

Comparing predicted portal dose images (PDIs) with PDIs measured with an electronic portal imaging device (EPID) can reveal problems like incorrect (dosimetric) performance of the treatment unit, erroneous design, production or application of compensators, and deviations between the patient anatomy during treatment and the anatomy according to the planning CT-scan. We have developed a back projection method to derive the absolute on-axis patient dose at 5 cm depth from a measured PDI. This measured dose can then be compared with the dose predicted by the treatment planning system.

Using the on-axis portal dose measured with the EPID ($D_{p,\text{patient}}$) [1] and the on the planning CT-data based prediction of the transmission through the patient (T_{patient}) [2] the dose that would have been measured with the EPID without a patient in the beam ($D_{p,0}$) can be derived: $D_{p,0} = D_{p,\text{patient}} / T_{\text{patient}}$. The dose in the patient can then be derived from $D_{p,0}$ taking into account effects as the difference in phantom scatter in the patient and the EPID and the inverse square law. For various phantoms, the predicted dose and the dose derived from a portal image agreed within 1% (1 SD).

The method has been clinically evaluated for 100 prostate cancer patients irradiated with one anterior and two lateral oblique fields. The predicted and measured dose, averaged over all fractions, agreed within 2% (1 SD). For some patients deviations above 5% have been found.

[1] Pasma *et al*, ICCR, 282-284, 1997.

[2] Kroonwijk *et al*, ICCR, 276-278, 1997.