CORE CONCEPT

Medical Radiation Protection in Hospitals Course: CT, Fluoroscopy and Nuclear Medicine Dose Control

21 December 2026 – 1 January 2027
London - Central London four-star

Medical Radiation Protection in Hospitals Course: CT, Fluoroscopy and Nuclear Medicine Dose Control

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Introduction:

Medical radiation protection in hospitals, covering CT, fluoroscopy and nuclear medicine dose control, is a 2-week course for radiation protection, imaging, nuclear medicine and biomedical engineering staff that ends with a Hospital Radiation Protection Programme and Dose Optimisation Plan. Hospitals face avoidable patient doses, unaudited CT protocols, skin injuries after long interventional procedures and uninvestigated staff dose readings when protection relies on habit. Nominees already work in imaging or radiation safety; teaching is by case study, and week two adds CT and interventional optimisation, nuclear medicine safety, communication and dose metrics. CoreConcept Training Center delivers this medical radiation protection course.

Course Objectives:

- Apply the ICRP justification, optimisation and dose limitation principles to medical, occupational and public exposures in a hospital
- Measure and record patient dose using CTDI, dose-length product and dose-area product, and set local diagnostic reference levels from dose surveys
- Specify shielding for X-ray and nuclear medicine rooms and run staff dosimetry and imaging equipment quality control
- Optimise CT and interventional fluoroscopy protocols for paediatric, pregnant and high-dose patients while protecting the eyes and hands of staff
- Control radiopharmaceutical handling, radioactive patient release and decay-in-storage of clinical waste in nuclear medicine
- Produce a Hospital Radiation Protection Programme and Dose Optimisation Plan with indicators the radiation safety committee can track

Target Audience:

- Radiation protection officers responsible for day-to-day radiation safety across hospital imaging and nuclear medicine areas
- Radiographers and technologists responsible for CT, fluoroscopy and radiography protocols and their dose records
- Nuclear medicine staff responsible for hot lab work, radiopharmaceutical administration and patient release
- Biomedical and clinical engineering staff responsible for imaging equipment acceptance, servicing and quality control
- Medical physics support staff responsible for patient dose surveys, shielding checks and dosimetry records

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Course Outline:

Day 1: Medical Exposure Context and Imaging Dose Fundamentals

- X-ray Production and Photon Interactions in Patient Tissue
- Absorbed, Equivalent and Effective Dose for Imaging Examinations
- Deterministic Skin Injury Versus Stochastic Cancer Risk
- Medical, Occupational and Public Exposure Category Distinctions
- Hospital Imaging Equipment Inventory and Exposure Baseline

Day 2: ICRP Principles, Patient Protection Framework and Hospital Roles

- ICRP System of Radiological Protection Applied to Hospitals
- Justification of Medical Exposures Using Imaging Referral Guidelines
- Optimisation of Patient Protection Under the ALARA Principle
- Dose Limitation for Hospital Staff, Carers and Visitors
- Radiation Protection Officer and Medical Physicist Duty Allocation

Day 3: Patient Dose Quantities, Diagnostic Reference Levels and Dose Audit

- Weighted and Volume CTDI Values Read From Scanner Consoles
- Dose-Length Product Recording for Each CT Examination Protocol
- Dose-Area Product Capture in Radiography and Fluoroscopy Rooms
- Local Diagnostic Reference Level Setting From Patient Dose Surveys
- Patient Dose Audit Comparing Median Values With Reference Levels

Day 4: Shielding Design Methods, Staff Dosimetry and Equipment Quality Control

- Workload, Use Factor and Occupancy Inputs for Shielding Design
- Lead Sheet and Barium Plaster Barrier Thickness Specification
- Leaded Glass Viewing Window and Door Shielding Verification
- Personal Dosimeter Issue, Wear Position and Dose Record Review
- X-ray Generator Output and Half-Value Layer Quality Control Tests

Day 5: Guided Case Study on an Imaging Unit Dose Review

- Case Hospital CT Protocol Doses Against Local Reference Levels
- Case Fluoroscopy Room Dose-Area Product Trend Review
- Case Staff Dosimeter Investigation Following an Elevated Reading
- Case Imaging Equipment Quality Control Findings and Corrective Actions
- Week-One Imaging Unit Dose Review Memo and Peer Challenge

Day 6: CT and Interventional Fluoroscopy Optimisation for Special Patient Groups

- CT Automatic Exposure Control and Iterative Reconstruction Tuning
- Size-Specific Dose Estimates for Paediatric CT Protocols
- Interventional Fluoroscopy Peak Skin Dose and Follow-Up Triggers
- Pregnancy Screening and Conceptus Dose Estimation Before Imaging
- Lens of the Eye Protection for Interventional Teams

Day 7: Nuclear Medicine Safety, Incident Governance and Committee Oversight

- Radiopharmaceutical Hot Lab Contamination Monitoring and Spill Cleanup
- Radioactive Patient Release Criteria and Discharge Instructions
- Decay-in-Storage Arrangements for Short-Lived Clinical Waste
- Unintended and Accidental Medical Exposure Reporting Procedure
- Hospital Radiation Safety Committee Terms of Reference and Minutes

Day 8: Patient, Referrer and Staff Communication on Radiation Risk

- Benefit and Risk Conversations With Patients Before Imaging
- Referrer Education on Imaging Appropriateness and Patient Dose
- Pregnant Staff Declaration and Work Adjustment Procedure
- Service Engineer Access Control for Shielded Imaging Rooms
- Radiation Protection Induction Plan for New Clinical Staff

Day 9: Dose Indicators, Image Quality Tracking and Benchmarking

- Patient Dose Indicator Dashboard by Modality and Protocol
- Repeat and Reject Analysis for Digital Radiography Images
- CT Phantom Image Quality Trend Monitoring Records
- Gamma Camera Uniformity and Dose Calibrator Constancy Tracking
- Benchmarking Local Reference Levels Against Published Survey Values

Day 10: Case Study Capstone and the Hospital Radiation Protection Programme

- Case Hospital Exposure Baseline and Protection Gap Assessment
- Shielding Review Schedule for Case Hospital Imaging Rooms
- Dose Optimisation Actions for Priority CT and Fluoroscopy Protocols
- Staff Dosimetry and Nuclear Medicine Procedure Set Assembly
- Hospital Radiation Protection Programme and Dose Optimisation Plan Completion

Skills You Will Gain:

- Patient Dose Measurement
- Diagnostic Reference Level Management
- Shielding Specification Review
- Personal Dosimetry Oversight
- Imaging Equipment Quality Control
- Interventional Skin Dose Monitoring
- Nuclear Medicine Contamination Control
- Radiation Risk Communication

Why Attend This Course:

- Deliver a Hospital Radiation Protection Programme and Dose Optimisation Plan to the radiation safety committee and the head of imaging
- Decide which CT and fluoroscopy protocols need optimisation first, based on audited doses against local reference levels
- Avoid radiation skin injuries, unplanned conceptus exposures, contamination events and repeat examinations that add dose and delay care
- Equip radiographers, nurses and referrers with dose checklists, patient communication scripts and induction material

Conclusion:

Back at work, the participant presents the Hospital Radiation Protection Programme and Dose Optimisation Plan to the radiation safety committee, the head of imaging and the nuclear medicine lead. The committee uses it to approve protocol changes, shielding reviews, dosimetry duties, quality control schedules and patient release rules, and to assign an owner to each dose indicator. After the first quarterly patient dose audit under the plan, the unit should compare results with its local reference levels, review any high staff readings and revise the protocols or procedures that underperformed.

Frequently Asked Questions FAQ:

What should participants prepare before the medical radiation protection in hospitals course?

Participants should already work in imaging, nuclear medicine, radiation safety or biomedical engineering. Bringing anonymised CT dose reports, fluoroscopy dose-area product logs, staff dosimeter summaries or a room layout lets the case work and capstone plan reflect their own hospital.

How does medical radiation protection in hospitals differ from industrial radiation safety training?

Industrial radiation safety training deals with sealed sources, site radiography and naturally occurring radioactive material. This course deals with deliberate exposure of patients for diagnosis, so it centres on justification, patient dose optimisation, reference levels and nuclear medicine practice alongside staff protection.

Why do diagnostic reference levels matter for medical radiation protection in hospitals?

Diagnostic reference levels show whether typical patient doses for an examination are unusually high. They are not dose limits; a hospital compares its median doses against them and investigates protocols that exceed them, directing optimisation effort where it lowers dose most.

What do participants take back from the medical radiation protection in hospitals course?

Participants take back a Hospital Radiation Protection Programme and Dose Optimisation Plan covering exposure baseline, shielding review, local reference levels, priority protocol changes, staff dosimetry, nuclear medicine procedures and dose indicators, ready to present to their radiation safety committee.