. In the last five years, NM services have been disrupted for indefinite periods of time for unknown reasons. As a result, opportunities to expand existing capacity, improve understanding of the benefits of NM, and invest in research and education to support its growth in Nigeria are desired.

* + - * Cost
* **Conclusion**

There have been no reports of NM radionuclides being used in terrorist actions. As a result, it's critical that the NM community reconsiders the existing approach, which has resulted in the loss of NM services in Nigeria, and recommends a more logical method for ensuring their supply (i.e., establishing an accelerator facility for the production of radioisotopes locally). Moreover, when applying global ideas in underdeveloped nations, there is need to also emphasize the importance of generating local pragmatic solutions.

References

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