Purpose: In our department, we have standardised treatment techniques significantly, which improves logistics and increases the awareness of deviations. We hypothesise that the variation in prescribed monitor units per technique would be reduced significantly. This could be utilized for a significant reduction in complexity of the MU check algorithm, compared with current independent MU-check systems, as recommended by AAPM-114.

Methods:
MU’s are calculated with a very simple independent algorithm (only symmetric beams in homogeneous media). The Simplification Correction Factor (SCF) is defined as the ratio between the MU’s from this simple calculation and the MU’s calculated by the planning system (Philips Pinnacle v9.0). For each patient group, average and standard deviation of the SCF is determined and 2*sigma is defined as action level. The historical group consisted of the first 770 patients, divided over 18 groups. Before transfer to the R&V-system a comparison with the historic reference group is automatically executed for each patient.

Results:
Typical average SCF-values are 0.93 for oesophagus box-geometry treatments, 1.06 for breast tangents, and 1.16 for prostate step&shoot IMRT. Standard deviations were 0.02, 0.06 and 0.06. Procedural deviations could be detected by this system; the false positive rate is <5%.

Conclusions:
The recommendations of AAPM TG-114 implicate the installation, maintenance and continuous upgrading of an additional dose calculation system with the main purpose of preventing treatment errors with a non-dosimetric origin like transfer errors, protocol breaches, etc. As an alternative, we developed a MU-check algorithm based on elemental dose calculations and comparison with a historic comparable patient group.
The method is useful for detection of errors of 5%-12%, so too large for improvement of the primary TPS but small enough for many procedural errors. Efforts in improvement of accuracy of dose calculations should be focussed on only one system.