



Co-funded by
the European Union

PIANOFORTE Partnership

European Partnership for Radiation Protection Research

Horizon-Euratom – 101061037

D3.8 - E-survey on public understanding of radiation protection issues

Main Authors: Balázs Madas, Veronika Groma (EK), Florian Rauser, Mandy Birschwilks, Andreas Blume (BfS), Almudena Real (CIEMAT), Tone-Mette Sjømoen and Jelena Mrdakovic Popic (DSA)

With contributions from WP3, task 3.4 participants: Sylvie Charron, Cynthia Réaud, Arnaud Aubergeon (IRSN), Caroline Schieber, Thierry Schneider (CEPN), Laure Sabatier (CEA), Arpad Farkas (EK), Yevgeniya Tomkiv, Lindis Skipperud, Deborah Oughton (NMBU), Alan Tkaczyk (UT), Pedro Vaz, Octavia Monteiro Gil, Isabel Paiva, Mario Capucho dos Reis (UL), Govert de With (NRG), Eleftheria Carinou, Sotiris Economides (EEAE), Nadja Zeleznik (EIMV), Boguslaw Michalik (GIG), Antonella Rosi, Grande Sveva, Palma Alessandra (ISS), Tanja Perko, Catrinel Turcanu (SCK CEN)

Reviewer(s): Members of the Executive Board

Work package / Task	WP3	T3.4
Deliverable nature:	Report	
Dissemination level: (Confidentiality)	Public	
Contractual delivery date:	Month 9 28 February 2023	
Actual delivery date:	Month 9 28 February 2023	
Version:	2.0	
Total number of pages:	32	
Keywords:	E-survey, radiation protection research, public understanding	
Approved by the coordinator:	Month 9	
Submitted to EC by the coordinator:	Month 9	

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Abstract

The purpose of D3.8 Deliverable report is to present an electronic survey of the PIANOFORTE partnership developed to explore public views on radiation protection issues. Description of the survey development process, its main features as well as a preliminary analysis of the obtained responses are provided.

During the EJP CONCERT, radiation risk perception and attitudes toward various radiation protection issues have been explored in different public groups as part of a large public survey, conducted in several national languages. Although the results of that survey indicated a reasonable level of public satisfaction with available information on radiation risks, there has clearly been a potential for a follow-up of public awareness of the main radiation protection concepts.

Therefore, as part of the PIANOFORTE partnership's work to align stakeholder interests across Europe, an electronic survey has been developed that provided an opportunity for a wide range of stakeholders to express their opinion on research priorities in radiation protection for the coming years. At the same time, the survey explored specific issues of general radiation protection and possible developments of public knowledge over time. Another goal of this PIANOFORTE survey was to promote and make available information about partnership stakeholder activities to different stakeholder networks across Europe during the first months of the partnership to highlight the envisioned openness to external inputs into the scientific community.

The PIANOFORTE e-survey has been launched in English language only, on the SurveyMonkey platform, on November 22, 2022, with a response deadline of January 31, 2023. The identified target groups were internal stakeholders – PIANOFORTE participants (POMs, AEs and radiation protection platforms), Stakeholder and Advisory Board (SAB) and external stakeholders from various identified interest groups related to radiation protection fields. The responses were obtained from 440 stakeholders, from 29 European countries, Canada, China, Colombia, India and the US.

The preliminary analysis of specific issues raised by the survey is provided in this report.

Table of Contents

1. Introduction.....	5
2. E-survey	5
2.1 Target groups of the survey	6
2.2 Participation in the survey	7
2.3 Structure of the survey	7
2.4 Implementation on the SurveyMonkey platform.....	8
3. Launching of the survey	8
4. First preliminary analysis of the survey results	8
4.1 General information about respondents.....	8
4.2 Information about the PIANOFORTE partnership.....	10
4.3 Radiation protection issues – an overview of understanding and opinions of stakeholders.....	12
5. Conclusions.....	17
Annex: E-survey of PIANOFORTE.....	18

List of Figures

Figure 1 Distribution of the respondents by country.....	9
Figure 2: Percentage of responses per identified stakeholder group.....	10
Figure 3: Average rating of optional topics for future joint research and development projects.....	12
Figure 4: Overview of answers showing stakeholders opinion about the most important improvements needed in the future in our societies concerning radiation protection.....	13
Figure 5: Fractions of answers showing concern about different medical applications of ionising radiation.....	15
Figure 6: Word cloud of text provided as additional specification of security threats by respondents.	15

List of Tables

Table 1: Research topics identified for the prioritization process in the preparation of the first PIANOFORTE Open Call.....	11
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1. Introduction

The PIANOFORTE ‘Partnership for European research in radiation protection and detection of ionising radiation: towards a safer use and improved radiation protection of the environment and human health’, a European Commission (EC) funded project, started in June 2022 and brings together 58 European organisations from 22 EU member states, Norway and the UK. The purpose of the Partnership is to support and organise consolidation of the research and innovation in the field of radiation protection in order to help national authorities to ensure progress with new knowledge, innovative methods and technologies, and skills, as well as to address current knowledge gaps, societal concerns and emerging issues.

Working package 3 (WP3) of the partnership is dedicated to Stakeholder Engagement, which aims to connect different stakeholders inside and outside the radiation protection community to assess radiation protection research needs and ensure that it influences and improves the lives of all European citizens. WP3 is organised through five different tasks which will synergistically consider the voices of radiation protection experts, users of radiation science products and civil society in general.

Task 3.4 in WP3, Direct Stakeholder Engagement, will ensure the implementation of the following activities:

- A wide range stakeholder registration and their mapping, according to pre-defined criteria, to specific networks for further activities (3.4.1),
- **Launching an e-survey about stakeholders’ views and opinions about PIANOFORTE partnership, its research priorities and general radiation protection issues (3.4.2),** and
- Organization of topical online public consultations and meetings (webinars) throughout the partnership (3.4.3).

These planned activities, in the form of pro-active interactions and innovative participatory processes / open consultation processes, are envisaged as the third pillar of PIANOFORTE’s external stakeholder interaction, along with a Stakeholder and Advisory Board (SAB) and direct exchanges with other relevant organisations.

2. E-survey

One of the direct stakeholder engagement activities, is to develop and conduct an electronic survey (e-survey). Within a previous public survey, arranged during the EJP CONCERT, radiation risk perception and attitudes towards different radiation protection issues have been explored among various expert and public groups across Europe. Although the survey results showed that the participants were satisfied to a reasonable level with the available information on radiation risks, they clearly showed the need for (a) an improvement in understanding of the main radiation protection concepts, (b) further exploring the information availability and knowledge development over time, as well as (c) better communication and stakeholder engagement in knowledge creation and in dissemination (e.g. in the actual EC funded projects).

Therefore, a web-based e-survey was developed and launched to explore these specific questions within the field of general radiation protection and possible improvements of public knowledge.

The main objectives of the survey were as follows:

- Gaining insights on the current stakeholders' views and opinions on the main radiation protection issues that were previously explored in other projects,
- Giving different stakeholders (end users) opportunity to express their opinions on research topics that should be prioritised in the area of radiation protection, which may potentially be linked to work related to Open Calls for R&I projects in PIANOFORTE, and
- Providing more information about the PIANOFORTE partnership to the wider stakeholder community in first months of the partnership.

The survey was developed in English and planned as a one-time activity at the beginning of the PIANOFORTE Partnership. However, certain countries, like France, translated the survey into their national languages to facilitate the process of participation for the public and contribute to a better response rate. Further activities, based on this survey, will be considered after a detailed statistical analysis of the obtained responses, outcome comparison to the results from the EJP CONCERT survey and possible future partnership and stakeholders' needs.

2.1 Target groups of the survey

Considering the main survey objectives, a wide range of external stakeholder groups, identified for the PIANOFORTE partnership, were identified as target groups for the survey:

- The Stakeholder and Advisory Board (SAB) of PIANOFORTE,
- European organizations - European policy makers (EC, Article 31 Group of Experts, HERCA, WENRA and others),
- International organisations (IOs) and associations - Experts in radiation protection and other related disciplines (IAEA, ICRP, UNSCEAR, IRPA, ENA, ERA and others),
- National policy makers and regulatory authorities – ministries, regulatory bodies, including those at regional and local levels – from different EU countries,
- Implementers/Users - national representatives of nuclear industries, non-nuclear industries, trade organizations, medical professional association in hospitals, national associations for radiation protection, waste management organizations, radiation protection experts, radiation protection officers, technical and scientific equipment manufacturers
- Research and Education & Training Community - research centres, universities, institutes, research platforms on other topics than radiation protection/use of ionising radiation,
- Civil society and affected communities - national, regional, local public organizations gathering impacted public groups or other thematic groups, such as but not limited to, medical patients' organisations, including individual patients; citizens (e.g., citizens science networks; representatives of communities living in areas near legacy sites and of municipalities with nuclear facilities), trade unions,
- NGOs - focused on different topics, among others those related with radiation protection,

- Media - journalists, professionals working in communication, and,
- Metrology - manufacturers of ionising radiation measuring devices; national metrological institutes (NMIs); EURAMET; calibration, certification and quality management (ILAC) organisations.

Additionally, the e-survey was distributed to the internal stakeholders:

- European Platforms in radiation protection research members of the MEENAS Consortium (MELODI, EURADOS, EURAMED, NERIS, ALLIANCE and SHARE),
- National Programme Owners and/or Managers (POMs), and
- Affiliated Entities (AEs).

2.2 Participation in the survey

The potential involvement of contact persons implied participation in an online, web-based survey of PIANOFORTE. The survey was launched on the SurveyMonkey platform, 22 November 2022, and was available until 31 January 2023.

To best tailor the questions to the identified audience (target groups), the survey was divided into different parts. The survey contained both closed and open-ended questions and covered information related to the PIANOFORTE partnership, research priorities for the partnership's Open Calls and general radiation protection issues – understanding, concerns and views.

Participation in the survey was voluntarily and the estimated time for completing the survey was approximately 15-20 minutes. The survey participants have been informed that all collected information would be used exclusively for the scientific purposes of the PIANOFORTE project, analysed anonymously as aggregated data and confidentially stored in accordance with the General Data Protection Regulation (GDPR).

2.3 Structure of the survey

The e-survey contained three types of questions:

- General Background questions: participants were asked to mark which stakeholder groups they belong to or could identify with, their name, profession, email, and country (for the purpose of the geographical distribution analysis). Apart from the first consent question which was made mandatory, questions in all fields of this section, although providing valuable information about the respondent's background profile, have been set as non-mandatory due to data protection and ethical issues.
- PIANOFORTE related questions: participants were briefed and asked about the main features and activities of the partnership, identified research priorities for decision making on R&I project funding and expected stakeholder engagement in the partnership, as well as how they would like to be informed about the partnership's outcomes.
- Radiation protection questions: raised questions covered the main radiation protection topics

and issues that are potentially of interest and/or concern to a wide range of stakeholders.

The e-survey is provided as a pdf document in the Annex 1 of this report.

2.4 Implementation on the SurveyMonkey platform

SurveyMonkey is a cloud-based survey tool that helps users to create, send and analyse surveys. Users can e-mail surveys to respondents and post them on their websites and social media profiles to increase the response rate. Prior to the launching, the survey was sent for testing to some participants in Task 3.4, the leader of WP3 and also to the project coordinator to check content, ethical issues and execution.

3. Launching of the survey

The e-survey was developed during the first months of the partnership and launched as given above in November 2022, with a response period of two months. The survey was distributed through a survey link sent to a list of email addresses, containing contacts from both national and international organisations, researchers, regulators, implementor groups, members of public, etc.

Regarding the dissemination route, the involvement of the Programme Owners and Managers (POMs) – participants of PIANOFORTE in each country and members of the European radiation protection platforms - was significant.

In order to have a capillary dissemination of the links, national contacts were encouraged to:

- Contact national, regional and local radiation protection authorities,
- Contact different groups of implementors in their countries,
- Contact hospitals and patient associations in their countries,
- Contact research organisations and universities,
- Publish the survey on social networks, those made for PIANOFORTE (webpage, LinkedIn, Twitter), but also to related existing national and international ones (e.g. CERAD, SHARE).

During the response time, several reminders were sent via emails at different occasions (meetings, conferences) and information was re-published on social networks and websites.

4. First preliminary analysis of the survey results

4.1 General information about respondents

The link for the PIANOFORTE e-survey was sent to 990 contacts in European countries, both participants and non-participants of the PIANOFORTE partnership. The contacts were also asked and encouraged to further distribute the survey link to other proper contact persons. In addition to personal e-mails, the survey was also announced on social media platforms. Considering the different

dissemination routes and the obtained responses, the overall response rate was approximately 40-45%. The responses were obtained from 34 different countries: 29 European countries (reflecting the fact that the primary target of the survey was Europe, in general), and Canada, China, Colombia, India and the United States (the responses are highly appreciated because they will allow for useful global information and proper comparisons).

The percentage of responses from people living in different countries is detailed in Figure 1. Taking into account the number of received responses, the most responding countries were Germany, Norway, France, Spain and Italy, but when number of replies per million of citizens was considered, it was observed that the response rate from the different countries was fairly homogeneous, with few countries such as Croatia, Estonia, Latvia and Norway providing slightly higher response rates with regard to the country population. Additionally, one-third of the respondents did not provide information on their country of residence, which influenced the presented distribution.

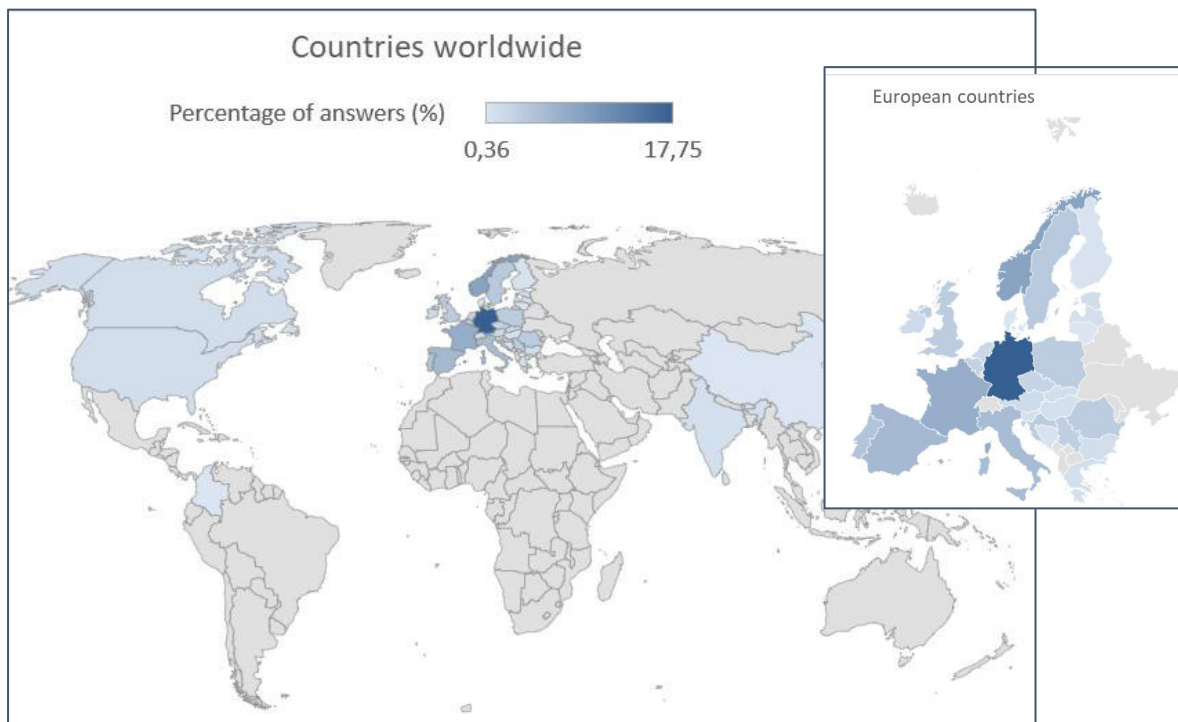


Figure 1 Distribution of the respondents by country.

It should be emphasized that the proportion of new contacts was significantly high, as 69% of respondents said that they had not filled out a survey on this topic before. Among them, the number who declared to belong to the NGO group increased significantly (sevenfold), and a number of those from the Implementers and Media groups tripled compared to previous similar survey (EJP CONCERT surveys), although the participation rate of these groups is somewhat low. As an illustration from the aspect of country, in the case of Serbia, all respondents completed this kind of survey for the first time, and the proportion of 'new' respondents is also high in Germany, Norway and Italy. Respondents who declared to have previously participated in similar surveys, most often participated in the surveys

conducted by the CONCERT EJP, H2020 RadoNorm, EURADOS and the IAEA.

The analysis of the of respondent’s profession showed a wide range, including researchers, regulators, experts from the international organisations (IAEA, UNSCEAR, HERCA), engineers, inspectors, legal advisors, medical doctors (radiologists, radiation epidemiologists), medical physicists and radiographers, managers, social scientists (Figure 2). The largest group of respondents were researchers and representatives of the Education & Training Community, followed by the national regulators and implementers and users of ionising radiation applications.

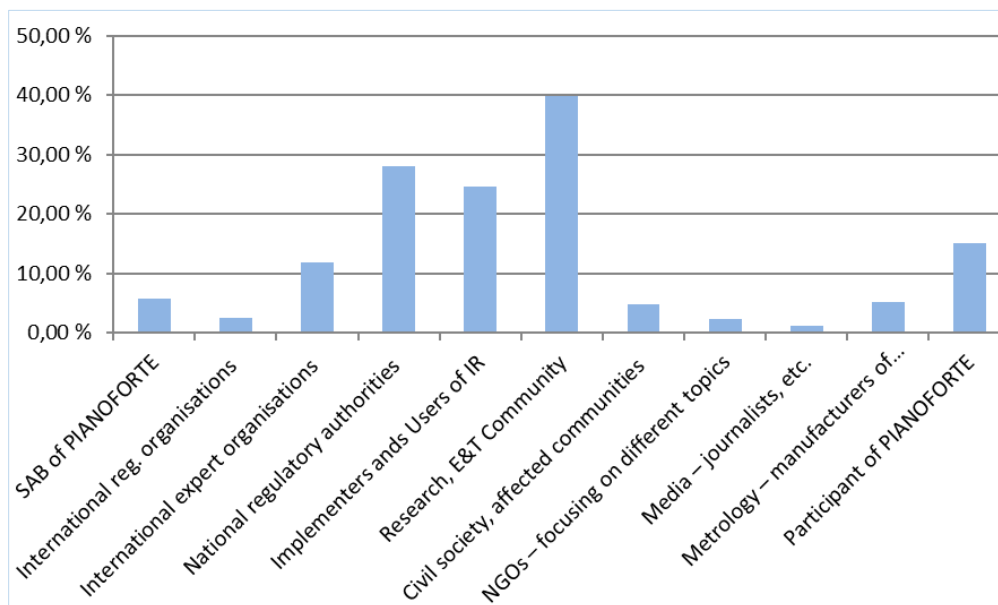


Figure 2: Percentage of responses per identified stakeholder group.

It is also interesting to note that only 40% of respondents provided their full name, while 54% of respondents provided their e-mail address, although information about anonymous approach and data protection was emphasized in the invitation to the survey and in the survey itself.

4.2 Information about the PIANOFORTE partnership

As one of the objectives of the current survey was to present PIANOFORTE, its goals and activities in the first partnership months to a broad European and global audience and various stakeholder groups, a series of questions related to PIANOFORTE was included in the survey.

About two thirds of the respondents had previously heard about the PIANOFORTE partnership via one or more of the following channels:

- Information received by the direct e-mail contact by WP3 of PIANOFORTE,
- Contacts with national POMs and AEs included in PIANOFORTE, advertising through colleagues,
- Information received through joint work, at conferences and meetings, and,
- PIANOFORTE website.

About 70% of respondents answered positively to the question of importance of stakeholder engagement in the PIANOFORTE partnership. The percentage of those respondents who consider participation in the project as highly important is highest when it comes to international and civil organizations and NGO communities.

The analysis of preference for different possible activities for stakeholder engagement showed the three most important activities for stakeholders as follows:

- To give opinion on radiation protection areas (e.g., medical use of ionising radiation, emergency and preparedness, radon, etc.), including research topics that should be prioritized in the EU scientific projects,
- To get reported results and outcomes from research projects in a more comprehensive way – and discuss the results achieved in the project,
- To be included as participants in research projects when the topic is of mutual concern and outcomes can be improved through such engagement.

The above given priorities expressed by stakeholders are in good agreement with planned PIANOFORTE Stakeholder Engagement Activities.

The additional topic and activity areas highlighted by respondents as being of high importance are *increasing public knowledge, communicating reliable as well as trustful scientific results to the whole society, broadening the basis for communication and conceptualization through visual arts and performing citizen science projects.*

To obtain an overview of stakeholders' opinions on radiation protection topics that should be prioritized in the future R&I projects, the list of research topics, identified by the WP2, for the first Open Call in PIANOFORTE, was presented (Table 1) and respondents were asked to rank each topic by assigning a score on a scale 1-8 (min-max of importance):

Table 1: Research topics identified for the prioritization process in the preparation of the first PIANOFORTE Open Call

A. Understanding and quantifying the health effects of radiation exposure
B. Improving the concepts of dose quantities
C. Understanding radiation-related effects on non-human biota and ecosystems
D. Optimising medical use of radiation
E. Improving radiation protection of workers and population
F. Developing an integrated approach to environmental exposure and risk assessment from ionising radiation
G. Optimising emergency and recovery preparedness and response
H. Radiation protection in/with society

Although relatively high rankings were obtained for each given priority (weighted average in the range from 4.81 to 6.58, Figure 3), the most supported radiation protection topic was *Understanding and quantifying the health effects of radiation exposure*, whilst the lowest rating on average was found for the topic related to *Understanding radiation-related effects on non-human biota and ecosystems*; however, no significant difference was found between any of the proposed research topics. It is observed that the survey results were comparable to stakeholders' input on the prioritization process for research priorities, received earlier during the online Topical Meetings organized for external stakeholders.

Moreover, the survey ranking is in good accordance with the overall ranking of research priorities (based on inputs from POMs, SAB, platforms) and the final choice on topics for the first Open Call (topics under A, D and G).

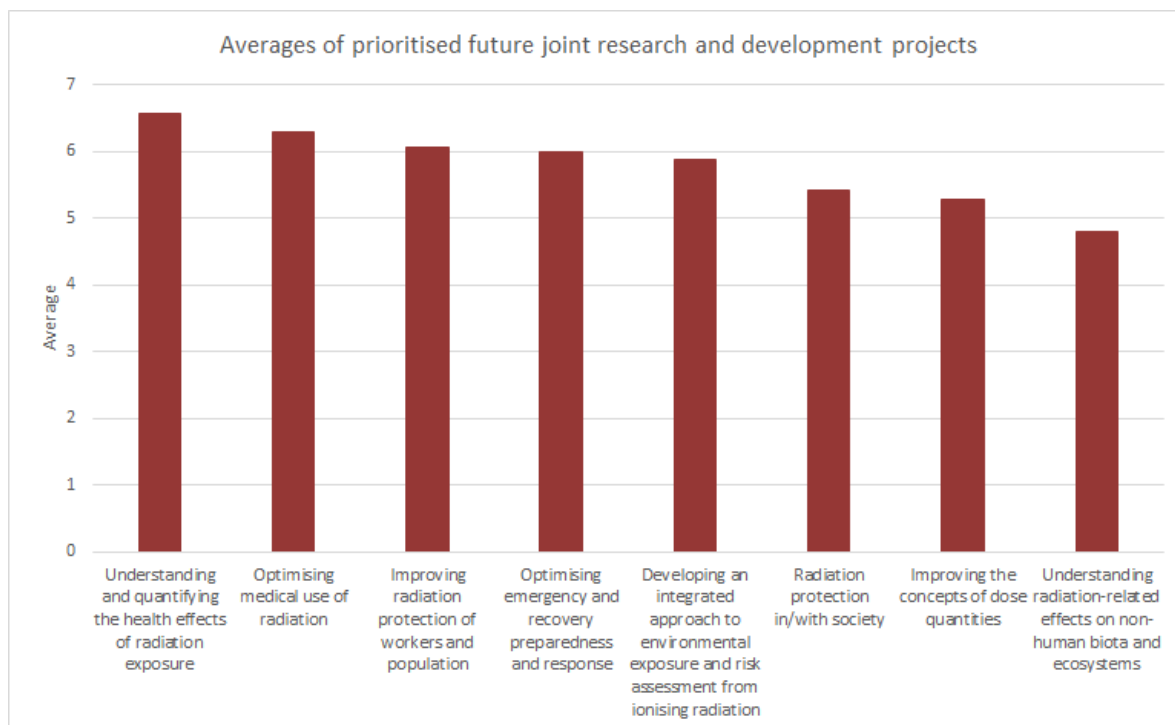


Figure 3: Average rating of optional topics for future joint research and development projects.

4.3 Radiation protection issues – an overview of understanding and opinions of stakeholders

A set of radiation protection related questions was included in the survey to obtain an overview of public understanding and opinions on important issues.

Respondents were asked for their opinions on the most important improvements needed in the future in our societies, concerning radiation protection; and to cover for all relevant opinions, a possibility for selecting multiple answers was given. The results are shown in Figure 4. The topics of *Research and development and their relationship to regulatory and management practice* was the most selected

option, with 63% of respondents marking this as of high importance. It was closely followed by the topics of *International collaboration in the field of radiation protection* (60%). These two options, which are the most chosen, probably reflected the large fraction of researchers among the respondents. The third most selected response was *Management practices in different countries concerning radiation protection* with 42% of respondents, followed by *Regulatory approaches in different countries concerning radiation protection* (35%) and *Legislative requirements for radiation protection* (22%).

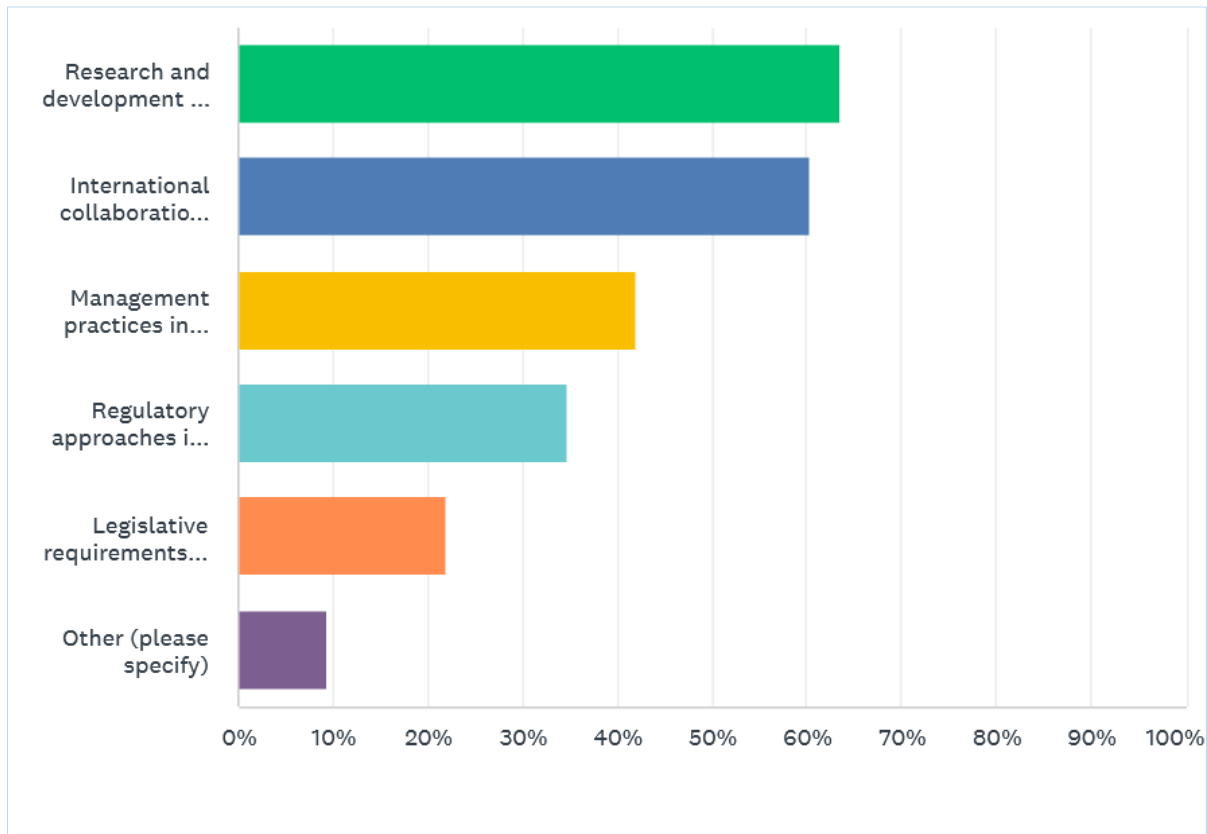


Figure 4: Overview of answers showing stakeholders opinion about the most important improvements needed in the future in our societies concerning radiation protection.

To explore the more general opinion of stakeholders on major radiation protection issues, participants were asked to mark *Areas of radiation protection and application of ionising radiation* that are of potential concern and/or subject to involvement for them (multiple choice was allowed). The three most chosen answers were each selected by somewhat more than 40% of the respondents:

- *Environmental radioactivity and radioecology* (44%),
- *Naturally occurring radioactive materials (NORM) including radon* (42%), and,
- *Use of ionising radiation in medical diagnostics or treatments* (41%).

It is rather surprising that environmental radioactivity and NORM including radon are the highest ranked, and most likely this can be related to the ongoing large European project 'RadoNorm – Towards effective radiation protection based on improved scientific evidence and societal

considerations – focused on Radon and NORM’, which also aims to improve public awareness of radon and NORM. Somewhat lower concern or personal interest/involvement was expressed for topics such as:

- *Emergency preparedness and recovery,*
- *Use of ionising radiation in research,*
- *Radioactive waste or spent nuclear fuel and decommissioning, and,*
- *Use of ionising radiation in nuclear industry, nuclear power plants.*

A further, statistical and detailed correlation analysis is needed for more accurate conclusions on results of this question as the overall ranking, presented here, may be the result of bias due to prevalence of respondents concerned/involved/interested in specific topics (e.g. researchers working with radioecology, radon etc). It may also explain the currently unexpected ‘low ranking’ of concern for nuclear power plants, which historically have been an important subject of public concern.

The survey was continued with a set of questions (No. 13 to 19) that were related specifically to the different topics - sources of ionising radiation, which potentially can be of radiation protection concern. These topics also corresponded well to the articles and requirements provided by the European Directive 2013/59/Euratom (EU BSSD) (EC, 2014). In contrast to the previous questions, only one answer could be selected in these questions.

More detailed exploration of medical exposures and opinion/concern was aimed by asking *Which of the following medical applications of ionising radiation do you consider as the highest concern/risk with respect to received radiation dose.*

As shown in Figure 5, a significant fraction of respondents answered either *I do not consider any medical applications of ionising radiation to be of concern and potential risk* (8%) or *I don’t know/not applicable* (18%).

For the rest of the respondents, *Use of ionising radiation in therapeutic purposes* (22%), *Interventional radiology* (20%), and *Diagnostic CT* (17%) are dominating reasons of concern (beside the benefit that is always assumed according to the justification principle of radiation protection). Medical procedures *PET-CT*, *X-ray imaging* and *Scintigraphy* were at the bottom of the list, while no one selected procedure of *Mammography* to be a reason of the potential radiation protection concern.

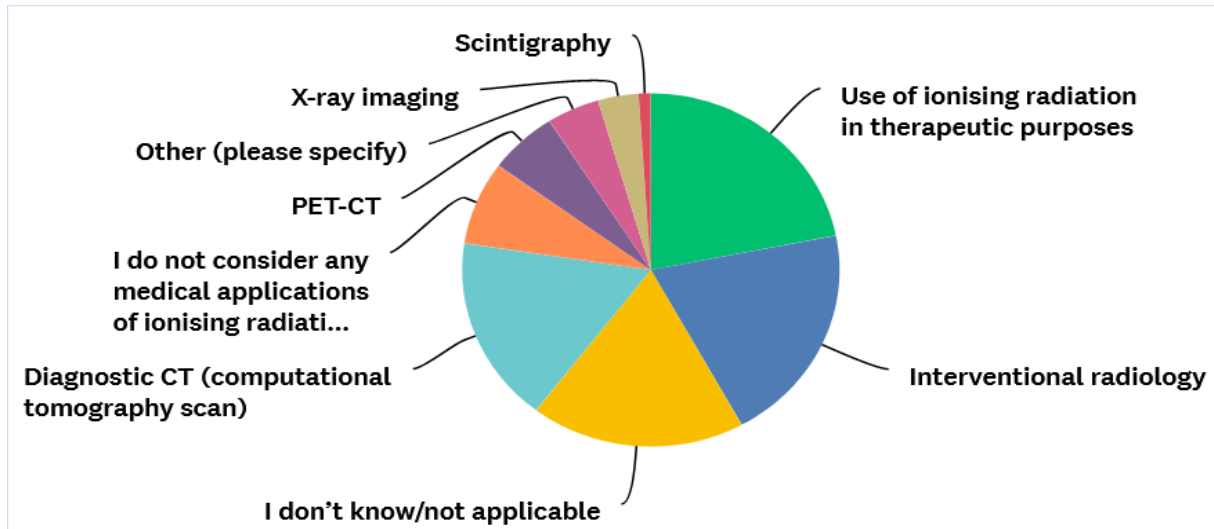


Figure 5: Fractions of answers showing concern about different medical applications of ionising radiation.

The issue of nuclear safety and security was raised by asking about opinion on nuclear power plants (NPP), but also nuclear threats and emergencies. The following preliminary trends can be observed:

- The use of NPPs is supported by the respondents who both explicitly say that they are *Highly valuable sources of energy with low carbon footprint, so their work should be supported*, and those who say that *With the threat of climate change, nuclear energy complements renewable energy and still cannot do without it*. In total, a positive attitude was expressed by the majority of 73% of respondents.
- Regarding nuclear security issues, *Terroristic threats involving radioactive material/ionising radiation* was selected to be of greater concern of respondents, followed by *Military installations and operations (including submarines)*.
- Additionally, regarding security concerns, it is important to note that *Potential scenario of using nuclear weapons in war in Ukraine* was listed as the utmost concern in the field *Other* (Figure 6).

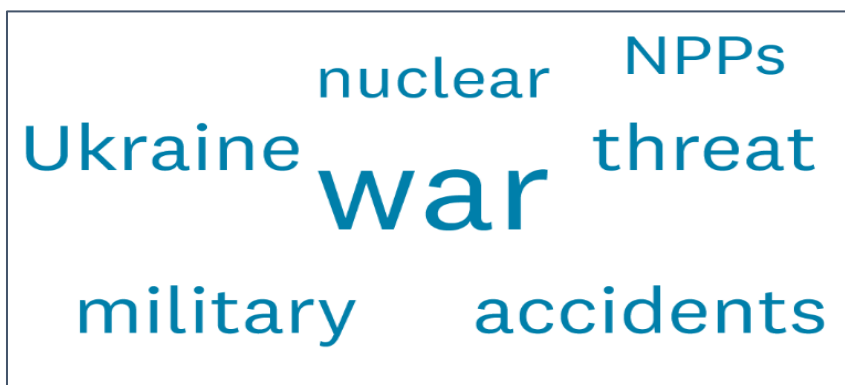


Figure 6: Word cloud of text provided as additional specification of security threats by respondents.

Analysis of the responses related to stakeholders' view on issues related to radioactive waste and decommissioning showed that the dominant concern in these cases was due to potential *Radioactive pollution and related health and environmental issues for future generations*, chosen by almost every second survey participant (47%). More than 30% selected the options *Exposure due to a radioactive release in disposal sites and/or decommissioned facilities* and *Future land use at places that were disposal sites or at decommissioned facilities* as the most important ones. Otherwise, the main concern was *Living in the vicinity of radioactive waste and/or decommissioning facilities* or *Other non-specified issues*.

The majority of survey respondents were aware that naturally occurring radionuclides are a potential radiation risk under certain industrial or environmental conditions, particularly high awareness was expressed about radon gas. Different sources of information on radon are listed in the responses, such as media, social media, authorities, but academia is listed as the most important one. However, less than half of the respondents (45%) measured radon at home.

Finally, two so-called matrix questions were asked, where respondents could express their (a) satisfaction with the available national information on different radiation protection issues, and (b) opinion about the level of implementation of measures required by the EU BSSD for specific radiation protection issues (cf. Annex). It must be emphasized that a detailed analysis regarding the number of respondents and cross-correlation with other questions as well as statistical analysis must be done in order to draw proper conclusions. Some preliminary examples of the results are as follows:

- The level of satisfaction with publicly available information on the given topics of radiation protection is the highest for *Use of ionising radiation in medical purposes* (71% of respondents answered that they are either rather or very satisfied). The high level of satisfaction (61-67% of respondents) was also expressed for available information on *NORM and radon, Emergency and preparedness* as well as for *Radioecology and environmental radioactivity*.
- In contrast, the lowest levels of satisfaction (33-41%) were expressed with regards to the information available on *Work and control of non-nuclear industry with radioactive materials* and regarding *Radioactive waste, spent fuel and decommissioning*.
- About 63% of all respondents answered the question on level of implementation of EU BSSD requirements related to the specific topics of radiation protection. The range of those who answered '*I don't know*' was 19-44%, most likely reflecting quite a few different stakeholder groups respondents on the survey that might not be in a position to answer this rather regulatory question correctly.
- Based on a preliminary overview, the highest percentage of respondents expressed opinion that the requirements from EU BSSD are fully implemented in case of *Medical use of ionizing radiation, Radon, Radioactive sources and Industrial application of ionising radiation*.
- Again, based on a preliminary overview, requirements of the EU BSSD related to the *Existing exposure from building materials, Accidental and unintended exposure of lower scale* are those that require better implementation (or marked as not implemented) according to the respondents of this survey.

5. Conclusions

The PIANOFORTE e-survey was developed and launched as part of WP3 Stakeholder Engagement activities of the European PIANOFORTE partnership. The main objectives of the survey were to (a) gain insights on stakeholders' views and opinions on the main radiation protection issues previously explored in other projects, (b) give different stakeholders (end users) opportunity to express their opinions on research topics that should be prioritized in the area of radiation protection (in Open Calls for R&I projects, but also in Strategic Research Agendas and Joint Roadmaps for future research in radiation protection), and (c) provide more information about the PIANOFORTE partnership to the wider stakeholder community in first months of the partnership.

The survey was launched in English, on the SurveyMonkey platform, in the period 22 November 2022 to 31 January 2023. The identified target groups were internal stakeholders – PIANOFORTE participants (POMs and radiation protection platforms), Stakeholder and Advisory Board (SAB) and external stakeholders from various identified interest groups related to radiation protection fields.

Responses were obtained from 440 stakeholders, from 29 European countries, Canada, China, Colombia, India and the US. The preliminary analysis of the survey results showed high percentage of respondents (69%) that previously did not participate in any similar survey. A wide range of respondents was identified, including researchers, regulators, experts from the international organisations (IAEA, UNSCEAR, HERCA), engineers, inspectors, legal advisors, medical practitioners (radiologists, radiation epidemiologists), medical physicists and radiographers, managers, social scientists. About 70% of respondents have previously heard about PIANOFORTE partnership through different channels. The same high percentage of respondents expressed opinion that stakeholder engagement in the PIANOFORTE partnership is of high importance, with most preferable engagement activities: giving opinion on radiation protection areas (e.g., medical use of ionising radiation, emergency and preparedness, radon, etc.), including research topics that should be prioritized in the EU scientific projects, being informed about results and outcomes from research projects in a more comprehensive way – and discuss the results achieved in the project, being included as participants in research projects when the topic is of mutual concern and outcomes can be improved through such engagement.

Results from the preliminary analysis of responses on questions related to specific radiation protection issues showed different views on various topics, with some interesting examples, such as:

- The most important improvements needed in future in radiation protection, as seen by stakeholders, are related to *Research and development and their relationship to regulatory and management practice* and the topic of *International collaboration in the field of radiation protection*.
- The level of satisfaction with publicly available information on the given topics of radiation protection is the highest for *Use of ionising radiation in medical purposes* (71% of respondents answered that they are either rather or very satisfied). A high level of satisfaction (61-67% of respondents) was also expressed for available information on *NORM and radon, Emergency and preparedness* as well as for *Radioecology and environmental radioactivity*.

Further specific response analysis is provided, however it must be emphasized that a more detailed, statistical analysis of responses and response cross-analysis is needed for more accurate conclusions, what will be available in the future.

Annex: E-survey of PIANOFORTE

The e-survey is attached to this document on the following pages.



PIANOFORTE - Electronic survey

Introduction

This electronic survey (e-survey) is organized by researchers from the PIANOFORTE partnership ('Partnership for European Research in Radiation Protection and Detection of Ionising Radiation: Towards safer use and better protection of the environment and human health' (2022-2027)) as a part of stakeholder engagement activities.

The main survey objectives are:

- To present PIANOFORTE, its aims and activities to a wide range of stakeholders in European countries,*
- To explore opinions and views on main radiation protection issues of relevance to stakeholders.*

You are kindly invited to voluntarily participate in this e-survey.

Estimated time for completing the survey is 15 minutes.

All collected information will be used exclusively for the scientific PIANOFORTE project purposes, analysed anonymously as aggregated data, and confidentially stored in accordance with the General Data Protection Regulation (GDPR). No personal information will be shared and data will be deleted after the analysis has been completed. The results and main survey conclusions will be presented in a report that will be available to all PIANOFORTE stakeholders.

More information on the PIANOFORTE partnership and Stakeholder engagement (Work Package 3) is available on the [PIANOFORTE website](#).

* 1. Please mark that you have read and understood the above information and participation conditions.

Yes



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General questions

2. Please mark below which of the identified stakeholder groups you belong to or you can identify with:

- Stakeholder and Advisory Board of PIANOFORTE
- International organisations – European policy makers (EC, Article 31 Group of Experts, HERCA, WENRA and others)
- International organisations and associations – Experts in radiation protection and other related disciplines (IAEA, ICRP, UNSCEAR, IRPA, ENA, ERA and others)
- National policy makers and regulatory authorities – ministries, regulatory bodies, including regional and municipal levels - from different EU countries
- Implementers/Users – national representatives from nuclear industries, non-nuclear industries, trade organisations, medical professional associations in hospitals, national associations on radiation protection, waste management organizations, radiation protection experts, radiation protection officers, medical, technical, scientific instruments manufacturers
- Research and Education & Training Community – research centres, universities, institutes, research platforms on other topics than radiation protection/use of ionising radiation
- Civil society and affected communities – national, regional, local public organizations gathering impacted public groups, or other thematic groups including but not limited to medical patients' organisations, including individual patients, citizens (e.g., citizens science networks, representatives of communities living in areas near legacy sites and of municipalities with nuclear facilities)
- NGOs – focusing on different topics
- Media – journalists, persons working in communication area and other media
- Metrology – manufacturers of ionising radiation measuring devices; national metrological institutes (NMIs), EURAMET, calibration, certification and quality management (ILAC) organisations
- Participant of PIANOFORTE

3. Have you previously participated in radiation protection surveys as part of projects or other activities?

No

Yes

If yes, in which?

4. What is your involvement in radiation protection?

Professional

Non professional



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Questions related to PIANOFORTE

5. Have you previously heard of the European PIANOFORTE partnership?

No

Yes

6. If yes, from which source?

Website

Twitter

Facebook

E-mail

I am a PIANOFORTE partner

Other (please specify)

7. How important is the stakeholder involvement in the PIANOFORTE project to you?

- Very important
- Important
- Somewhat important
- Not at all important
- I don't know/not applicable

8. Please mark those activities for which, in your opinion, it is most important to involve different stakeholder groups:

- Participation in local public meetings on specific radiation protection issues together with researchers and authorities to consider situations of concern
- Individual interviews with public stakeholders on identified situations of radiation protection concern
- To give opinion on radiation protection areas (e.g. medical use of ionizing radiation, emergency and preparedness, radon, etc.) including research topics that should be prioritized in the EU scientific projects
- To give opinion on research priorities in strategic research agendas for radiation protection for the next 10 years
- To be included as participant in research projects where the topic is of mutual concern and outcomes can be improved through such engagement
- To get reported results/outcomes from research projects in a more comprehensive way – and discuss the results achieved in the project
- I don't know/not applicable
- Other (please specify)

9. How would you like to be involved in the stakeholder activities of the PIANOFORTE project?

- By answering this survey
- To be consulted to give your opinion on the research priorities identified for the Open Calls that will be organised within PIANOFORTE
- To be consulted to give your opinion on long-term research objectives and priorities that will be identified in Strategic Research Agendas and Joint Road Maps of the radiation protection platforms
- To be informed about PIANOFORTE results
- To actively participate in the discussion and dissemination of PIANOFORTE activities and results
- I don't know/not applicable
- Other (please specify)

11. In your opinion, the most important improvements needed in the future in our societies, concerning radiation protection, are related to the following aspects:

- Legislative requirements for radiation protection
- Regulatory approaches in different countries concerning radiation protection
- Management practices in different countries concerning radiation protection
- International collaboration in the field of radiation protection
- Research and development and their relationship to regulatory and management practice
- Other (please specify)



PIANOFORTE - Electronic survey

General questions on radiation protection

12. In which area of radiation protection or application of ionising radiation are you most concerned about or involved in?

- Use of ionising radiation in medical diagnostics or treatments
- Use of ionising radiation in research
- Use of ionising radiation in non-nuclear industry
- Use of ionising radiation in nuclear industry, nuclear power plants
- Radioactive waste or spent nuclear fuel and decommissioning
- Environmental radioactivity and radioecology
- Emergency preparedness and recovery
- Naturally occurring radioactive materials (NORM) including radon
- I don't know/not applicable
- Other (please specify)

13. Which of the following medical applications of ionising radiation do you consider as the highest concern/risk with respect to received radiation dose:

- Diagnostic CT (computational tomography scan)
- PET-CT
- Mammography
- X-ray imaging
- Scintigraphy
- Interventional radiology
- Use of ionising radiation in therapeutic purposes
- I do not consider any medical applications of ionising radiation as concern/risk
- I don't know/not applicable
- Other (please specify)

14. How do you consider the use of nuclear power plants (NPPs) for energy production?

- NPPs are highly valuable sources of energy with low carbon footprint, so their work should be supported
- With the threat of climate change, nuclear energy complements renewable energies and still cannot do without it
- The number of NPPs should be reduced by systematic decommissioning in future. Plans should be made at national and international levels
- NPPs are dangerous for the present and future generations
- I am mostly concerned about NPP accidents regarding their operation and maintenance
- I don't know/not applicable

15. Which of the following threats that could lead to emergency situations do you consider as of highest concern/risk:

- Incidents and accidents (including criticality accidents) in nuclear installations (power generation, research reactors, etc.)
- Radioactive waste repositories
- Transport accidents of radioactive material
- Lost/orphan sources
- Terroristic threats involving radioactive material/ionising radiation
- Military installations and operations (including submarines)
- Satellite re-entry with radioactive sources
- Other events involving the non-controlled exposure or spread of radioactivity (Hospitals, Medical & Industrial Isotope Production Facilities, Space Weather, etc.)
- I don't know/not applicable
- Other (please specify)

16. Which of the following statements related to the issues of radioactive waste and decommissioning is of most concern to you:

- Living in the vicinity of radioactive waste and/or decommissioning facilities
- Radioactive pollution and related health and environmental issues for future generations
- Future land use at places that were disposal sites or at decommissioned facilities
- Exposure due to a radioactive release in disposal sites and/or decommissioned facilities
- I don't know/not applicable
- Other (please specify)

17. Do you consider naturally occurring radionuclides as possible source of radiation risk?

- No, it is natural phenomenon
- Yes, but only when enhanced due to human activity
- Yes, always, however not always amendable to control.

18. Have you heard about the naturally occurring radioactive gas radon?

- No
- Yes

If yes, indicate the main source of information (media, social media, authorities, academia, other):

19. Have you ever measured radon at your home?

- No
- Yes

20. What do you think about the available information in your country on the following radiation protection issues?

	Very unsatisfied	Rather unsatisfied	Rather satisfied	Very satisfied	I don't know/not applicable
Ionizing radiation in medical applications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Application of ionizing radiation in research and industries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work and control of nuclear power plants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work and control of non-nuclear industry with radioactive materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radioactive waste, spent fuel and decommissioning processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental radioactivity and radioecology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency and preparedness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NORM & Radon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Please mark your opinion about the actions implemented in your country according to the European Directive 2013/59/Euratom (EU BSS), to protect the health of workers and of the general public from the risks and threats of ionizing radiation from given sources or exposure situations

	Not implemented	Partially implemented	Fully implemented	I don't know
Medical use of ionizing radiation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industrial application of ionising radiation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manufacture, production, processing, handling, disposal, use, storage, holding, transport, import to, and export of	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

radioactive material				
Exposure to orphan sources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NORM involving industries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operation of aircraft and/or spacecraft	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existing exposure from building materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existing exposure of the public and long-term health protection in normal circumstances	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existing exposure resulting from the after-effects of an emergency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existing exposure resulting from radioactive legacy sites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accidental and unintended exposure of lower scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency exposure situations (preparedness, planning of response and management)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radioactive sources (unsealed, sealed, high activity sealed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Do you have or have you had any other types of issues related to radiation protection?



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Background questions

Your e-mail address is requested as a unique identifier to allow the merging of your answers to this survey and follow-up surveys. Your responses, however, will be analyzed anonymously as aggregated data.

23. What is your name?

24. What is your profession?

25. What is your current age?

- Under 18
- 18-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70-79
- 80-89
- 90 or older

* 26. In what country do you live?

27. What is your email address?