42nd Meeting of the Radiation Safety Standards Committee

12-14 June 2017

ISEMIR - Information System on Occupational Exposure in Medicine, Industry and Research

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What is ISEMIR?

- Tool for optimization of occupational radiation protection
- Online web-based information system
- 2 specific topical areas:
  1. Industrial radiography
     ISEMIR IR
  2. Interventional cardiology
     ISEMIR IC

- The IAEA General Conference resolution (60):
  “Requests the Secretariat to promote ISEMIR to facilitate the implementation of as low as reasonably achievable (ALARA) practices and effective exposure control, and recommends that Member States provide data on occupational exposure to the ISEMIR programme”
Who can participate?

Primary for **end users** from:

1. Non-destructive testing (NDT) companies carrying out industrial radiography
2. Medical facilities carrying out interventional cardiology procedures

Roles:

1. Coordinators (managers or RPOs)
2. Occupationally exposed workers

- Participation is free
What are the benefits of participation?

- To improve **occupational radiation protection** in the medical facilities or NDT companies
- To provide for efficient **data collection and maintenance** on occupational exposure and radiation practices
- To analyze the **trends of occupational doses** of individuals, facilities/companies against global or regional data
- To identify **good practices as well as gaps**
- To define follow-up actions to address identified gaps and disseminate **lessons learnt**
ISEMIR http://nucleus.iaea.org/isemir

History of the project

- Advisory group
- 2 Working groups

- Worldwide survey
- ISEMIR partial release (IC data input)

- ISEMIR partial release (IR data input)

- Full release of ISEMIR

2009 2012 2015 2017
Why focus on industrial radiography?

The use of radiation to test for faults or defects is a common technique used for testing internal structure of for example welds or pipelines.

**Challenge:**
- the work is carried out under difficult working conditions
- remote or urban areas
- little supervision
- use of strong gamma sources
Why focus on interventional cardiology?

The use of image guided interventional procedures in cardiology has increased in the last three decades, bringing great benefit to millions of patients around the world.

**Challenge:**
- procedures can involve significant occupational radiation doses
- health professionals are present in the room alongside the patient when radiation is being used
World-wide surveys (2012)

- To **gain insights into practice** of occupational radiation protection in these 2 fields
- Surveys addressed to:
  - National regulatory authorities
  - Operating companies (Licensees)/ Chief interventional cardiologists
  - Occupationally exposed workers - Industrial radiographers and interventional cardiologists
- Questions about radiation protection procedures in place, training, incidents, safety of personnel, the public and sources
Survey on industrial radiography

59 regulatory bodies
95 NDT companies
432 industrial radiographers

- **Shortcomings identified:** lacking use of collimators/diaphragms, survey meters not as widely available as they should be, high frequency of incidents, occupational doses received by radiographers varied considerably, with no correlation with radiographic workload
Survey on interventional cardiology

81 regulatory bodies
45 chief interventional cardiologists
201 interventional cardiologists

- **Shortcomings identified:** obtaining a representative world-wide sampling, personal bias in reporting radiation protection habits, obtaining valid dose records
What did the surveys show?

- Significant occupational doses do occur
- Radiation protection is not being effectively optimized
- Detailed information at the operational level is lacking – need for an international database
- Results published in IAEA-TECDOC-1747 (IR) and IAEA-TECDOC-1735 (IC)
ISEMIR  http://nucleus.iaea.org/ismir

How does it work?

1. Registration
2. Data entry
3. Benchmarking and analysis

Data submission
Verification of data by IAEA
Publishing of data

Registration
Verification of data by IAEA
Publishing of data
Benchmarking and analysis

Data submission
Verification of data by IAEA
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Data entry
How does it work?

1. Go to https://nucleus.iaea.org/isemir
2. Select ISEMIR-IR or ISEMIR-IC
3. Register in order to gain access to ISEMIR
1. Registration

Welcome to ISEMIR

ISEMIR is the IAEA Information System on Occupational Exposure in Medicine, Industry and Research.

ISEMIR Interventional Cardiology (ISEMIR-IC)

ISEMIR Industrial Radiography (ISEMIR-IR)
1. Registration

User profile and company/facility information:

My User Profile

<table>
<thead>
<tr>
<th>Required Information</th>
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<tbody>
<tr>
<td>Nucleus Login:</td>
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<td>Phone Number:</td>
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<td>User Role(s):</td>
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<tr>
<td>• ISEMIRIR Company Coordinator</td>
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ISEMIR http://nucleus.iaea.org/isemir
ISEMIR  
http://nucleus.iaea.org/isemir

How does it work?

1. Registration
2. Data entry
3. Publishing of data
4. Verification of data by IAEA
5. Benchmarking and analysis

Data submission
2. Data entry

- Reporting is done annually
- Data is confidential and anonymous
- 2 datasets:
  1. **Company/facility attributes**
  2. **Individual attributes**
- Flexible in terms of data collection
- Mandatory fields related to dose information
2. Data entry

IR data entry – personnel and company:
- Annual occupational doses, minimum detectable level
- Radiographic workloads - number of exposures
- Radiation protection training
- Radiography sources used
- Compliance inspections of radiographers, preventive maintenance of devices
- Use of collimators, survey meters, reading dosimeters, etc.
- Number of incidents

- Professional roles in ISEMIR-IR: assistant to the radiographer, industrial radiographer, manager, RPO, source recovery, trainee
2. Data entry

IC data entry – personnel and facility:
- Annual occupational doses
- Workload - number of procedures
- Radiation protection training
- Information about equipment types and performance
- Facility QA programme
- Use of protective equipment

- Professional roles in ISEMIR-IC: interventional cardiologist, electrophysiologist, medical radiation technologist, nurse, other
How does it work?

1. Registration

2. Data entry

3. Benchmarking and analysis

Data submission

Verification of data by IAEA

Publishing of data

ISEMIR
http://nucleus.iaea.org/ismsir
3. Benchmarking and analysis

1. **Statistical analysis**
   based on occupational doses per radiographic exposure/procedure as a function of personnel and facility attributes

2. **Benchmarking**
   against global or regional trends based on any combination of professional training, role, workload, use of protective equipment

3. **Trends over time**
   Show annual effective dose or mean dose per radiographic exposure over successive years
3. Benchmarking and analysis

Example –
ISEMIR-IC: 40 percent of personnel from the ISEMIR-IC database had a dose metric in the same or lower dose band than the selected individual.
Example – **ISEMIR-IR:**
Benchmarking of an individual against regional trends for the particular year

Example – **ISEMIR-IR:**
Trends over time for an individual
Short demonstration – ISEMIR-IR

Welcome to ISEMIR

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ISEMIR Interventional Cardiology (ISEMIR-IC)

ISEMIR-IC - a tool for interventional cardiology facilities to improve their implementation of optimization of occupational radiation protection.

ISEMIR IR - a tool for non-destructive testing companies carrying out industrial radiography to improve implementation of optimization of occupational radiation protection.

https://youtu.be/jRbHo6wZw3s
How can you collaborate with ISEMIR?

- **Insights into benchmarking** of occupational radiation protection habits and procedures – on a regional and worldwide basis
- Once the data reaches significant level, the IAEA intends to publish annual report based on the analysis and benchmarking

Help us to promote ISEMIR through your networks!
Would you like to know more?

- Visit ISEMIR website
  http://nucleus.iaea.org/isemir
- Download user guides
- Contact emails:
  ISEMIR-IR.Contact-Point@iaea.org
  ISEMIR-IC.Contact-Point@iaea.org
Thank you!

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