

# Radiotherapy Incident Management at the MUHC: Standardization, Workflow, and Collaboration

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- **Incident:**
  - An unwanted or unexpected change from normal system behaviour which causes or has the potential to cause an adverse effect to persons or equipment
- **Incident Learning:**
  - Improving patient safety through prevention of incident recurrence and propagation
- *To err is human, to learn is divine*

## LESSONS FROM AVIATION

### Reducing Health Care Hazards: Lessons From The Commercial Aviation Safety Team

A proposed public-private partnership to help the health community emulate the successes of CAST in commercial aviation

by **Peter J. Pronovost, Christine A. Goeschel, Kyle L. Olsen, Pham, Marlene R. Miller, Sean M. Berenholtz, J. Bryan Sexton, Mark A. Marsteller, Laura L. Morlock, Albert W. Wu, Jerod M. Loeb, and M. Clancy**

**ABSTRACT:** The movement to improve quality of care and patient safety has achieved some measurable and sustained progress. However, the slow progress in the health care community contrasts with the success of aviation safety. After a tragic 1995 plane crash, the aviation industry and government created the Commercial Aviation Safety Team (CAST) to investigate and prevent future accidents. This public-private partnership of safety officials and technical experts has been responsible for the decreased average rate of fatal aviation accidents. We propose a similar partnership in the health care community to coordinate national efforts to improve patient safety and quality forward. [*Health Affairs* 28, no. 3 (2009): w479–w489. DOI: 10.1377/hlthaff.28.3.w479]

The screenshot shows the New York Times website interface. At the top, there are navigation links for 'SECTIONS', 'HOME', and a 'SEARCH' icon. The main headline area features three articles: '1. Oregon Shooting at Umpqua College Kills as Many as 13, Official Says', '2. FEATURE Ellen Page Goes Off-Script' (with a small photo of Ellen Page), and '3. Obama Reacts to Oregon Shooting: 'We've Become Numb to This''. Below this, the 'HEALTH' section is highlighted, with the sub-header 'THE RADIATION BOOM'. The main article is titled 'Radiation Offers New Cures, and Ways to Do Harm' by 'WALT BOGDANICH' dated 'JAN. 23, 2010'. On the left side of the article, there are social media sharing options: 'Email', 'Share' (Facebook icon), 'Tweet' (Twitter icon), 'Pin' (Pinterest icon), 'Save' (bookmark icon), and 'More' (arrow icon). The article text begins with 'As Scott Jerome-Parks lay dying, he clung to this wish: that his fatal radiation overdose — which left him deaf, struggling to see, unable to swallow, burned, with his teeth falling out, with [ulcers](#) in his mouth and throat, nauseated, in severe pain and finally unable to breathe — be studied and talked about publicly so that others might not have to live his nightmare.' It continues with 'Sensing death was near, Mr. Jerome-Parks summoned his family for a final Christmas. His friends sent two buckets of sand from the beach where they had played as children so he could touch it, feel it and remember better days.' and 'Mr. Jerome-Parks died several weeks later in 2007. He was 43.' The final paragraph states 'A New York City hospital treating him for tongue [cancer](#) had failed to detect a computer error that directed a linear accelerator to blast his brain stem and neck with errant beams of radiation. Not once, but on three consecutive days.'



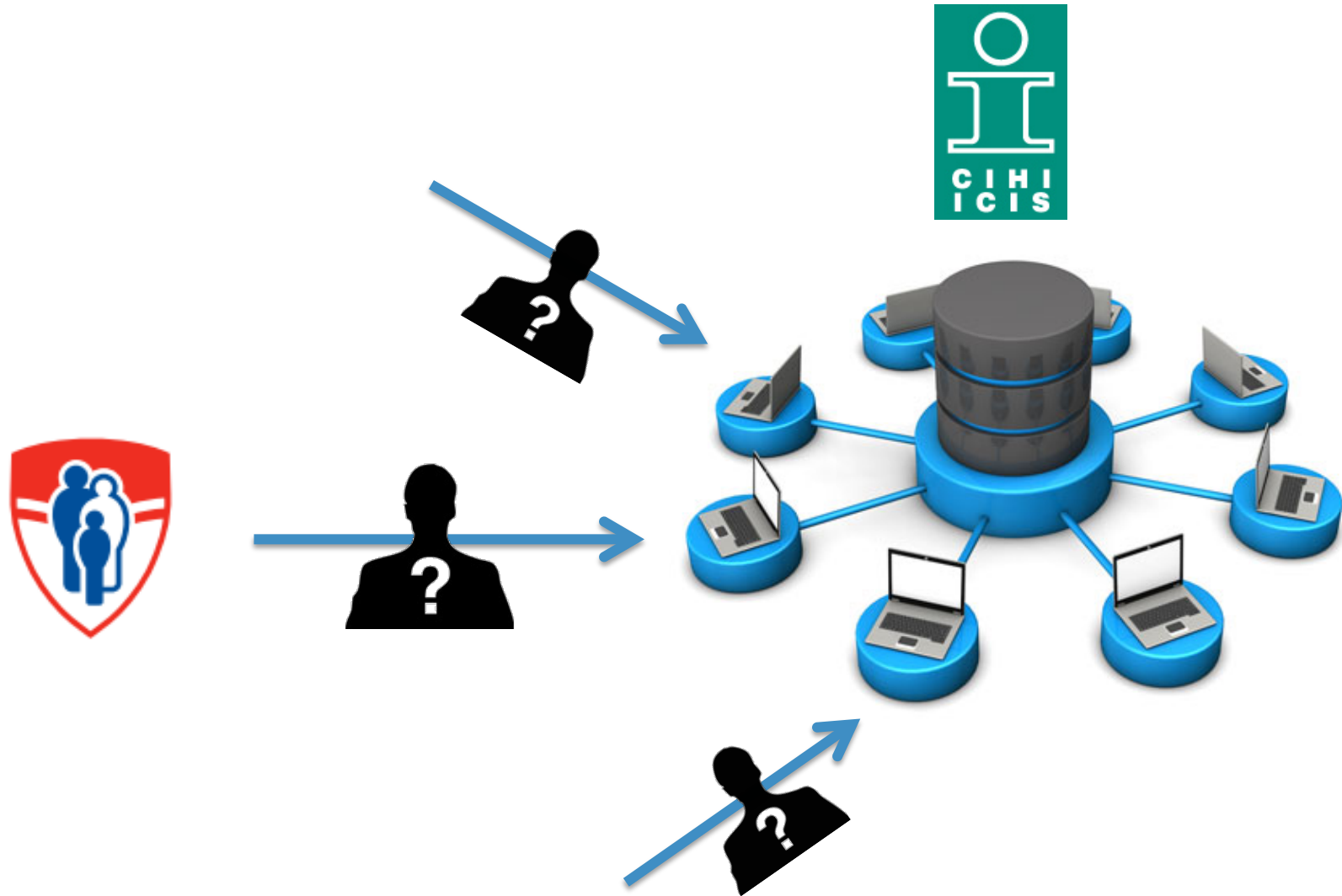
**CPQR**  
Canadian Partnership for  
Quality Radiotherapy  
**PCQR**  
Partenariat canadien pour  
la qualité en radiothérapie



National System for  
Incident Reporting –  
Radiation Treatment

Taxonomy Data Category		Data Fields and Menu Choices
Number	Description	
1. Impact		
1.1	Incident description	Free text
1.2	Incident type	<b>Actual incident:</b> Reached the patient, with or without harm <b>Near miss:</b> Detected before reaching the patient <b>Reportable circumstance:</b> Hazard not involving a patient
1.3	Acute medical harm  (Adapted from the WHO-ICPS)	<b>Not applicable:</b> Near miss or reportable circumstance <b>None:</b> Patient is asymptomatic and no treatment is required <b>Mild:</b> Symptoms if present are mild; no or minimal intervention (observation, investigation, minor treatment) is required; harm or loss of function is minimal, or intermediate but short term <b>Moderate:</b> Patient is symptomatic requiring intervention (additional treatment or operative procedure) or a prolonged hospital stay; long term or permanent harm or loss of function <b>Severe:</b> Patient is symptomatic requiring life-saving intervention or a major surgical/medical intervention; shortened life expectancy, or major long term or permanent harm or loss of function <b>Death:</b> On the balance of probabilities, death was caused or brought forward in the short term by the incident. <b>Unknown</b>
1.4	Dosimetric severity	<b>Not applicable:</b> Near miss or reportable circumstance <b>Minor:</b> ≤5% tumour underdose or OAR overdose, relative to the intended doses to these structures over the course of treatment <b>Moderate:</b> >5% and ≤25% tumour underdose or OAR overdose, relative to the intended doses to these structures over the course of treatment <b>Severe:</b> >25% tumour underdose or OAR overdose, relative to the intended doses to these structures over the course of treatment <b>Unknown</b>

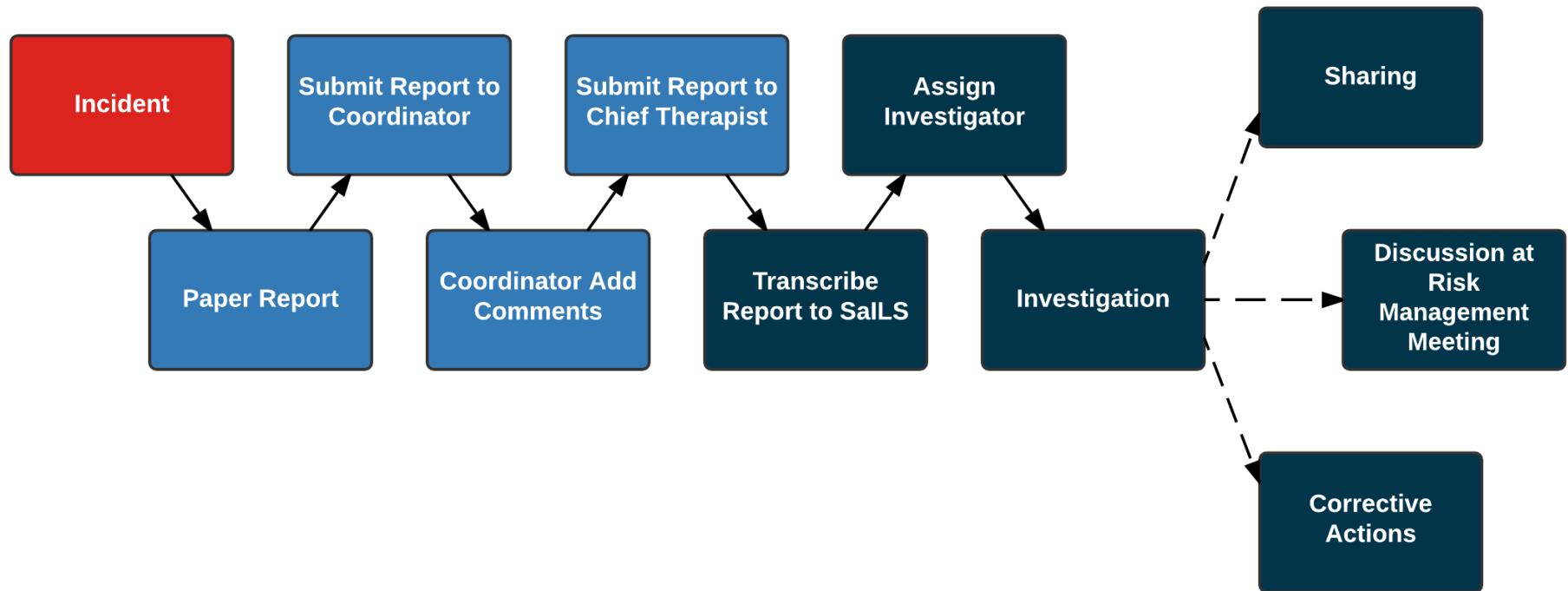
# Incident Sharing



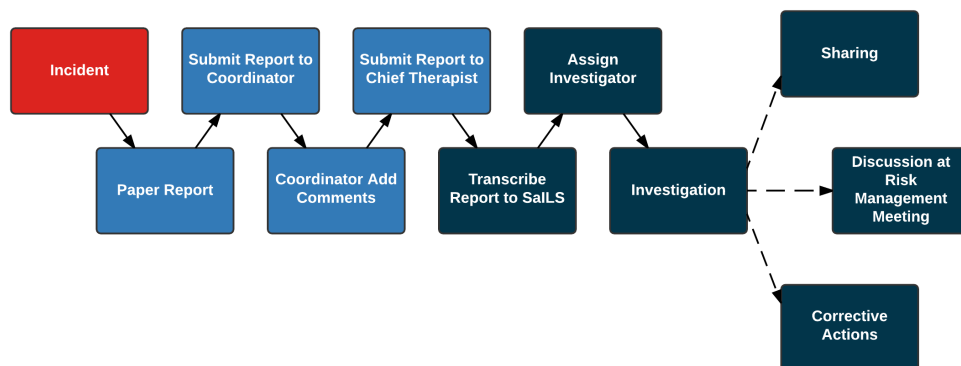
- New incident taxonomy is not simply “plug and play”
  - Supporting workflow
  - Multi-professional internal collaboration
- Safety Incident Learning System (SaILS)
  - New online incident management system
  - Incorporate NSIR-RT taxonomy
  - Facilitates workflow
  - Adapted from concept and code base established at TOHCC
  - Written in Django (Python)
  - Tied to MySQL database

# Overview

- Paper component
- Online component (SaLS)



# Paper Report



- Unique incident IDs for event tracking
- NSIR-RT fields
- Facilitates immediate discussion

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## RADIATION ONCOLOGY EVENT REPORT #1

Event Type (Please choose one)	<input type="checkbox"/> Reportable circumstance: a hazard not involving a patient		
	<input type="checkbox"/> Near miss: an incident that was detected before reaching a patient		
	<input type="checkbox"/> Actual incident: an incident that has reached one or more patients		
For actual incidents please fill out the following fields			
Patient ID/Name			Diagnosis
Oncologist			Treatment Site
For ALL events please fill out the following fields			
# of Patients Affected			Date Event Detected
Functional Work Area (e.g. TB_1, brachy)			Time Event Detected
Description of Event (Please avoid judgement, analysis, or accusation)			
Reported By			Date of Report (If different than Date Event Detected)
Reported To			
Patient Support			
Patient Support Required (Y/N)			Patient Support Given (Y/N)
Patient Support Description (Please describe the support given or requested)			

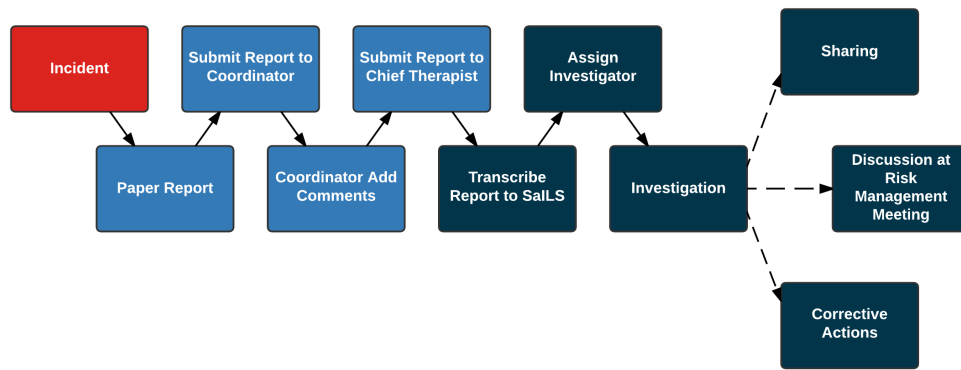
Please Tear Here

### Event Tracking and Follow-up

To follow-up on this event, please note the unique ID number (#1) associated with this report. You may check the status of the investigation of this event online, in the hospital network, by visiting the following URL: [medphys:8000/nsir/search](https://medphys:8000/nsir/search). On this webpage, enter the unique ID number associated with this report in the search field to receive up-to-date investigation tracking information.



# Transcribe to SaLS

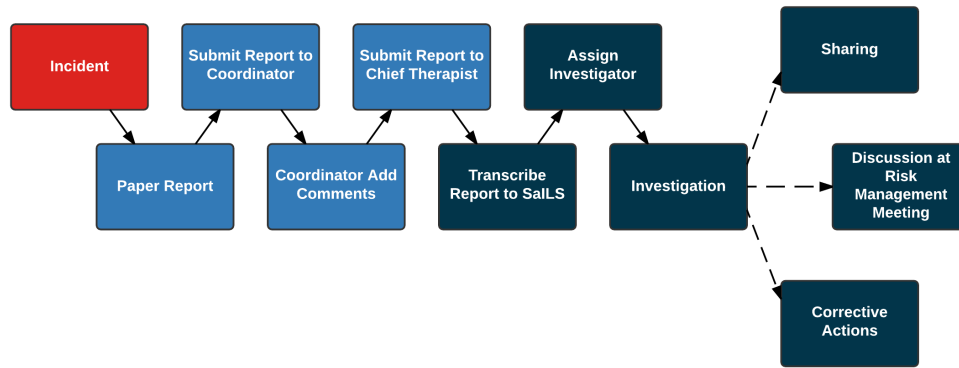


- NSIR-RT conditional fields
- Investigator assignment

The screenshot shows the 'Report an Incident' form in the SaLS system. The form includes the following fields:

- Incident ID:** Unique Incident ID
- Event Type:** Dropdown menu
- Number of Patients Affected:** Dropdown menu
- Functional Work Area:** Dropdown menu
- Date Incident Detected:** 2015-11-24
- Time Period Detected:** Dropdown menu
- Incident Description:** Text area with placeholder: 'Briefly summarize the incident. Please avoid judgement, analysis, or accusation.'
- Descriptor:** Text area with placeholder: 'One sentence descriptor of the incident'
- Reported By:** First Last
- Reported To:** First Last
- Patient Support Required:** Dropdown menu
- Staff Support Required:** Dropdown menu
- Investigator:** Dropdown menu
- Username:** lgmontgomery
- Password:** Password
- Submit:** Button

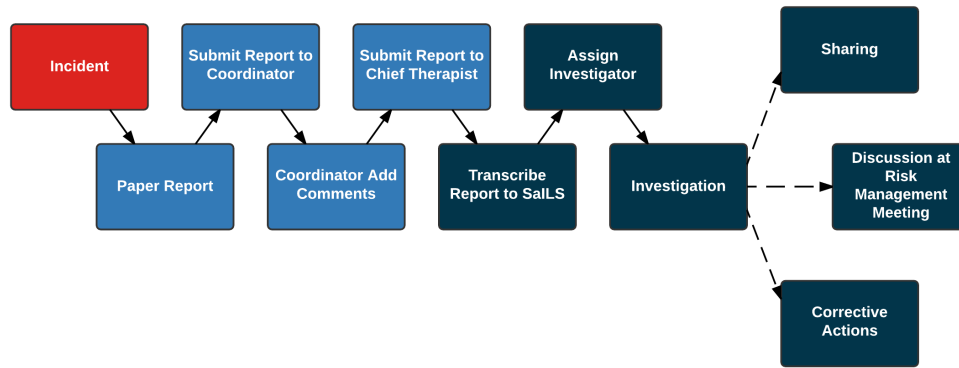
# Investigation



- NSIR-RT compatible sharing
- Flag for discussion
- Corrective actions

The screenshot shows the 'SaILS' interface for 'Incident #49 Investigation'. The top navigation bar includes 'Report An Incident', 'Search', 'Dashboard', and 'Incidents'. The incident status is 'Incomplete'. A 'Previous page' link is available. A message states: 'You are not currently subscribed for email updates about this incident: [Subscribe](#)'. A section titled 'Missing Fields which are Required for NSIR-RT Sharing:' lists required fields: 'Process Step Occurred, Process Step Detected, Primary Problem Type, Contributing Factors, Radiation Treatment Technique, Total Dose Prescribed (Gy), Number Of Fractions Prescribed, Number Of Fractions Delivered Incorrectly, Body Regions Treated, Ameliorating Actions, Failed Safety Barriers'. An 'Update' button is present. Below this, a list of sections is shown: 'Local Information', 'Investigator Information', 'Support Information', and 'NSIR-RT Section 1: Impact'. The 'NSIR-RT Section 1: Impact' section is expanded, showing a text area for 'Incident Description' (containing 'a'), and dropdown menus for 'Event Type' (Actual incident), 'Acute Medical Harm' (Mild), 'Dosimetric Impact' (Moderate), and 'Latent Medical Harm' (Unknown). The 'NSIR-RT Section 2: Discovery' section is also visible at the bottom.

# Event Tracking



- Incident tracking
- Up-to-date investigation information

The screenshot shows the SaILS web application interface. The top navigation bar includes 'SaILS', 'Report An Incident', 'Search', 'Dashboard', and 'Incidents'. The main content area is titled 'Search for an Incident' and prompts the user to enter a unique ID number. A search box contains the number '55', and a 'Search' button is next to it. Below the search box, it states 'Incident #55 found!' and provides two links: 'Click here to view a summary.' and 'Click here to investigate.'

Below the search section, there is a section titled 'Incident #55 Summary' with a sub-header 'Workflow & Tracking'. This section displays a flowchart similar to the one in the first diagram, but with green boxes for the initial steps and a blue box for 'Investigation'. The flowchart shows the process from 'Incident' through 'Paper Report', 'Submit Report to Coordinator', 'Submit Report to Chief Therapist', 'Assign Investigator', 'Investigation', 'Sharing', 'Discussion at Risk Management Meeting', and 'Corrective Actions'.

At the bottom, there are two summary tables: 'Report Summary' and 'Investigation Summary'.

Report Summary	
Reported by:	s
Reported to:	s
Event type:	Reportable circumstance
Functional work area:	Brachytherapy
Descriptor:	s
Date event was detected:	Sept. 24, 2015
Submitted to SaILS by:	Logan Montgomery
Date submitted to SaILS:	Nov. 24, 2015, 4:14 p.m.

Investigation Summary	
Investigator:	Logan Montgomery
Date Investigator was assigned:	Nov. 24, 2015, 4:14 p.m.

- Standardization:
  - Implement in our clinic
  - Validate NSIR-RT for robustness & conciseness
- Collaboration:
  - Batch upload from SaLS to national database
- Workflow:
  - Develop suite of statistical analysis tools
  - Analyze historical & new incident data

# Acknowledgements

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- Randle Taylor
- Ryan Bottema



**CPQR**

Canadian Partnership for  
Quality Radiotherapy

**PCQR**

Partenariat canadien pour  
la qualité en radiothérapie



**Medical Physics**  
RESEARCH TRAINING NETWORK

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provided by:



**NSERC**  
**CRSNG**

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