Contribution ID: **7** Type: **Oral**

Training Needs Assessment for Transitioning from Cesium-137 to X-ray Blood Irradiators in African Countries

Abstract
Background
The transition from Cesium-137 (
Cs) gamma irradiators to non-isotopic X-ray
technology is a global security imperative to mitigate the risk of radiological
terrorism[1][15]. In the African context, this transition faces unique operational
challenges, including inconsistent electrical power supply, extreme climatic conditions,
and limited access to specialized technical support[3][6]. The prevention of TransfusionAssociated
Graft-Versus-Host
Disease
(TA-GvHD)
depends
critically on the
effective
and

uniform
irradiation of
blood
products.
Historically,
137
137
Cs irradiators have been the
standard due to their operational simplicity and independence from electrical
infrastructure. However, international security initiatives—including the Global Cesium
Security Initiative (GCSI)—now advocate for the replacement of high-activity radioactive
sources with alternative technologies such as X-ray irradiators to reduce security
vulnerabilities[1][15].
Objective
This study presents a comprehensive Training Needs Assessment (TNA) framework
designed to facilitate sustainable adoption of X-ray blood irradiators within African blood
banking facilities and healthcare systems.
Methods
A multi-layered TNA approach is proposed, targeting three distinct professional cohorts:
clinical laboratory operators, biomedical engineers and medical physicists, and radiation
protection officers with regulatory responsibilities[3][12]. The assessment framework
evaluates critical gaps across four domains: technical operation, infrastructure
management, clinical dosimetry, and radiation safety protocols. Data collection
instruments include quantitative skill-gap surveys, infrastructure audits, and semistructured
qualitative
interviews.
Results
Preliminary analysis reveals that while X-ray technology effectively reduces the security
burden associated with radioactive sources, it simultaneously increases technical
requirements for stable electrical infrastructure, specialized preventive maintenance
protocols, and enhanced cooling system management[1][2]. Training curricula must
transition from “static source management” principles to “dynamic electrical system
troubleshooting” competencies[2][15].
Conclusion
Successful technology transition requires a fundamental shift from vendor-dependent

maintenance models to locally sustainable capacity building within African healthcare systems[6][12]. This TNA framework serves as a strategic roadmap for ministries of health and international development partners to ensure continuous availability of safe, appropriately irradiated blood components in low-resource settings.

Primary authors: KOFI, Mostafa (Prince Sultan Military Medical City, Riyadh, Saudi Arabia); Mr MBOYO„ H. E. Gaspard Liyoko (African Commisssion on Nuclear Energy); Dr OMONDI, , Collins (AFCON); Prof. FI-ALA , Lamiaa (Professor of Public Health, FHE-UK, Princess Noura Bent Abdelrahman University, Riyadh, Saudi Arabia); Prof. HARIS , Jasson T. (Professor, School of Health Sciences, Associate Dean for Graduate Programs and Online Education, Director for the Center for Radiological and Nuclear Security (CRANS), Teaching Academy Fellow, Purdue University, United States of America)

Presenter: KOFI, Mostafa (Prince Sultan Military Medical City, Riyadh, Saudi Arabia)

Track Classification: Radiation and Health Physics