Purpose: During a radiotherapy treatment course the dose delivery can be influenced by a number of factors, e.g. anatomical changes over time. This can result in discrepancies between planned and delivered dose. The electronic portal imaging device has been demonstrated to be valuable for transit dosimetry verification. The aim of this study is to investigate the information that can be derived from 2D transit portal dosimetry by examining interfractional dose changes over a treatment course.  

Methods and Materials: To create a trend overview of the interfractional changes in transit dose, the predicted portal dose for the different beams is compared to a measured portal dose using a ? evaluation. For each beam of the delivered fraction information is extracted from the ? images to differentiate systematic from random dose delivery errors. From the systematic dose errors of a fraction for different projected contours, derived from the treatment planning contours several metrics are extracted like percentage pixels with ? exceeding unity. Finally the extracted metrics from each contour and beam are weighted with beam weight and the average and standard deviation are calculated, resulting in a fraction result. For this study, we analyzed 6 lung cancer patients and 20 prostate cancer patients.  

Results: In some prostate cases the rectal filling was causing the dose delivery problems. For the lung cancer patients, anatomy changes from the diminishing atelectasis caused a transit dose difference and adaptations to the plan were applied.  

Conclusion: We have shown that from interfractional trend overview valuable information can be derived. However, to use this for adaptive radiotherapy, 2D transit dose differences with this method should be correlated with the 3D delivered dose, to define decision criteria. By optimizing these decision criteria it should be possible to prevent either over or under dosage of the tumor or OARs.