SAFety in Radiation ONcology

SAFRON

Updates on patient safety in radiotherapy by Radiation Protection of Patients (RPOP), IAEA

March 2021

EFFECTIVE USE OF TIMEOUT

Are we using timeout effectively in radiotherapy and radionuclide therapy?

A timeout is defined as 'an immediate pause by the medical team to confirm the correct patient, procedure, and site' initially viewed as a safety measure to prevent harm as a result of providing medical care on the wrong patient or the wrong site or performing the wrong procedure[1].

Timeouts have evolved to include quality patient care and enhanced performance of the medical team. In radiotherapy and radionuclide therapy facilities this is sometimes accomplished using a policy, procedure, form or checklist. Radiotherapy and radionuclide therapy facilities can have various checklist or timeout procedures throughout the entire process, which can occur when performing calibration or quality assurance on equipment; when preparing and reviewing patient treatment planning; during procurement of radionuclides for therapy; or at the time of administrating radionuclide therapy or radiation treatments.

A timeout is very effective before administration of radiation to the patient. It is sometimes the last line of defence to prevent an error from occurring. Important aspects of a timeout procedure are to ensure that everyone: knows what is expected; understands the value of taking the pause to review critical machine or treatment information; and is empowered to stop the continuation of the activity if the results of the timeout indicates that something might be incorrect.

However, we see that timeouts are not always used as designed. Some of the issues with timeout procedures include:

- A lack of a formal timeout policy and procedure;
- Timeouts occurring during the process that are

redundant or ill placed in the process;
• Timeouts performed without full participation of the team;
• A lack of management support for the use of timeout;
• Staff do not feel empowered to stop a procedure or activity;
• A lack of a strong safety culture;
• Staff are distracted or feel like they are being rushed to complete a complicated task.

In the SAFRON Radiation Therapy Reporting and Incident Learning System, we can see several examples where timeout could have been used to prevent an unintended exposure to the patient: in external beam radiotherapy we have cases where the **wrong patient was treated**; in brachytherapy we have cases where the **wrong treatment area was treated**; in radionuclide therapy we have cases where the **wrong radiopharmaceutical was administered**. An example of each is provided on later pages.

Just how important is timeout?

Using data collected in SAFRON we can see the number of cases where timeout prevented an unintended exposure, where it could have prevented an unintended exposure and where if it was in place it might have prevented an error.

When time outs are performed well, they reflect on the facility's ability to prioritize a patient-centred safety culture and develop a work environment of trust where staff are empowered to report patient safety events without fear of reprisal. During a timeout, the team comes together, increasing the chances that all members will have the situational awareness needed to prevent harm.

[1] The Joint Commission on Accreditation of Healthcare Organizations. Comprehensive Accreditation Manual for Hospitals. Glossary. Oakbrook Terrace, IL. 2017 update. (Manual and corresponding updates are subscription-based.)

Read more on timeouts used in radiotherapy:
- **A Comprehensive and Feasible QA Program for Surface Guided Radiotherapy**

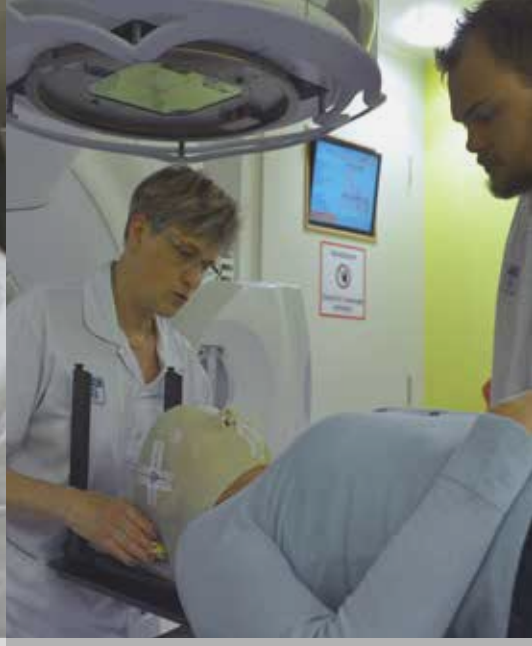
Read more on the use of timeout in other medical specialities:
- **Timeout for Contrast: Using Physician Behavior Modification to Reduce Contrast in the Catheterization Laboratory**
- **The Effect of Medication Reconciliation Timeout on Patient Safety: An Evidence-Based Project**
- **Everyone has Their Role to Play During the World Health Organisation Surgical Safety Checklist in Australia: A Prospective Observational Study**

The IAEA developed a leaflet entitled **Check, Review and Report** to support some of the items that should be checked at different stages in the process of radiotherapy. This could be used to develop the timeout procedure for physicians, medical physicists and radiation therapists.

SAFRON	External Beam Therapy	Brachytherapy	Radionuclide Therapy
Timeout procedure failed to identify the incident?	110	2	1
Timeout procedure identified the incident?	10	0	0
Timeout procedure might have identified the incident?	160	29	10

Learning through experience:
Using SAFRON Incident
Learning System in Philippines
– case study

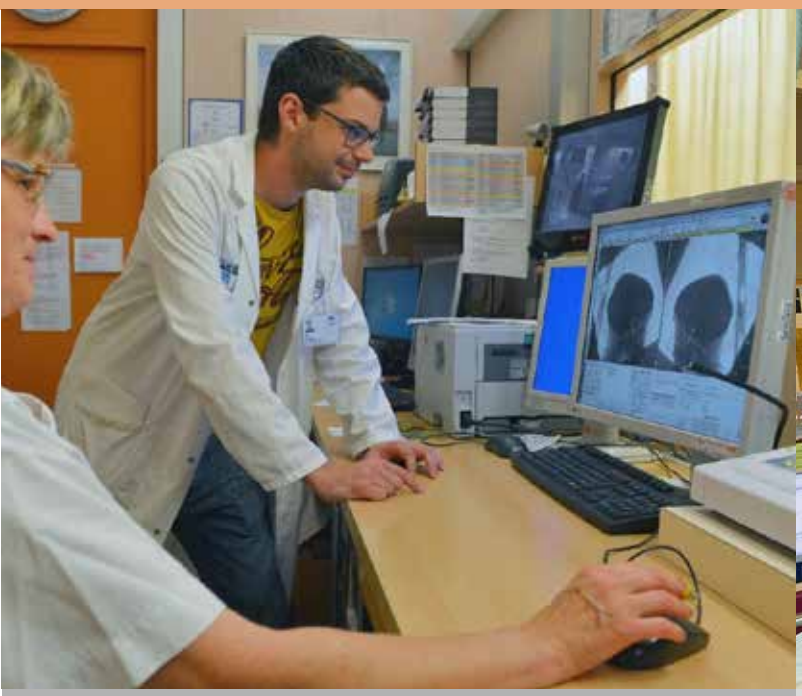
Radionuclide therapy events:
What we can learn and
what to do?



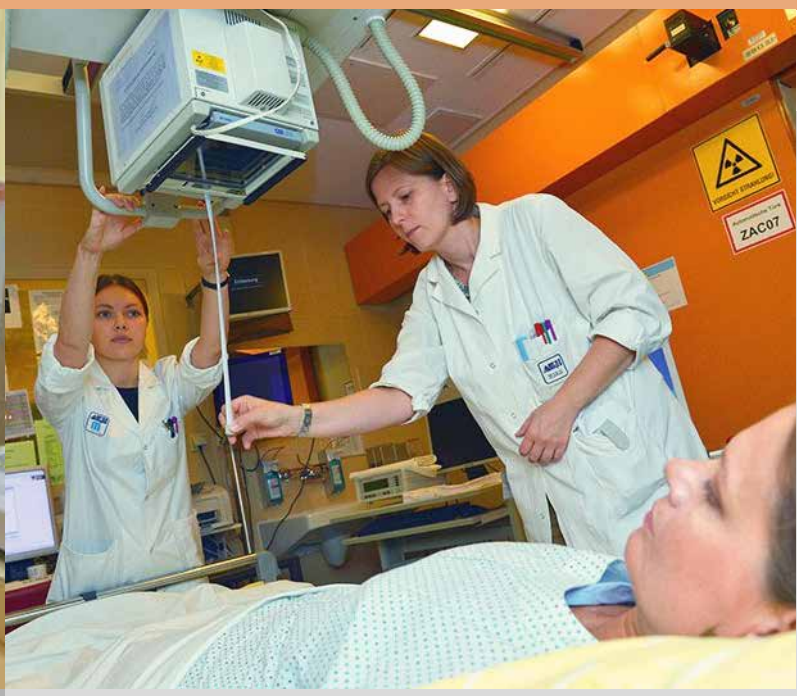
The role of medical physicists in quality,
patient safety and error reduction in the era
of modern radiotherapy

RPOP webinars

Click on the webinar tile to play



Training and education to
reduce unintended exposure



Safety culture:
Requires non-stop attention

SAFRON Safety Reporting and Learning System for Radiotherapy

View Incident Report

You can view incident report details below.

ADD TO HOME PAGE EDIT INCIDENT REPORT

Wrong patient treated

Treatment modality:	External beam radiotherapy
Did the incident reach the patient?	No
Equipment used:	Linear Accelerator
Treatment method:	3D (three dimensional) conformal
Date of discovery:	2019-06-27
Who discovered the incident?	Radiation therapist/staff at treatment unit treating patients
How was the incident discovered?	Chart check
What phase in the process is the incident associated with?	3.2.1. Treatment
Where in the process was incident discovered?	2.1.1. Identification of patient
Was anyone affected by the incident?	Yes, more than 1 patient - 2
Was any part of the prescribed treatment delivered incorrectly?	Yes
First day of treatment:	No
How many fractions were delivered incorrectly?	1
Total number of fractions prescribed:	24
Prescribed dose per fraction (Gy):	2.00
If relevant, please estimate the dose deviation from the prescribed dose per fraction:	

Clinical incident severity:	Potential serious incident
If the incident-cause is related to equipment (hardware or software), please specify the make, model and version number:	
Describe the incident in detail:	Two patients with similar names were in the waiting room. Both patients had planned pelvic radiotherapy. RTT returning from vacation, did not recognize the patients from face. As a result, the wrong patient was irradiated, Moreover, the patients were about one age, height and weight. Therefore RTT did not noticed the difference even in portal images (isocenter location was almost the same for both patients).
Describe the causes of the incident:	1.4 Inadequate communication of procedure 5.2 Lack of communications
What safety barrier failed to identify the incident?	Intra-treatment monitoring
What safety barrier identified the incident?	Verification of patient ID Time out
What safety barrier might have identified the incident?	Verification that pretreatment condition have been taken into account
Describe contributing factors to the incident:	
Suggest preventive action(s):	

SAFRON Safety Reporting and Learning System for Radiotherapy

View Incident Report

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ADD TO HOME PAGE EDIT INCIDENT REPORT

Brachytherapy plans not optimized

Treatment modality:	Brachytherapy
Did the incident reach the patient?	No
Treatment method:	High dose rate afterloader
Date of discovery:	2017-11-06
Who discovered the incident?	Radiation oncologist (physician)
How was the incident discovered?	Found at the time of first patient treatment during regular checks
What phase in the process is the incident associated with?	2.5.8. Dose distribution optimization
Where in the process was incident discovered?	2.5.9. Generation of plan for approval
Was anyone affected by the incident?	No, but someone could have been; potential incident
Was any part of the prescribed treatment delivered incorrectly?	No
First treatment fraction (for multi-fraction course of treatment)	No
How many fractions were delivered incorrectly?	0
Total number of fractions prescribed:	4
Prescribed dose per fraction (Gy):	7.00
If relevant, please estimate the dose deviation from the prescribed dose per fraction:	0-5%

Clinical incident severity:	Potential serious incident
If the incident-cause is related to equipment (hardware or software), please specify the make, model and version number:	Not applicable
Describe the incident in detail:	The plan for brachytherapy not optimized
Describe the causes of the incident:	1.3 Standard/Procedure/Practice not followed 1.4 Inadequate communication of procedure 5.3 Inadequate direction/information
What safety barrier failed to identify the incident?	Physician peer review Review of treatment plan Time out
What safety barrier identified the incident?	Independent confirmation of dose calculation
What safety barrier might have identified the incident?	Physician peer review Review of treatment plan Time out
Describe contributing factors to the incident:	Inattention to details; work environment; presence of distractions
Suggest preventive action(s):	Attention to details, Proper communication and endorsements, No interruption zones. Review of treatment plans before approval and execution, Regular chart checks and time outs

SAFRON Safety Reporting and Learning System for Radiotherapy

View Incident Report

You can view incident report details below.

ADD TO HOME PAGE EDIT LOCAL INFORMATION EDIT INCIDENT REPORT

Patient received the wrong dose for thyroid cancer

Treatment modality:	Radionuclide therapy
Did the incident reach the patient?	Yes
Route of administration:	Oral
Conditions treated:	Thyroid cancer
Radiopharmaceutical:	I131 NA Iodide capsules
Date of discovery:	2019-07-16
Who discovered the incident?	Other, please specify/no information provided
How was the incident discovered?	Post therapy Imaging
What phase in the process is the incident associated with?	2.3.3. Choice of activity and fractionation
Where in the process was incident discovered?	3.3.7 Other
Was anyone affected by the incident?	Yes, one patient
Was any part of the prescribed treatment delivered incorrectly?	Yes
What was the dose or administered activity prescribed?:	0.518 GBq
What dose or administered activity was delivered?:	1.221 GBq
If relevant, please estimate the dose deviation from the prescribed dose per fraction:	>50%
Clinical incident severity:	Minor incident

If the incident-cause is related to equipment (hardware or software), please specify the make, model and version number:	
Describe the incident in detail:	On July 16, 2019, the facility reported that a patient undergoing treatment with iodine-131 (I-131) for thyroid cancer received a dose that was at least 10 Gy (1,000 rad) more than expected and at least 50 percent greater than that prescribed. The written directive prescribed 0.518 GBq (14 mCi) of I-131 to deliver a thyroid dose of 400 Gy (40,000 rad). Post treatment, the licensee determined that the patient was administered 1.221 GBq (33 mCi), resulting in a thyroid dose of 965 Gy (96,500 rad). The patient and the referring physician were both informed of the event. The licensee reports that no adverse health effects are anticipated for the patient.
Describe the causes of the incident:	1.2 Inadequate standard/procedure/practice 1.3 Standard/Procedure/Practice not followed 1.4 Inadequate communication of procedure 1.5 Inadequate assessment of risk 3.2 Inadequate design specification 3.5 Inadequate assessment of operational capabilities
What safety barrier failed to identify the incident?	Time out verification of correct patient, activity and radionuclide prior to treatment
What safety barrier identified the incident?	
What safety barrier might have identified the incident?	Independent confirmation of activity prior to administration (i.e. a second in house check of activity)
Describe contributing factors to the incident:	The licensee determined that the root cause for this event was human error. The licensee’s certified nuclear medicine technologist (CNMT) did not follow procedures and thus did not verify that the correct dose was being given to the patient. The CNMT performed a time-out procedure, which included reviewing the written directive, verifying it with the attending physician, and having the CNMTs perform a dose assay on the 0.518 GBq (14 mCi) NaI therapy capsule. After performing adequate patient identification procedures, the CNMT went to the nuclear medicine laboratory and collected a 1.2 GBq (33 mCi) therapy capsule instead of the 0.518 GBq (14 mCi) capsule. The CNMT did not look at the label to ensure it was for the intended patient and administered the 1.2 GBq (33 mCi) capsule.
Describe corrective action to take, e.g. modification of remaining treatment:	All CNMTs have been retrained on the importance of following established policies and procedures for administration of therapeutic radiopharmaceuticals, including checking the label to ensure that the medication is for the correct patient. The CNMTs are now required to use a workstation on wheels to confirm the dose again before administration. In addition, all therapeutic radiopharmaceuticals will be stored in the

licensee's radiopharmacy until the patient is present and the staff is ready to conduct the time-out. Multiple therapy doses will not be stored in the nuclear medicine laboratory.

Who should be or has been informed about the incident (e.g. patient, responsible physician, hospital management, regulatory authority)?

Suggest preventive action(s):

IAEA
International Atomic Energy Agency

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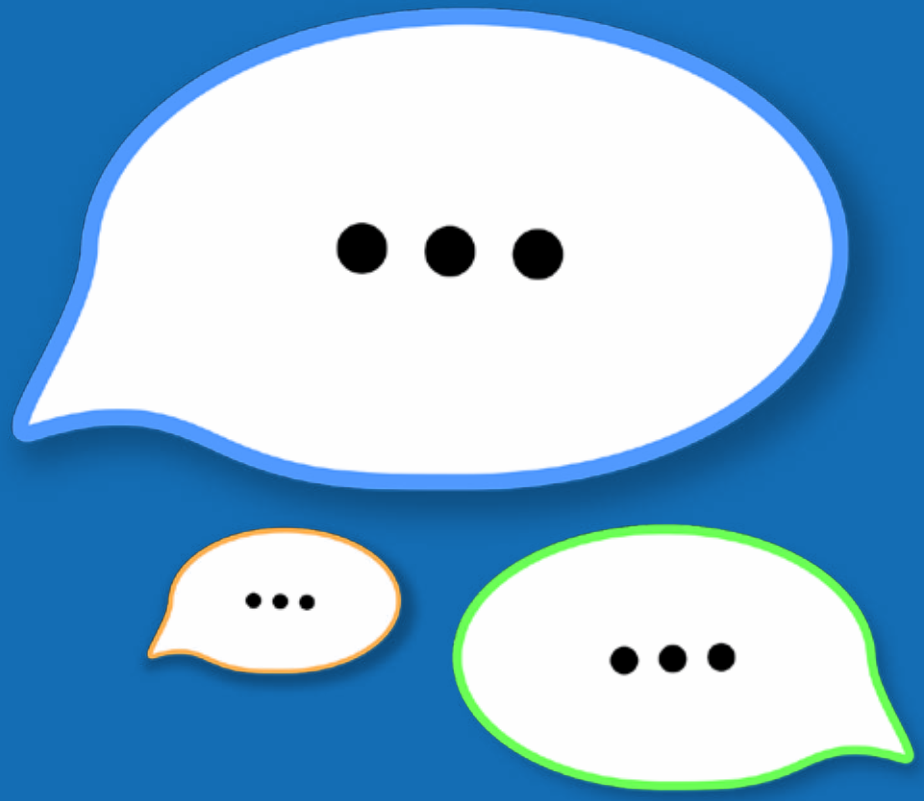

RADIATION SAFETY CULTURE TRAIT TALKS

Handbook