

# Inter-observer variability in the analysis of radiotherapy incidents using the PRISMA method



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## Introduction

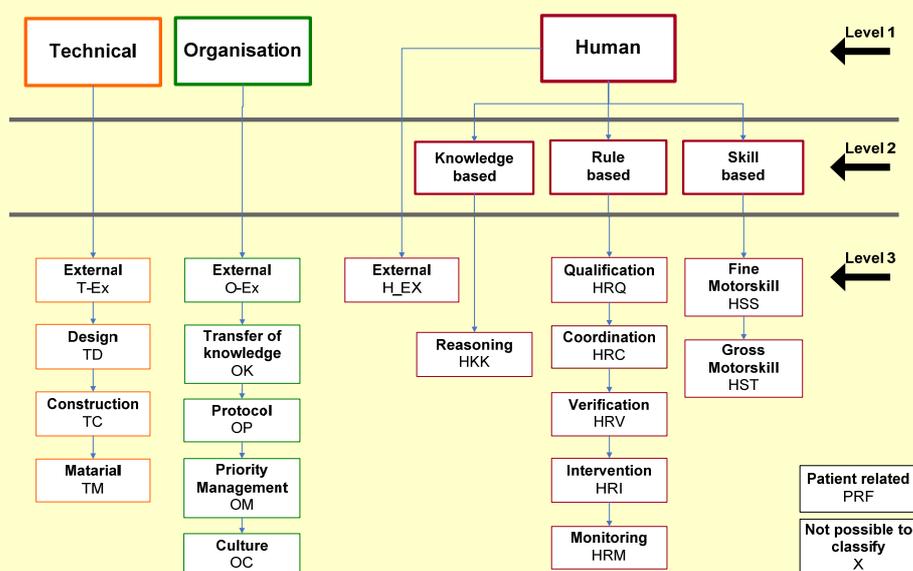


Since 2005 incidents and near incidents during the course of radiotherapy treatment were individually recorded and analyzed using the PRISMA (Prevention and Recovery Information System for Monitoring and Analysis) method by two Radiation Therapy Technologists (RTT) from our department.

## Aim

The aim of this study was to investigate the inter-observer variability of these two RTTs, with respect to the root causes of the incidents.

## Methods



For this study 40 randomly selected (near) incidents have been analyzed using the PRISMA method. Incidents are broken down into a tree of root causes, which are specified using 20 codes from 3 main categories.

**Level 1:** technical (T), organizational (O) or human (H) factors.

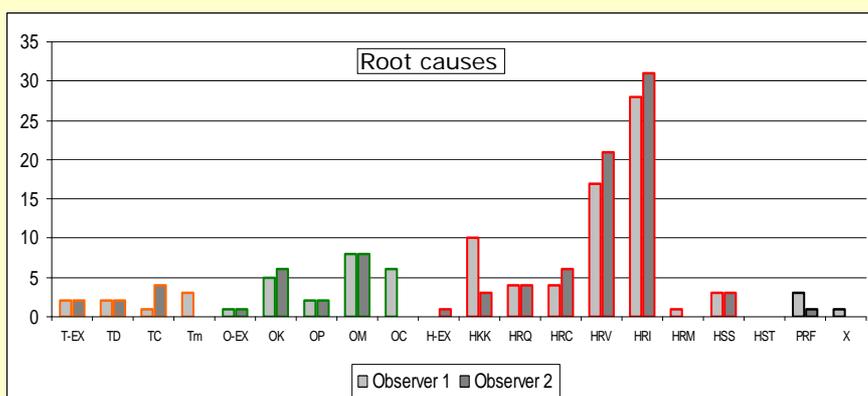
Main categories are further specified using sub-categories.

**Level 2:** Human factors are subdivided into knowledge-based (HK), rule-based (HR) or skill-based (HS) factors.

**Level 3:** All root causes.

Both observers analyzed the (near) incidents independently and collected the results in separate files. Inter-observer variability of the root causes was analyzed using Agreement and Cohen-Kappa statistics at the three levels of classification.

## Results



The average number of root causes per incident was 2.4 and 2.5 for the two observers, respectively.

The average agreement on level 1=81%, level 2 = 70%, level 3= 90%.

However, Kappa scores were relatively low and showed a large spread.

The range of Kappa scores for all factors at level 3 is (-0.14 ... 1.0).

The range of Kappa scores for just the Human factors is (-0.14 ... 0.72).

This may be due to extreme prevalence values in combination with a low number (40) of incidents analyzed. Therefore, additional analysis with a higher number of incidents is required.

The most important differences shown in the diagram are the root causes HKK and OC.

During the discussion of the results of the reports we found there was a different interpretation of the definition of the code HKK and more root causes could be qualified as an OC.

## Conclusion

**A high level of agreement in analyzing root causes was found for the two observers. However, we have demonstrated that it is useful for observers to analyze (near) incidents together on a regular basis in order to maintain a good level of agreement between individually performed analyses.**