Purpose:
To study propagation of human error in EBRT in a small radiation oncology department.

Methods:
While reporting of medical events is mandatory, reporting of other human errors needs encouragement. A mechanism of voluntary reporting was adopted. Specifically, one coordinator was assigned to collect and de-identify all non-medical-event errors. Each error is categorized according to place of origin, how it was caught, and clinical impact. Each error is assigned severity score on a 5 point scale.

The EBRT process is modeled into stages of a mostly serial flow: Front Desk, Nursing, MD Consultation and Rx, CT-Sim, Treatment Planning, Pre-Tx Physics Chart Check, Pre-Tx RTT check, Delivery, Weekly Chart Check, and Completion Physics Chart Check.

When an error propagates beyond one stage, its severity gets multiplied 2, 3… times as the missed stages increase.

Error Severity SUM = Incidence x Severity Score x Propagation Multiplier.

Results:
On the map of error propagation are 21 recorded incidences for Jan-Feb of 2011: 17 originated in Delivery, 7 in Treatment Planning. Three errors propagated beyond one stage. The error severity map shows a different pattern of hot spots: Treatment Planning (severity score 22), Delivery (17), MD Consult (10). MD Consult’s increased rank in severity is due to its potential to cause medical events.

Pre-Tx Physics Chart Check and Weekly Chart Check are effective error catchers as most errors end in them on the error maps.

Conclusions:
Map of error propagation can be used to identify hot spots of error origination and traps for catching errors and thus be an effective tool for quality control.

Reference 1. Bissonnette and Medlam 2010, “Trend analysis of radiation therapy incidents over seven years.” Radiotherapy and Oncology 96 139–144