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Audit Methodology for Medical Physics Clinical Training Programmes

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TRAINING COURSE SERIES 74

AUDIT METHODOLOGY FOR MEDICAL PHYSICS CLINICAL TRAINING PROGRAMMES

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INTERNATIONAL ATOMIC ENERGY AGENCY
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FOREWORD

Clinically qualified medical physicists are specialized health professionals, expected to work independently with professional ethical standards and competencies acquired during clinical training. Their work in the field of radiation medicine directly contributes to the safety, quality and effectiveness of the diagnosis and treatment of patients.

Structured and supervised clinical training programmes equip medical physicists with the competencies needed in the clinical environment. Formally structured clinical training is often overlooked when setting up educational programmes, and this has a negative impact on the recognition of clinically qualified medical physicists. Although medical physics is classified among the list of health professions by the International Labour Organization, formal recognition of clinically qualified medical physicists through certification is still lacking in many countries.

In the past decade, the IAEA has received an increasing number of requests from its Member States for assistance in establishing medical physics education programmes. A need for guidance on how to establish and sustain quality clinical training programmes was identified from a series of reviews conducted interregionally under the technical cooperation programme. A series of consultants meetings were held in 2020 and a standardized methodology was developed for auditing medical physics clinical training programmes. This publication describes this audit methodology, which provides an independent review of the adherence to standards and the sustainability of the programme for quality improvement. The methodology focuses on processes and structure and is applicable to a variety of contexts, settings and clinical training programmes. The publication highlights the major components that support the achievement of best practices in clinical training. The publication may also be used as a guide to establishing clinical training programmes.

The audit methodology applies to all specialties of medical physics (e.g. diagnostic radiology, nuclear medicine and radiation oncology) and all types of clinical training programmes, independently of whether they take place in one or several hospitals and if they host a few or many residents. The audit methodology is structured in sequential phases, allowing for flexibility in its application and adoption in Member States.

The IAEA officer responsible for this publication was G. Loreti of the Division of Human Health.

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1. INTRODUCTION

1.1. BACKGROUND

Medical physics mainly refers to the application of radiation to diagnosis and treatment of diseases and includes the specialties of nuclear medicine (NM), diagnostic radiology (DR) and radiation oncology (also called radiation therapy or RT). Medical physics has been classified as a health profession by the International Labour Organization (ILO) [1] in its publication International Standard Classification of Occupation. The IAEA has provided guidance on the roles and responsibilities of Clinically Qualified Medical Physicists (CQMPs) [2, 3], the related academic education [4], clinical training programmes (CTPs) for three specialties (NM, DR and RT) [5–7] and on how to establish certification [8]. Successful completion of a postgraduate academic programme in medical physics leads to partial fulfilment of the requirements to be recognized as a clinically qualified medical physicist (CQMP) [3]. The postgraduate level academic programme is outside of the scope of the audit methodology described in this publication, however its connection to the CTP may be examined under the framework of the prerequisites for acceptance into a CTP. Figure 1 schematically shows the education pathways through which CQMPs acquire the knowledge, competencies and formal recognition, as per the publication Human Health Series No. 25 [3].

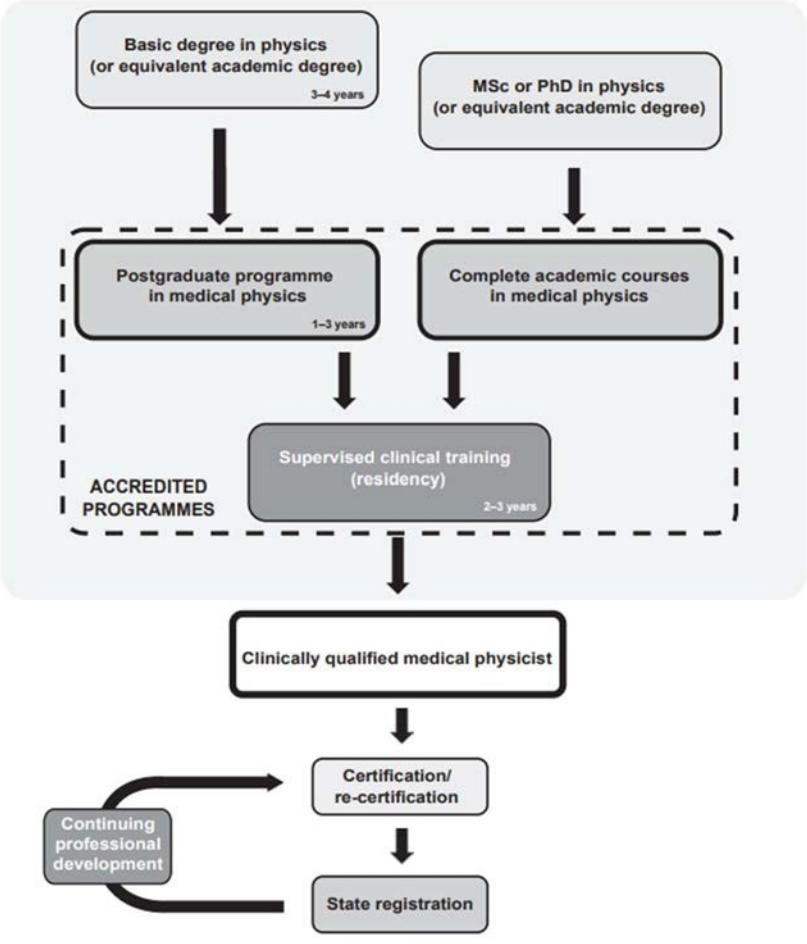

FIG. 1. Reproduced from Ref. [3]. The recommendations on minimum requirements for the academic education and clinical training of clinically qualified medical physicists.

A structured and supervised CTP is crucial to provide the competencies needed to work independently in one or more specialties of medical physics and achieve recognition as a CQMP [3, 8]. Upon successful completion of the CTP (also called residency), the medical physicist is expected to be able to work autonomously, undertaking the responsibilities connected to this health profession, to the benefit of patients, colleagues and the healthcare system. The ability to work independently is connected to the CTP, which in turn assumes a solid academic knowledge. Like for all health professions, to ensure that medical physicists achieve and maintain the relevant competencies over time, it is important that a system of certification is established, including re-certification through continuous professional development (CPD) [3, 8]. A CTP may be organized in various ways, for instance including one hospital or several, in one or more geographical locations. To ensure coordination and effectiveness, a CTP is typically managed in a structured, often centralized manner.

1.2. OBJECTIVE

The objective of this publication is to promote the quality improvement of CTPs, irrespective of their content, structure and medical physics specialty, through providing a methodology and standardized tools to carry out voluntary or formal independent audits. The methodology is applicable to established, as well as new CTPs, and promotes monitoring of CTPs within a structured quality management system. This document is also adaptable to different contexts and to CTPs in different settings. Part of this methodology may also be used for self-assessment, in preparation for an audit, or as a practice to support the monitoring of quality of a CTP. This publication is addressed to all professionals involved in establishing, delivering, or leading a CTP in medical physics, as well as to the residents, for clarifying standards and managing expectations.

1.3. SCOPE

Full or partial conformity of CTPs to specific standards (typically national) can be assessed through procedures such as accreditation [9]. The present publication does not seek to contradict or replace accreditation, which typically demonstrates fulfilment of specific requirements (e.g. at the national level) and analyses the content of a programme in comparison to the specific adopted standard. The scope of the audit methodology described herein is to identify the existence of structured procedures (independently of their type) and their implementation according to best practices within a CTP, with the aim of providing peer review and feedback for improvement. Structured CTPs in medical physics that undergo regular peer review are rare and therefore benchmarking to international best practice is challenging. Consequently, this publication also serves the purpose of providing guidance and support in harmonization. The audit methodology is not specialty-related, nor programme-related. The applicability of this methodology is subsequently adaptable to different CTPs and can potentially support local programme accreditation, where available.

1.4. STRUCTURE

Section 2 provides insights on the audit methodology, introducing the structure of a CTP in medical physics, the roles and responsibilities during the audit and the aim of the audit of a CTP. Section 3 describes the audit structure and the elements of the CTP that the audit probes; suggested forms and checklists relevant to this chapter are available in the Appendixes.

Section 4 describes the audit communication management strategy, which aims at facilitating, structuring and harmonizing the exchanges between the auditors and the auditees.

Section 5 describes in depth the desk-based audit; related forms are provided in the Appendixes.

Section 6 provides a description of the on-site visit, expanding on its structure and its specificities. Section 7 describes the final audit report, its content and structure, related forms are provided in the Appendixes. Section 8 tackles the importance of follow-up audits and the forms these can take.

2. THE AUDIT METHODOLOGY

The methodology described in this publication builds on established approaches to comprehensive auditing of clinical practice [10–12]. Independent external audits are instruments that support quality and continuous improvement in various fields. To implement an audit is to review processes, content and all related components in a systematic manner to provide final findings, commendations and recommendations that may trigger improvement, and to foster a quality-centred approach. Audits are a voluntary peer review process and can only be initiated upon request by the main involved stakeholders. The audit can be targeted (partial) or complete (peer review of the entire CTP), depending on the needs. Audits probe the status at a specific moment in time, verifying quality (intended as alignment to agreed-upon standards). Consequently, follow up audits (partial or complete) may be considered, to verify implementation of recommendations and assess developments over time.

2.1. CTP IN MEDICAL PHYSICS

A CTP, as per international best practices [5–7], is typically organized around competencies, which can be defined as a set of related skills, knowledge, and attitudes [13] that enable individuals to act in accordance with the prescribed performance requirements for their roles. Equipping residents (in some settings sometimes also called trainees or interns) with specialized medical physics competencies is the main objective of a CTP in medical physics. The CTP may be structured to include collaboration among several hospitals, each providing specific competencies, to ultimately complete the curriculum as a cooperative effort. This can occur, for instance, when the complete set of competencies cannot be acquired in a single centre for reasons such as:

(a) Unavailability of infrastructure, equipment and/or procedures needed to acquire competencies;
(b) Unavailability of clinical supervisor(s) with sufficient experience in a specific competency or set of competencies;
(c) Lack of access to supervised hands-on activities of the resident(s). For instance, when the clinical workload is such that protected time cannot be assigned for the residents to practice on the equipment, or supervisors cannot allocate sufficient time to teaching resident(s).

In these cases, collaboration could provide a solution that allows the adequate completion of the residents' competencies. For example, if the primary training facility does not include a brachytherapy service, and competency in this modality is required as part of the clinical training curriculum, the resident can be seconded to another centre to acquire the competency.

2.2. ROLES AND RESPONSIBILITIES IN THE AUDIT PROCESS

The audit methodology refers to specific roles and responsibilities in the preparation, implementation, finalization, and follow-up phases of the audit process.

The audit requestor is typically the person in charge of the programme, or head of the CTP.

The audit requestor in general triggers the audit process and facilitates its preparation through:

(a) Formulating the objectives of the audit;
(b) Providing the needed documentation in the appropriate timeframe, to support and inform the audit request and the desk-based audit;
(c) Supplying data and relevant additional documentation where needed and/or requested to enable the auditors to complete their evaluation;
(d) Identifying individuals and arranging their participation in the on-site audit, although the auditors are free to interview any staff member they deem appropriate;
(e) Informing the department(s) and hospital(s) management(s) involved in the CTP of the audit and its timeframe and ensuring that the administrative needs are taken care of to allow the auditors to perform the tasks related to the audit.

The audit coordinator is the person who receives the audit request and organizes the audit. This involves:

(a) Performing a preliminary analysis of the acceptability of the audit request and reverting to the audit requestor as needed;
(b) Informing the audit requestor about the methodology and sharing relevant guidelines pertaining to the audit methodology;
(c) Devising an indicative timeframe for every audit step, for the purpose of planning;
(d) Requesting information from the audit requestor, to ease the collection of information needed for the desk-based audit;
(e) Identifying at least two auditors, ensuring no conflicts of interest exist;
(f) Informing and briefing the auditors with respect to the audit methodology, including related confidentiality clauses;
(g) Sharing the audit-related documentation with the auditors;
(h) Devising a communication management strategy and inform all involved parties on the related processes;
(i) Collating the audit reports from the auditors and sharing the final findings, commendations and recommendations with the head of the CTP and other stakeholders (according to what is established in the communication management strategy).

Audit coordination can, in some cases, be provided by an independent authority, for instance a certification body or the IAEA.

The auditors are typically CQMPs with in-depth understanding and experience relevant to clinical training of medical physicists. In specific cases, identified by the audit coordinator, auditors with certification, knowledge and understanding in the medical physics specialty(ies) covered by the CTP being audited may facilitate the process, but it is not in general a pre-requisite, because the audit methodology described in this publication is not specialty related. The same auditors would preferably conduct the desk-based and on-site audit. If this is not possible, the audit coordinator is expected to adequately brief the on-site auditors before the start of their tasks, providing the background information from the desk-based audit. The auditors' roles encompass:

(a) Engaging and liaising with the audit coordinator during the audit process and seeking clarifications whenever necessary;
(b) Appreciating the sensitivity and confidentiality of the audit process;
(c) Providing a written acceptance of the appointment as an auditor, acknowledging the confidentiality of the entire audit process;
(d) Performing a timely review of the preliminary documentation and background information provided for the desk-based audit;

(e) Requesting additional information where needed, in alignment with the communication management strategy set by the audit coordinator;
(f) Conducting the audit and all related communication in alignment with the communication management strategy set by the audit coordinator;
(g) Providing an independent audit report for each of the audit steps (desk-based and on-site), summarizing the work performed, including findings, commendations, recommendations for improvement and explanations in support of the recommendations.

The auditees are the recipients of the audit, in particular, they include the main stakeholders of the CTP, including the head of the CTP and the clinical supervisor(s). Among the clinical supervisors, there is typically one person who is appointed as primary supervisor for each resident. The primary supervisor works in the hospital where the CTP is coordinated. In cases where a collaboration among hospitals is established in the framework of the CTP, the primary supervisor is located in the primary hospital, where most of the CTP is implemented.

The different roles are summarized in Table 1.

TABLE 1. MAIN ROLES IN THE AUDIT PROCESS

Name	**Role in relation to the audit**
Audit requestor	Person triggering the audit process and facilitating its preparation
Head of the CTP	Director of the programme, a CQMP typically is the audit requestor and might also be one of the clinical supervisors of the CTP
Auditees	Main stakeholders of the CTP receiver of the audit, including the supervisors involved in the CTP
Resident	Person enrolled in the CTP, in some contexts also called trainee or intern
Primary supervisor	Supervisor in charge of the clinical training of specific resident (s). The primary supervisor(s) are considered stakeholders of the audit and therefore belong to the category of auditees
Audit coordinator	Receiver of the audit requests, the organizer of a suitable audit, sends the final audit report and results
Auditor(s)	CQMPs with experience pertaining to education and clinical training, tasked with carrying out a confidential peer review with the intent of contributing to improving CTP in medical physics

2.3. AUDIT OF THE CTP

The main aim of an audit of a CTP is to support its improvement through peer review and resulting (re)commendations. Additionally, the audit process may support other endeavours, such as:

(a) Accreditation of the CTP;
(b) Designation of the CTP as a training resource at the national, regional or interregional level;
(c) Expansion or restructuring of an existing CTP.

The audit process reviews a CTP, taking into account its context and, therefore, the process is not intended to be used as a comparison between programmes, hospital(s), institutions or professionals. The audit investigates the quality (intended as adherence to best practices) of the CTP, with respect to the existence of procedures in its implementation, documentation and mechanisms of monitoring. Consequently, the audit methodology presented in this publication does not provide assessment of the radiation medicine services, nor of the competencies acquired by the resident(s). The audits are furthermore not designed for regulatory purposes or for accreditation of the CTP, even though the

findings of the audit may be relevant to such processes or requirements. Table 2 summarizes the scope of the audit methodology and indicates items that are not included.

TABLE 2. SUMMARY OF THE SCOPE OF THE AUDIT METHODOLOGY

Items appraised during a CTP audit	**Items excluded from the CTP audit**
CTP structure	Status and quality of the radiation medicine services
CTP implementation processes and their documentation	Formal assessment of the competence of residents and past residents
Clinical training supervision (structure and methodology)	Clinical competencies of the supervisor(s)
Low stakes resident assessment during the CTP (e.g. routine feedback)	Academic education programmes linked to the CTP
High stakes resident assessment for formal verification of competency (e.g. final exams)	Radiation medicine equipment performance or quality
CTP sustainability	CTP relevant to other health professions that might coexist in the same institution(s)
CTP monitoring mechanisms (including lessons learned and risk evaluation)	Regulatory compliance (e.g. radiation safety aspects and relevant regulations).

Although not part of the audit scope, auditor(s) can record, document, flag and communicate concerns on incidental findings noted in the course of the audit, if reasonable doubts can be expressed, in areas pertaining to radiation safety or ethical concerns related to patients. The audit coordinator is in charge of facilitating or suggesting follow-up investigations in consultation with the head of the CTP, where appropriate. For instance, an audit of a CTP in radiotherapy medical physics, could trigger a recommendation for a subsequent audit such as QUATRO [10], postal dosimetry audit [14], etc.. Similarly, a comprehensive audit (e.g. QUATRO), could trigger the recommendation and subsequent request for a CTP audit.

3. AUDIT STRUCTURE

The audit of a CTP entails a process composed of various steps that are summarized in Fig. 2.

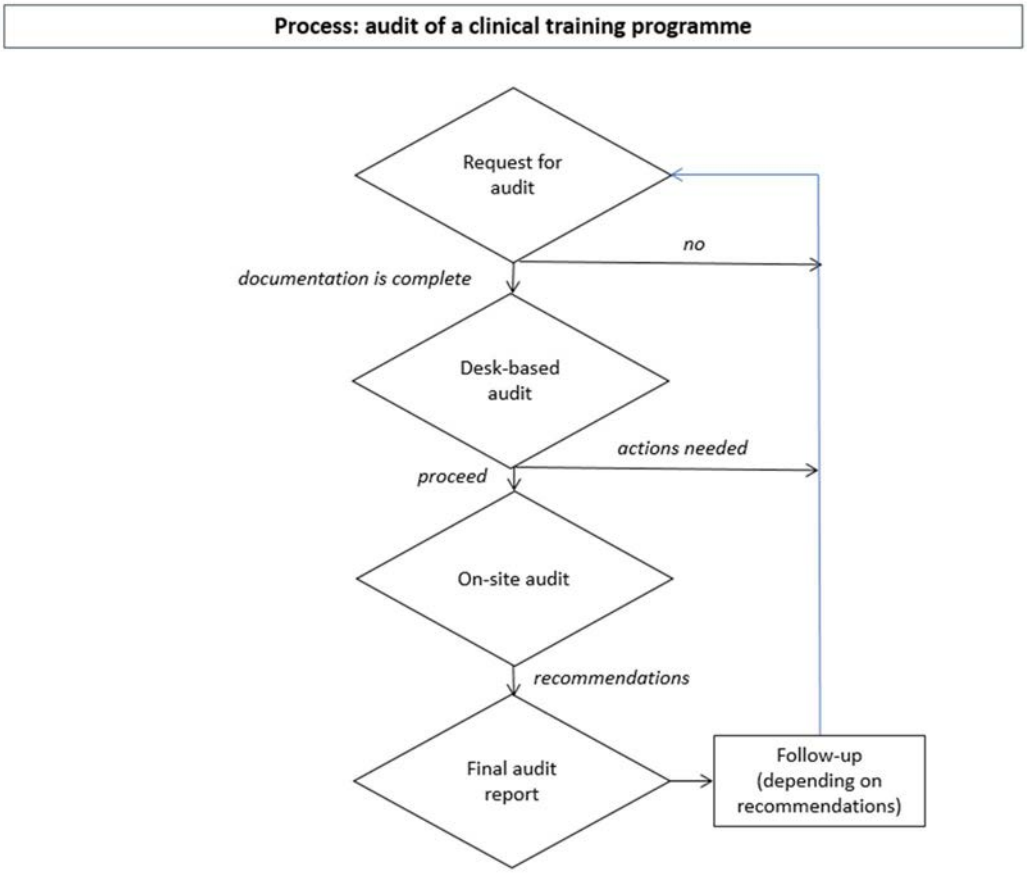

FIG. 2. The different steps of the audit methodology.

3.1. REQUEST FOR AUDIT

Comprehensive audits of CTPs in medical physics are voluntary. The request for an audit normally originates from the main stakeholders of the CTP to be audited, for instance the head of the CTP. The administration of the institution(s) where the clinical training takes place, or the health authority may also be originators of the request for an audit. In cases where the audit request originates from entities not directly involved in the CTP but with an indirect connection to it, the head of the CTP is expected to endorse the request. A lack of endorsement of an audit request by the head of the CTP, as well as by the involved institutions (e.g. hospital(s) hosting the CTP), is considered a reason for rejecting an audit request, due to its impact on the cooperation that is needed during the audit.

The audit is formally requested in written form and complemented by background information about the CTP. The request includes documentation on the CTP, for instance:

(a) Curriculum of the CTP and reference guidelines followed (if applicable);
(b) Structure of the CTP including indication of: the head of the programme, name, number and address of the involved hospital(s);
(c) Mechanisms embedding the CTP in its context (e.g. external advisors to ensure its purpose matches the local needs for the profession);
(d) Medical physics specialty(ies) of the CTP;
(e) Years of existence of the CTP (for each specialty, if more than one is active);
(f) Number of residents at the time of the audit request in each medical physics specialty;
(g) Number of supervisors in each specialty of the CTP at the time of the audit request;
(h) Overall number of residents who successfully completed the CTP over the years in each specialty;
(i) Link to academic programmes if applicable, with details such as: nature of the link (e.g. national requirement, independent agreement etc.), name of the university, referent person and contact information;
(j) Declaration of acceptance of the audit process by all involved stakeholders, namely the host hospital(s), the CTP head.
(k) Strengths, weaknesses, opportunities, and threats (SWOT) table filled in by the head of the CTP.

The formal request including supporting documentation, is considered an essential component of the audit process. A template for the request of such audit, including all the listed elements is provided in Appendix I. A template for a letter of acceptance of the audit is provided in Appendix II.

3.1.1. Initial review of the audit request

It is the responsibility of the audit coordinator to evaluate at this point if the request for the audit is deemed suitable to initiate the desk-based audit. The audit coordinator reviews the validity and completeness of the audit request. In case the request is not considered acceptable, the audit coordinator informs the audit requestor, providing the reasons for the rejection and indications on what amendments to apply to re-submit a new request.

In case the request is deemed acceptable, the audit coordinator informs the audit requestor on the audit methodology, including how the communication pertaining to the audit is conducted, and agrees on a tentative timeframe for the next steps of the audit.

The audit coordinator proceeds then to identify and nominate auditors, based on the context of the CTP, typically at least two CQMPs who are expected to provide a written acceptance of the task, including undertaking a confidentiality clause, applicable to the entire audit process.

3.1.2. Documentation supporting the audit request

Completeness of the documentation provided in support of the audit request is crucial as it informs the desk-based audit and provides the baseline information for the on-site audit, where deemed feasible. The documents that support the audit request may be grouped into three main areas: contextualization, details and monitoring of the CTP. Table 3 contains a summary of the documentation. A checklist to facilitate the preparation and collection of such information is given in Appendix III.

During the desk-based audit, the auditors may request complementary information or interactions with the stakeholders, to further probe or validate the material provided.

The same documents serve as baseline information when carrying out the on-site audit.

TABLE 3. TYPICAL DOCUMENTATION TO SUPPORT A REQUEST FOR AN AUDIT OF A CTP IN MEDICAL PHYSICS

Area	**Information**	**Template availability**
Contextualization of the CTP	Academic programmes linked to the CTP	Not applicable
	Structure of the CTP	Appendix IV.1
	Support of the CTP by the involved hospital(s)	Not applicable
	Equipment and procedures performed at the hospital(s) involved in the CTP	Appendix IV.2
	Organograms of the departments where the CTP takes place	Not applicable
	Radiation protection services and equipment	Appendix IV.2
	Infrastructure to support study and research activities	Appendix IV.3
	Professional ethics (e.g. collaboration with a bioethics department)	Appendix IV.4
	Sustainability of the CTP in the national, regional or interregional environment	Appendix IV.5
Details of the CTP	CTP curriculum: - acceptance criteria; - competencies of the CTP - ratio of residents/supervisors	Not applicable
	Documented proves of clinical training (assessment, portfolios, logbooks, final examination)	Available in IAEA publications TCS-37, 47, 50 [5–7] and regional adaptations [15, 16]
	Staff and advisors involved in the CTP	Appendix V
Monitoring of the CTP	Documented follow up on absorption of former residents as CQMP in hospitals	Appendix VI
	Documented feedback collection from residents and clinical supervisors, their analysis and follow up for improvement	Appendix VI
	Structured and documented mechanisms in place to record challenges and risks and related correction measures taken	Appendix VI
	Involvement in internal or external audits (if applicable)	Appendix VI
	Accreditation (where existing)	Not applicable

3.2. CONTEXTUALIZATION OF THE CTP

The context in which the CTP is offered, both in the relevant local setting (e.g. involved hospital(s), availability of academic programmes in medical physics) at the national level and – where applicable – regionally or internationally, is typically described in documents that include information such as the:

(a) List of academic programme(s) (if existing) linked to the CTP that provide the intake of residents;
(b) Structure of the CTP, including a detailed plan of the clinical training scheme, highlighting its competencies and the hospitals where they are acquired;
(c) Written acknowledgement of support of the CTP by the involved hospital(s);
(d) Equipment and procedures of the hospital(s) involved in the CTP;
(e) Organograms of the departments where CTP takes place;
(f) Availability of radiation protection services, equipment and individual monitoring of exposed personnel (including residents of the CTP)
(g) Availability of infrastructure such as: internet connection, computers with software allowing writing of reports and papers, access to a library with a variety of medical physics literature and journals;
(h) Availability of professional ethics support (e.g. mandatory ethics training for supervisors and residents, collaboration with a bioethics department);
(i) Information about the CTP in the national, regional and interregional environment, where applicable (including details on mechanisms of certification where applicable);
(j) Information on sustainability of the CTP, for instance details such as the funding of the programme and financial support of the residents.

Further insight into salient elements of the evaluation performed by the auditors is provided in the paragraphs below.

3.2.1. Academic Programmes linked to the CTP

According to international best practices [5–7], admission to a CTP in medical physics presupposes that a postgraduate academic programme in medical physics [4] has been completed. Consequently, the audit requestor may provide the criteria used to identify medical physics academic programmes that are considered to adequately prepare residents for admission to the CTP; completion of specified local or national academic programmes in medical physics may be needed for acceptance into CTPs. An agreement such as a Memorandum of Understanding (MoU) could define a collaboration in which the CQMPs of the hospital also participate in local academic teaching activities, students carry out supervised laboratory exercises organized by the CQMPs and/or student research is related to clinical activities. More than one medical physics academic programme can be linked to the same CTP. Details of these aspects allow the auditors to define the environment and context of the CTP, in particular with respect to the prior knowledge expected of residents.

3.2.2. Structure of the CTP

A CTP in medical physics may be summarized as a collection of separate competencies. This approach allows the structuring of a CTP as a collaboration among hospitals. For this reason, it is important for the preparation and logistical organization of the audit, that details are provided with respect to each competency, the hospital(s) where each are acquired and demonstrated and the

supervisory aspects. Examples of templates based on IAEA guidelines [5–7] [15, 16] are introduced and their links provided in Appendix IV.

3.2.3. Hospital support of the CTP

A CTP needs the full acknowledgement and support of the hospital(s) management; this also ensures transparency of the process and cooperation during the on-site audit. A declaration letter could demonstrate compliance to this point. A further proof of the support of the hospital to the CTP may include proof of time off granted to staff for attendance of training relevant to the programme, for instance train the trainers courses.

3.2.4. Equipment and Procedures

Information on the available equipment and procedures in the hospital(s) involved in the CTP is used to review that the programme is embedded in a suitably equipped environment, where an adequate number of procedures are performed to allow the competencies to realistically be achieved. For instance, it is unlikely that a competency in High Dose Rate (HDR) brachytherapy be achieved when very few procedures are performed (e.g. less than five cases per week). Residents need to repeat a procedure several times to acquire the relevant competency and ultimately become fully independent practitioners in all competencies of the CTP curriculum.

Information pertaining to the availability of dosimetry equipment and related written procedures indicate that quality control is performed. Quality control and documentation play an important role in the routine activities of CQMPs for all three specialties. For this reason, it is important that the auditors ensure residents are taught such procedures and are involved in all related activities, including protocol review and application, measurements and documentation, analysis and monitoring. The information provided in the forms filled in during the desk-based audit is then later verified during the on-site audit, where applicable.

Plans for expansion and installation of new equipment present opportunities for the resident(s) to acquire competencies in acceptance tests and commissioning procedures, and witness how baselines for quality control of clinical equipment are created. Where no new equipment acquisition is foreseen during the residency programme, competencies in annual quality control of equipment fulfil the same learning objectives, provided residents are allowed direct involvement in the procedures, under adequate structured supervision.

3.2.5. Organograms of the departments hosting the CTP

This information can be provided in the form of a diagram, to allow the auditors to familiarize themselves with the structure of the departments and their personnel, so as to facilitate the interactions and activities also during the on-site audit, if applicable. Additionally, the organogram indicates the position of the medical physics department within the overall hospital organizational structure, including the level of responsibility, independence and related lines of authority.

3.2.6. Radiation protection services

It is relevant information for the auditors to understand whether the clinical training programme has been adequately planned and embedded in an environment of radiation safety culture. Although an in-depth analysis of the radiation protection framework in the department is outside of the scope of the audit of the clinical training programme in medical physics, it is the duty of the auditors to report

on the adequacy of measures taken to ensure that the residents are undergoing training in radiation protection [2]. For this reason, auditors may report on the existence of a radiation protection programme, including radiation protection of workers, patients and the public, and on availability of related competencies.

3.2.7. Infrastructure for research

The residents are expected to be provided with tools that allow them to acquire competencies in accordance with the CTP curriculum. For this reason, information is requested on, for instance, the availability of internet connection, access to computers with software for writing of papers and reports and access to a library offering medical physics literature and journals. Information on opportunities for residents to participate in scientific conferences is also relevant. A template is available in Appendix IV.3.

3.2.8. Professional ethics support

CQMPs are health professionals and, as such, are confronted with a variety of ethical dilemmas in their clinical practice. For this reason, information on the availability of support in professional ethics in the hospital(s) is relevant to the audit. Examples include the existence of bioethics expertise and human research ethics committees, and access to scenario-based training in ethics. A template is available in Appendix IV.4.

3.2.9. Sustainability of the CTP in the national context and beyond

The sustainability of the CTP over time is important and therefore is analysed in the framework of the audit process. Sustainability includes various aspects linked to:

(a) Connection of the CTP to its context;
(b) Quality management of the CTP;
(c) Recognition of the profession of CQMP;
(d) Financial sustainability.

Understanding the role played by the CTP in its context is of relevance for the auditors, in order to appreciate the significance and potential of the audited programme. CTPs are usually well connected to a national context, in particular with respect to the needs of the Ministry of Health to produce sufficient numbers of CQMPs for the benefit of the country. A CTP may also serve a region, sub-region or, in some cases, operate internationally.

It is important for a CTP to be structured within a quality management system, to promote continuous improvement that includes regular assessments, to ensure the programme operates according to best practices and produces a health workforce with appropriate and adequate competencies. Follow-up with former residents with respect to their activities after completion of the CTP is expected to be part of the quality management processes of a CTP.

The existence of a certification pathway for CQMPs that is equivalent to other health professions is important for the recognition of medical physics [8]. Additionally, the strategy of the health authority to ensure sustainability of all training programmes for health professions under their aegis should also apply to CTPs in medical physics. This implies that equal treatment is given to the CTP(s) in medical physics and that, for instance, funding of the residencies is granted, as done for other health professionals (e.g. specialization for medical doctors). This would entail the availability of fulltime

residency positions, thus contributing to the CTP sustainability. Consequently, the auditors may review the existence of funding for residents and the existence of opportunities to attend courses and conferences, for instance, to strengthen their knowledge.

Financial support of a CTP for health professionals is typically provided through public entities, e.g. the Ministry of Health or international Agencies, and may include fellowships for the residents.

It is important to consider that funding of a CTP aiming to capacitate health professionals respects ethical considerations and conflict of interest. Typical scenarios could be private sponsorship of residents or training materials, or responsibility for training delegated to medical equipment suppliers commercial service providers, pharmaceutical companies or entities with a strategic financial interest related to public health.

A checklist to facilitate the report and analysis relevant to the sustainability of CTPs is provided in Appendix IV.5.

A summary of the audit elements of this chapter is provided in Fig. 3.

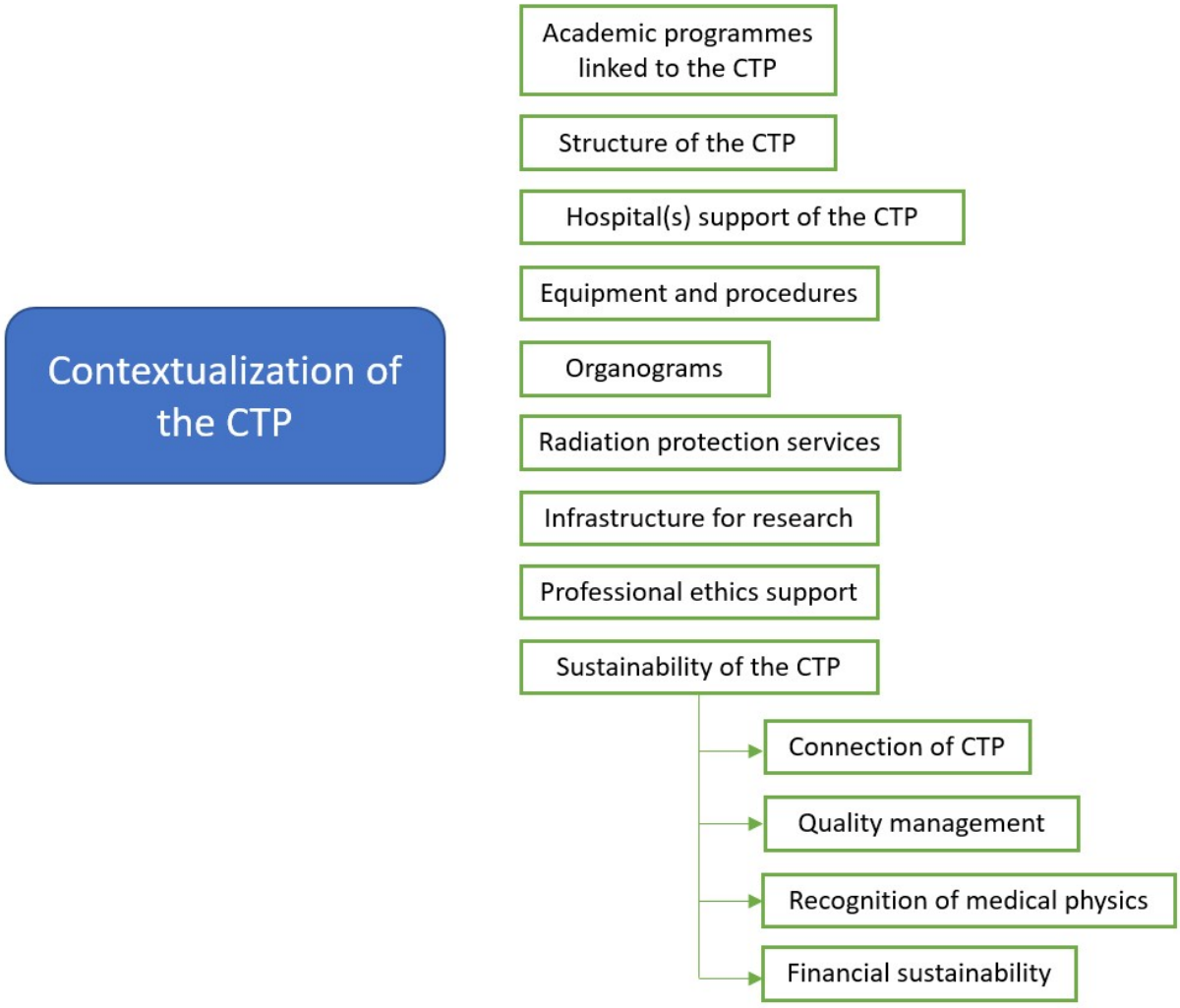

FIG. 3. Elements of the audit that inform on the context of the CTP. (Key: CTP, clinical training programme).

3.3. DETAILS OF THE CTP

In-depth information on how the CTP is organized, including information on how residents are selected, and the programme is implemented in the day-to-day practice represents the core part of a CTP audit. The documents relevant to these aspects typically include:

(a) The CTP detailed curriculum providing:
  (i) Description of prerequisites, criteria and selection methodology for enrolling in the CTP;
  (ii) List of competencies offered for each specialty;
  (iii) Information relevant to the ratio of clinical supervisors to residents.

(b) Documented proof of clinical training, such as portfolios and logbooks (where existing) to provide details of:
  (i) how residents' competencies are assessed during the CTP;
  (ii) the final CTP examination, with information pertaining to for instance: standardization through rubrics, involvement of external examiners;

(c) Information on the staff involved in the CTP and advisors where existing:
  (i) Curriculum vitae of the head of the CTP;
  (ii) Details of composition and role of external advisors to the CTP, for instance steering committees, advisory boards, if existing;
  (iii) List and qualifications of the supervisors;
  (iv) List, certification and job title of other staff directly involved in clinical training;
  (v) Information on participation of clinical training supervisors in CPD activities, where applicable.

The main components of such group of documents are described more in detail in the paragraphs below.

3.3.1. The CTP curriculum

The auditors explore the existence of a curriculum, its availability to residents and prospective residents, its alignment to best practices, local regulations and its implementation in practice. References to national best practices should be specified in the curriculum, so that alignment can be checked.

The structure, content and aim of the CTP is crucial information to prepare and carry out an audit. A CTP curriculum is a document that includes fundamental information on the CTP; it comprises details such as prerequisites for enrolment, content of the programme and its detailed content (e.g. competencies) and related means of assessment. Details providing the prerequisite criteria for being accepted into the CTP are for instance important elements for the auditors to understand the connection of the CTP to the local education system.

A CTP is typically composed of a collection of modules and competencies for each medical physics specialty. The curriculum is expected to provide a detailed list of such competencies often with examples of what activities the residents are expected to undertake during the CTP to acquire the competencies. Considering that the competencies are taught by the clinical supervisors, it is important that their time allows for the supervisory tasks. Normally, this entails limiting the maximum number of residents per each supervisor. The curriculum typically provides this information, by specifying

the maximum residents/supervisor ratio. The IAEA provides a reference in the footnote at page 4 of Training Course Series N. 37 [5] that "*Normally, the number of residents in a department should not exceed the number of clinically competent medical physicists in that department; however, this may vary according to local situations including department workload*." In the IAEA AFRA guidelines [15], there is clear reference to a ratio of residents to supervisors of 2:1. Consequently, a variability that takes into account the local conditions is expected, however overloading supervisors may impact the quality, effectiveness and sustainability of clinical training. Sustainability of the supervision of residents is typically ensured through:

(a) Limiting the number of residents per supervisor;
(b) Allocating dedicated time to the supervisor for such task.

3.3.2. Documented proof of clinical training

The compliance of a residency to the CTP can be checked by the auditors through written records, typically portfolios and, during the on-site audit, through observation and interviews. Portfolios usually contain a written track of the supervisor(s) signing off competencies. Examples of a portfolio's structure can be found in the IAEA publications providing guidance for clinical training in the different specialties of medical physics [5–7].

The clinical supervisors are expected to carry out regular, structured and documented assessment of the residents on their progress and achievement of competencies. This includes regular formal and informal assessments, in a combination and proportion that is defined by the relevant CTP, or as needed. Routine or informal assessment is part of ensuring the resident progresses satisfactorily during the CTP. This type of performance evaluation may also be referred to as low-stakes assessment and focuses on providing feedback to the resident to overcome limitations and progress to independent practice. Evaluation, scoring and reaching a final decision on the learning process (e.g. final examination at the end of a CTP) is also called high-stakes assessment and is typically associated with a pass or fail decision. This can take the form of an objective structured clinical examinations (OSCEs), written, oral and/or practical, or a combination of all these components. CTPs may also include a final independent and external assessment of the competencies acquired by the resident.

According to best practices [5–7], it is important that all types of assessments are documented, and records are kept as evidence. The auditors analyse such records and their maintenance over time. It is not part of the scope of the audit to evaluate the results of the residents with respect to such assessments, but rather to ensure the existence of the assessments, their structure, documentation, regularity, and their application in practice, under different circumstances. For instance, during the desk-based audit, the curriculum, sample portfolios and logbooks (where existing) provide information on the structure of assessments; during the on-site audit, discussions may happen separately with the supervisor and the residents, allowing probe the mechanisms of assessment, their regularity and aspects such as follow-ups with respect to negative assessments, to ensure that the resident is given opportunities to improve, when gaps have been identified.

The auditors may also take into account the following:

(a) Alignment between the content of the assessments and the curriculum of the CTP. This can be checked for instance through the analysis of written documentation (e.g. exam's question repositories, reports of final examinations) and conversations with the residents and clinical supervisor(s) during the on-site audit;

(b) Involvement of examiners, in particular their role with respect to the CTP and their professional profile;
(c) Existence of mechanisms in place to counter potential conflict of interest (e.g. direct supervisors are not to be sole examiners of their residents);
(d) Standardization of the final examination process(es) across all residents;
(e) Standardization of the process(es) for dealing with negative assessments.

3.3.3. Staff and advisors involved in the CTP

As part of a CTP, different hospital professionals are involved in the training of the medical physics residents. A specific form has been developed to help the auditors understand the involvement of hospital staff to better plan the audit and related interviews, where judged of relevance. In general, support to the CTP by all – directly and indirectly involved – staff is expected. The lack of such support and, in extreme cases, the adversity to it, can hinder the CTP, impeding its timely and effective development. For these reasons, the auditors may probe this in the framework of the audit during direct observations and interviews during the on-site audit.

The main pillar of a CTP is the head of the CTP, who may also be one of the clinical supervisors. In general, the head of the CTP is a CQMP, working in the primary hospital hosting the CTP.

The clinical training supervisor is a CQMP preferably recognized or certified in the relevant specialty. The supervisor is usually an experienced CQMP, however the extent and duration of this experience can vary depending on the local situation and availability of CQMPs. In some instances, a supervisor might not be able to offer supervision in some competencies, that are then delegated to other CQMPs, implying a collaboration.

Furthermore, the audit assesses the availability of the clinical training supervisor(s) to resident(s). It is suggested to take into account the staffing levels [17, 18] of a department, when establishing a CTP, considering the time allocated for supervision. In general, hospitals that do not have adequate medical physics staffing levels, may struggle to host several residents. They could however consider offering residencies for a limited number of competencies only, in the framework of CTPs organized as a collaborative effort among several hospitals.

Information on how the CTP is managed (e.g. existence and composition of external advisors, such as a steering committee, advisory boards) and its content shaped, verified and updated, is a major focus of the audit. Overall, the CTP does not exist in isolation, like other programmes aiming at capacitating health professionals, it would benefit from advice and strategic insight provided by stakeholders representing the medical physics profession and the health authority. These may include the professional society, certification board, experienced CQMPs, heads of CTP from neighbouring countries or international programmes. Information on the entities involved as external advisors for the CTP, where existing, and their role, constitutes an important element for the auditors to define the context of the programme and its relation to various stakeholders. For instance, advice may be regularly sought by the head of the CTP to ensure the programme fulfils its social purpose of furnishing capacitated professionals in the various specialties of medical physics, to support the healthcare system and in an adequate number to allow absorption into the healthcare system. In particular, it is crucial that the competencies achieved through the CTP respond to the needs of the healthcare system. The medical physics profession is linked to technological developments, therefore the CTP curriculum may need regular review in order to evolve accordingly. Consequently, advisors may collaborate with the head of the CTP to identify, prioritize and update the competencies.

A summary of the main elements considered in the framework of the audit of the CTP is provided in Fig. 4.

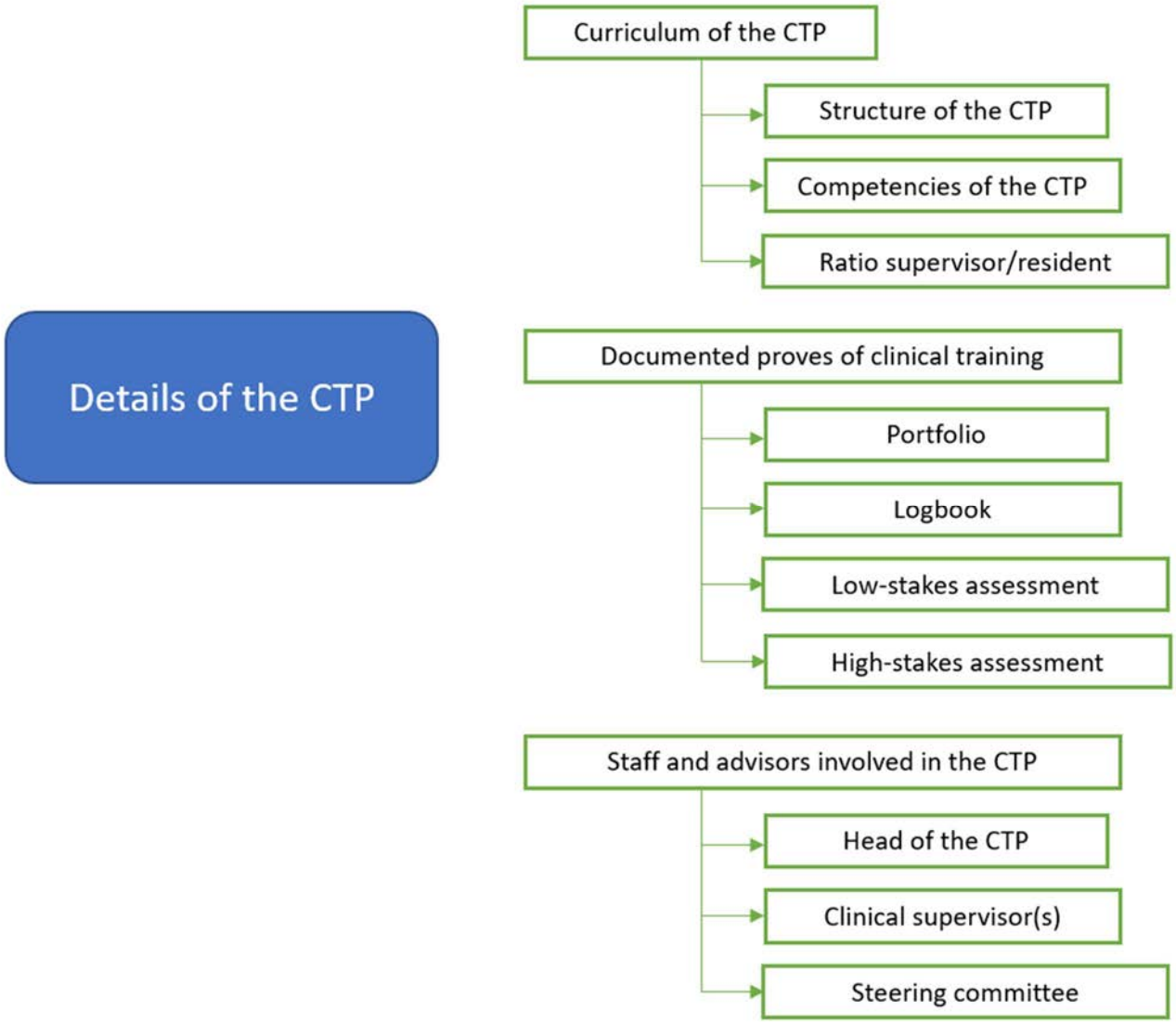

FIG. 4. Elements of the audit that inform on the details of the CTP. (Key: CTP, clinical training programme).

3.4. MONITORING OF THE CTP

Mechanisms and strategies that allow for monitoring and evaluation of the CTP typically include indicators relevant to: compliance of the CTP with standards, collection and application of lessons learned, context and efficacy of the CTP. The aim of a CTP is to deliver competencies to residents to become independent practitioners. For this reason, it is expected that a programme would establish strategies to regularly check and report on achieving such objectives, defining documented systems of internal review and enhancement [19, 20], such as extraction and evaluation of lessons learned, with a focus on continuous improvement of the programme. The auditors could explore the existence of such mechanisms and their frequency of use.

If there is a low rate of absorption of the CTP graduates into hospital employment, it is in the interest of the head of the CTP to consider the reasons. This could entail contact with the former residents, as well as involvement of the national professional medical physics organization or certification body (where existing), to identify whether this follows from a lack of recognition of the profession, a misalignment of the competencies provided during the CTP with the ones needed or it indicates a market saturation.

Since a CTP supports capacity building in a health system, where evidence indicates that it is not effective, discontinuation of the programme is to be considered.

Documents typically providing evidence of monitoring of CTPs may include:

(a) Documented follow up on absorption of former residents as CQMP in hospital services in the area of their specialization;
(b) Systematic feedback from residents and the supervisors to provide evaluation on the CTP and to guide corrective actions;
(c) Structured and documented mechanisms to record challenges and risks and related corrective measures. The head of the CTP is responsible of establishing the processes of risk management and escalation and of ensuring that these are active;
(d) Involvement in internal, external audits or accreditation (if applicable);
(e) Proof of CTP accreditation, where existing, and its frequency of renewal.

The auditors check that documented mechanisms supporting the monitoring of various aspects of the CTP exist, without focusing on the results of such processes, but rather on their existence.

A visual summary of the main elements considered in the framework of the audit of the CTP is available in Fig. 5.

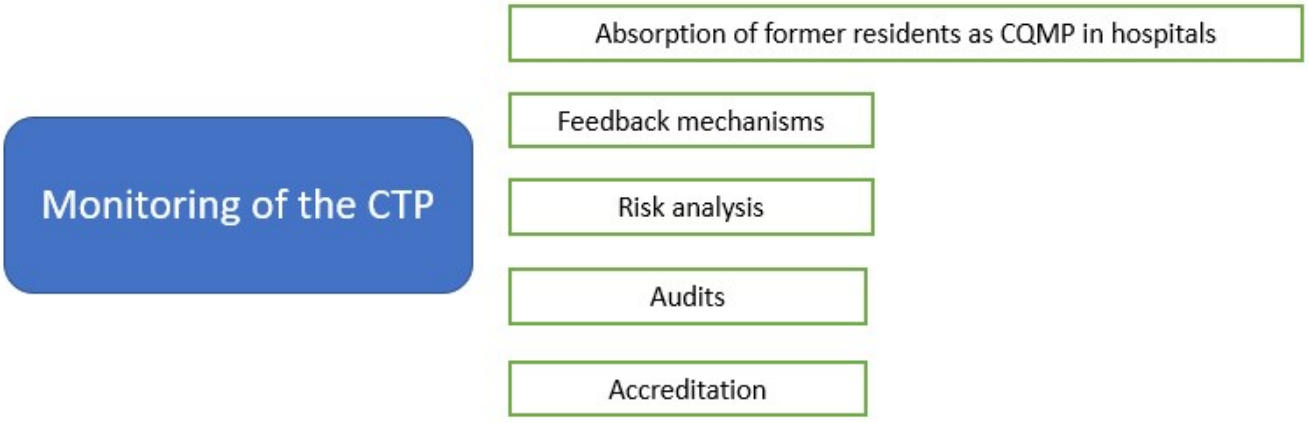

FIG. 5. Elements of the audit that inform on the monitoring process part of the CTP. (Key: CTP, clinical training programme).

4. AUDIT COMMUNICATION MANAGEMENT STRATEGY

The audit coordinator defines and clarifies the communication management strategy, to which the audit process conforms. This is typically done through a document that identifies all stakeholders and defines at what stage and how they engage in the communication workflow. This is of particular importance in an audit process, where confidentiality of data and sensitivity of some of the topics might negatively impact the process, if not handled appropriately.

This also serves the purpose of maintaining the stakeholders informed and engaged in the preparation, implementation and finalization of the audit process. Contextually, the process is instrumental in standardizing the approach to communication of the auditors, relieving them from the burden of deciding the communication style, modalities and recipients in the different phases of the process. This consequently minimizes the risk that miscommunication affects the audit process.

The audit coordinator may be considered a project manager, in alignment with project management methods. As such, the audit coordinator has an active role in the entire audit process and related communication. The communication approach may need to be assessed and – if needed – re-evaluated during the audit process, to best suit the situation and context. The communication strategy may be a table, a short text or a combination of both and typically contains:

(a) A general description of its purpose;
(b) A list of involved stakeholders with their contact information;
(c) The roles and responsibilities with respect to communication;
(d) Mention of the type of relationship to be maintained with the different stakeholders and their role with respect to the audit;
(e) A list of communications methods, tools and software (where applicable) that are used, such as electronic mail, meetings, videoconference tools and presentations;
(f) The structure of the reports, including details of the information they are expected to contain and their level of confidentiality;
(g) The timing and main deadlines for communication and reporting to happen;
(h) What information may be shared with what stakeholders and how (email, oral communication etc.);
(i) Whom to contact in case of questions and additional information for each of the audit's phases;
(j) Handling communication and confidential issues during the audit;
(k) Handling and communicating unexpected issues (such as safety red flags) outside of the scope of the audit.

Examples of communication strategies templates may be found, for instance, in the framework of project management methodologies.

5. DESK-BASED AUDIT

A desk-based audit is part of the CTP audit process, aiming at collecting detailed information that is used to:

(a) Analyse details of the CTP through information (e.g. data, self-assessment) voluntarily collected and provided by the audit requestor;
(b) Define whether an on-site audit should take place;
(c) Design a tailored on-site audit.

In some specific cases, the desk-based audit may represent a stand-alone audit process, for instance when it is a follow-up to a limited number of specific findings, recommendations and commendations, issued from a recently concluded on-site audit. Templates are made available to support the auditors in collecting information relevant to the CTP (Appendix VII), the residents (Appendix VIII), the involved hospital staff (Appendix IX), the clinical supervisors (Appendix X).

5.1. OUTCOME

The completion of the desk-based audit provides elements informing a decision on whether to proceed with the on-site audit of the CTP.

To reach such a decision in a structured manner, it is important that the audit coordinator and auditors develop a consistent and standardized methodology, such as a scoring scale with rubrics to facilitate and standardize the evaluation. A suggested template is provided in Appendix XI.

The process of desk-based audit is conducted independently by the external auditors. The criteria for scoring may comprise the completeness of the documents provided, their consistency, and their alignment to the CTP curriculum and other complementary documentation, as well as the willingness of the main stakeholders to receive the audit. Each auditor produces a written independent evaluation and related scoring in the form of a short report for review by the audit coordinator. The audit coordinator calculates the average resulting scores and, based on them and on the reports, decides whether there is a basis to proceed with the on-site audit.

In case the opinions of the auditors diverge widely with respect to the decision to proceed with an on-site audit, a third party can be consulted by the audit coordinator to come to a decision.

5.2. REPORT

The independent reports of the desk-based audit prepared by each auditor are sent to the audit coordinator. The reports would typically include the following information:

(a) The list of documents received for evaluation, with a note on whether the documentation provided was complete;
(b) A brief description of the desk-based evaluations performed;
(c) The outcome of such evaluations with respect to proceeding with an on-site audit or not and in what time frame;
(d) Desk-based audit report including: identified strengths of the CTP, areas for improvement, formulated in an unambiguous way, with reference to the priority in which to be addressed and practical recommendations on how to set up corrective measures;
(e) Appendixes with further details, including for instance supporting evidence, where relevant.

The auditors' reports of the desk-based audit are then revised by the audit coordinator who analyses the scores and summarizes in a written answer to the audit requestor, whether an on-site audit is performed and in what time frame. The (re)commendations issued from the desk-base audit are also shared.

6. ON-SITE AUDIT

6.1. PRINCIPLES AND PREPARATION

The ultimate aim of the on-site audit is to support the quality improvement of the CTP, through conducting a structured in-depth peer review, informed by the desk-based audit. The recommendations, commendations and findings provided by the auditors are meant to be constructive, reinforce the strengths of the CTP and outline a feasible way forward to overcome any identified weaknesses.

During the on-site audit, the auditors communicate directly with members of the staff, observing their activities relevant to the CTP and visiting training sites. Consequently, the audit is typically organized during a suitable timeframe, when the main stakeholders of the CTP are available.

It is understood that auditors are granted access to the activities and documentation pertaining to the CTP, to facilitate their review process and help provide a realistic overview of the programme and its infrastructure. It is in the interest of the audit process that all aspects of the CTP are analysed as deemed appropriate by the auditors. Cooperation is expected to maximize the benefits of the audit. Withholding information or providing misleading data or testimony may negatively impact an audit process.

Examples of templates that help structure and harmonize the on-site audit are provided in the Appendixes VII–X. In general, the documents used for the desk-based audit are the same as those used during the on-site audit. This also facilitates the comparison of the on-site audit findings against the baselines provided in the self-assessment documents used in the desk-based audit. Major discrepancies between the two sets of documents may also need follow up.

6.2. STRUCTURE OF THE ON-SITE VISIT

The on-site visit represents the core of an audit and entails several types of evaluations and processes that are performed independently by the auditors. It may involve a level of sensitivity with respect to communication and enquiry, consequently approachability, independence and transparency are important attributes for auditors. Details on specific sensitivities are typically relayed by the audit coordinator through the communication management strategy. However, considering the complexity of the task, it is expected that experience and/or specific training pertaining to audit skills would be helpful to auditors to prepare them for the related tasks.

6.2.1. Team composition and visit duration

The on-site visit team is usually composed of at least two auditors, selected by the audit coordinator based on the appropriateness of their experience and expertise, who collaborate during the on-site visit, but provide an independent evaluation of the CTP through separate reports.

The audit team is composed by CQMPs with in-depth understanding and experience in clinical training of medical physicists. In specific cases identified by the audit coordinator, certification, knowledge or understanding in the medical physics specialty(ies) related to the CTP being audited, may facilitate the process, but it is not in general a pre-requisite.

The duration of the on-site audit for one CTP specialty is typically at least two full working days. Depending on the scope, the duration may be extended, for instance for CTPs in more than one medical physics specialty or taking place over several sites.

6.2.2. Centres receiving the on-site audit

Where different hospitals are involved in the CTP, on-site visits are highly recommended where feasible, particularly if they constitute a major portion of the CTP. In cases where not all sites can be audited, a desk-based audit may be accepted, provided all components are probed through the methodology and documentation adopted for the primary audit site.

6.2.3. On-site audit methodology

The on-site audit typically validates and complements the information provided for the desk-based audit. In most cases, a complete check of all elements is not practical or possible and auditors pinpoint key elements to be analysed during the on-site audit. Auditors may identify a sample of elements that strategically cover different areas and aspects of the CTP.

Questionnaires and checklists provided in the framework of the desk-based audit may be discussed point by point with the staff, including the residents, for validation of information. On-site discussions with the involved stakeholders and observations usually provide additional information and help solve inconsistencies. The added value of an on-site audit is the opportunity of interacting directly with the CTP residents and supervisors and observe daily clinical training activities.

During the desk-based, as well as the on-site audit, it is suggested that auditors use the same templates and checklists to help guide and standardize their workflow. All templates and forms can be the same for both audit phases.

In case a discrepancy is found during the on-site audit, the element may be highlighted in the final report, detailing the investigation performed, supported by relevant documentation.

6.3. ON-SITE AUDIT SPECIFICITIES

It is important that the on-site audit focuses on elements that may only be probed, validated or clarified through direct observation and interviews.

6.3.1. Entrance briefing

An entrance briefing is essential to introduce the auditors to the CTP stakeholders on the first day (e.g. head of the CTP, clinical supervisors, residents). Typically, the head of the CTP defines who may attend the entrance briefing in priority and who could be present. The briefing also facilitates the establishment of direct communication between the auditors and the local team and provides information on the objectives and methods that are deployed during the audit. The expected outputs of the meeting include:

– Agreement on the duration and logistics of the audit to be performed;
– Brief presentation on the CTP, including introduction of the involved clinical supervisors (typically present during the meeting);
– Agreement on the agenda for the audit.

The head of the CTP may in this occasion introduce the organizational chart and layout of the facility. The briefing could also include some historical description of the CTP, statistics on its outcomes and eventual expansion plans, to help understand the context of the programme within the health system of the country. When the CTP serves a wider area, for instance a sub-region, region or have an international reach, this may also be presented during the briefing.

6.3.2. Direct observation of equipment in use in the CTP

Review of the available equipment and infrastructure declared as part of the CTP is carried out during the on-site visit in the hospital(s). A dedicated tour to visit the different departments of the hospital is typically one of the first points of the audit visit agenda; this allows the auditors to familiarize themselves with the clinical training environment and infrastructure and observe whether the CTP offers the resident(s) exposure to an adequate range of equipment and activities, in alignment with the CTP scope or curriculum. The purpose of this review is aimed at ensuring that the CTP is embedded in a suitable environment. An in-depth analysis of the department processes and workflow is outside of the scope of the peer review of the CTP however, presence of indicators is taken into account (e.g. availability of written procedures). Quality control being an essential component of the routine activities of CQMPs, indicators will be mostly relevant to this activity.

6.3.3. Supervision and assessment

The review of resident's supervision is a particularly complex task in the framework of an audit, because its evaluation entails not only ensuring its structure (mainly through the CTP documentation such as the portfolio), but also its implementation, which includes elements prone to subjectivity. To mitigate these challenges, the audit is based on a structured canvas that identifies key elements to be reviewed or undertaken by each auditor separately:

(a) Written documents such as the portfolio;
(b) Documents such as rubrics and standardized methodologies in place for the assessment;
(c) Observations during the on-site visit;
(d) Joint and separate interviews with resident(s) and supervisor(s).

Additionally, the auditors may probe whether a professional attitude is cultivated in the residents, for instance through the inclusion of competency assessments pertaining to the ability of the residents to interact and communicate appropriately with patients, colleagues and the team of health professionals within the framework of a patient-centred service. While research and technological developments are important components of the work of a CQMP, the focus of health professionals is service to patients. Supervisors are therefore expected to teach this element and assess it.

Auditors may complement or supplement the information provided by the auditees if needed, through additional investigations and interviews. When in doubt with respect to the possible procedures, the auditors may refer to the communication management strategy document or contact the audit coordinator for advice. Descriptions of any additional assessment carried out is included in the final audit report.

6.3.4. Exit interview

The closure of the audit is typically done through a meeting that involves the hospital management, the supervisor(s), the head of the CTP, the residents and the auditors. On this occasion, the auditors share their general impression of the audit, highlighting key strengths and weaknesses encountered.

A list of key commendations and recommendations are provided and time for questions and discussions allocated, to evaluate whether expectations have been fulfilled by all involved parties.

Feedback from auditees is also invited during this meeting, to allow the auditors to identify possible improvements for future audit visits.

6.4. CONFIDENTIALITY

Apart from the list of key commendations and recommendations shared during the exit interview, all information related to the on-site audit is confidential and is not distributed by the auditors to any individuals other than the audit coordinator who is in charge of further reviewing and compiling the results to share with the relevant parties. If relevant, at a second stage, the coordinator and the head of the CTP may discuss ways by which lessons learned can be disseminated, so that other audits of CTPs can benefit from the experience. For instance, findings, commendations and recommendations from the auditing of several CTPs may be summarized in journal publications, subject to anonymization of the audited centres, in order to share trends or best practices.

7. FINAL AUDIT REPORT

Following the completion of the on-site review audit, each expert prepares their end-of-audit report to be sent to the audit coordinator. A template is available in Appendix XII. The report typically includes the following elements:

(a) Brief description of the audit activities with details of the visit agenda;
(b) List of people met and their role with respect to the CTP;
(c) Description of the facility (infrastructure, workload, etc.);
(d) Considerations on whether the audit was welcomed, since the degree of cooperation from the institution has a significant impact on the credibility and factuality of the final report;
(e) Findings and results of the on-site audit, highlighting whether in agreement with the desk-based audit;
(f) List of strengths of the CTP;
(g) Recommendations for improvement of the CTP, formulated in an unambiguous way, identifying the priorities to be addressed, with a suggested timeline.
(h) Appendixes with further details and evidence where relevant.

The confidential, independent audit reports from the auditors is provided to the audit coordinator, who disseminates key findings to the head of the CTP, as per the request and communication management strategy. Summaries of the final audit report may be shared with the health authorities and CTP management, if so defined and agreed upon in the communication management strategy.

8. AUDIT FOLLOW-UP

The purpose of the audit is to improve the quality of a CTP. Consequently, the result of the audit includes findings, commendations and recommendations. Follow-up is a helpful tool in pursuit of continuous quality improvement to ensure processes are implemented and updated according to best practices. The audit can be considered as a snapshot taken at a specific time; conditions and contexts can change over time and could justify a request for a follow-up audit. For instance, clinical training is heavily reliant on human resources (clinical supervisors, mainly), therefore, changes in the main supervisory team can have consequences on the CTP. Other situations that may lead to request a

follow-up audit include: changes in the infrastructure, new equipment, new clinical procedures and expansion of the CTP to encompass more medical physics specialties.

In case of limited but significant findings, a paper-based follow up could be recommended, provided that this is done in a defined and short timeframe after the audit (e.g. not more than 3 months) and is considered feasible by the audit coordinator. Some audit activities, such as reviewing documents, could be carried out to verify implementation of the corrective actions, following the process described for the desk-based audit. At the end of this process, a modified final report may be delivered.

APPENDIX I. "AUDIT REQUEST"

The written request for an audit is expected to be complemented by relevant information that allows the audit coordinator to verify its eligibility for the audit, as well as to identify the appropriate auditors. The suggested document in Table 4 aims at facilitating the audit requestor in preparing the application, linking it to the additional documents that are connected to it.

TABLE 4. TEMPLATE TO FACILITATE THE PREPARATION OF A REQUEST FOR AN AUDIT OF A CTP

Form to Request an Audit of a Clinical Training Programme (CTP) in Medical Physics
Date (day/month/year):
Medical physics specialty(ies) the audit of the CTP is requested for: DR NM RT
Location(s) of the CTP programme Country(ies): Town(s):
Audit requestor
First name:
Family name:
Job title:
Affiliation:
Role with respect to the CTP:
Head of the CTP (leave blank if it is the same as the requestor)
First name:
Family name:
Job title:
Affiliation:
The head of the CTP is aware of this request and agrees to receive the audit: Yes No
The clinical supervisors of the CTP are aware of this request and agree to receive the audit: Yes No
Names and signatures of the supervisors agreeing:
The management of the hospital(s) involved in the CTP is aware of this request and agrees to receive the audit: Yes No
Name(s) and signature of the responsible agreeing:
List the objectives of this audit (type text below, not more than 100 words):

Form to Request an Audit of a Clinical Training Programme (CTP) in Medical Physics
Strengths: Weaknesses: Opportunities: Threats:
Letter of the audit requestor to the audit coordinator (*type text below*):

Information	**Details**
Declaration of acceptance of the audit by the representative(s) of the hospital(s) involved in the CTP attached to the request	Attached / Not attached
Curriculum of the CTP	Attached / Not attached
What reference guidelines are followed for the syllabus (national, regional, international). Please attach the document or indicate a relevant website	Attached / Not attached
Structure of the CTP (e.g table with competencies, name of supervisors, address of all involved hospital(s))	Attached / Not attached
Active medical physics specialties in the framework of the CTP (circle what applicable)	DR NM RT
Years of existence of the CTP (for each medical physics specialty, if more than one is active)	DR _____ NM _____ RT _____
Number of residents at the time of the audit request in each specialty the CTP is active in	DR _____ NM _____ RT _____
Number of supervisors in each specialty of the CTP at the time of the audit request	DR _____ NM _____ RT _____
Overall number of residents who successfully completed the CTP over the years in each specialty (if more than one specialty is active)	DR _____ NM _____ RT _____
Please, write the link to academic programmes, if applicable, with details such as name of the university, referent person and contact information	

APPENDIX II. "LETTER OF ACCEPTANCE OF THE AUDIT"

A written acceptance of the audit may be prepared following the template made available in Table 5.

TABLE 5. TEMPLATE TO PREPARE A LETTER OF ACCEPTANCE OF THE AUDIT OF THE CTP IN MEDICAL PHYSICS

Entity Name (e.g. hospital):
Letter of acceptance of the audit (type text below):
Name and signature of the representative:
Date (day/month/year):

APPENDIX III. "CHECKLIST FOR DOCUMENTATION IN SUPPORT OF AN AUDIT REQUEST"

TABLE 6. CHECKLIST TO GUIDE IN THE SUBMISSION OF ALL THE DOCUMENTS NEEDED TO PROCEED WITH THE AUDIT REQUEST FOR THE CTP IN MEDICAL PHYSICS

Area	Information	Provided	Comments
Contextualization of the CTP	Academic programmes linked to the CTP	Y / N	
	Structure of the CTP	Y / N	
	Support of the CTP by the involved hospital(s)	Y / N	
	Equipment and procedures performed at the hospital(s) involved in the CTP	Y / N	
	Organograms of the departments where the CTP takes place	Y / N	
	Radiation protection services and equipment	Y / N	
	Infrastructure to support study and research activities	Y / N	
	Professional ethics (e.g. collaboration with a bioethics department)	Y / N	
	Sustainability of the CTP in the national, regional or interregional environment	Y / N	
Details of the CTP	CTP curriculum: - acceptance criteria	Y / N	
	- competencies of the CTP		
	- ratio of residents/supervisors		
	Documented proves of clinical training (assessment, portfolios, logbooks, final examination)	Y / N	
	Staff and advisors involved in the CTP	Y / N	

Area	Information	Provided	Comments
Monitoring of the CTP	Documented follow up on absorption of former residents as CQMP in hospitals	Y / N	
	Documented feedback collection from residents and clinical supervisors, their analysis and follow up for improvement	Y / N	
	Structured and documented mechanisms in place to record challenges and risks and related correction measures taken	Y / N	
	Involvement in internal or external audits (if applicable)	Y / N	
	Accreditation (where existing)	Y / N	

APPENDIX IV. "TEMPLATES RELEVANT TO THE CONTEXTUALIZATION OF THE CTP"

IV.1. "STRUCTURE OF THE CTP"

A CTP consists of a collection of competencies and therefore may be schematically summarized in a table. Fillable templates based on the IAEA clinical training guidelines and their regional versions are downloadable from the IAEA Human Health Campus website [21].

The templates help summarize information such as competencies (as per the curriculum followed) and hospitals where these are taught. Additionally, the name of the assigned supervisor(s) is included to facilitate follow up by the head of the CTP.

IV.2. "EQUIPMENT, PROCEDURES AND RADIATION PROTECTION"

Table 7 provides a template through which collecting information on the equipment, number of procedures taking place at the hospital(s) hosting the CTP, as well as basic information on radiation protection matters.

TABLE 7. TEMPLATE TO PROVIDE INFORMATION ON THE INFRASTRUCTURE AND PROCEDURES AVAILABLE AT THE INSTITUTION(S) HOSTING THE CTP

Questionnaire on Clinical Institution's Infrastructure and Staffing				
Please, complete this questionnaire to the best of your knowledge.				
Your name:				
Your email address:				
Your job title:				
Country:				
Institution:				
Clinical Institution				
Is your institution:	□ Public	□ Private	□ Combined	□ Other
Select which services in the field of radiation medicine are offered in your hospital:	□ Radiology	□ Radiotherapy	□ Nuclear Medicine	

Questionnaire on Clinical Institution's Infrastructure and Staffing		
Radiology		
If it applies, please identify which of the imaging techniques and equipment are available in your **radiology service**:	□ Radiography □ Fluoroscopy □ Computer Tomography □ Mammography	□ Interventional Radiology □ MRI □ Ultrasound □ Dental
Do you have any equipment which is currently being installed or considered for replacement in the department? If yes, what?	□ Yes	□ No

Please select which radiology equipment is **available and functioning** in your hospital/clinic (check all that apply), providing, if possible, the approximate number of procedures performed yearly:

Equipment	Annual number of exams
□ Film based conventional RX radiology	□ below 3000 □ between 3000–6000 □ over 6000
□ MRI	□ below 500 □ between 500–1 500 □ over 1 500
□ Digital RX radiology	□ below 3 000 □ between 3 000–6 000 □ over 6 000
□ Ultrasound echography	□ below 3 000 □ between 3 000–6 000 □ over 6 000
□ Single slice Computed Tomography	□ below 1 500 □ between 1 500–3 000 □ over 3 000
□ Interventional radiology	□ below 500 □ between 500–1 500 □ over 1500

Questionnaire on Clinical Institution's Infrastructure and Staffing	
Radiology	
Equipment	**Annual number of exams**
□ Multislice Computed Tomography	□ below 1 500 □ between 1 500–3 000 □ over 3 000
□ Computed Radiology (CR) systems	□ below 3 000 □ between 3 000–6 000 □ over 6 000
□ Film-based mammography	□ below 2 000 □ between 2 000–4 000 □ over 4 000
□ Fluoroscopy (fixed, C-arms)	□ below 1500 □ between 1500–3000 □ over 3000
□ Digital mammography	□ below 2000 □ between 2 000–4 000 □ over 4 000
□ DXA	□ below 300 □ between 300–600 □ over 600
□ Dental radiography	□ below 1500 □ between 1 500–3 000 □ over 3000
□ PACS	Number of workstations:
Do you have available and functioning dosimetry equipment (including detectors, kV meters, phantoms, etc.) for radiology QA/QC?	□ Yes □ No

If the answer to the above is yes, please list them here:

Number of professionals working in the diagnostic and interventional radiology service of your institution, please express it as full-time equivalents (FTE), e.g. a half-time employee is equivalent to 0.5, or if a professional is spending half of the time in the department, please score 0.5:

Number of radiologists: Number of diagnostic radiographers: Number of medical physicists:

Questionnaire on Clinical Institution's Infrastructure and Staffing		
Nuclear Medicine		
If applicable, please identify which imaging techniques and equipment are available in your **nuclear medicine service**:	□ RIA □ Thyroid counter □ Diagnostic imaging using dedicated PET systems □ Diagnostic imaging using gamma cameras and/or SPECT □ hot cell for conventional NM available	□ Radionuclide therapy □ Techniques to support radio □ Diagnostic imaging using PET-CT scans □ Diagnostic imaging using hybrid systems (SPECT-CT) □ hot cell for PET radionuclides available
Do you have any equipment which is currently being installed or considered for replacement in the department? If yes, what?	□ Yes	□ No

Please select which nuclear medicine equipment is **available and functioning** in your hospital/clinic (check all that apply), providing, if possible, the approximate number of procedures performed yearly:

Equipment	**Annual number of exams**
□ RIA	□ below 150 000 □ between 150 000–300 000 □ over 300 000
□ Diagnostic imaging using hybrid systems (SPECT-CT)	□ below 600 □ between 600–1 200 □ over 1 200
□ Diagnostic imaging using gamma cameras and/or SPECT systems	□ below 3 000 □ between 3 000–6 000 □ over 6 000
□ Radionuclide therapy	□ below 600 □ between 600–1 200 □ over 1 200 List of radionuclides used for therapy:

Questionnaire on Clinical Institution's Infrastructure and Staffing

Nuclear Medicine

Equipment	**Annual number of exams**
□ Thyroid counter	□ below 1 500 □ between 1 500–3 000 □ over 3 000
□ Diagnostic imaging using PET-CT scans	□ below 1 500 □ between 1 500–3 000 □ over 3 000
□ Diagnostic imaging using dedicated PET systems	□ below 500 □ between 500–1 000 □ over 1 000
□ Techniques to support radio guided surgery	□ below 150 □ between 150–300 □ over 300

Number of professionals working in the nuclear medicine service of your institution, please express it as full-time equivalents (FTE), e.g. a half-time employee is equivalent to 0.5, or if a professional is spending half of the time in the department, please score 0.5:

Number of nuclear medicine physicians:	____	Number of medical physicists:	___
Number of technologists:	____	Number of radiopharmacists:	___

Radiotherapy

If applicable, please identify which imaging techniques and equipment are available in your **radiotherapy service**:	□ Fluoroscopic (conventional) simulator □ CT-simulator (shared access or dedicated) □ Treatment Planning Systems □ Superficial X-ray Therapy □ Orthovoltage Therapy □ Cobalt 60 teletherapy □ LINAC □ Electron therapy □ Gamma Knife □ Cyberknife	□ IGRT □ Intracranial SRS □ SRT/SBRT □ LDR Brachytherapy (Caesium) □ LDR seeds (I125) □ HDR brachytherapy (Cobalt-60) □ HDR brachytherapy (Iridium-192) □ PDR brachytherapy (Iridium-192) □ Proton therapy □ IMRT Technology

Questionnaire on Clinical Institution's Infrastructure and Staffing

Radiotherapy

Do you have any equipment which is currently being installed or considered for replacement in the department? If yes, what?	□ Yes	□ No

Please select which of the radiotherapy equipment are performed in your hospital/clinic (check all that apply), providing, if possible, the approximate number of procedures performed yearly:

Equipment	**Annual number of patients per unit**
□ Superficial or orthovoltage radiotherapy	□ below 200 □ between 200–400 □ over 400
□ Manual LDR brachytherapy	□ below 100 □ between 100–200 □ over 200
□ Cobalt-60 radiotherapy	□ below 300 □ between 300–500 □ over 500
□ HDR brachytherapy (Ir or Co)	□ below 400 □ between 400–500 □ over 500
□ Linac (conformal radiotherapy)	□ below 300 □ between 300–500 □ over 500
□ IMRT Technology	□ below 300 □ between 300–500 □ over 500
□ SBRT	□ below 50 □ between 50-100 □ over 100
□ SRS	□ below 20 □ between 20-50 □ over 50

Number of professionals working in the radiotherapy service of your institution, please express it as full-time equivalents (FTE), e.g. a half-time employee is equivalent to 0.5, or if a professional is spending half of the time in the department, please score 0.5:

Number of radiation/clinical oncologists:	Number of radiation therapy technologists:	Number of medical physicists:

Questionnaire on Clinical Institution's Infrastructure and Staffing

Quality Assurance

Quality Assurance /Quality Control practices (existence of established procedures) in:

□ Diagnostic/Interventional Radiology □ Nuclear Medicine □ Radiotherapy

Please mention on which calibration protocols or international guidelines are the quality assurance/quality control procedures based, if any:

Regulatory Authority Requirements (Regular quality control tests/records are required for licensing) in:

□ Diagnostic/Interventional Radiology □ Nuclear Medicine □ Radiotherapy

Name of the Institution that issued the license, if any:

Radiation Protection

Do you have radiation zone classification (i.e. restricted areas with panel indication)?	□ Yes	□ No
Are there fixed area monitors in controlled areas?	□ Yes	□ No
Do you have portable radiation monitors available and functioning?	□ Yes	□ No
If applicable, do you have a professional in charge of verifying the area radiation?	□ Yes	□ No
If yes, what professional is in charge of this task?		
Do you have personal dosimeters?	□ Yes	□ No
If yes, of what kind:		
Do you keep records of the staff occupational procedures?	□ Yes	□ No
If yes, what professional is in charge of this task?		
Do you have dose evaluation of patient's procedures?	□ Yes	□ No
If yes, what professional is in charge of this task?		
Do you have a Diagnostic Reference Level in place?	□ Yes	□ No
If yes, what professional is in charge of this task?		

Questionnaire on Clinical Institution's Infrastructure and Staffing		
Radiation Protection		
Are there light radiation indicators in relevant areas?	□ Yes	□ No
Do you have personal radiation protection devices for workers (e.g. lead aprons, mobile lead shields, etc.)?	□ Yes	□ No
If yes, please list the available equipment:		
Do you perform monitoring of nuclear medicine patients before discharge?	□ Yes	□ No
If yes, what professional is in charge of this task?		
Please add here any other information you might consider relevant:		

IV.3. “INFRASTRUCTURE TO SUPPORT STUDY AND RESEARCH ACTIVITIES”

Table 8 provides a template to summarize information on infrastructure present at the hospital(s) hosting the CTPs, to allow the residents to carry out their work and deepen their familiarity with research in the field of clinical medical physics.

TABLE 8. TEMPLATE TO PROVIDE INFORMATION ON AVAILABLE INFRASTRUCTURE TO SUPPORT RESIDENTS IN THEIR WORK AND LEARNING PROCESS

Item	**Availability (Y/N)**
Internet connection	
Workstation with adequate software to write reports, analyse and organise data	
Access to library offering medical physics related material	
Office areas	
Other (specify)	

IV.4. “PROFESSIONAL ETHICS”

TABLE 9. TEMPLATE TO SUMMARIZE THE RESOURCES IN SUPPORT OF PROFESSIONAL ETHICS AVAILABLE TO THE SUPERVISORS AS WELL AS TO THE RESIDENTS OF THE CTP

Professional ethics support	**Availability (Y/N)**
Bioethics hospital department	
University ethics/bioethics department	
External ethics advice	
Access to dedicated training (e.g. CPD) in professional ethics	

IV.5. "SUSTAINABILITY OF THE CTP IN THE NATIONAL, REGIONAL OR INTERREGIONAL ENVIRONMENT"

The sustainability of the CTP over time is important and therefore is an element that is analysed in the framework of the audit process. Sustainability includes various aspects that are summarized in Table 10.

TABLE 10. TEMPLATE TO FACILITATE THE COLLECTION OF INFORMATION RELEVANT TO THE SUSTAINABILITY OF CTPs

Item	**Description**	**Details**
Connection CTP to context: catchment area	International Regional National	International residents since start of CTP: _____% Regional residents since start of CTP: _____% National residents since start of CTP: _____%
Quality management of the CTP	Written and documented procedures Follow-up structured mechanism for former residents Follow-up structured mechanism for supervisors	Available/not available Available/not available Available/not available
Recognition of the profession of CQMP	As a health profession Certification available Re-certification available Details on the certification body	Y/N Y/N Y/N
Financial sustainability	Residents fully funded per year Origin of the funds: Name of entity(ies) funding the resident(s): Type of the entity(ies) funding the resident(s) (e.g. public, private): Funds available for residents to attend conferences etc.	_____%

APPENDIX V. "TEMPLATES RELEVANT TO THE DETAILS OF THE CTP"

TABLE 11. TEMPLATE TO FACILITATE THE CREATION OF A LIST OF STAFF AND EXTERNAL ADVISORS TO THE CTP (WHERE EXISTING)

Staff name	**Job title**	**Role in the CTP**	**Experience working independently in the clinic (in years)**
	CQMP MD RTT Other (specify)		

Advisors (if available)		
Name	**Job title**	**Affiliation**

APPENDIX VI. "TEMPLATES RELEVANT TO THE MONITORING OF THE CTP"

TABLE 12. TEMPLATE TO FACILITATE THE FOLLOW UP ON THE RECRUITMENT AS CQMPS IN HOSPITALS OF FORMER RESIDENTS HAVING COMPLETED THE CTP

Date	**Number of CQMPs completing the CTP**	**Date of check**	**Number of CQMPs working in a hospital**
	DR		DR
	NM		NM
	RT		RT

TABLE 13. TEMPLATE TO FACILITATE THE FEEDBACK COLLECTION AND ANALYSIS FROM FORMER RESIDENTS HAVING COMPLETED THE CTP

Specialty (select one):	**DR**	**NM**	**RT**		
Date feedback form circulated	**Number of former residents' replies expected**	**Number of former residents' replies received**	**Items of concern**	**Follow up plan**	**Resolved**
				Y / N	Y / N
				Y / N	Y / N
				Y / N	Y / N

TABLE 14. TEMPLATE TO FACILITATE THE FEEDBACK COLLECTION AND ANALYSIS FROM CLINICAL SUPERVISORS

Specialty (select one):	**DR**	**NM**	**RT**		
Date feedback form circulated	**Number of clinical supervisors' replies expected**	**Number of clinical supervisors' replies expected**	**Items of concern**	**Follow up plan**	**Resolved**
				Y / N	Y / N
				Y / N	Y / N
				Y / N	Y / N
				Y / N	Y / N

TABLE 15. TEMPLATE TO FACILITATE THE COLLECTION OF INFORMATION PERTAINING TO AUDIT(S) AND ACCREDITATION (WHERE APPLICABLE)

	External audit	**Internal audit**	**Accreditation**	**Performed by (name of entity)**
Involvement of the CTP with	Y / N	Y / N	Y / N	Y / N
Latest occurrence (date)				
Date of renewal (where applicable)				

APPENDIX VII. "CHECKLIST CLINICAL TRAINING PROGRAMME"

Content: This form focuses on the prerequisites for enrolling in the CTP, scope of the programme, training workload, description of the activities of the residents, evaluation and supervision criteria and periodicity, teaching modalities, continuous education modalities employed during the training period, details of external evaluation and existence of steering committees.

Purpose: to provide a comprehensive overview on the CTP, its structure (number and details of involved hospitals), highlighting crucial elements that the auditors may probe in depth during the on-site visit.

Multiplicity: as many as centres where the CTP takes place; it may be used during the on-site auditing in its entirety or partially to interview multiple involved people (e.g. clinical supervisor, resident(s)) and then compare answers.

Timing: desk-based and on-site

Compiler for desk-based audit: the head of the CTP

Compiler for on-site audit: auditors

TABLE 16. CHECKLIST TO FACILITATE THE COLLECTION OF ELEMENTS OF INTEREST TO THE AUDIT PERTAINING TO THE CTP

CHECKLIST CLINICAL TRAINING PROGRAMME IN MEDICAL PHYSICS			
Items to be checked	**Quick answers**		**Comments/answers**
How is the selection done / what are the criteria for entering clinical training programme?	Master's degree in….		
	CV		
	Recertification		
	Interview		
Link with academic programme?	Stand-alone		
	Integrated		
Do the residents have a contract?	□ Yes	□ No	
Are there any documentation/policy regarding the staff involved in the clinical training programme (not residents)? If yes, please send a copy to the auditors.	□ Yes	□ No	

CHECKLIST CLINICAL TRAINING PROGRAMME IN MEDICAL PHYSICS			
Items to be checked	**Quick answers**		**Comments/answers**
Hospital induction (hand hygiene, administrative issues, professional conduct, etc.)	□ Yes	□ No	
Internal rules	□ Yes	□ No	
CTP induction (e.g. competencies, timeframe etc.)	□ Yes	□ No	
Are the residents required to perform research activities as part of their training?	□ Yes	□ No	
If yes, what shape does this take?			
How is this assessed?			
Are the residents involved in journal clubs	□ Yes	□ No	
Are the residents involved in multidisciplinary clinical review meetings, e.g. chart rounds	□ Yes	□ No	
Are residents involved in discussions group	□ Yes	□ No	
Is the resident aware of ethical considerations when performing research? (e.g. ethics approval)	□ Yes	□ No	
Is the resident taking part in ethics training	□ Yes	□ No	
Are there options to extend the training programme for a defined period? For how long?	□ Yes	□ No	
What is the minimum foreseen time to complete the training in a medical physics specialty (e.g. hours per week)?			
Is clinical training embedded in the clinical activities?	□ Yes	□ No	
Are clinical training activities performed outside of the clinical activities?	□ Yes	□ No	
Is the clinical training programme's curriculum available in written form?	□ Yes	□ No	

CHECKLIST CLINICAL TRAINING PROGRAMME IN MEDICAL PHYSICS			
Items to be checked	**Quick answers**		**Comments/answers**
Is it defined in written form where the resident receives the clinical training (e.g. weekly schedules)	□ Yes	□ No	
Is it defined in written form who is in charge of the resident during the different tasks of the clinical training (supervisor, co-supervisor, staff member) Please, give details of how the resident is supervised.	□ Yes	□ No	
Are there mechanisms in place to allow for different degrees of supervision of the resident (e.g. demonstration followed by resident performing the task with help, performing the task supervised with minimal supervisor intervention) How is unsatisfactory performance dealt with? Practical competence Behavioural or disciplinary issues	□ Yes	□ No	
Is there a requirement for a minimum number of procedures that the resident has to perform? If yes to the above, how many?	□ Yes	□ No	

CHECKLIST CLINICAL TRAINING PROGRAMME IN MEDICAL PHYSICS			
Items to be checked	**Quick answers**		**Comments/answers**
Does the supervisor provide lectures on the theoretical basis of the activities to the resident(s)	□ Yes	□ No	
Is the supervisor formally involved (e.g. as lecturer) in a relevant (e.g. medical physics, applied physics) postgraduate programme?	□ Yes	□ No	
How many residents are supervised by the same supervisor?			
Comments, if any:			
Are there written ethics guidelines available to the resident(s)?	□ Yes	□ No	
Is the resident maintaining a logbook (a record of their training experience)?	□ Yes	□ No	
Is there a written learning agreement between the supervisor and the resident (e.g. includes learning needs, assessment criteria, strategy and timeline to acquire the competencies)?	□ Yes	□ No	
Is there a portfolio (e.g includes the competencies to be achieved and timelines)?	□ Yes	□ No	
Is the portfolio examined at regular intervals by the clinical supervisor?	□ Yes	□ No	
Are there in place continuous evaluation mechanisms of the resident(s) (e.g. the resident is asked to present on topics, provide practical hands-on demonstrations, etc.)?	□ Yes	□ No	
Are regular individual meetings scheduled between the resident(s) and supervisor to discuss about the resident's progress?	□ Yes	□ No	
Is there a written progress report?	□ Yes	□ No	
Is the progress report signed off by a supervisor?	□ Yes	□ No	

CHECKLIST CLINICAL TRAINING PROGRAMME IN MEDICAL PHYSICS			
Items to be checked	**Quick answers**		**Comments/answers**
Is the supervisor maintaining written records of e.g. lapsed deadlines and unacceptable behaviour from the resident(s) How are the residents evaluated (e.g. scores, evaluations etc.)? Please, give details:	□ Yes	□ No	
How often are residents' competencies evaluated?	□ daily □ monthly □ annually □ other		
Methods are established and in use to assess of the progression of clinical training	□ Yes	□ No	
Are records kept of the activities done by the resident? If yes, please give details.	□ Yes	□ No	
Are records kept of the activities done by the supervisor? If yes, please give details.	□ Yes	□ No	
Are records kept of the activities done by the other professionals involved in training? If yes, please give details.	□ Yes	□ No	

CHECKLIST CLINICAL TRAINING PROGRAMME IN MEDICAL PHYSICS			
Items to be checked	**Quick answers**		**Comments/answers**
Is the assessment adapted to the individual?	□ Yes	□ No	
If yes to the above, please, give details:			
Is there an external independent assessment of the resident?	□ Yes	□ No	
If yes to the above, how many times does it take place during the programme?			
Is the national steering committee participating in the final exam?	□ Yes	□ No	
Is there a practical exam as part of the final examination?	□ Yes	□ No	
Is there a process for the residents to give anonymous feedback on their supervisors and other staff involved in the training scheme?	□ Yes	□ No	
How many clinical supervisors are responsible of the residents different than the main supervisor for specific activities?			
Is there an internal assessment of the programme in place?	□ Yes	□ No	
Is there an external assessment of the overall clinical training programme?	□ Yes	□ No	
Who assesses that each competency provided is clear and well defined			
Who assesses that the overall goal of the clinical training provided			
Is there a backup plan in case of disruption of clinical training activities (e.g. equipment breaks, leave of the supervisor, etc.)?	□ Yes	□ No	
If yes, please give details.			

CHECKLIST CLINICAL TRAINING PROGRAMME IN MEDICAL PHYSICS			
Items to be checked	**Quick answers**		**Comments/answers**
Is there a job description related to the activities of the clinical supervisor? If yes give details.	□ Yes	□ No	
What mechanisms are in place to select the clinical supervisors?			
Is there a formal link with a university? If yes, what programme (e.g. medical physics):	□ Yes	□ No	
Is there a job description for the other training professionals involved (e.g. other medical physicists, dosimetrist)? If yes, please give details:	□ Yes	□ No	
Is the supervisor involved in clinical training of other professionals such as RTTs, radiographers, radiology residents? If yes, please give details:	□ Yes	□ No	
Are there any other residents in the department such as radiographers, radiologist etc.? If yes, please give details:	□ Yes	□ No	
Are there written instructions and guidelines on how to perform tasks for the resident?	□ Yes	□ No	
Is there a career development plan for the supervisor or staff involved in clinical training?	□ Yes	□ No	
Has the resident a special account to access the system computers that is limiting their actions (such as approving and modifying plans etc.)	□ Yes	□ No	

CHECKLIST CLINICAL TRAINING PROGRAMME IN MEDICAL PHYSICS			
Items to be checked	**Quick answers**		**Comments/answers**
Do the involved staff and supervisor receive training for the clinical training activities? If yes, please give details:	□ Yes	□ No	
Is there regular staff and resident meetings? If yes, please give details:	□ Yes	□ No	
Is there regular resident and supervisor meetings? If yes, please give details:	□ Yes	□ No	
Is there an external person assessing the training programme?	□ Yes	□ No	
Is there a MoU between involved clinical institutions participating in the clinical training?	□ Yes	□ No	

APPENDIX VIII. "CHECKLIST RESIDENTS"

Content: questions about the required profile for enrolling in the programme, maximum number of residents per supervisor, type of written information used during the training process to assess the resident performance, roles and responsibilities, type of interaction and exposure to other professionals and activities, resource availability during routine training, and access to radiation safety procedures.

Purpose: to enquire about the selection criteria and the residents' experience

Multiplicity: only one for the desk-based review. Suggested several on-site. It is recommended that the auditors ask such questions to more than one resident

Timing: desk-based and on-site

Compiler for desk-based audit: the resident

Compiler for on-site audit: auditors

To provide preliminary information during the desk-based review and guide the on-site audit

TABLE 17. CHECKLIST TO FACILITATE THE COLLECTION OF ELEMENTS OF INTEREST TO THE AUDIT PERTAINING TO THE RESIDENTS

CHECKLIST RESIDENT		
Items to be checked	**Quick answers**	**Comments/answers**
How is the selection done / what are the criteria for entering the clinical training programme?	Master's degree in…. CV Recertification Interview	
Link with academic programme?	Stand-alone Integrated	
What is the maximum number of residents supervised per supervisor?		
Has the resident discussed with the supervisor and signed a learning agreement (e.g. clinical training plan) before the residency?	□ Yes □ No	
If yes to the above, is the plan reviewed regularly?	□ Yes □ No	
What is the highest academic degree held by the resident? In which topic?		

CHECKLIST RESIDENT			
Items to be checked	**Quick answers**		**Comments/answers**
Is there a defined scheduled of the periodic meetings with the supervisor?	□ Yes	□ No	
Are there written reports of the activities performed with the supervisor?	□ Yes	□ No	
Is the resident maintaining a logbook?	□ Yes	□ No	
Is the resident maintaining and updating regularly a portfolio?	□ Yes	□ No	
If yes, how often:			
Is the portfolio regularly reviewed by the supervisor?	□ Yes	□ No	
If yes, how often:			
Is it defined in advance and scheduled in which area the student receives the training (e.g. weekly/monthly/ 6 months schedules)?	□ Yes	□ No	
Is it defined who is responsible for the resident during the clinical training (supervisor directly, delegated staff member)	□ Yes	□ No	
Is it defined in advance and scheduled where in the hospital the resident receives the training (e.g. weekly schedule)?	□ Yes	□ No	
Is the resident allowed to work alone?	□ Yes	□ No	
If yes, what activities may be performed?			
Is there a “resident working alone” procedure?	□ Yes	□ No	
Is the resident allowed to work unsupervised?	□ Yes	□ No	
If yes, what activities may be performed?			
Is there a “resident working unsupervised” procedure?	□ Yes	□ No	
Is there any structured educational interaction between the residents as part of the clinical training? For example: Regular presentations of topics linked to the learned activities, Group reports to submit	□ Yes	□ No	

CHECKLIST RESIDENT		
Items to be checked	**Quick answers**	**Comments/answers**
Has the resident received a full demonstration of the use of the equipment before being allowed to use it under supervision? By whom?	□ Yes □ No	
Is the resident allowed to use the dosimetry equipment under supervision?	□ Yes □ No	
Degree of access of the resident to the equipment (hands-on training) during the clinical training: what is the declared % of time dedicated to practical activities?	□ 25% □ 50% □ 75% □ 100%	
Does the resident understand the workflow of patients? - Resident: Example of patient workflow	□ Yes □ No	
Interaction with other professionals:		
- Doctors	□ Yes □ No	
- Technologists	□ Yes □ No	
- Engineer	□ Yes □ No	
- Manager	□ Yes □ No	
Is the resident participating in multidisciplinary meetings? If yes to the above, with what frequency?	□ Yes □ No	
Exposure to different activities:		
- Routine	□ Yes □ No	
- Implementation of new technique	□ Yes □ No	
- Meetings with other staff	□ Yes □ No	
- Research	□ Yes □ No	

CHECKLIST RESIDENT			
Items to be checked	**Quick answers**		**Comments/answers**
- Teaching activities (such as routine presentations in front of other residents etc)	□ Yes	□ No	
- Presentation and participation in residents' forums to share progress	□ Yes	□ No	
- Presentation of summaries of scientific papers	□ Yes	□ No	
Are the resident's attitudes evaluated (e.g. Critical thinking, Problem solving, Timekeeping, Safety, Teamwork, Participative or passive, Respect of department rules, Professionalism, Communication)? If yes, please explain how:	□ Yes	□ No	
Does the resident have access to the informatic systems through a personal password?	□ Yes	□ No	
Does the resident have access to simulation systems?	□ Yes	□ No	
Does the resident have access to controlled areas?	□ Yes	□ No	
Does the resident have a personal dosimeter?	□ Yes	□ No	
Is there a system in place for the resident to officially provide feedback about the supervisor?	□ Yes	□ No	
Is there a clear understanding in the department that the responsibility for the resident's activities is given to supervisor(s)?	□ Yes	□ No	
Is there an available policy in the Centre(s) that regulates the residents' activities?	□ Yes	□ No	
Is there a system in place to keep track of the residents' "outcomes" (post programme)?	□ Yes	□ No	
Is there a system in place for the resident to regularly provide feedback about the supervisor to the programme coordinator?	□ Yes	□ No	

CHECKLIST RESIDENT			
Items to be checked	**Quick answers**		**Comments/answers**
Is there an anonymous reporting system available to assess or provide feedback of the supervisor and other staff involved in the clinical training?	□ Yes	□ No	
Is there a system in place for the resident to regularly provide feedback about the supervisor to the supervisor?	□ Yes	□ No	
Has the resident received an induction training within their first week of starting (e.g. ethics, hand washing, fire)?	□ Yes	□ No	
Has the resident received training on radiation safety procedures within the first week of training?	□ Yes	□ No	
Resident access to written radiation emergency procedures?	□ Yes	□ No	
Please write on the views of the resident(s) on:			
Strengths:			
Weaknesses:			
Opportunities:			
Threats:			
of the CTP			

APPENDIX IX. "CHECKLIST STAFF"

Content: this form focuses on staff (other than the clinical supervisor) involved in the CTP including different professionals

Purpose: to enquire about the involvement of various staff and different types of professionals in the CTP.

Multiplicity: one for the desk-based audit; several on-site, it is indeed suggested that the auditors' interview more than one staff member, sampling among the different involved professionals

Timing: desk-based and on-site

Compiler for desk-based audit: the head of the CTP

Compiler for on-site audit: auditors

TABLE 18. CHECKLIST TO FACILITATE THE COLLECTION OF ELEMENTS OF INTEREST TO THE AUDIT PERTAINING TO HOSPITAL STAFF INVOLVED IN THE CTP

CHECKLIST STAFF			
Checklist	**Quick answers**		**Comments/answers**
Staff involved in the clinical training programme:			
Supervisor	□ Yes	□ No	
Other medical physicist	□ Yes	□ No	
Dosimetrist	□ Yes	□ No	
Therapist	□ Yes	□ No	
Specialty-related medical doctor	□ Yes	□ No	
Engineer	□ Yes	□ No	
RPO staff	□ Yes	□ No	
Is there any documentation/policy regarding the staff involved	□ Yes	□ No	
Does the hospital management support the programme?	□ Yes	□ No	

CHECKLIST STAFF			
Items to be checked	**Quick answers**		**Comments/answers**
Is there an internal assessment of the staff involved in clinical training?	□ Yes	□ No	
Is there an organigram available including the resident and supervisor roles?	□ Yes	□ No	
Are the documents related to training plan (e.g. Gantt) defined by the training coordinator?	□ Yes	□ No	
Is the supervisor involved in preparing the documents related to the training plan (e.g. Gantt)?	□ Yes	□ No	
Does the staff of the training programme provide periodic lectures to complement the training?	□ Yes	□ No	
If answered yes to the above, is there any track kept of the topics and efforts in coordinating these activities?	□ Yes	□ No	
If existing, are the provided lectures in line and coherent with the goals of the training programme?	□ Yes	□ No	
Is the staff involved in clinical training providing University lectures? If yes, at what level (undergraduate, postgraduate etc.)?	□ Yes	□ No	
If answered yes to the question above, is the appointment of the staff official?	□ Yes	□ No	
Are the other clinical medical physicists of the team certified?	□ Yes	□ No	
For how many years have the other clinical medical physicists in the team been working independently as clinical medical physicist?			
What is the highest academic degree held by the clinical medical physicists of the team?			
Is there a double check by another staff member of the training and assessment done by the clinical supervisor?	□ Yes	□ No	

CHECKLIST STAFF			
Items to be checked	**Quick answers**		**Comments/answers**
Are there written reports of the training activities done by the other staff members involved in the clinical training?	□ Yes	□ No	
Is there an anonymous reporting system available to assess or provide feedback of the supervisor and other staff involved in the clinical training?	□ Yes	□ No	
How many supervisors are responsible for the residents?			
What is the maximum number of residents who can be accepted in the programme?			
Is the supervisor responsible of more than 2 residents per year?	□ Yes	□ No	
Is there officially allocated time for the supervisor for the clinical training?	□ Yes	□ No	
Is there officially allocated time for the staff involved for the clinical training?	□ Yes	□ No	
Is there allocated time for training of supervisors in the clinical training processes?	□ Yes	□ No	
Is there allocated time for training of involved staff in the clinical training processes?	□ Yes	□ No	
Is there any action or re-planning of the activities, in case the supervisor cannot support the student activities?	□ Yes	□ No	
Is there a defined job description including the training activities for the other staff involved in the clinical training professional (e.g. physicist, dosimetrist)?	□ Yes	□ No	

CHECKLIST STAFF			
Items to be checked	**Quick answers**		**Comments/answers**
Do the involved staff or the supervisor receive recognition for the clinical training activity (e.g. CPD)?	□ Yes	□ No	
Is a ratio resident/supervisor specified?	□ Yes	□ No	
Is there any other concomitant training program assigned to the supervisor?	□ Yes	□ No	
Are there any other people in training in the department (e.g. Visiting, RTT, RO etc)?	□ Yes	□ No	
Are clinical training activities contributing to career development for the involved staff?	□ Yes	□ No	
Is there any regular staff and resident meeting?	□ Yes	□ No	

APPENDIX X. "CHECKLIST SUPERVISORS"

Content: this form focuses on the supervisor-related aspects and view and includes element such as formal requirements to become a supervisor, including degrees, certifications and previous experience in the field of clinical medical physics, level of involvement with the residents in term of responsibilities, and methodologies employed for assessing the resident's performance.

Purpose: define the background and assessment methods of the main actor influencing the CTP

Multiplicity: one for the desk-based review and one on-site, as the resident is typically assigned one main supervisor, despite the possibility of delegating the supervision of specific competencies to other staff. The main supervisor is responsible of the overall clinical training of the assigned resident.

Timing: desk-based and on-site

Compiler for desk-based audit: the head of the CTP in collaboration with the clinical supervisors

Compiler for on-site audit: auditors

TABLE 19. CHECKLIST TO FACILITATE THE COLLECTION OF ELEMENTS OF INTEREST TO THE AUDIT PERTAINING TO THE SUPERVISORS INVOLVED IN THE CTP

CHECKLIST SUPERVISOR		
Items to be checked	**Quick answers**	**Comments/answers**
How is the selection of the residents done / what are the criteria for entering clinical training programme?	Master's degree in…. CV Recertification Interview	
Link with academic programme?	Stand-alone Integrated	
What is the maximum number of residents supervised per supervisor?		
Has the resident discussed with the supervisor and signed a learning agreement (clinical training plan) before the residency?	□ Yes □ No	
If yes, is the plan reviewed regularly?	□ Yes □ No	

CHECKLIST SUPERVISOR			
Items to be checked	**Quick answers**		**Comments/answers**
Are there specific qualifications and experience required to become a clinical supervisor? If yes, please give details:	□ Yes	□ No	
Are there specific qualifications and experience necessary to become a clinical co-supervisor? If yes, please give details:	□ Yes	□ No	
What is the highest academic degree held by the clinical supervisor? What is the highest academic degree held by the clinical co-supervisor?			
Is the supervisor/co-supervisor a certified MP?	□ Yes	□ No	
For how many years has the clinical supervisor been working independently as clinical medical physicist? For how many years has the clinical co-supervisor been working independently as clinical medical physicist?			
Is it defined in advance and scheduled in which area the student receives the training (e.g. weekly, monthly, 6 months schedules)?	□ Yes	□ No	
Is it defined who is responsible for the resident during the clinical training (supervisor directly, delegated staff member)? Please explain how (e.g. written records)	□ Yes	□ No	
Is it defined in written form where the resident receives the clinical training e.g. weekly/monthly/ 6 months schedules)?	□ Yes	□ No	
Is the resident allowed to work alone?	□ Yes	□ No	
Is there a “resident working alone” procedure?	□ Yes	□ No	
Is the resident allowed to work unsupervised?	□ Yes	□ No	

CHECKLIST SUPERVISOR		
Items to be checked	**Quick answers**	**Comments/answers**
Is there a “resident working unsupervised” procedure?	□ Yes □ No	
Is the resident maintaining and updating regularly a portfolio?	□ Yes □ No	
Is the portfolio regularly reviewed by the supervisor?	□ Yes □ No	
If so, how often:		
Is there a defined scheduled of the periodic meetings with the resident?	□ Yes □ No	
If so, how often:		
Are there written reports of the activities performed with the resident?	□ Yes □ No	
Is there any structured educational interaction between the residents as part of the clinical training? For example:	□ Yes □ No	
Regular presentations of topics linked to the learned activities	□ Yes □ No	
Group reports to submit	□ Yes □ No	
Has the supervisor directly given to the resident a full demonstration of the use of the equipment before allowing them to use the equipment under supervision?	□ Yes □ No	
Is the resident allowed to directly use the dosimetry equipment under supervision?	□ Yes □ No	
Degree of access of the resident to the equipment (hands-on training) during the clinical training: what is the declared % of time dedicated to practical activities	□ 25% □ 50% □ 75% □ 100%	
Is the resident participating in multidisciplinary meetings and with what frequency?	□ Yes □ No	
The resident has access to the informatic systems through a personal password	□ Yes □ No	

CHECKLIST SUPERVISOR			
Items to be checked	**Quick answers**		**Comments/answers**
Is the resident exposed to different activities?	□ Yes	□ No	
- Routine	□ Yes	□ No	
- Implementation of new technique	□ Yes	□ No	
- Meetings with other staff	□ Yes	□ No	
- Research	□ Yes	□ No	
- Teaching activities (such as routine presentations in front of other residents etc.)	□ Yes	□ No	
Are the residents' attitudes evaluated (e.g. Critical thinking, Problem solving, Timekeeping, Safety, Teamwork, Participative or passive, Respect of department rules, Professionalism, Communication) and how?	□ Yes	□ No	
Assessment of residents throughout the programme: Do you use (more than one can be used) and please explain:			
Informal assessments	□ Yes	□ No	
Formal assessments	□ Yes	□ No	
Exit exam – oral	□ Yes	□ No	
Exit exam – practical	□ Yes	□ No	
Logbook	□ Yes	□ No	
Portfolio of Evidence	□ Yes	□ No	
Presentations of work done in the department	□ Yes	□ No	
Other types / methodologies of assessment?	□ Yes	□ No	
If answered yes to any of the above, please explain how:			

CHECKLIST SUPERVISOR			
Items to be checked	**Quick answers**		**Comments/answers**
Is there a double check by another staff member of the training done by the clinical supervisor?	□ Yes	□ No	
Is there a clear understanding in the department that the responsibility for the resident's activities is given to supervisor(s)?	□ Yes	□ No	
Is there an available policy in the Centre(s) that regulates the residents' activities?	□ Yes	□ No	
Is there a system in place to keep track of the residents' "outcomes" (post programme)?	□ Yes	□ No	
Is there allocated time to training of supervisors in the clinical training processes?	□ Yes	□ No	
Is there any action or re-planning of the activities, in case the supervisor cannot support the student activities?	□ Yes	□ No	
Is there a defined job description including the training activities for the supervisor?	□ Yes	□ No	
Is there a system in place for the supervisor to regularly provide feedback about the resident to the programme coordinator?	□ Yes	□ No	
Is there an anonymous reporting system available to assess or provide feedback of the supervisor and other staff involved in the clinical training?	□ Yes	□ No	
Is there a system in place for the resident to regularly provide feedback about the supervisor to the supervisor?	□ Yes	□ No	
Please write on the views of the clinical training supervisor(s) on: Strengths: Weaknesses: Opportunities: Threats: of the CTP			

APPENDIX XI. "TEMPLATES FOR THE CONCLUSION OF A DESK-BASED AUDIT"

Rubrics may help standardize the evaluation of the CTP during the desk-based audit, facilitating the deliberation on whether to proceed to an on-site audit.

Table 20 provides an example of rubric that might be used for his purpose. The audit coordinator, upon reception of the reports from the auditors, calculates the average score for the individual items.

TABLE 20. TABLE TO HELP SUMMARIZE THE EVALUATION CONDUCTED BY THE AUDITORS DURING THE DESK-BASED AUDIT

Result of the evaluation of the item	**Score**	**Evaluation**
The documents/items provide the needed information clearly, concisely and without contradictions.	3	Optimal
The documents/items provide the needed information. However, they lack clarity, brevity and might present minor contradictions that can be addressed by – for instance – an on-site visit.	2	Acceptable
The documents/items do not provide the needed information with sufficient clarity, brevity and without contradictions.	1	Not acceptable

Table 21 is designed to help the finalization of the desk-based report; it helps summarize the evaluation, referring to the suitability of the element analysed, with respect to the audit. The table offers the possibility of including a scoring, based on the rubrics in Table 20. Comments may also be added, to clarify the reasons for the selected scores.

Each auditor is expected to provide a table, filled in individually and independently from the other auditor(s).

TABLE 21. TABLE TO FACILITATE THE EVALUATION CONDUCTED BY THE AUDITORS DURING THE DESK-BASED AUDIT

Area	Information	Score	Comments
	Legend: [1] *Not acceptable* [2] *Acceptable* [3] *Optimal*		
Contextualization of the CTP	Academic programmes linked to the CTP	[1] [2] [3]	
	Structure of the CTP	[1] [2] [3]	
	Support of the CTP by the involved hospital(s)	[1] [2] [3]	
	Equipment and procedures performed at the hospital(s) involved in the CTP	[1] [2] [3]	
	Organograms of the departments where the CTP takes place	[1] [2] [3]	
	Radiation protection services and equipment	[1] [2] [3]	
	Infrastructure to support study and research activities	[1] [2] [3]	
	Professional ethics (e.g. collaboration with a bioethics department)	[1] [2] [3]	
	Sustainability of the CTP in the national, regional or interregional environment	[1] [2] [3]	
Details of the CTP	CTP curriculum:	[1] [2] [3]	
	- acceptance criteria	[1] [2] [3]	
	- competencies of the CTP	[1] [2] [3]	
	- Ratio of residents/supervisors	[1] [2] [3]	
	Documented proves of clinical training (assessment, portfolios, logbooks, final examination)	[1] [2] [3]	
	Staff and advisors involved in the CTP	[1] [2] [3]	

Area	Information	Score	Comments
	Legend: [1] *Not acceptable* [2] *Acceptable* [3] *Optimal*		
Monitoring of the CTP	Documented follow up on absorption of former residents as CQMP in hospitals	[1] [2] [3]	
	Documented feedback collection from residents and clinical supervisors, their analysis and follow up for improvement	[1] [2] [3]	
	Structured and documented mechanisms in place to record challenges and risks and related correction measures taken	[1] [2] [3]	
	Involvement in internal or external audits (if applicable)	[1] [2] [3]	
	Accreditation (where existing)	[1] [2] [3]	

The checklist provided in Table 22 is designed to summarize the analysis of the checklists provided about the CTP, staff, supervisors and residents and provide additional information.

TABLE 22. TEMPLATE TO SUMMARIZE THE EVALUATION OF THE CHECKLISTS ON THE CTP, STAFF, SUPERVISORS AND RESIDENTS

Form relevant to	Average Score	Checks through interviews	Number of interviews conducted	Alignment in between form and interviews	Comments
	Legend: [1] *Not acceptable* [2] *Acceptable* [3] *Optimal*				
CTP	[1] [2] [3]	Y / N		Y / N	
Staff	[1] [2] [3]	Y / N		Y / N	
Supervisors	[1] [2] [3]	Y / N		Y / N	
Residents	[1] [2] [3]	Y / N		Y / N	

TABLE 23. TEMPLATE TO FACILITATE THE FINAL REPORT OF THE DESK-BASED AUDIT

DESK-BASED AUDIT REPORT OF THE CTP

The audit was based on the results of the analysis of the documents attached to this evaluation. This includes the list of documents received with a concise indication of their suitability and scoring.

Evaluations performed: *type here a concise description of the assessment performed, interviews, videoconference performed and list of people the auditor has interacted with. Please highlight difficulties or non-compliances encountered, if any.*

Outcome of the desk-based audit:

□ Proceed with an on-site audit □ Do not proceed with an on-site audit

Reason:

Identified strengths of the CTP:

Identified weaknesses of the CTP:

Commendations:

Recommendations prioritized from most urgent, number 1, to least urgent (add as many as needed). An indication of the estimated time frame to address it is also provided for each:

1) Time frame for addressing it:

Suggestions for addressing it:

2) Time frame for addressing it:

Suggestions for addressing it:

3) Time frame for addressing it:

Suggestions for addressing it:

Appendixes (list of additional documents in support of the report, if applicable):

APPENDIX XII. "TEMPLATES FOR THE CONCLUSION OF AN ON-SITE AUDIT"

Rubrics may help standardize the evaluation of the CTP also during the on-site audit and could favour reaching a fact-based audit conclusion. The same rubrics provided in Table 20 are relevant for the scoring of the desk-based audit. Table 25 may be used to favour harmonization of the audit results. Specific columns are provided to define the suitability of the different components analysed during the audit and evaluate where the elements are in alignment with respect to the findings of the desk-based audit. Each auditor is expected to fill in a table individually and independently.

Upon reception of the reports from the auditors, the audit coordinator, calculates the average score for the individual items.

TABLE 24. SUGGESTED TOOL TO HARMONIZE AND FACILITATE THE EVALUATION CONDUCTED BY THE AUDITORS DURING THE ON-SITE AUDIT

Area	**Information**	**Alignment to what found during the desk-based audit**	**Score**	**Comments**
	Legend: [1] *Not acceptable* [2] *Acceptable* [3] *Optimal*			
Contextualization of the CTP	Academic programmes linked to the CTP	Y / N	[1] [2] [3]	
	Structure of the CTP	Y / N	[1] [2] [3]	
	Support of the CTP by the involved hospital(s)	Y / N	[1] [2] [3]	
	Equipment and procedures performed at the hospital(s) involved in the CTP	Y / N	[1] [2] [3]	
	Organograms of the departments where the CTP takes place	Y / N	[1] [2] [3]	
	Radiation protection services and equipment	Y / N	[1] [2] [3]	

Area	Information	Alignment to what found during the desk-based audit	Score	Comments
	Legend: [1] *Not acceptable* [2] *Acceptable* [3] *Optimal*			
Contextualization of the CTP	Infrastructure to support study and research activities	Y / N	[1] [2] [3]	
	Professional ethics (e.g. collaboration with a bioethics department)	Y / N	[1] [2] [3]	
	Sustainability of the CTP in the national, regional or interregional environment	Y / N	[1] [2] [3]	
Details of the CTP	CTP curriculum:	Y / N	[1] [2] [3]	
	- acceptance criteria	Y / N	[1] [2] [3]	
	- competencies of the CTP	Y / N	[1] [2] [3]	
	- ratio of residents/supervisors	Y / N	[1] [2] [3]	
	Documented proves of clinical training (assessment, portfolios, logbooks, final examination)	Y / N	[1] [2] [3]	
	Staff and advisors involved in the CTP	Y / N	[1] [2] [3]	

Area	Information	Alignment to what found during the desk-based audit	Score	Comments
	Legend: [1] *Not acceptable* [2] *Acceptable* [3] *Optimal*			
Monitoring of the CTP	Documented follow up on absorption of former residents as CQMP in hospitals	Y / N	[1] [2] [3]	
	Documented feedback collection from residents and clinical supervisors, their analysis and follow up for improvement	Y / N	[1] [2] [3]	
	Structured and documented mechanisms in place to record challenges and risks and related correction measures taken	Y / N	[1] [2] [3]	
	Involvement in internal or external audits (if applicable)	Y / N	[1] [2] [3]	
	Accreditation (where existing)	Y / N	[1] [2] [3]	

The checklist provided in Table 25 is designed to summarize the results of the on-site observations pertaining to the assessment of the CTP, staff, supervisors and residents and indicate whether the individual elements pass positively the audit conducted. Each auditor is expected to fill in the table independently.

TABLE 25. TEMPLATE TO SUMMARIZE THE EVALUATIONS DURING THE ON-SITE AUDITS

Form relevant to	**Average Score**	**Checks through interviews**	**Number of interviews conducted**	**Alignment in between desk-based audit results, interviews, observations**	**Comments**
	Legend: [1] *Not acceptable* [2] *Acceptable* [3] *Optimal*				
CTP	[1] [2] [3]	Y / N		Y / N	
Staff	[1] [2] [3]	Y / N		Y / N	
Supervisors	[1] [2] [3]	Y / N		Y / N	
Residents	[1] [2] [3]	Y / N		Y / N	

Each auditor is also expected to provide a final report independently compiled and which conclusions are based and supported by documents summarizing the analysis performed and their outcomes, for instance the tables provided above.

TABLE 26. TEMPLATE FOR THE FINAL REPORT OF THE ON-SITE AUDIT

FINAL AUDIT REPORT OF THE CTP		
The audit was based on the results of the analysis of the outcomes of the desk-based audit and related documents, complemented and enriched by observations and interviews performed on-site, for which the relevant documentation is attached to this document.		
Evaluations performed: *type here a concise description of the assessment performed, interviews, observations performed. Please highlight difficulties or non-compliances encountered, if any.*		
The agenda of the on-site audit is attached to this document	□ Yes	□No
Date of the audit:		
Overall cooperation during the audit	□ Yes	□No
Comments:		

FINAL AUDIT REPORT OF THE CTP

Brief description of the facility(ies):

Workload/Staffing levels:

Identified strengths of the CTP:

Identified weaknesses of the CTP:

Commendations:

Recommendations prioritized from most urgent, number 1, to least urgent (add as many as needed). An indication of the estimated time frame to address it is also provided for each:

1) Time frame for addressing it:

Suggestions for addressing it:

2) Time frame for addressing it:

Suggestions for addressing it:

3) Time frame for addressing it:

Suggestions for addressing it:

Appendixes (list of additional documents in support of the report, if applicable):

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