EU JUST CT

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EU-JUST-CT

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List of Abbreviations

BSSD	Basic Safety Standards Directive (Council Directive 2013/59/Euratom)
CA	Competent Authority
CDS	Clinical Decision Support
EC	European Commission
EPR	Electronic Patient Record
ESR	European Society of Radiology
EU	European Union
HERCA	Heads of the European Radiological protection Competent Authorities
NCA	National Competent Authority
NDSC	National Decision Support Company
OECD	Organisation for Economic Co-operation and Development
PACS	Picture Archiving and Communication System
POC	Point of Care
QuADRANT	Constant improvement in quality and safety of radiology, radiotherapy and nuclear medicine through clinical audit
RCR	Royal College of Radiologist of the UK
SGQS	Steering Group on Quality and Safety
STUK	Radiation and Nuclear Safety Authority of Finland
WP	Work Package
WGMA	Working Group on Medical Applications
WONCA	World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians

1. Introduction and background

The European Commission Tender 'European co-ordinated action on improving justification of computed tomography' (EU-JUST-CT) was launched in April 2021 with the goal of improving justification of computed tomography in Europe through co-ordinated action. The EU-JUST-CT project is funded by the European Commission's Directorate General for Energy (N° ENER/D3/2020-74).

Ionising radiation is widely used for medical diagnosis and treatment of major diseases, such as cancer and cardiac conditions.

While indispensable for modern medicine, ionising radiation is also a known carcinogen. European legislation (Council Directive 2013/59/EURATOM – BSSD) aims to ensure that the medical uses of ionising radiation are appropriately justified and the radiation protection of patients and medical staff is optimised in line with international principles and guidance.

The BSSD requires medical exposures to be 'justified', to ensure that their health benefit outweighs the individual detriment that the exposure might cause. The Directive further requires individual radiological procedures to be justified in advance taking into account the specific objectives of the procedure and the patient's characteristics and prescribes a justification process under the clinical responsibility of a radiological practitioner and involving the referring physician. The Directive also requests Member States to introduce referral guidelines for medical imaging, which should be made available to the referrers.

The increasing use of computed tomography (CT) in recent years has led to a significant increase in patient radiation doses in advanced economies. CT is now responsible for more than half of the medical radiation exposure of the EU citizens and is a subject of particular concern. Several studies have shown a significant rate of unjustified computed-tomography (CT) exams.

The Council Conclusions on Justification of medical imaging involving exposure to ionising radiation, issued in 2015 call upon Member States to undertake actions to improve the situation, including strengthening the application of clinical audits in relation to justification and the implementation of referral guidelines for medical imaging.

The general objective of the EU-JUST-CT project is to improve the justification of computed tomography in the EU through the development and implementation of common approaches and co-ordinated action in this area among Member States. The work is part of the broader SAMIRA initiative and closely related to the Commission's work on clinical audit e.g. the QuADRANT project.

A specific objective of the project was to organise a workshop as part of WP7 to present the results of the work to the Member States and to allow a discussion on the state of play of justification of CT examinations in the EU and on the needs and opportunities for further action in this area.

The planning and organisation of the workshop was the responsibility of the WP7 team, consisting of project lead B. Brkljačić (University of Zagreb School of Medicine, HR), project co-lead A. Karoussou-Schreiner (Ministry of Health, LU) as well as the contributors A. Brady, J. Sosna, R. Bly, S. Ebdon-Jackson, S. Foley, the Project Office and Steering Group.

The project started on 7 April 2021 and will last until March 2024.

1.1. Target group

The workshop aimed to bring together Member States' health and radiation protection authorities, auditing organisations, and radiology professionals from European countries as well as the relevant European associations and networks, and international organisations active in the subject area. Target groups were thus representatives of national radiology societies, national radiation protection authorities, national health authorities, health professionals, and patient representatives.

1.2. Organisational aspects

The workshop was planned as an in-person event of duration 1.5 days and took place on 28 September 2023, 13:00-17:45 and 29 September from 9:00-16:05 at Hotel Parc Belle-Vue, Luxembourg. Following public demand, remote participation was facilitated and announced on 12-14 September.

1.3. Participation

Total participation (onsite and remote, including speakers, moderators and panellists) amounted to 100 attendees on 28 September and 103 attendees on 29 September.

2. Summary of Sessions

All speakers and panellists were contacted with a request to provide their consent for the sharing of their presentation slides on the EU-JUST-CT website. The relevant slides were thus made available on the webpage http://www.eurosafeimaging.org/eu-just-ct/wp-7 from 9 October to 9 November.

Day 1, 28 September 2023

Session 1 Opening and scene setting

Project office

Aims of the session

The session aimed to provide general information about the workshop as well as the EU-JUST-CT project in the context of other European projects related to radiation protection and against the background of the legal framework regarding justification.

Key points

- The workshop was well attended both onsite and remotely, with broad representation of all target groups and the majority of EU-27 countries (and representatives from Israel, Norway, Switzerland, United Kingdom), as well as European Commission representatives of DG ENER and DG SANTE onsite.
- European legislation on justification of individual medical exposures exists, but awareness and implementation are still lacking in several Member States.
- The EU-JUST-CT project aims to improve the justification of CT in the EU through the development and implementation of a common approach and co-ordinated action and has for this purpose performed audits in seven countries simultaneously. Another completed

goal of the project was the development and discussion of a European guidance document to improve justification of CT examinations.
- The work is part of the broader SAMIRA initiative and closely related to the Commission's work on clinical audit e.g. the QuADRANT project.

Summary of presentations

A. Karoussou-Schreiner, project co-leader, opened the Workshop by briefly introducing herself and project leader B. Brkljačić, and welcomed the onsite and remote participants. 68 individuals from 28 countries had registered for onsite and 45 for remote participation. She particularly welcomed the European Commission DG ENER representatives M. Hübel and G. Simeonov and announced that DG SANTE representative M. Schuppe would join the workshop on Day 2. She also welcomed all representatives of national radiology societies, national radiation protection authorities, national health authorities, international organisations (IAEA), health professionals, patient representatives and the statistician's team from the Gertner Institute in Israel who had analysed the audits. She thanked all online participants for joining as well as all contributors to the project. B. Brkljačić echoed her thanks, pointing out the multidisciplinary character of the EU-JUST-CT project, in which audits were performed in seven countries simultaneously. He also encouraged the remote participants to ask questions or post comments via the Zoom Q&A window or send comments via email.

B. Brkljačić passed the floor to M. Hübel, Head of Unit, Radiation Protection and Nuclear Safety, Directorate General for Energy (DG ENER) to set the scene and provide the policy background.

M. Hübel welcomed everyone on behalf of the European Commission and thanked the project team for the work performed. He started his outline of the policy background by mentioning the Euratom legal framework for radiation protection in medicine, in particular Council Directive 2013/59/Euratom, Basic Safety Standards (BSSD) and Chapter VII, Medical Exposures. He explained the process of implementation of Euratom law in Member States, mentioning the EC's role to help member states in the practical implementation of the framework in the interest of patients. To this end, the EC publishes its Radiation Protection series, including on the topic of justification. He pointed out the 2015 Council Conclusions on justification of medical exposures that were adopted to increase awareness of radiation protection and justification among Member States. This was followed by the EU Beating Cancer Plan and SAMIRA (Strategic Agenda for Medical Ionising Radiation Applications). To steer this, an official advisory group, the SGQS (Steering Group on Quality and Safety) has been set up, where countries are represented by their health and radiation protection authorities. The group's role includes looking at the outcome of projects like EU-JUST-CT and implementation in practice. The SGQS has adopted a first position paper on clinical audit, which is based on the QuADRANT project. He gave an overview of ongoing EU activities on quality and safety of medical applications, such as EU-JUST-CT or EU-REST, which are all aligned with the objectives of the Directive. He concluded by saying that the present project is part of a bigger picture about translating evidence and experience from implementation into better implementation and increased commitment among member states and taking SAMIRA forward. He thanked all those who contributed to the project, which helps the EC to better support Member States in radiation protection.

B. Brkljačić continued by providing an overview of the project scope and work plan, mentioning among other things the increasing number of CT procedures and the collective dose in recent years, the importance and legal aspects of justification and the structure and objectives of the EU-JUST-CT project, namely to collect up-to-date information about justification of CT examinations in Europe, to develop a common methodology for auditing justification of CT examinations, to carry out co-ordinated pilot audits of justification of CT examinations and to discuss the status of justification of CT examinations with the Member States and identify opportunities for further action. He presented the project consortium, work packages, Advisory Group and Steering Group.

He described the establishment of the auditor pool, the development of a common methodology and tools and the coordinated process of carrying out pilot audits of justification of CT examinations based on the ESR iGuide, He presented the participating centres, mentioning that in total, approx. 6,400 referrals had been provided to the auditors. He continued by mentioning the guidance on the implementation of justification in healthcare settings that was developed in the course of the project (see Session 5, S. Ebdon-Jackson). B. Brkljačić concluded by stating that the present workshop was a platform to discuss the audit results with Member States and to identify opportunities for further action.

Summary of discussion

There was no discussion in Session 1.

Conclusions from the session

Awareness of legal aspects of radiation protection and justification still needs to be increased among Member States. The EU-JUST-CT project has contributed to reaching this goal by having carried out pilot audits of justification of CT examinations in seven countries simultaneously based on the ESR iGuide. The EU-JUST-CT project supports the EC's efforts to take SAMIRA forward and to better support Member States in radiation protection. The workshop participants as representatives of the Member States of different relevant bodies are encouraged to share comments and suggestions based on the presentations that will be given.

Session 2 Individual justification of CT practices across Europe

Rapporteur**:** S. Foley

Aims of the session

The session aimed to provide an overview of WP2 (Collection of information about justification of CT examinations in Europe) results of both the literature review and the survey of national competent authorities and European professional societies. Secondly, the panel discussion provided an overview of good practices and barriers to justification in three European countries (Finland, Estonia, Luxembourg).

Key points

- Session 2 gave an overview of WP2 results of both the literature review and the survey of national competent authorities and European professional societies.

Summary of presentations

S. Foley gave an overview of WP2 results of both the literature review and the survey of national competent authorities and European professional societies. He finished by pointing to the resulting publication in Insights into Imaging (https://doi.org/10.1186/s13244-022-01325-1)

R. Bly gave an overview of Finland's interest in the area of CT justification and how the Finnish Radiation and Nuclear Safety Authority (STUK) has guidance in place for justification for referring physicians (2015) and on paediatric CT (2012). A number of research publications have also been published (by Oulu University), the results of which started local discussions on the importance of CT justification. EU-JUST-CT is complementing previous Finnish actions reviewing CT justification. The HERCA inspection week also increased the amount of justification included nationally.

A. Karoussou-Schreiner provided an overview of individual justification practices in Luxembourg, which, as per OECD data, has some of the highest CT rates in Europe. In 2015 the competent authority developed an action plan to reduce the number of inappropriate CT examinations, improve

the quality of patient care and save resources. This involved four axes including clinical audits, education and an awareness campaign as well as inspection of practices. A 2015 audit showed poor completion of referrals. In 2016 an audit of the appropriateness of CT and MRI examinations was carried out and was repeated in 2023. The awareness campaign included advertisements on buses as well as posters within radiology departments, with information additionally sent to referrers. Multilingual posters have been developed for use in radiology departments. A dedicated medical imaging referral form with compulsory fields for clinical information has also been introduced. Additionally, there is now mandatory training for all referrers and practitioners (6 hours). A number of barriers were identified such as the current use of paper referrals rather than digital. There is a lack of access to patients' previous imaging and medical records, and also pressure from the public to facilitate quick and easy access to imaging.

J. Subina provided an overview of Estonian regulations. Family doctors (GPs) may refer for CT but such examinations are not covered by national health insurance. Specific information is required for all imaging referrals and is facilitated by the national PACS, which allows review of previous imaging. Clinical audit is required internally once a year and external audit every 5 years. Regarding the Estonian contribution to the EU-JUST-CT project all data collection was done manually and translation was required to English and vice versa to allow external auditors review.

Summary of discussion

The panel discussion took questions on a variety of topics. Questions on the literature review focussed on whether the quality of the collated audits was assessed – and how comparable results are between publications. S. Foley clarified that the WP2 report on the literature review identified the different methodologies applied and also strengths and weaknesses of different approaches. The heterogeneity of studies meant direct comparison was difficult. Regarding clinical decision support system implementation, it was evident from the survey that clinical decision support (CDS) was not widely available and although referral guidelines are available, they are not regularly used and perhaps unless embedded into the referral workflow their use may be limited. Questions arose as to the benefits of having a standard methodology for auditing CT justification or whether this required additional workload for those countries who already have methodologies in place. There was agreement as to the benefits of a standard approach to facilitate comparisons between countries/regions, as a valuable resource for those countries/regions wishing to start such audits – to avoid needless reinvention and finally to increase awareness of the importance of justification within radiology and CT specifically. G. Simeonov queried how Luxembourg had implemented mandatory training for all referrers in justification. For context it was pointed out that the initial draft of the BSS included a requirement for mandatory training although this was rejected by Member States and the final BSS Directive recommended (but not compelled) such education and training. A. Karoussou-Schreiner answered that Luxembourg took advantage of the transposition of the BSS to ensure that a new requirement was added to ensure this training was mandated nationally. A question arose as to the methodology applied to assess CT justification – whether medical records were reviewed etc as despite the low rates of justification reported it is typical that there may well be other information communicated outside of the radiology referral (e.g. during telephone calls etc) and thus perhaps this may lead to underestimation of real justification rates. Finally, a question was posed as to how medico-legal referrals are handled as there may not be a clear justification for such imaging but local resources (e.g. lack of hospital beds) may lead to referrals to reassure clinicians prior to discharging patients. This must be addressed locally and practitioners must be satisfied that there is a clinical need for examinations.

Actions to take / Conclusions from the session

A large heterogeneity exists regarding justification of individual CT examinations across Europe. To improve individual justification requires a multi-factorial approach, involving education and training,

as well as workflow engineering and clinical audit. CDS systems may better ensure practical implementation of guidelines.

Session 3 EU-JUST-CT pilot audits: methodology and participation

Rapporteur**:** A. Karoussou-Schreiner

Aims of the session

The aims of this session were to present in detail the audit methodology, the standard, the results from the pilot audits, the results from the survey completed by the participating centres as well as to discuss the experience of pilot audit participants.

Key points

- A common methodology for the pilot audits was developed
- Pilot audits were carried out in seven European countries
- The results show variation in the appropriateness of CT examinations between countries
- Efforts still need to be made to implement the process of justification
- The establishment and use of IT tools as well as written protocols can help with the implementation of justification

Summary of presentations

1. **Audit methodology and tools and auditor workflow (A. Karoussou-Schreiner)**

This presentation describes the methodology used for the pilot audits on the appropriateness of CT examinations carried out in the seven participating countries. The methodology used for similar audits carried out in Northern Ireland and Luxembourg was adopted and adapted. The imaging referral guidelines of the ESR, embedded in the ESR iGuide, were used as a standard for the audits. 1,000 referrals of previously performed CT examinations were sampled for a specific date/dates in each participating country. Each referral was audited by two auditors. Each country had four auditors who completed a special spreadsheet with data obtained from each referral. Data analysis was carried out by statisticians in order to obtain the percentage of appropriateness of CT examinations according to a number of well-defined variables. Following the agreed methodology, rejected requests and previous imaging were not included.

2. **Standard: ESR iGuide clinical decision support tool (B. Brkljačić)**

In this presentation a description of the standard used for the pilot audits was given. ESR iGuide is an online web portal that recommends the most appropriate imaging tests based on patient demographic data, providing information on the level of appropriateness, estimated cost, and expected radiation exposure. The guidelines are developed by leading American and European radiologists and are evidence based. ESR's iGuide is an effective tool for selecting the most appropriate imaging study at the point of care. It can improve patient care and decrease unnecessary radiation.

3. **Results of EU-JUST-CT pilot audits of justification of CT (J. Sosna)**

In this presentation the results of the pilot audits on the appropriateness of CT examinations in seven countries were presented. The participating countries were Belgium, Denmark, Estonia, Finland, Greece, Hungary and Slovenia. For each country the results were presented according to private or public institution, inpatient or outpatient, gender, anatomical region, referrer specialty and adult or paediatric population. The results from the pilot audits show that appropriateness of CT examinations varies between the countries.

4. **Results of hospital survey and correlation with results (B. Brkljačić)**

In this presentation the results from a survey that was completed by the participating centres of each country were presented. The aim of the survey was to understand the implementation of the justification process in each centre. The survey questioned the existence of written protocols describing the process of justification, the assignment and documentation of responsibilities, the evaluation of the referral, the existence and use of referral guidelines as well as the availability of MRI. The results of the survey showed that there is a correlation between justification efforts in specific countries and the audit results.

5. **Panel: Experience reports of pilot audit participants**
   Participating hospitals – Estonia (M. Reim)
   Participating NCAs – Greece (C. Pafilis), Hungary (R. Elek)
   Participating Auditors – Belgium (A. Baetslé), Slovenia (M. Marolt Mušič)

For this panel session participating hospitals, NCAs and auditors were able to give feedback on their experience of the pilot audits. A representative of the participating hospitals in Estonia gave feedback. In general, the feedback from the hospitals was good. They did however need to have the agreement from the ethics committee in order to participate in the project. Some difficulty with the translation of clinical indications was encountered. The NCA representative from Hungary presented his experience with the audits. He presented how the participating centres were selected and how the referrals were collected. Two participating auditors, one from Belgium and one from Slovenia, gave their feedback. The ESR iGuide is lacking some specific clinical indications in oncology, especially in rare cancers, and update of the ESR iGuide in this field is desirable. However, in most instances it is easy to determine appropriateness of referrals based on clinical data. ESR iGuide includes an oncology matrix with unscored rules adaptable for local guidance for those indications where ACR and ESR have not yet published guidelines. For the purposes of EU-JUST-CT, unscored rules were excluded. The ESR plans to provide more comprehensive scored guidance for oncology indications that currently do not have appropriateness scores in future. Referrals without a clinical indication are by definition not justified, as medical appropriateness can only be assessed based on the clinical information provided. Paediatric CT examinations were low in number. They also discussed the influence of the availability of MRI.

Summary of discussion

The methodology used to assess appropriateness of referrals for CT was very good and the results of the pilot audits were comprehensive. It was agreed that developing a common methodology for clinical audits in European countries would be a worthwhile objective. EU-JUST-CT is a valuable example of clinical audit. There is a need for developing IT tools to help with the implementation of the process of justification. Digital request forms, clinical decision support systems and national PACS systems can all help with justification.

Actions to take / Conclusions from the session

The development of one common methodology for the pilot audits carried out in the EU-JUST-CT project can be used as an example for the development a common methodology for other types of clinical audits in European countries. The ESR iGuide is an effective tool for selecting the most appropriate imaging examination and is a good standard to use when auditing appropriateness of imaging examinations. The results from the pilot audits show that there is a variation in appropriateness of CT examinations between the countries. It is clear that efforts still have to be made to improve the implementation of the justification process in some countries. It has been shown that there is a correlation between the existence of written procedures that describe the process of justification in imaging departments and the appropriateness of CT examinations.

Session 4 Country reports on recent or planned audits of CT justification

Rapporteur**:** R. Bly

Aims of the session

In this session four EU countries were invited to present their experiences on recent or planned audits of CT justifications. The aim was to share methods for conducting audits and available results of them.

Key points

- Auditing should be a regular tool for improvement.
- National projects on audits on justification or appropriateness of CT referrals have been carried out by radiologists by using a clinical decision support system (ESR iGuide).
- The audits conducted on the appropriateness of CT referrals indicate that a large number of the referrals have potential for improvement.
- Auditing results should be communicated to hospitals and utilised for taking further actions for improvement.

Summary of presentations

A. Bouëtté presented experiences from Luxembourg, where appropriateness of CT and MRI referrals were audited in both 2016 and 2023. In Luxembourg, the French referral guidance is utilised. During the audit process, two auditors evaluated each referral. In 2016, they engaged in discussions to reach a consensus, whereas in 2023, this step was omitted.

The findings of the audit revealed notable progress in the appropriateness of CT referrals between 2016 and 2023, with an increase from 61% to 75%. However, there was no significant observed change in the practice of MRI referrals, remaining at 78% in 2016 and 80% in 2023. The results indicated that CT requests from medical specialists were more likely to be justified compared to those from general practitioners (GPs). Additionally, paediatric CT referrals demonstrated better results than adult CT referrals. Areas that showed potential for improvement included spinal, extremity, and head CT referrals. It is worth noting that substitution was feasible for all inappropriate CT referrals, highlighting an opportunity for improvement.

H. Ståhlbrandt from Sweden presented the findings of a study that audited the appropriateness of adult CT and MRI referrals in October 2021 across four healthcare regions in Sweden. The study utilised the ESR iGuide web portal as a reference, which was translated into Swedish. Due to variations in coding systems among healthcare districts, a significant recoding effort was undertaken, resulting in approximately 13,000 codes. Automatic processing for ESR iGuide takes into account only the reason for the exam, not the past patient history. The study exclusively relied on the ESR iGuide tool without the involvement of auditors. The results of the study demonstrated the feasibility of utilising the ESR iGuide with additional automatic processing tools for retrospective appropriateness analyses of large datasets. In the national CT and MRI audit in Sweden that was presented, a semi-automated data processing tool provided by the ESR was used to process electronic referrals, and it was suggested that ESR iGuide could be used with additional automatic processing tools for retrospective appropriateness analysis of large datasets in the future.

The study successfully mapped 93% of referrals to ESR iGuide, which is a significant achievement. The results indicated that 56% of the referrals matched the recommended indications. In 14% of cases, the referrals were generally deemed inappropriate, while in 23% of cases, the referrals had the potential to be appropriate. The majority, 63%, of referrals were found to be usually appropriate. Notably, referrals for the lowest age groups demonstrated the highest level of appropriateness, while no significant gender differences were observed. Primary care referrals showed lower levels of appropriateness compared to other sources. Among the inappropriate referrals, no more appropriate

exam was available in 2%. Regional variations were identified, suggesting the need for national guidelines that are easily accessible to improve the overall situation.

T. Hrubá from Slovakia introduced a draft regulation for clinical auditing. The completion of the Decree of the Ministry of Health is awaited to finalise the auditing process. The Ministry of Health will serve as the responsible body for conducting the audits. The composition of the auditing team and the rules for audit performance will be regulated accordingly. Commissions of experts for clinical audits in specific areas are being prepared, with assistance from the Slovak Radiological Society. A commission comprising 6 experts has already been established for the CT audit. The initial audit will focus on assessing the justification of CT procedures.

During the presentation by E. Mille from Germany, a system for auditing was discussed. In Germany, there is a federal law that is enforced across 16 states, with one or more competent authorities (CAs) responsible for implementation in each state. Since 1987, medical bodies have been mandated by the CAs to ensure compliance. Practitioners are required to obtain a licence from the CA, which notifies the designated medical body responsible for conducting biennial audits. These medical bodies report their findings to the CAs, who have the authority to request an audit before the scheduled two-year interval if necessary. In cases where severe deficiencies are identified, it is possible to report the matter to the body responsible for quality assurance in social insurance. Notably, one of the most common findings in 2022 audits was the lack of proper justification.

Summary of discussion

The discussion primarily revolved around the audit experiences conducted in Luxembourg and Sweden. It was noted that there is no available data in Luxembourg regarding any changes in the number of examinations between 2016 and 2023. Rejection of referrals was found to be very rare, as it is generally easier to substitute one examination with another. While the results in Luxembourg were not particularly favourable, the method employed in the audits demonstrated robustness. The hospitals will receive both the national report and their own individual results. It was suggested that in Luxembourg, it may be beneficial to focus more on the hospitals that exhibited poorer results. G. Simeonov emphasised that the data from these studies is accessible to all authorities, and it is important for each county to consider how to utilize this information effectively.

The Swedish experience of utilizing ESR iGuide proved to be highly interesting for the participants. The process involved the conversion of referrals into the ESR iGuide through the assistance of an ESR iGuide expert, utilising a computerised approach. The information from healthcare regions was gathered using excel sheets, and the entire transformation process, including mapping, was completed within a span of approximately two days. This rapid turnaround time was considered remarkably efficient.

H. Ståhlbrandt highlighted the presence of numerous instances where more suitable examinations could be conducted. By integrating referral guidance into the system, it would automatically suggest more appropriate examinations. She is currently in the process of drafting a paper that outlines the indications of inappropriate or not appropriate examinations. It is important to note that the study did not involve cancer patients, and therefore, the repetition of examinations for this specific group was not a contributing factor to the occurrence of inappropriate examinations.

During the discussion, the perspective of patients regarding the balance between benefits and drawbacks was also taken into account. S. Steve Ebdon-Jackson emphasised the significance of symptom-free periods for cancer patients, where the exact definition of benefits may not be clearly defined. The topic of repetitive imaging was brought up, with G. Frija highlighting the absence of a consensus regarding a threshold of 100 mSv. G. Simeonov stressed the importance of paying attention to follow-up imaging, even in the absence of conclusive scientific evidence. It was also noted that other crucial groups, such as adolescents, should be considered in these discussions.

Actions to take / Conclusions from the session

The audits conducted on the appropriateness of CT referrals in Luxembourg and Sweden indicate that approximately one quarter of the referrals have potential for improvement. Two different auditing methods proved useful. In Sweden, an impressive 93% of referrals were successfully mapped to the ESR iGuide, which was translated into Swedish. It is important to note that the Swedish verification of appropriateness was carried out independently from radiologists. In Luxembourg it was also noted that justification seems to be better for younger patients and that justification seems to be better when the referrer is a medical specialist rather than a GP.

Session 5 How to improve implementation of justification in healthcare settings and ensure uptake of EU-JUST-CT findings and recommendations

Rapporteur: H. Waltenburg

Aims of the session

To present the guidelines developed in the EU-JUST-CT project as well as getting inputs from a broad range of stakeholders on the difficulties encountered in securing justification and on the ways forward.

Key points

- Defining and recognising the responsibilities of different groups in the justification process is key
- In communication with referrers and others it is important to point out that in most cases where the proposed imaging is not appropriate, the alternative is not no imaging, but better imaging
- Imaging referral guidelines are important, while the full impact will only be realised if the guidelines are integrated at the point of care
- Follow up the implementation of justification processes through clinical audit

Summary of presentations

S. Ebdon-Jackson presented the EU-JUST-CT guidance document as of August 2023 which is primarily intended for the management and staff of radiology departments. After setting the scene through the requirements from the Euratom BSSD, the importance of the different responsibilities in the process of justification of individual exposures of patients, including CT exposures was highlighted. The referrer has an important role in assessing the patient and based on this assessment providing the necessary clinical information in the referral. Up-to-date referral guidelines, preferably integrated in clinical decision support systems, are required tools for the referrer.

The practitioner, in general a radiologist, has the role of justifying the exposure. Education and training regarding appropriateness, radiation protection and legal responsibilities are key elements for all involved in justification of CT exposures. In this way, radiologists are better equipped to actually justify examinations, as opposed to merely vetting referrals.

Regarding the practical implementation of the justification process, it was stressed that acting in accordance with roles and responsibilities is very important, as is providing opportunities for dialogue between referrer, radiologist and radiology department staff. In some cases, the referrer and practitioner are the same person, but it is still important to focus on the role in each step.

Finally, the importance of following up the justification processes through clinical audit was highlighted.

R. Killeen presented experiences from Ireland with implementing point of care clinical decision support (POC CDS) in a hospital. Stand-alone referral guidelines have been (and still are) available in Ireland, but major changes in referral habits were only seen after incorporating the referral guidelines directly into the referral workflow through POC CDS. It was clearly demonstrated that introduction of POC CDS reduced the number of CT scans, in particular by reducing the number of unnecessary duplicate scans. It was also observed that referral habits reverted when the POC CDS was unavailable for a period of a few months due to a cyber-attack. The results of this study indicate that POC CDS has the potential to reduce the number of imaging procedures sufficiently to remove the current waiting lists in Ireland.

A. Karoussou-Schreiner presented the expectations of regulators, primarily through the work of HERCA. HERCA WGMA initiatives regarding individual justification include a position paper, workshops for inspectors, an action week with inspections and an awareness campaign.

During inspections, hospitals are expected to present written procedures addressing all elements of the justification process and to demonstrate that a practitioner evaluates referrals before any examination is carried out, to decide if the examination is justified or it should be either rejected or substituted with another examination. Referral guidelines, clinical audit as well as education and training are also addressed in inspections.

A. Brady (pre-recorded lecture) promoted the many roles of professional societies in the work with referral guidelines: generation/adoption, dissemination and incorporation into referral systems. Additionally, the acceptance of guidelines may be improved through liaisons with referrer professional societies.

The importance of professional societies in assuring appropriate use of CT scanning in individual health assessments was particularly highlighted. Closer cooperation between national radiological societies and competent authorities was proposed to ensure consistency of understanding.

B. Brkljačić addressed the challenges of the radiology department, for instance due to massive expectations from many stakeholders and a lack of sufficient radiologists in several countries. The importance of and some obstacles in going from “Volume-based” radiology to “Value-based” radiology were presented. Incomplete referrals are common obstacles, and access to guidelines at the point of care was again stressed as a means for improvement. Ensuring that the referrer has the incentive to use guidelines is very important.

Imaging is a key element in many clinical pathways, but in some cases the expectations of patients are too firmly set already in initial consultations. Involvement of and decisions by patients should be based on clear and concise information.

The specific needs for very clear allocations of responsibilities when using teleradiology was stressed. Artificial intelligence is providing new tools and may prove to be a game changer not so far into the future.

E. Briers presented the patient’s perspective, starting out by thanking for the large amount of work carried out to help patients. The difficulties in risk perception, not the least when balancing risks and benefits, was presented, and again communication was recognised as being of paramount importance. Patients have confidence in doctors, while doctors also need to acknowledge the patients’ needs.

O. Holmberg (IAEA) took a long perspective, pointing to the fact that while protection of radiation workers has been considered since the first international radiation protection recommendations, protection of patients has only been properly expanded in the later years, although medical uses were among the earliest to appear and are by far the dominating source of exposure from man-made sources. In recent years, international organisations have devoted focus to medical exposures, including the issue of justification, in meetings, guidelines and training efforts. A continued focus is still needed for justification to improve.

Summary of discussion

There was no discussion in this part of Session 5.

Actions to take / Conclusions from the session

Policies and procedures for justification need to be established and implemented, with clearly defined and recognised responsibilities of different groups of healthcare professionals. Digital tools such as clinical decision support systems and upcoming artificial intelligence systems have great potential for helping both referrers and practitioners. Communication within the patient-referrer-practitioner chain is of paramount importance.

Session 5 cont'd How to improve implementation of justification in healthcare settings and ensure uptake of EU-JUST-CT findings and recommendations

Rapporteur**:** G. Simantirakis

Aims of the session

To provide the perspective of all the parties that are involved in the process of justification during a panel discussion in order to identify ways of implementing the project's findings and recommendations.

Key points

Strategies to reduce inappropriate use of CT exams should be based on the tree pillars of 1) Regulations, 2) Communication and coordination and 3) Knowledge and skills.

- Financial aspects are important factors concerning the excessive use of CT. A change from a "volume based" to a "value based" system is essential
- Lack of human resources and of alternative imaging modalities (e.g. MRI, ultrasound) can lead to unjustified use of CT
- Actions for awareness creation and patient education on the proper use of CT exams can greatly contribute
- Availability of referral guidelines or, even better, an integrated Clinical Decision Support (CDS) system can play a key role in the justification process

Summary of presentations

R. Asenova represented WONCA Europe (World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians) and provided the referrer's perspective of the justification process. She mentioned that decision-making should be based on the best available research evidence, on population characteristics, needs, values and preferences and on the available resources, including practitioner expertise. She presented a WONCA position paper on overdiagnosis and actions to be taken. Finally, she emphasised that strategies to reduce inappropriate use of CT examinations should be based on the tree pillars of 1) Regulations, 2) Communication and coordination and 3) Knowledge and skills.

R. Klöckner provided the radiologist's perspective during the panel discussion. He stressed that improving justification of CT examinations is a multi-component task and that financial aspects are important factors concerning the excessive use of CT, especially in the private sector. A change from a "volume based" to a "value based" system is essential in order to improve the justification process.

The radiographer's perspective was provided by A. Kaučič, who mentioned that the assessment of all referral notes in terms of justification by a radiologist is not always possible, since their number is limited and they are occupied with other duties as well. Moreover, there are cases where CT facilities work without the presence of a radiologist, as the diagnosis is performed remotely, a fact that

increases the number of unjustified examinations. He also pointed out that radiologists and radiographers are often under pressure by the referring doctors or even by the patients to perform additional exams or exam phases. Finally, the shortage of MRI, which is sometimes more appropriate than CT, was emphasised.

E. Briers provided the patient's perspective on the justification process. He stressed that even the patient can contribute to the process, as long as there is proper communication with the prescriber and the personnel of the CT facility. He also mentioned the importance of the patient being informed about possible changes of the prescribed CT examination before they present themselves in the facility for the examination. Finally, he mentioned that some CT examinations could be avoided if the patient had access to records of previous examinations performed in other facilities.

The national health authority/service provider perspective was provided by the Belgian representative, N. Reynders-Frederix. He presented actions undertaken in Belgium for public information and awareness creation and for stakeholder collaboration that can play a crucial role in the proper use of CT. The importance of the availability of referral guidelines and, even better, an integrated CDS system was pointed out. The latter, combined with a system of electronic referrals, gives the opportunity for an effective and early assessment of a prescribed examination in terms of justification, before patients present themselves in the CT department.

Finally, the national competent authority perspective was provided by the Slovenian representative D. Žontar, who joined the workshop remotely. He outlined the problems with the proper implementation of the justification principle and presented actions that can be undertaken by the competent authorities in order to reduce inappropriate use of CT. The importance of clinical audits and of the availability of referral guidelines was pointed out. Finally, it was stressed that the results of the EU-JUST-CT project are very valuable for competent authorities, as a clear methodology and a well-defined standard of reference is provided for the evaluation of the proper use of CT.

Summary of discussion

During the discussion, the importance of the use of integrated CDS systems was again pointed out. It was also mentioned that the familiarisation of radiographers with referral guidelines could contribute to avoiding unnecessary examinations. Moreover, it was mentioned that defensive medicine combined with lack of clinical competence is an important contributor in the excessive use of CT. Finally, the importance of a holistic approach towards better implementation of justification was emphasised.

Actions to take / Conclusions from the session

The panel discussion identified ways of implementing the project's findings and enhancing the use of the justification principle. The availability of referral guidelines, especially in integrated CDS system format can play a key role. A holistic approach that would involve healthcare settings, national authorities and the public seems necessary towards the optimum implementation of justification in CT.

Session 6 Moving forward: Needs and opportunities for further action

Rapporteur**:** B. Brkljačić

Aims of the session

To present a summary of the discussions during the workshop and recommendations arising thereof, to provide an outlook on the next steps of the project, to present opportunities for future work on justification, including within the SAMIRA Action Plan, and for speakers and the audience to make final remarks.

Key points

- A correlation exists between justification efforts and audit results and between the availability of written procedures for justification and appropriateness.
- The EU-JUST-CT project as an incentive for authorities to enhance justification efforts
- Avoiding inappropriate imaging (= imaging that does not contribute to appropriate patient care) will become increasingly important
- Potential of AI: integration in the CDS to allow a faster justification process and to free up time of radiologists for individual patient care, patients and radiologists becoming equal partners.
- EC commitment to continued support of audits and work on justification.

Summary of presentations

B. Brkljačić presented a summary of the workshop discussions and recommendations, starting with the following findings from the project: The audit results suggest that a correlation exists between justification efforts and audit results. So far, considerable justification efforts have been made in Belgium, Denmark and Finland, which showed the best results within the project, with the highest scores of appropriate and lowest scores of inappropriate exams as well as very low figures of examinations that could not be scored due to lacking or insufficient data in the referral. B. Brkljačić outlined the activities performed in Estonia, Greece, Hungary and Slovenia. He mentioned that Estonia plans to establish a body for external audits as well as a national procedure for clinical audits and that Slovenia plans to use the findings of the EU-JUST-CT project as a basis for a formal audit on CT justification. Overall, it remains to be hoped that the results of the EU-JUST-CT project will incentivise authorities in relevant countries to increase efforts regarding the implementation of justification, especially to reduce the rate of referrals with no or insufficient data.

Lessons learned from the project and recommendations for countries wishing to carry out audits relate mostly to the auditors' time resources and preparedness to learn how to use the ESR iGuide and to the quality of the referrals. The latter is crucial to the audit process and varied considerably between countries according to the project's arbitration team, showing room for improvement in certain countries.

The survey responses received from centres to be audited revealed a correlation between the availability of written procedures for justification and appropriateness. Another finding of the mentioned survey is the fact that CDS is either fully or partially available in only 40% of facilities that have referral guidelines available. Even for countries with the best results, the answers demonstrate that guidelines are not used extensively, especially not in the form of a CDS system available to referrers, which would however considerably facilitate the process. It was noted that justification was not necessarily best when CDS was available but related more to good access to previous imaging, comprehensive information on referrals and good communication between all relevant parties including patient, referrer and radiologist.
For the future, AI integration in the CDS is being investigated to allow a faster justification process.

The EU-JUST-CT project has also demonstrated the importance of involving radiation protection authorities, of carrying out awareness campaigns and of educating referrers about their legal obligations, with referrers and radiologists having shared responsibilities. Moreover, national audits should be performed, using the EU-JUST-CT methodology. B. Brkljačić pointed out the importance of a standard approach and the benefits of a uniform methodology that can be used for clinical audit. He also underlined the value of training on justification for medical professionals as well as the benefits of activities by NCAs and other stakeholders to improve justification, as shown by the example of Luxembourg.

The issue of self-referrals was mentioned as a topic to be dealt with in the future.

Some further improvements of the ESR iGuide are needed, e.g., regarding oncology and COVID-19, which is already taken care of. A COVID-package (linking especially lung indications to searches for COVID, Corona, etc.) was developed by ACR/NDSC and is available in ESR iGuide as well, but has only been deployed to individual organisations when requested. The systematic incorporation of oncologic imaging guidelines is planned by the ESR (oncology indications currently exist as unscored rules for clinical practice implementation, but are not suitable for retrospective audits.) An important question raised by J. Sosna during the present workshop is whether the ESR iGuide can be used for justification when the radiologists is absent at the location where the imaging is performed, e.g., in hospitals using teleradiology.

A. Karoussou-Schreiner outlined the next steps of the EU-JUST-CT Project, which include the preparation of the workshop proceedings capturing the valuable feedback and input received during the present workshop. The final proceedings will be published on the project website following relevant review and approval procedures. Workshop attendees will be notified as soon as the final proceedings are available. In addition, the final project report will be prepared by the end of November, including the finalised analysis of the audits and the final guidance document.
Following approval of the final report including the final analysis of the audits by the EC, a publication in the Radiation Protection series is envisaged in two parts: Part 1 will consist of an executive summary, the final analysis report of the audits, the final methodology and a link to the workshop proceedings. Part 2 will be the Final Guidance Document to assist radiology departments in improving justification. Furthermore, it is envisaged that the project team and the participating countries publish the results in peer-reviewed journals in alignment with all involved players.
Dissemination efforts, e.g., via a session during ECR 2024, will continue after conclusion of the project to ensure impact and sustainability. As B. Brkljačić had mentioned, several countries are interested in performing audits nationally. Furthermore, involvement in and contribution to follow-up actions under the SAMIRA framework are envisaged as appropriate (e.g., clinical audit).

S. Ebdon-Jackson presented opportunities for future work on justification, including the impact of AI and advanced clinical support tools. He outlined the background, mentioning The Royal College of Radiologists referral guidelines “Making the best use of clinical radiology” that were introduced in 1989, when CT was a scare resource. These guidelines were, however, referral not justification guidelines, which has not changed, and were stand-alone guidelines primarily intended for diagnosis, which was consistent with the way CT was used at that time. In the 1990s, parallel healthcare pathways started to be developed. They were specialty developed and stand-alone (not integrated into imaging department referral guidelines). Some of these pathways, with imaging embedded, had greater value for care pathways and multiple imaging.
Regarding future developments, S. Ebdon-Jackson mentioned that efforts had been made to integrate radiology and specialty imaging guidelines, which still has room for improvement regarding multiple imaging. Comprehensive CDS and requesting systems should become the standard of care, and big data will be needed. The aim is to focus on the individual patient.
He saw a certain potential of AI powered decision support systems for the future. So far, there are hardly any publications on how AI influences justification. Better population data, individual patient data and electronic patient records (EPR) will be needed. Other important factors are data security and public acceptance.
Opportunities for future work on justification are improvements of imaging guidelines throughout the care pathway, consistency and flexibility for individual patients and personalised medicine. Avoiding inappropriate imaging (= imaging that does not contribute to appropriate patient care) is another topic for the future, namely the reduction of inappropriate imaging, i.e., imaging that does not contribute to appropriate patient care, which will ensure that scarce resources are applied where they are most needed and ideally free up resources for radiologists to dedicate more time to individual patient care.

In terms of way forward and conclusions, public confidence needs to be improved, and comprehensive EPRs as well as integrated imaging guidelines are required for the complete care pathway. In view of future AI driven systems, checks and balances as well as resources need to be in place for patient input and clinical specialist review.

G. Simeonov, Radiation Protection and Nuclear Safety Unit, Directorate General for Energy (DG ENER), presented opportunities for future work on justification within the SAMIRA Action Plan. Referring to the previous talk on AI, he mentioned that DG ENER's relations with DG Connect will become increasingly important.

He outlined the three pillars of SAMIRA one of them being quality and safety, and mentioned the Steering Group on Quality and Safety (SGQS), as well as the EU-JUST-CT project as one of the ongoing activities, most of which are not about justification. He also mentioned the ongoing European Union Radiation, Education, Staffing & Training (EU-REST) study, which is coordinated by the ESR just as the EU-JUST-CT project and noted that the Radiation Protection Series No. 175 (Guidelines on radiation protection education and training of medical professionals in the European Union) is a result from another project and also mention justification.

Regarding future SAMIRA activities on Quality and Safety of medical applications, he mentioned an action grant under the EU4Health programme on clinical audit, which builds on the results of QuADRANT and EU-JUST-CT. Other future SAMIRA activities are exploring the concept of Key Performance Indicators (KPIs) on Quality and Safety of medical applications of ionising radiation, for which a request for services has been issued, and the Joint Action "Preparatory activities on quality and safety of medical applications of ionising radiation".

Summary of discussions

In reply to the question from participating countries when they may share and publish their data, G. Simeonov stated that the EC will need to look more closely at the final presentations, but that he generally did not see any obstacles in sharing the data with the NCAs, and that it is then up to them how to share the data internally with the hospitals etc. The question when countries can issue a public announcement or news item and share the results with the auditors still has to be discussed in more detail within the project.

By way of closing remarks, G. Simeonov appreciated the enthusiasm and interest during the workshop as well as several countries' interest to use the results. He underlined the EC's intention to continue supporting audits and work on justification. Regarding the next steps, he referred to the Radiation Protection series as mentioned by A. Karoussou-Schreiner, and the planned discussions with the Article 31 Group of Experts in November regarding the publication as well as the SGQS group regarding the appropriate way to take the results forward.

He thanked everyone involved in the EU-JUST-CT project and the workshop, including the project team and office, the NCAs, clinicians, the technical team onsite and the audience for their active participation.

B. Brkljačić announced that the presentations will be on the website for a limited time. On A. Karoussou-Schreiner's and his behalf, he thanked all participants, NCAs and national society representatives, statisticians, project office, technicians and everyone involved, and announced that the next EU-JUST-CT session will be held during ECR 2024 in Vienna.

Actions to take / Conclusions from the session

It is hoped that the results of the EU-JUST-CT project will incentivise national authorities to increase efforts towards justification. The latter could be facilitated by the increased use of guidelines, especially in the form of a CDS system, potentially by the integration of AI in the CDS, by training medical professionals on justification as well as by activities by NCAs and all stakeholders. Several

countries are interested in performing national audits and are encouraged to apply the EU-JUST-CT methodology for this purpose. Some further improvements of the ESR iGuide have been identified. Avoiding unjustified examinations will be an important topic for the future, namely the reduction of inappropriate imaging. The EC is committed to continue supporting audits and work on justification. Upon conclusion of the EU-JUST-CT project, publications and ongoing dissemination activities as well as involvement in and contribution to follow-up actions under the SAMIRA framework are envisaged as appropriate.

3. Conclusions

The EU-JUST-CT workshop offered an opportunity to representatives of national radiology societies, national radiation protection authorities, national health authorities, health professionals and patient representatives from EU member states to learn about the state of play of justification of CT examinations in the EU. As part of the EU-JUST-CT project, it was the first time that the same methodology for auditing justification of CT examinations was used simultaneously in seven EU countries with the ESR iGuide as a reference standard. This was possible thanks to the excellent collaboration between national radiology societies, national competent authorities and hospitals of the countries involved as well as the auditors, who audited over 6,400 referrals.

The workshop generated considerable interest, strengthening the hope that the results will encourage other Member States to carry out audits on their CT justification using the methodology developed and employed within the EU-JUST-CT project, which is freely available on the EU-JUST-CT website. This would be of particular importance as the level of compliance with the BSSD still shows room for improvement and awareness of legal aspects of radiation protection and justification needs to be increased among Member States. In line with the EC's intention to continue supporting audits and work on justification, the EU-JUST-CT project supports the EC's efforts towards better implementation and increased commitment among Member States and to take the SAMIRA initiative forward.

The presentations and panel discussion about individual justification of CT practices across Europe revealed that heterogeneity exists regarding justification of individual CT examinations across Europe and that improving individual justification requires a multi-factorial approach, involving education and training, as well as workflow engineering and clinical audit. CDS systems may support the practical implementation of guidelines.

The session and panel discussion on EU-JUST-CT pilot audits: methodology and participation revealed considerable variation between countries in terms of appropriateness of CT examinations as well as the need for further efforts to implement justification, e.g., by the development and use of IT tools and written protocols to support the implementation of justification. Moreover, the methodology developed for the EU-JUST-CT project can be used as an example for the development of other common methodologies for clinical audits in European countries. The ESR iGuide is an effective tool for selecting the most appropriate imaging examination and a suitable standard for auditing appropriateness of imaging examinations.

The reports from four country representatives on recent or planned audits of CT justification suggested that audit should be a regular tool for improvement and that audit results should be communicated to hospitals and utilised for further actions for improvement.

Presentations and discussions about how to improve implementation of justification in healthcare settings and ensure uptake of EU-JUST-CT findings and recommendations revealed that policies and procedures for justification need to be established and implemented, with clearly defined and recognised responsibilities of different groups of healthcare professionals. Digital tools such as clinical decision support systems and upcoming AI systems have great potential to help both

referrers and practitioners. Communication within the patient-referrer-practitioner chain is of paramount importance.

Possible reasons for the unjustified use of CT include financial aspects, which requires a change from a “volume based” to a “value based” approach, as well as lack of human resources and alternative imaging modalities such as MRI or ultrasound. Awareness campaigns on the one hand and the availability of referral guidelines, especially in integrated CDS system format, on the other hand can help reduce unjustified CTs. A holistic approach involving healthcare settings, national authorities and the public seems necessary for the optimal implementation of CT justification.

In terms of moving forward, the lively discussions and interest among the audience in performing national audits applying the EU-JUST-CT methodology nurture the hope that the results of the EU-JUST-CT project will incentivise national authorities to enhance efforts towards justification, e.g., by the increased use of guidelines, ideally in the form of a CDS system, by training medical professionals on justification and by awareness raising and other activities by NCAs and relevant stakeholders.
The final steps of the EU-JUST-CT project foresee a publication in the EC Radiation Protection series. In terms of project sustainability, further publications and ongoing dissemination activities as well as involvement in and contribution to follow-up actions under the SAMIRA framework are envisaged as appropriate beyond the scheduled end of the EU-JUST-CT project in March 2024.

4. Appendices

Appendix 1: Final Workshop Programme

Day 1: Thursday, 28 September 2023

Session 1 Opening and scene setting

Moderators: A. Karoussou-Schreiner & B. Brkljačić

13.00-13.10 Welcome by the European Commission and the Contractor (M. Hübel, B. Brkljačić)

13.10-13.25 Scene setting and policy background by the EC (M. Hübel)

13.25-13.40 Introduction to the EU-JUST-CT Project (B. Brkljačić)

Overview of project scope and work plan

Session 2 Individual justification of CT practices across Europe

Moderators: K. van Slambrouck & G. Frija

Rapporteur: S. Foley

13.40-14.00 Results of the EU-JUST-CT survey of national competent authorities and radiology societies and literature review (S. Foley)

14.00-14.30 Panel: Member State presentations (based on a call for expressions of interest to present good practice, encountered hurdles etc.)

Finland (R. Bly)

Luxembourg (A. Karoussou-Schreiner)

Estonia (J. Šubina)

14.30-14.45 Discussion

14.45-15.05 Coffee Break

Session 3 EU-JUST-CT pilot audits: methodology and participation

Moderator: **E.G. Friberg & C. Ewertsen**

Rapporteur: A. Karoussou-Schreiner

15.05-15.25 Audit methodology and tools and auditor workflow (A. Karoussou-Schreiner)

15.25-15.40 Standard: ESR iGuide clinical decision support tool (B. Brkljačić)

15.40-16.20 Results of EU-JUST-CT pilot audits of justification of CT (J. Sosna)

16.20-16.35 Results of hospital survey and correlation with results (B. B. Brkljačić)

16.35-17.05 Panel: Experience reports of pilot audit participants

Participating hospitals – Estonia (M. Reim)

Participating NCAs – Greece (C. Pafilis), Hungary (R. Elek)

Participating Auditors – Belgium (A. Baetslé), Slovenia (M. Marolt Mušič)

17.05-17.35 Discussion

17.35-17.45 Wrap-up and conclusions Day 1 (A. Karoussou-Schreiner, B. Brkljačić)

Day 2: Friday, 29 September 2023

09.00-09.10 Welcome to Day 2 and introduction of programme (B. Brkljačić)

Session 4 Country reports on recent or planned audits of CT justification

Moderator: G. Simeonov

Rapporteur: R. Bly

09.10-10.00 Panel of national representatives

Luxembourg (A. Bouëtté)

Sweden (H. Ståhlbrandt)

Slovakia (T. Hrubá)

Germany (E. Mille)

10.00-10.20 Discussion

10.20-10.30 Wrap-up and conclusions (G. Simeonov)

10.30-11.00 Coffee Break

Session 5 How to improve implementation of justification in healthcare settings and ensure uptake of EU-JUST-CT findings and recommendations

Moderators: S. Ebdon-Jackson & M. Schuppe (EC DG SANTE)

Rapporteur: H. Waltenburg

11.00-11.30 EU-JUST-CT guidance document incl. practical tools to facilitate and undertake the justification process (S. Ebdon-Jackson)

11:30-11:45 Impact of point of care CDS on patient journey, radiation dose exposure and sustainability (R. Killeen)

11.45-12.00 Expectations of the regulator and inspection (A. Karoussou-Schreiner)

12.00-12.15 Role of professional societies (A. Brady)

12.15-12.30 Challenges for the radiology department (B. Brkljačić)

12.30-12.45 The patient perspective (E. Briers)

12.45-13.00 Perspectives of International Organisations

IAEA (O. Holmberg)

13.00-14.00 Lunch Break

Session 5 cont'd How to improve implementation of justification in healthcare settings and ensure uptake of EU-JUST-CT findings and recommendations

Moderators: S. Ebdon-Jackson & M. Schuppe (EC DG SANTE)

Rapporteur: G. Simantirakis

14.00-14:45 Panel discussion on how to improve justification in hospitals and private practice

Referrer (R. Assenova)

Radiologist (R. Klöckner)

Radiographer (A. Kaučič)

Patient (E. Briers)

Health authority/service provider representative (N. Reynders-Frederix)

National competent authority representative (D. Žontar)

14:45-15:00 Audience discussion

Session 6 Moving forward: Needs and opportunities for further action

Moderator: A. Karoussou-Schreiner

Rapporteur: B. Brkljačić

15.00-15.15 Summary of workshop discussions and recommendations (B. Brkljačić)

15.15-15.25 Next steps of the EU-JUST-CT Project (A. Karoussou-Schreiner)

15.25-15.35 Opportunities for future work on justification, incl. impact of AI and advanced clinical decision support tools (S. Ebdon-Jackson)

15.35-15.45 Opportunities for future work on justification within SAMIRA Action Plan (G. Simeonov)

15:45-15.55 Final remarks from speakers and audience

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Appendix 2: List of rapporteurs to sessions

Session 2	Shane Foley
Session 3	Alexandra Karoussou-Schreiner
Session 4	Ritva Bly
Session 5	Hanne Waltenburg
Session 5 cont'd	Georgios Simantirakis
Session 6	Boris Brkljačić

Appendix 3: Workshop presentations

All presentations from speakers and panellists who consented to share them can be found here:

EU-JUST-CT Workshop Day 1: Slides

EU-JUST-CT Workshop Day 2: Slides