



ICRP



UNIVERSITÀ
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Associazione Italiana
Radioterapia e Oncologia clinica



Challenges of Radiological Protection in Research and Society referring to Medical Field

October 3/2024

Milan, Italy

Sala Napoleonica/Via Sant'Antonio, 12
Università di Milano



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ISS activities on Radiation and Health

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The Italian National Institute of Health, ISS



Mission

ISS promotes and protects national and international public health through *research*, *surveillance*, *regulation*, *control*, *prevention*, *communication*, *counselling*, and *training*.

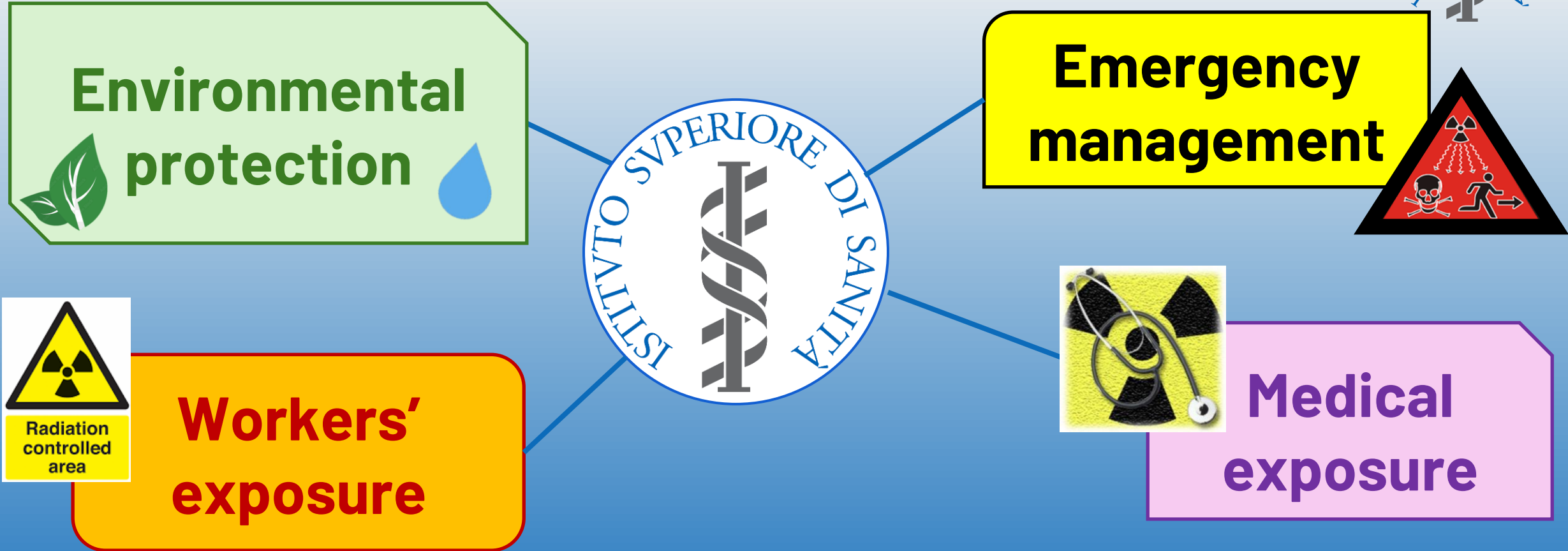


Vision

ISS aims to advance health knowledge through *research* and *dissemination* of scientific knowledge and evidence to *decision-makers*, *professionals* and *citizens*.



Activities on Radiation and Health



ISS deals with both **ionising** and **non-ionising radiation** in the context of public health protection and safety.

ISS Role in International Organizations



- **ISS** is a **WHO Collaborative Centre** on Radiation and Health;



- **ISS** contributes to the **UNSCEAR** activities;



Scientific Committee on the Effects of Atomic Radiation

- **ISS** participates in the **Group of Experts** on Radiation Protection under *Art.31 of Euratom Treaty* (**GoE31**) to support the European Commission.



Ionising Radiation and Medicine



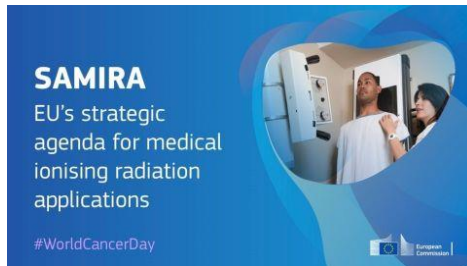
- **ISS** participates in strategic action plans in a synergic way with the **Italian Ministry of Health** and with **national clinical and research structures**:

- Italian National Center for Disease Prevention and Control **CCM** projects.
- **Review of proposals for clinical studies** focusing on the RP aspects.

- **ISS** takes part of several **EU Partnerships**:



European Union



European Radiation Dosimetry Group

- **ISS** proposes and funds innovative Research Projects and collaborates with National and International Research and Clinical Institutions.

A National Action



Italian National Center for Disease Prevention and Control



- Title:
Methodological approach for identifying conversion factors of exposure data into effective dose for procedures of radiological and nuclear medicine examinations
- Participants:
ISS (Coordinator) + 4 Italian Hospitals of NHS + Ministry of Health, MoH (Funder)
- Motivation:
 - **Harmonization** of radiological practices **across the country;**
 - Mitigation of **unnecessary radiation exposure.**
- Dlg 101/2020 (EURATOM 59/2013) mandates healthcare institutions to **report the dosimetric data** of the radiological and NM examinations (DAP, DLP, A_{inj} , ...).
- Aim of this study is to propose a methodological approach for converting reported dosimetric data into effective dose:
 - Conducting a **systematic review of the standardized effective dose coefficients** and determining their range of validity (i.e. specific procedures, acquisition protocols, patient characteristics, individual data);
 - Proposing a **simulation study** to identify eff dose coefficients for a subset of radiological procedures not currently covered (e.g. interventional radiology).



EU Partnership

PrISMA

Preparatory activities for
Implementation of quality and
Safety of
Medical Ionizing radiation
Applications

SAMIRA

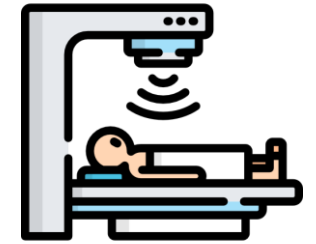
EU's strategic
agenda for medical
ionising radiation
applications

#WorldCancerDay



ISS participates in **PrISMA** as EU Member State **Competent Authority** to prepare activities for a **SAMIRA Joint Action**:

- The SAMIRA-JA facilitates the pooling of expertise from different EU countries in order to
 - ➡ Promote the **safe**, **high-quality**, and **reliable** use of **medical ionising radiation**.
 - ➡ Support the implementation of **European requirements** for **radiation protection** in the Member States.
 - ➡ Ensure that **all EU citizens** benefit from **the same high level of care**.



Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Health and Digital Executive Agency (HaDEA). Neither the European Union nor the granting authority can be held responsible for them.



Research Projects on IR & Medicine

ISS internally funds several **Research Projects** aimed at improving the use of ionising radiation in the medical field with particular focus on




- Radiation Protection of **healthcare workers**;
- Justification and optimisation related to **caregivers**;
- **Patient dosimetry** in both diagnostic and therapeutic contexts.



In collaboration with **National and international Healthcare Institutes, Scientific and Professional Associations, Clinical Partners** and other **Stakeholders**.

Some ongoing Research Projects at ISS

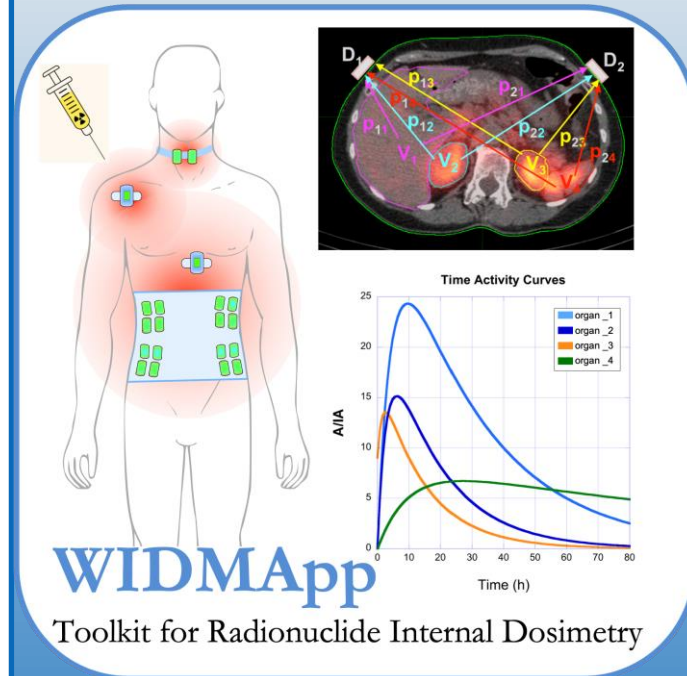


Project	Role of ISS	Start	Funding	Objectives
SIREN 	Partner PI: P Fattibene, A Palma	2021	IT-INAIL +PNRR +ISS	R&D of virtual dosimetry system for dose reconstruction of caregivers and NM workers in accident and near miss situation.
MAIBAI - Developing a Metrological framework for Assessment of Image-Based Artificial Intelligence systems for disease detection	Partner PI: G Gigante 	2023	EURAMET	Development of a standardized framework for evaluating image-based AI systems used for diagnostics or screening (i.e. breast cancer) and promoting responsible radiation use.
SEGNAR - Synergic Effects of Gold Nanorods And Radiopharmaceuticals	Partner PI: V Dini	2024	IT-INFN	Feasibility study of a theranostic system based on ^{99m}Tc transported by Gold Nanorods (AuNRs) in the tumor cells
WIDMApp – Wearable Individual Dose Monitoring Apparatus	Host Institution PI: E Solfaroli Camillocci	2024	IT-ISS	R&D of an innovative toolkit for internal radiation dosimetry in patient undergoing treatments with radionuclide
VITA – Virtual Imaging Trials in medicine 	Partner PI: B Caccia	2025	IT-INFN	Design of digital models of radiological exams including patients and medical hardware

WIDMApp, research project funded by ISS

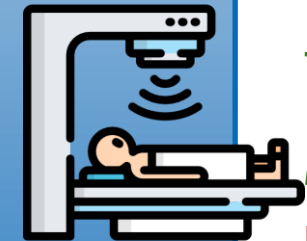


- The **Wearable Individual Dose Monitoring Apparatus** is a toolkit for **personalized dosimetry** of patients undergoing treatments with radionuclides.
- **WIDMApp** provides precise monitoring of the biodistribution of radiopharmaceuticals in organs.
- Key features:
 1. Continuous **biokinetic data collection** from a radiation detection system worn by the patient;
 2. Modeling of the **patient's structures** and simulation of the **radiation propagation within the body**;
 3. Custom-developed algorithm for analysing biokinetic data and simulation information **to estimate time integrated activity** of organs.
- Expected outcome:
 - Precise calculation of the **absorbed dose** to tumor and normal tissues;
 - Enhanced treatment effectiveness with the potential for **personalization of activity to be administered**.





- **ISS** is a **Research Institution** that plays an important role in National and International Organizations and Scientific Collaborations.
- **ISS** actively disseminates its **scientific knowledge** and **expertise** on use of ionising radiation in medical applications to *decision-makers, healthcare professionals, caregivers, patients, and the general public.*
- **ISS** contributes to the development of **regulations, recommendations, and guidelines** in the areas of medical ionising radiation to promote and protect public health at national and international levels.



Thank you for your attention!



Istituto Superiore di Sanità

National Institute of Health in Italy

www.iss.it

The logo of the Istituto Superiore di Sanità (ISS) is a circular emblem. It features a central Rod of Asclepius, a staff with a single snake coiled around it. The words "ISTITUTO SUPERIORE DI SANITÀ" are written in a circular path around the central symbol.