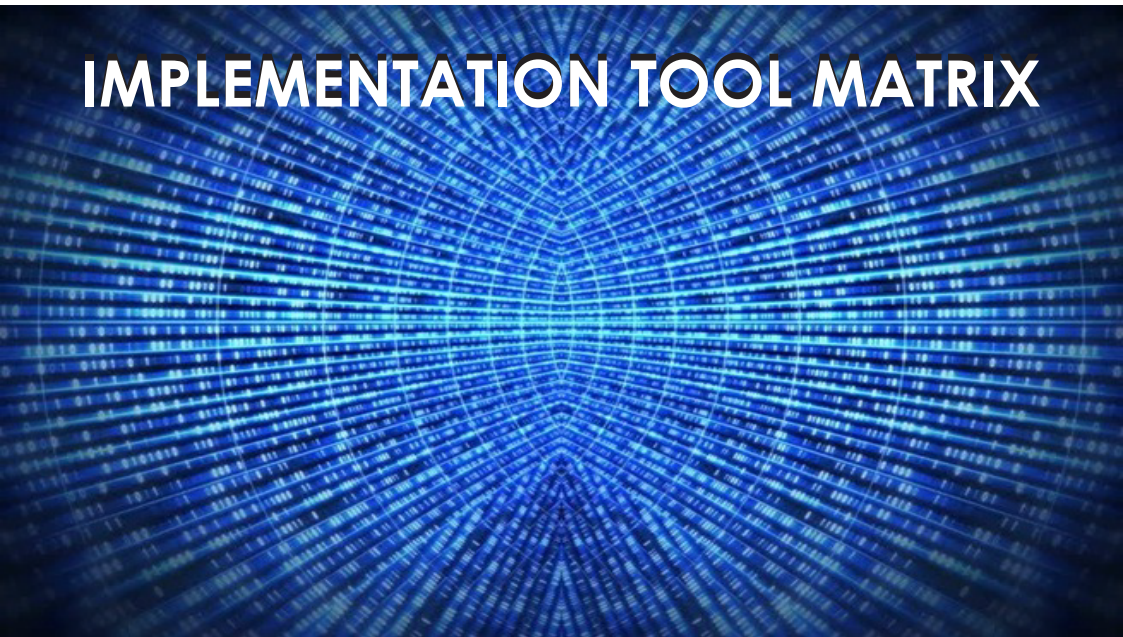




# AFROSAFE<sub>RAD</sub>

*Championing Radiation Safety*

## IMPLEMENTATION TOOL MATRIX



**2015 - 2018**



# IMPLEMENTATION TOOL MATRIX

2015 - 2018

## DEDICATION

To all the Radiation Health Workers in Africa

A fundamental concern for others in our individual and community lives would go a long way in making the world the better place we so passionately dreamt of.

***Nelson Mandela***

## TABLE OF CONTENTS

Dedication .....	i
Table of contents .....	ii
List of abbreviations .....	iii
Foreword .....	1
Preface .....	2
Acknowledgment .....	3
Background .....	4
Introduction .....	5
AFROSAFE <sub>RAD</sub> Declaration .....	6
AFROSAFE <sub>RAD</sub> Document and Implementation tool matrix.....	8
AFROSAFE <sub>RAD</sub> implementation tool strategic objective 1 .....	10
AFROSAFE <sub>RAD</sub> implementation tool strategic objective 2 .....	12
AFROSAFE <sub>RAD</sub> implementation tool strategic objective 3 .....	19
AFROSAFE <sub>RAD</sub> implementation tool strategic objective 4 .....	22
AFROSAFE <sub>RAD</sub> implementation tool strategic objective 5 .....	25
AFROSAFE <sub>RAD</sub> implementation tool strategic objective 6 .....	27
APPENDICES	
1. References .....	30
2. Signed copy of AFROSAFERAD Declaration .....	31
3. List of participating Institutions and professional bodies .....	32

## List of abbreviations

<b>ACR</b>	American College of Radiology
<b>AfSPI</b>	African Society of Paediatric Imaging
<b>ASR</b>	African Society of Radiology
<b>BSS</b>	Basic Safety Standards
<b>CBRN</b>	Chemical Biological Radiological and Nuclear
<b>CoE</b>	Centre of Excellence
<b>CME</b>	Continuous Medical Education
<b>DDIRM</b>	Department of Diagnostic Imaging and Radiation Medicine
<b>DRLs</b>	Diagnostic Reference levels
<b>EAARP</b>	East African Association of Radiation Protection
<b>ECA</b>	East and Central Africa
<b>ESR</b>	European Society of Radiology
<b>ECUREI</b>	Ernest Cook Ultrasound Research and Education Institute
<b>FAMPO</b>	Federation of African Medical Physics Organization
<b>IAEA</b>	International Atomic Energy Agency
<b>ICRP</b>	International Commission on Radiological Protection
<b>IOMP</b>	International Organization of Medical Physics
<b>IRPA</b>	International Radiation Protection Association
<b>ISR</b>	International Society of Radiology
<b>ISRRT</b>	International Society of Radiographers and Radiological Technologists
<b>JKUAT</b>	Jomo Kenyatta University of Agriculture and Technology
<b>KAR</b>	Kenya Association of Radiology
<b>KEBS</b>	Kenya Bureau of Standards
<b>KMTC</b>	Kenya Medical Training Institute
<b>KNEB</b>	Kenya Nuclear Electricity Board
<b>KNH</b>	Kenyatta National Hospital
<b>M &amp; E</b>	Monitoring and Evaluation
<b>MoH</b>	Ministry of Health
<b>NACOSTI</b>	National Council of Science and Technology
<b>PACORI</b>	Pan African Congress of Radiology and Imaging
<b>RASIMS</b>	Radiation Safety Information Management System
<b>RCR</b>	Royal College of Radiologists
<b>RPB</b>	Radiation Protection Board
<b>SORK</b>	Society of Radiography in Kenya
<b>UNSCEAR</b>	United Nations Scientific Committee on the Effects of Atomic Radiation
<b>UoN-CHS</b>	University of Nairobi, College of Health Sciences
<b>WFPI</b>	World Federation of Paediatric Imaging
<b>WHO</b>	World Health Organization

## Foreword

Among all the subjects that are fundamental to the practice of radiology, the most important is radiation safety. The authors of this booklet have set out to perpetuate what has been found wanting for many years. They need to be commended for their perspicacity in producing this invaluable aid towards first steps of radiation safety. In my 27 years working as a radiologist, I have often thought about why no one in Africa has taken the initiative to expand on the issues relating to radiation safety and in particular how to tackle the challenges in a manner that is easy to read and comprehend. The expectations of and the need for such guidelines are overwhelming. The objectives set out by AFROSAFE<sub>RAD</sub> and the stated strategic implementation tools are a first step for the radiation health worker and his fellow clinicians to monitor themselves and safeguard the general public by ensuring the use of radiation in medicine within Africa is beneficial. While these are just the first steps, the implementation of these tools is imperative and with determined country-specific AFROSAFE<sub>RAD</sub> teams, I feel assured that radiation safety will be enhanced.

On a subject so broad, decisions must be made as to omissions and inclusions. This booklet very concisely, but simply, covers all aspects of radiation safety applicable to users.

I extend my congratulations for this unique accomplishment to the editors, publishers and sponsors who have contributed towards the production and completion of this Implementation Matrix Tool booklet within the scope and purpose that it is meant to fulfill.

As President of African Society of Radiology, I feel proud that the continental initiative has started here in Kenya. I would like to see wide distribution of this publication beyond the borders of Kenya extending throughout Africa.

**Prof. Sudhir Vinayak**  
**President, African Society of Radiology (ASR)**  
**2015**

## Preface

AFROSAFE<sub>RAD</sub> is a campaign made by radiation health workers to unite and address safety issues that arise from the use of radiation in medicine in Africa. This campaign is based on the Joint position statement by the IAEA and WHO known as the Bonn Call-for-action.

The AFROSAFE<sub>RAD</sub> campaign was launched at the 8th Biennial Pan African Congress of Radiology and Imaging (PACORI) in Feb 2015 at Nairobi, Kenya. Present in this meeting were radiologists, radiographers, medical physicists, radio-oncologists, equipment manufacturers as well as international representatives and dignitaries from WHO, IAEA, ICRP, ECR, WFPI, RAD-AID and Image Gently. Professional bodies present included ASR, ISRRT and FAMPO. The campaign extends to involve patient lobby groups.

In this campaign we declare that we shall encourage adherence to standards, policies, strategies and activities for the promotion of radiation safety and for maximization of benefits from radiological medical procedures

Africa is unique in that we have not yet established national and/or institutional diagnostic reference levels (DRLs) which are important for optimization of radiation in medicine. Another major challenge is that medical physicists who are important in maintaining quality assurance of the radiation equipment are not incorporated into the medical health systems. Furthermore there is inadequate research on issues related to radiation use in Africa.

The interim steering committee for AFROSAFE<sub>RAD</sub> appointed during the February, 2015 PACORI congress and ratified during the ASR 2015 conference has developed the AFROSAFE<sub>RAD</sub> document and implementation tool matrix that countries in Africa can use as a template to develop their own radiation safety programs and timelines.

The AFROSAFE<sub>RAD</sub> Implementation Matrix Tool booklet gives an outline of the various activities that will guide all the African countries towards the successful delivery of this campaign. We anticipate that through AFROSAFE<sub>RAD</sub>, we shall ensure that the benefits outweigh the risks for all medical radiation exposures in Africa.

**Dr. Rose Nyabanda**

**AFROSAFE<sub>RAD</sub> steering committee member and Kenyan Champion  
PACORI president  
2013-2015**



## Acknowledgments

I would like to sincerely acknowledge with deep gratitude all those who participated in the process that led to the AFROSAFE<sub>RAD</sub> Campaign and the development of the Implementation Tool Matrix. Space may not allow mentioning each of you individually but your contributions and expertise greatly assisted in making this booklet possible.

I particularly want to thank the following for their invaluable contributions towards this book. Dr. Nicholas Muraguri -Director Medical Services, Dr Rose Nyabanda- AFROSAFE<sub>RAD</sub> Kenyan champion, Prof Michael Kawooya- ECUREI, Dr. Jessica Wambani –Chief Radiologist KNH, Mr. Joe Kamande –RPB, CBRN, Mr. Arthur Koteng –RPB, Dr. Laban Thiga- MoH, Dr. David Otwoma- NACOSTI, Mr. Luke Kanamu –KMTC, Dr. Veronica Manduku- chair KAR and Mr. Kenneth Kariuki- president SORK.

In addition, I would like to thank the AFROSAFE steering committee who participated in several roundtable meetings in order to bring this book to reality. They include Dr. Patricia Othieno, Mr. Antony Mamati, Mrs. Margaret Njuwe, Ms Catherine Muchuki, Mrs. Veronica Njagi, Mr. Caesar Barare, Mr. Felix Wanjala and Mr. Collins Omondi-KEBS.

The AFROSAFE<sub>RAD</sub> steering committee would like to pay special tribute to the various stakeholders for their participation and ownership of this process. These include MoH, KNH, UoN-CHS, PACORI, RPB, CBRN, KAR, SORK, ASR, ISRRT, EAARP, NACOSTI, KEBS, KNEB, Medical Imaging Sciences Department –KMTC and JKUAT.

I would also like to thank the affiliates, partners and friends of AFROSAFE<sub>RAD</sub> for their invaluable contribution, advice and support. These includes WHO, IAEA, ISR, ISRRT, ESR, Euro Safe, IRPA, ICRP, Image Gently, RAD-AID, IOMP and WFPI.

It would not have been possible to print this book without the financial support of our sponsors. In this regard, I would like to thank Philips East Africa, Meditec Systems Ltd, GE Healthcare, Bayer Health care, Colour International Ltd for their generous contributions.

**Dr. Gladys Mwangi**  
**AFROSAFE<sub>RAD</sub> steering committee chair**  
**PACORI general secretary 2015-2017**

## Background

The use of radiation in medicine has led to major improvements in the diagnosis and treatment of human diseases. Annually, worldwide, more than 3,600 million X-ray examinations are performed, 37 million nuclear medicine procedures are carried out, and 7.5 million radiotherapy treatments are given<sup>1</sup>. As the benefits for patients gain recognition, the use of radiation in medicine increases.

The effects of radiation risks are probabilistic in nature. According to the American Cancer Society, lack of scientific data makes it difficult to determine a precise risk of cancer in the future from radiation exposure today, but the increase in the cancer incidence rate is estimated to about 0.17 percent per rem of radiation dose based on the effects observed with high doses. It is impossible to say with certainty that any single person will acquire a radiation-induced cancer<sup>2</sup>. Therefore, in all imaging methods using X-radiations, the equipment operator must adjust the characteristics of the X-ray beam to optimize the critical balance between image quality and exposure to the patient.

The AFROSAFE<sub>RAD</sub> campaign aims to raise awareness on the need of radiation safety in medicine to prevent unnecessary medical radiation exposures. The campaign will educate the African populace on the essential role of radiology and medical imaging in the provision of quality healthcare and the high educational and professional standards required of all staff working in radiology and medical imaging. This will be achieved through well strategized programs through the deliberate usage of the AFROSAFE<sub>RAD</sub> operation matrix outlined in this book.

**Mr. Luke G. Kanamu**  
**AFROSAFE<sub>RAD</sub> steering committee member**

## INTRODUCTION

Traditionally it is the role of regulatory authorities to focus on the safety of the working environment. This is achieved through legal means that ensure radiological facilities meet expected safety and performance standards. An operational radiological facility is required to appoint a qualified radiation safety officer (RSO) who must ensure that all radiation workers are monitored for radiation exposure, while patients undergoing radiological examinations receive the lowest possible dose area product (DAP) in the region of interest (ROI). Furthermore, the RSO must also endeavour to ensure that this radiation exposure is kept at a minimum through various techniques such as dose distribution, regular quality control checks and continuous professional development. The type of radiological equipment also plays a significant role in radiological protection and safety. There has been an evolution of radiological equipment from hand-held fluoroscopic medical imaging units which carried a significant risk of radiation injuries to radiation health workers and patients to digital units which allow dose reduction, image optimization, recording and computing of radiation dose to the patient.

Modern and advanced radiological imaging equipment such as the multidetector CT scan, interventional radiological procedures and cardiac catheterization expose patients to high doses of radiation. While this is much appreciated within the medical fraternity, the IAEA and WHO are concerned about the high doses to patients. There has been found a need therefore, to carry out studies to develop Diagnostic Reference Levels (DRLs) for the various medical radiological procedures. The development of institutional and national DRLs will form a major milestone in medical radiation protection. The first level of patient protection is the Justification of the examination by the prescribing practitioner and Optimization of medical images by the radiation health worker. Developed DRLs form baseline exposure level data and enable further reduction of radiation dose levels as well as comparison between institutions and countries.

AFROSAFE<sub>RAD</sub> endeavours to encourage self regulation by medical professionals in radiology through promoting a radiation safety culture and creating radiation safety awareness in patients and the public.

**J. K. Kamande, OGW**

**Head, ECA CBRN- CoE Secretariat**

**AND SECRETARY, KENYA RADIATION PROTECTION BOARD**

---

**AFROSAFE<sub>RAD</sub> DECLARATION (17th FEBRUARY 2015)****Preamble**

In the past few decades, use of radiation for diagnosis and treatment of human diseases has expanded enormously worldwide. Modern technologies have made new applications safer but their inappropriate use can lead to unnecessary or unintended radiation exposures and risks. The era of helical multi-detector CT has revolutionized imaging. CT Image acquisition has become amazingly faster, with images of superb resolution and detail acquired within a few seconds. This high image quality has attracted more CT requisitions from referrers. This increased demand has been associated with more inappropriate imaging and frequency of complications like skin injuries<sup>3</sup>. Furthermore, the imaging protocols are not standardized, and often there are no child-friendly protocols albeit the higher sensitivity of pediatric tissues to radiation. Consequently, medical radiation exposures are now the largest contributor to the exposure of the population to radiation from artificial sources (95%), only exceeded worldwide by natural background as a source of exposure.

For Africa, radiation safety is an emerging but important health challenge. Some causes of inappropriate imaging are peculiar to Africa whereas others are similar to those in other continents.

All over the world, there has been a rallying call for radiation health workers to adhere to the principles of radiation protection and radiation safety. This has led to numerous successful campaigns such as Image Gently and Image Wisely in the USA. In 2012, during a conference on Radiation Safety by WHO and IAEA, the Bonn Call for Action was launched<sup>4</sup>. This was followed by the launch of EuroSafe by the European Congress of Radiology in 2014<sup>5</sup>. Africa cannot afford to be left behind and this year, AFROSAFE was launched at the 8<sup>th</sup> biennial Pan African Congress of Radiology and Imaging (PACORI) on 17<sup>th</sup> February 2015<sup>6</sup>.

Thus, AFROSAFE is a campaign made by radiation health workers in Africa for Africa. Through this Campaign we unite with a common goal to identify and address issues arising from radiation protection in medicine in Africa and we shall promote adherence to policies, strategies and activities for the promotion of radiation safety and for maximization of benefits from radiological medical procedures.

The following is the declaration that Radiation Health Workers in Africa committed to adhere to on 17<sup>th</sup> February 2015.

### **AFROSAFE DECLARATION**

We, the radiation health workers of Africa declare that we shall, through the creation of the AFROSAFE<sub>RAD</sub> campaign, promote the safe and beneficial use of radiation through the following actions:

1. Ensuring that benefits outweigh risks in all radiological medical procedures
2. Fostering regular radiation dose monitoring, recording and reporting
3. Campaign for the establishment and implementation of regulations to standardize the practice of radiation health workers
4. Promote and assist in the development of policies, guidelines and appropriate criteria for the safe use of radiation in health care at all levels
5. Advise and advocate for the establishment of procurement procedures of radiological equipment as per national guidelines
6. Promote and assist in the conducting of regular professional development and training on radiation safety
7. Advocate for the creation of public awareness on radiation safety
8. Lobby for research funding in radiation safety
9. Stimulate and uphold the development of a radiation safety culture in health care settings

*(Signed copy of actual declaration is found in the appendix)*

## AFROSAFE<sub>RAD</sub> DOCUMENT AND IMPLEMENTATION TOOL MATRIX

AFROSAFE<sub>RAD</sub> is a campaign made by radiation health workers in Africa.

Its main objective is to unite with a common goal to identify and address issues arising from radiation protection in medicine in Africa

The genesis of this campaign is the Joint position statement by the IAEA and WHO known as the Bonn Call-for-action which was inaugurated in December 2012.

### **Aim/ Goal of AFROSAFERAD**

Through this Campaign we state that we shall promote adherence to policies, strategies and activities for the promotion of radiation safety and for maximization of benefits from radiological medical procedures

### **VISION**

All radiation-based medical procedures in Africa are beneficial.

### **MISSION STATEMENT**

To ensure that the benefits outweigh the risks for all medical radiation exposures in Africa

### **SWOT ANALYSIS**

#### Challenges of radiation safety in Africa

1. Inadequate / Lack of adherence to institutional clinical practice guidelines
2. Minimal funding and engagement in radiological research
3. Lack of policies and regulation in the training and practice of radiation medicine profession.
4. Inadequate awareness of the radiology safety policies
5. Non-adherence to laid-down procedures for procurement, maintenance, decommissioning and disposal of radiology equipment.

#### Strengths

1. Available training institution
2. Established professional bodies
3. Radiation-monitoring of workers, public and environment
4. Existing regional and international linkages ; Chemical, biological, radiological and nuclear center (CBRN), WHO, IAEA

### Weaknesses

1. Inadequate knowledge, poor attitude and practice in radiation safety
2. Financial constraints for quality assurance programs
3. Inequitable distribution of radiation facilities and skilled personnel
4. Absence of regulatory bodies in some countries.
5. Lack of guidelines and imaging appropriateness criteria.

### Opportunities

1. Existing linkages and collaborations with international bodies and radiological societies
2. Networking within Africa
3. Similar campaigns and interventions in other parts of the world like EuroSafe, Image Gently
4. Emerging economies

### Threats

1. Political instability and insecurity
2. Rapid increase in population growth, increase in disease burden and emerging diseases.

## AFROSAFE IMPLEMENTATION TOOL Strategic Objective 1

<b>Main Objective: 1</b>	<b>To strengthen the overall radiation protection of patients, health workers and public</b>	
<b>Specific objectives</b>	<ul style="list-style-type: none"> <li>a) Enhance quality assurance programs in medical exposures</li> <li>b) Promote national registries of all radiation health workers, their annual cumulative doses and the radiation-emitting equipment</li> <li>c) Standardize radiation monitoring of workers and radiological facilities</li> <li>d) Promote regular monitoring and documentation of radiation sources by the institutions and submission to regulatory bodies</li> </ul>	
<b>Goal</b>	To ensure that all medical exposures are documented and are within the International Basic safety requirements	
<b>Reference clause</b>	Bonn call 8 and 10	
<b>Performance Measures/indicators</b>	<p>Number of quality assurance programs in medical exposures</p> <p>Number of countries with updated national registries of all radiation health workers, their annual cumulative dose and radiation-emitted equipment</p>	
<b>Background/ methodology</b>	<p>The regulatory bodies to develop a data base for all radiation health workers, their annual cumulative doses, and radiation emitting equipment</p> <p>Conduct sensitization seminars/workshops for all radiation workers</p>	
<b>Activities and timeline</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Develop QA programs in medical exposure	6-12 months
	Develop and update data base for all radiation health workers, their annual cumulative doses, and radiation emitting equipment	continuous
	Conduct sensitization seminars/workshops for all radiation workers	Periodic



<b>Resources Required:</b>	Human resource Funded budget
<b>Lead Organization:</b>	Regulatory bodies, health institutions
<b>Anticipated Result:</b>	Data base of all radiation health workers, their annual cumulative doses, and radiation emitting equipment
<b>Key partners</b>	Government agencies, WHO, IAEA, ISR, ISRRT, FAMPO
<b>Alignment:</b>	Relevant government / sectoral plans Bonn-call for action 8 and 10 AFROSAFE declaration 1, 2, 3 and 6

## AFROSAFE IMPLEMENTATION TOOL Strategic Objective 2

<b>Main Objective: 2</b>	<b>Safe and appropriate use of ionizing radiation in medicine</b>	
<b>Specific objective a)</b>	Develop policy guidelines on the safe use of radiation from the community to the national level.	
<b>Goal:</b>	Policy available	
<b>Reference clause:</b>	Bonn call 1, 2, 4, 8 , New International Basic Safety Standards (NEW BSS)	
<b>Performance Measures/ indicators:</b>	Policy documents on safe use of ionizing radiation	
<b>Background/ methodology:</b>	Create awareness for use of evidence-based referral guidelines (RG), avail RG and use the RG e.g the ISR guidelines. Adapt and adopt the international guidelines e.g. the guidelines on pediatric imaging.	
<b>Activities and timeline:</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Lobby for policy on safe and appropriate use of radiation.	2 months
	Hold stakeholders meetings to deliberate on priority areas and create awareness	periodic
	Development of guidelines where none are available	8 months
	Adoption and dissemination through associations	2 months
<b>Resources Required:</b>	Meeting logistics Human resource Already published Evidence-based standards and guidelines	
<b>Lead Organizations:</b>	ASR, ISRRT bodies.	
<b>Other organizations:</b>	AfSPI, National Health authorities, biomedical engineers, national health authorities (Ministries of health), regulatory bodies	
<b>Anticipated Result:</b>	Documents and endorsed guidelines.	
<b>Key partners:</b>	WHO, IAEA, ISR, ISRRT	

<b>Alignment:</b>	Relevant government / sectoral plans, NEW BSS Bonn-call for action 1, 2, 4, 8 AFROSAFE declaration 1, 3, 4 and 9
-------------------	---

<b>Main Objective: 2</b>	<b>Safe and appropriate use of ionizing radiation in medicine</b>	
<b>Specific objective b)</b>	To develop regulations to standardize the practice of all radiation workers	
<b>Goal</b>	Regulatory framework in place	
<b>Reference clause</b>	Bonn call for action 8	
<b>Performance Measures/ indicators:</b>	Regulatory framework in place. Number of Actual standards/ Codes developed Number of dissemination forums Level of awareness (survey report)	
<b>Background/ methodology:</b>	All relevant professional bodies to develop/review their codes of practice/conduct Work with national ethics and integrity institutions to review the codes. Create awareness through focused campaigns in all regions.	
<b>Activities and timeline:</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Advocate and develop regulations for standardizing radiation workers' practice	2 months
	Review any codes that are available	4 months
	Launch the codes	1 months
	Awareness campaign	12 months
	Monitoring and evaluation	periodic
<b>Resources Required:</b>	Meeting logistics Consultancy	
<b>Lead Organization:</b>	Professional bodies ASR,FAMPO, ISRRT, AfSPI,	
<b>Other relevant institutions:</b>	Ministry of Health, national regulatory authorities	
<b>Anticipated Result:</b>	Codes of practice in place and adopted	

<b>Key partners:</b>	WHO, IAEA, ISR, ISRTT
<b>Alignment:</b>	BONN CALL-FOR-ACTION 8 AFROSAFE DECLARATION 1, 3, 4 and 9

<b>Main Objective: 2</b>	<b>Safe and appropriate use of ionizing radiation in medicine</b>	
<b>Specific objective c)</b>	to develop and apply evidence-based imaging referral guidelines and appropriateness criteria	
<b>Goal</b>	Use of evidence-based appropriateness criteria and referral guidelines.	
<b>Reference clause</b>	Bonn call for action 1, new BSS	
<b>Performance Measures/indicators:</b>	Proportion of health facilities having imaging referral guidelines (RG) Proportion of health facilities using RG	
<b>Background/ methodology:</b>	Prioritize, Create awareness, adopt and adapt available evidence-based referral guidelines, promote and facilitate availability of guidelines in health facilities, promote their application, encourage and facilitate research on impact of guidelines on clinician's referral practice.	
<b>Activities and timeline:</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Create awareness of guidelines to all medical professionals	6 months
	Assist to disseminate and avail already existing evidence-based referral guidelines like the ISR, RCR, Diagnostic Imaging Pathways, ACR, and work with professional societies to adapt where necessary.	6 months
	Work with national professional societies and other institutions to Educate membership and other clinicians on the guidelines.	continuous
	Monitoring and evaluation for uptake, application, and impact of guidelines on referral practice.	periodic

<b>Resources Required:</b>	Meeting logistics Consultancy Workshops CMES Trainings Available published evidence-based referral guidelines.
<b>Lead Organization:</b>	ASR, ISRR
<b>Other organizations:</b>	AfSPI, National Health authorities, biomedical engineers, national health authorities (Ministries of health), regulatory bodies
<b>Anticipated Result:</b>	Referral guidelines in place and adopted Increase of proportion of appropriate referrals Reduction of proportion of inappropriate referrals.
<b>Key partners:</b>	Professional bodies, training institutions, Universities, Hospitals, Ministry of Health, regulatory authorities
<b>Alignment:</b>	AFROSAFE DECLARATION 1, 3, 4 and 9

<b>Main Objective: 2</b>	<b>Safe and appropriate use of ionizing radiation in medicine</b>	
<b>Specific objective d)</b>	To incorporate radiation safety modules into medical curricula	
<b>Goal:</b>	Radiation safety modules developed and incorporated	
<b>Reference clause:</b>	Bonn call for action	
<b>Performance Measures/indicators:</b>	Number of relevant medical curricula with incorporated radiation safety modules Total number of hours on radiation safety modules in the curriculum	
<b>Background/ methodology:</b>	Needs assessment Develop guidelines on radiation safety modules	
<b>Activities and timeline:</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Review and analysis	4 months
	Meeting to agree on scope of modules and content	6 months

	Develop the actual modules	12 months
	Incorporation into curricula	24 months
<b>Resources Required:</b>	Meeting logistics Stationery, internet and binding Consultancy Workshops CMES	
<b>Lead Organization:</b>	Training institutions, Universities, Teaching Hospitals	
<b>Other organizations</b>	ASR, ISRRT, AFSPI, National Health authorities, biomedical engineers, national health authorities (Ministries of health), regulatory bodies	
<b>Anticipated Result:</b>	Knowledgeable professional utilizing radiation safely, promotion of safety culture.	
<b>Key partners:</b>	Education Ministry, WHO, IAEA, ESR, image gently	
<b>Alignment:</b>	BONN-CALL FOR ACTION 1, 2, 4, 8 AFROSAFE DECLARATION 1, 3, 4 and 9	

<b>Main Objective: 2</b>	<b>Safe and appropriate use of ionizing radiation in medicine</b>	
<b>Specific objective e)</b>	Continuous professional development in radiation safety	
<b>Goal</b>	Updated Knowledge on radiation safety	
<b>Reference clause</b>	Bonn call for action	
<b>Performance Measures/indicators:</b>	Number of radiation safety seminars Number of professionals attending seminars on radiation safety	
<b>Background/ methodology :</b>	Develop and recommend short-courses on radiation safety Conduct accredited CPD activities on radiation safety	
<b>Activities and timeline:</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Advocacy through professional bodies/ Regulatory bodies	Continuous
	Stakeholders meeting to develop scope and content of the modules	6 months
		24 months

<b>Resources Required:</b>	Meeting logistics Workshops CMES
<b>Lead Organization:</b>	Professional bodies: ASR, ISRRRT, AfSPI, National Health authorities, biomedical engineers, national health authorities (Ministries of health), regulatory bodies
<b>Anticipated Result:</b>	Best practices on radiation safety
<b>Key partners:</b>	Regulatory and accreditation bodies
<b>Alignment:</b>	BONN-CALL FOR ACTION 1, 2, 4, 8 AFROSAFE DECLARATION 1, 3, 4 and 9

<b>Main Objective: 2</b>	<b>Safe and appropriate use of ionizing radiation in medicine</b>	
<b>Specific objective f)</b>	To recognize the role of medical physicists in healthcare	
<b>Goal</b>	Established scheme of service for medical physicists in healthcare	
<b>Reference clause</b>	Bonn call of action	
<b>Performance Measures/indicators:</b>	Number of countries with adopted schemes of service	
<b>Background/ methodology:</b>	Lobby governments to recognize the role of medical physicists Develop and adopt schemes of service	
<b>Activities and timeline:</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Advocacy through professional bodies/ Regulatory bodies	6 months
	Stakeholders meeting to develop a policy	6 months
	Develop and recommend schemes of service through relevant institutions	12 months
	M&E	periodic
<b>Resources Required:</b>	Meeting logistics Workshops CMEs	

<b>Lead Organization:</b>	FAMPO
<b>Anticipated Result:</b>	Schemes of service in place
<b>Key partners:</b>	Ministry of health, Health institutions
<b>Alignment:</b>	Bonn-call for action 1, 2, 4, 8 AFROSAFE declaration 1, 3, 4 and 9



## AFROSAFE IMPLEMENTATION TOOL Strategic Objective 3

<b>Main objective: 3</b>	<b>Enhance global information and help improve the benefit/risk dialogue with patients and the public</b>	
<b>Specific objectives a and b:</b>	a) Improve data collection on medical exposures through local and national periodic surveys b) Regular reporting of radiation dose analyses in publications, seminars and conferences	
<b>Goal:</b>	Encourage documentation of radiation doses Disseminate radiation dose analyses through publications and conferences	
<b>Reference clause:</b>	Bonn call for action item 6 and 9	
<b>Performance measures/indicators:</b>	1. Number of institutions that have developed DRLs 2. Number of forums to Disseminate information on radiation dose analyses 3. Number of published documents on radiation safety available to the patients and general public	
<b>Background / methodology:</b>	1. Periodic local and national surveys of all institutions for compliance tracking 2. Develop dissemination platform 3. Publish developed DRLs	
<b>Activities and timeline:</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Periodic local and national surveys of all institutions for compliance trackin	Every 3-6 months
	Develop dissemination platform	On-going
	Publish developed DRLs	periodic
<b>Resource required:</b>	Human resource Funded budget ICT platform	
<b>Lead organization :</b>	Professional societies, bodies, regulatory bodies and relevant government agencies	
<b>Other organizations:</b>	Regulatory bodies and relevant government agencies	
<b>Anticipated results:</b>	Increase in the number of compliant institutions Varied dissemination forums Publications on DRLs	

<b>Key partners:</b>	IAEA, WHO, Government agencies, regulatory bodies
<b>Alignment:</b>	BONN CALL FOR ACTION 6, 9 and health policies in host countries AFROSAFE DECLARATION 2 and 7

<b>Main objective: 3</b>	<b>Enhance global information and help improve the benefit/risk dialogue with patients and the public</b>
<b>Specific objective c &amp; d:</b>	<p>c) To create Awareness of radiation benefits and risks through public lectures, print and electronic media</p> <p>d) Improve communication skills of health professionals and support benefit/risk dialogue between referring and radiological medical practitioners and between these two groups and the patients and public)</p> <p>e) Engage public and patients in benefit/risk dialogue through Patient-for-Patient Safety organizations</p>
<b>Goal:</b>	To develop systems and tools that foster benefit – risk dialogue with patients and the public
<b>Reference clause:</b>	Bonn call for action item 6 and 9
<b>Performance measures/indicators:</b>	<ol style="list-style-type: none"> <li>1) Number of forums to Disseminate information on benefit-risk.</li> <li>2) Frequency of consultations on benefit and risk between referring and radiological practitioners</li> <li>3) Frequency of engagements between referrers, radiological practitioners and public/patient for patient safety initiatives.</li> <li>4) Level of behavioural change</li> </ol>
<b>Background / methodology:</b>	<ol style="list-style-type: none"> <li>1. Adapt and adopt WHO,I CRP, IAEA, ESR, Image gently publications on benefit-risk of patients and the public</li> <li>2. Develop a communication strategy on radiation benefit-risk</li> <li>3. To carry out capacity building forums on radiation benefits communication</li> </ol>

	<p>4. To carry out focussed awareness campaigns to the patients and public on benefit /risk of radiation use in healthcare.</p> <p>5. Benchmark with existing benefit-risk practices</p>	
<b>Activities and timeline:</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Adapt and adopt existing publications, and develop communication strategies on benefit risk communication	6-12 months
	Develop a tool for assessing behavioural change	6 months
	Capacity building forums on radiation benefits communication	continuous
	Conduct harmonized dissemination of information on radiation safety	continuous
	Benchmark with existing benefit-risk practices	periodic
<b>Resource required:</b>	Human resource Funded budget	
<b>Lead organisation:</b>	Professional bodies, regulatory bodies and relevant government agencies, patient for patient safety initiatives	
<b>Anticipated results:</b>	<p>1. Published and available promotional / awareness materials</p> <p>2. Behavioural change towards radiation safety</p> <p>3. Increased public awareness on radiation safety</p>	
<b>Key partners:</b>	IAEA, WHO, Government agencies, regulatory bodies and patient-interest groups	
<b>Alignment:</b>	Bonn call for action 6, 9 and health policies in host countries AFROSAFE declaration 2, 6 and 7	

## AFROSAFE IMPLEMENTATION TOOL Strategic Objective 4

<b>Main Objective: 4</b>	<b>To enhance the safety and quality of radiological procedures in medicine</b>
<b>Specific objective</b>	<ul style="list-style-type: none"> <li>a) Correlate image quality to clinical-specific facility protocols</li> <li>b) Establish and update diagnostic reference levels (DRLs) for adults and children</li> <li>c) Document patients' radiation doses in all procedures in order to develop dose data (radiation dose tracking)</li> <li>d) Implement regular audit of imaging techniques and treatment procedures</li> <li>e) Institute emergency preparedness measures</li> </ul>
<b>Goal</b>	<p>To ensure that all radiological procedures and examinations are justified and optimized</p> <p>Developed protocol-auditing program</p> <p>Developed dose reference levels for all diagnostic and therapeutic procedures</p> <p>Available protocols for radiation-related emergencies</p>
<b>Reference clause</b>	Bonn Call for Action 2
<b>Performance Measures/indicators:</b>	<ul style="list-style-type: none"> <li>Number of facilities using developed clinical specific protocols</li> <li>Number of countries with national DRLs for adult and pediatric examinations</li> <li>Reliable records of patient doses</li> <li>Evidence of scheduled audits</li> <li>Protocols on emergency preparedness</li> </ul>
<b>Background/ methodology:</b>	<ul style="list-style-type: none"> <li>Professional bodies to develop guidelines on clinical protocols</li> <li>Facilities to develop clinical specific protocols</li> <li>Adapt and adopt standards for image quality analysis which are protocol specific</li> <li>Develop a schedule for regular audits</li> <li>Recording of radiation dose for each examination</li> <li>Analysis of the radiation doses and comparison with guidelines from other countries</li> <li>Instituting measures to reduce radiation dose where necessary</li> </ul>

	Develop protocols for radiation-related emergencies	
<b>Activities and timeline</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Professional bodies to develop guidelines on clinical protocols	12 months
	Facilities to develop clinical specific protocols	12 Months
	Adapt and adopt standards for image quality analysis which are protocol specific	12 Months
	Develop a schedule for regular audits	12-18 months
	Maintain a record of patient doses for each procedure or examination	continuous
	Analysis of the radiation doses and comparison with guidelines from other countries	periodically
	Instituting measures to reduce radiation dose where necessary	continuous
	Develop protocols for radiation-related emergencies	12 months
<b>Resources Required:</b>	Human resource Funded budgets ICT platform	
<b>Lead Organization:</b>	Professional bodies Regulatory bodies , National Health Authorities, research and training institutions, FAMPO, ASR, fSPI, ISRRT	
<b>Anticipated Result:</b>	Clinical specific protocols developed National DRLs Record of patient doses Register of scheduled audits Decline in Image-reject analysis values	
<b>Key partners:</b>	IAEA, WHO, regulatory bodies , training institutions, friends of AFROSAFE	
<b>Alignment:</b>	Bonn call for Action 2 AFROSAFE DECLARATION 1, 2, 3, 4 and 9	

<b>Main Objective: 4</b>	<b>To enhance the safety and quality of radiological procedures in medicine</b>	
<b>Specific objective</b>	a) Establish a reporting mechanism of incidents and accidents in radiation protection	
<b>Goal</b>	To ensure that all incidents and accidents are reported	
<b>Reference clause</b>	Bonn Call for Action 7	
<b>Performance Measures/indicators:</b>	Record of incidents and accidents in radiation protection Reports made to RASIMS on incidents/accidents	
<b>Background/ methodology :</b>	Keep a register of incidents and accidents in radiation protection	
<b>Activities and timelines</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Keep a register of incidents and accidents in radiation protection	Continuous
<b>Resources Required:</b>	Human resource ICT platform	
<b>Lead Organization:</b>	Health Facilities,	
<b>Other organizations:</b>	Regulatory authorities, , ASR, ISRRT, FAMPO , AfSPI,	
<b>Anticipated Result:</b>	Updated National Registry of incidents and accidents in radiation protection	
<b>Key partners:</b>	IAEA, WHO, ESR, WFPI, RAD-AID.ORG, ICRP, Image Gently, UNSCEAR, IOMP, IRPA, training institutions, friends of AFROSAFE	
<b>Alignment:</b>	Bonn call for Action 7 AFROSAFE declaration 9	

## AFROSAFE IMPLEMENTATION TOOL Strategic Objective 5

<b>Main Objective: 5</b>	<b>To encourage safety in diagnostic and therapeutic equipment and facilities</b>	
<b>Specific objectives</b>	<ul style="list-style-type: none"> <li>a) Advocate for procurement procedures as per national regulation</li> <li>b) Regular maintenance and calibration of equipment</li> <li>c) Promote radiation safety in facility layout</li> <li>d) Ensure safety features in radiation equipment</li> </ul>	
<b>Goal</b>	To ensure that the radiological facilities and equipment adhere to radiation safety standards	
<b>Reference clause</b>	Bonn Call for Action 3, 8 and 10	
<b>Performance Measures/indicators:</b>	<p>Published templates on procurement Developed Procedures for calibration and maintenance of equipment Number of radiological facilities and equipment that meet radiation safety standards Number of radiation equipment with safety features in each facility</p>	
<b>Background/ methodology :</b>	<p>Procurement cycle involves process of writing specifications, purchase, installation, commissioning and maintenance, decommissioning and boarding off. Safety must be a priority throughout the entire cycle. All stakeholders including medical physicists should be involved in ensuring a safety-responsive procurement cycle and in the development and implementation of QA/QC programs for diagnostic and therapeutic radiation medicine procedures.</p>	
<b>Activities and timeline</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	To advocate for the implementation of procurement procedures	Continuous
	To develop procedures for calibration and maintenance of equipment	One year
	To document radiological facilities and equipment that meet radiation safety standards	continuous
	Monitoring and evaluation	periodic

<b>Resources Required:</b>	Human resource Funds
<b>Lead Organization:</b>	FAMPO
<b>Other organizations</b>	ASR, ISRRT , AfSPI, National Health authorities, biomedical engineers, regulatory bodies
<b>Anticipated Result:</b>	Report on QUALITY CONTROL in diagnostic and therapeutic procedures
<b>Key partners</b>	Health facilities, radiation regulatory bodies, standards bodies, professional bodies
<b>Alignment:</b>	Bonn call for action 3, 8 and 10 AFROSAFE declaration 1 and 5



## AFROSAFE IMPLEMENTATION TOOL Strategic Objective 6

<b>Main Objective: 6</b>	<b>Promote research in radiation protection and safety</b>	
<b>Specific objective</b>	<ol style="list-style-type: none"> <li>1. Prioritize research in radiation safety at national and institutional level</li> <li>2. Participate in the development of global and regional strategic research agendas on radiation safety in medicine</li> </ol>	
<b>Goal</b>	To promote research that addresses continental radiation safety needs and challenges	
<b>Reference clause</b>	Bonn-call-for-action 5	
<b>Performance - Measures/indicators:</b>	Safety-responsive national, regional and continental research agendas - Number of on-going research (short term) - Number of published articles (long term)	
<b>Background/ methodology :</b>	- Needs assessment on radiation safety - Develop a database of participating institutions (training, research, hospitals)	
<b>Activities and timeline</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Needs assessment; survey of leading/ participating institutions	12 months
	Capacity building in radiation safety issues and research proposal development	periodic
	Develop a dissemination platform (newsletter, journal, website etc)	12 months
	Lobby for protected time for research from Employers	continuous
	Conduct regular team meetings for status report	continuous
<b>Resources Required:</b>	Funds for needs assessment, capacity- building workshop and developing dissemination fora	
<b>Lead Organization:</b>	Training institutions: universities and colleges, research and health institutions	
<b>Other organizations</b>	ASR, FAMPO, AfSPI, ISRRT	

<b>Anticipated Result:</b>	National DRLs, Published research in peer-reviewed journals/ newsletters Dissemination of research findings in different forums
<b>Key partners</b>	WHO, IAEA, WFPI, EuroSafe, ESR, ISR, ISRRT, IOMP, Image Gently, IRPA, ICRP
<b>Alignment:</b>	Bonn-call-for action 5 AFROSAFE declaration 6 and 8

## AFROSAFE IMPLEMENTATION TOOL

<b>Main Objective: 6</b>	<b>Promote research in radiation protection and safety</b>	
<b>Specific objective</b>	Lobby for increased research funding in radiation safety	
<b>Goal</b>	Funded research	
<b>Reference clause</b>	Bonn-call-for action 5	
<b>Performance Measures/indicators:</b>	Numbers of funded research Number of funded workshops/conferences on radiation safety Number of grants in radiation safety	
<b>Background/ methodology :</b>	Facilitate researchers in acquisition of research funds through lobbying for research funding from partners, collaborators and friends of AFROSAFE	
<b>Activities and timeline</b>	<b>ACTIVITY</b>	<b>TIMELINE</b>
	Lobby for budget reviews	continuous
	Proposal development	continuous
	Develop a policy document on fund administration	12 months
	Research for existing/ available grants in radiation safety	Continuous
	Database of funding organizations and their funding priorities/ interests	Continuous
<b>Resources Required:</b>	Human resource Funding	

<b>Lead Organization:</b>	Training institutions: universities and colleges, research and health institutions
<b>Other organizations</b>	ASR,FAMPO, ISRRT, AfSPI
<b>Anticipated Result:</b>	Study/research report
<b>Key partners</b>	IAEA, WHO, ESR, ISR, WFPI, RAD-AID.ORG, Image Gently, UNSCEAR, IOMP, IRPA, ICRP
<b>Alignment:</b>	Bonn-call-for action 5 AFROSAFE declaration 6 and 8

## Appendix

### REFERENCES

1. World Health Organization (2008) Global Initiative on Radiation Safety in Healthcare Settings, Technical Meeting Report, WHO Headquarters, Geneva  
[http://www.who.int/ionizing\\_radiation/about/GI\\_TM\\_Report\\_2008\\_Dec.pdf](http://www.who.int/ionizing_radiation/about/GI_TM_Report_2008_Dec.pdf)
2. American Cancer Society (2015) X-rays, Gamma Rays, and Cancer Risk, [www.cancer.org](http://www.cancer.org).  
<http://www.cancer.org/cancer/cancercauses/radiationexposure-andcancer/xraysgammaraysandcancerrisk/x-rays-gamma-rays-and-cancer-risk-do-xrays-and-gamma-rays-cause-cancer>
3. Rehani MM. Challenges in radiation protection of patients for the 21st century. *AJR Am J Roentgenol* 2013 April; 200(4): 762-764  
<http://www.ncbi.nlm.nih.gov/pubmed/23521444>
4. Bonn Call for Action  
[http://www.who.int/ionizing\\_radiation/medical\\_exposure/Bonn\\_call\\_action.pdf](http://www.who.int/ionizing_radiation/medical_exposure/Bonn_call_action.pdf)
5. EuroSafe Imaging  
<http://www.eurosafeimaging.org/about>
6. Launching of AFROSAFE: Radiation Protection of patients  
<https://rpop.iaea.org/RPOP/RPoP/Content/News/launching-af-roSAFE.htm>



*Championing radiation safety*

We, the radiation health workers of Africa declare that we shall, through the creation of the AFROSAFE campaign, promote the safe and beneficial use of radiation through the following actions:

1. Ensuring that benefits outweigh risks in all radiological medical procedures
2. Fostering regular radiation dose monitoring, recording and reporting
3. Campaign for the establishment and implementation of regulations to standardize the practice of radiation health workers
4. Promote and assist in the development of policies, guidelines and appropriate criteria for the safe use of radiation in health care at all levels
5. Advise and advocate for the establishment of procurement procedures of radiological equipment as per national guidelines
6. Promote and assist in the conducting of regular professional development and training on radiation safety
7. Facilitate for the creation of public awareness on radiation safety
8. Promote research in radiation safety and lobby for funding
9. Stimulate and uphold the development of a radiation safety culture in health care settings

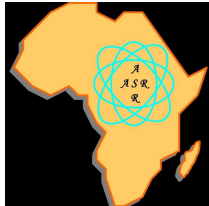
Prof. M. Kawooya  
ASR Secretary

Dr R. Nyabanda  
PACORI President 2015

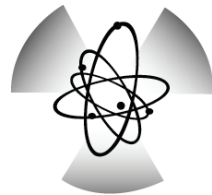
Dr. Taofeeq Ige  
FAMPO Sec-General

## List of participating institutions and professional bodies

1. Ministry of Health-Kenya (MoH)
2. Kenyatta National Hospital (KNH)
3. University of Nairobi, College of Health Sciences(UoN-CHS)
4. Radiation Protection Board (RBP)
5. Chemical Biological Radiological and Nuclear (CBRN)
6. Pan African Congress of Radiology and Imaging (PACORI)
7. Kenya Association of Radiology (KAR)
8. Society of Radiographers in Kenya (SORK)
9. African Society of Radiology (ASR)
10. International Society of Radiographers and Radiological Technologists (ISRRT)
11. East African Association of Radiation Protection (EAARP)
12. National Council of Science and Technology (NACOSTI)
13. Kenya Bureau of Standards (KEBS)
14. African Society of Paediatric Imaging (AfSPI)



**CHEMICAL**



**RADIATION PROTECTION BOARD**



