Purpose: In addition to treatment planning, dosimetrists have to prepare documentation and manually enter data in treatment management system (TMS) which did not transfer or setup automatically. The required documents and data are dependent on the disease site, treatment machine and clinical workflow. Errors and inconsistencies can cause redundant work, treatment delays and potentially treatment errors. To address these issues, an electronic checking software tool, DosCheck was clinically implemented to check the existence of necessary documentations and the integrity of manually-entered data. The purpose of this software is to reduce the frequency of human errors and to improve efficiency.

Methods: DosCheck reads data and documents from 1) TMS, 2) Pinnacle TPS, and 3) DICOM plan files stored in a DICOM-RT PACS. It processes documents in Word and PDF format, treatment plan data in Pinnacle native format and DICOM format, and Mosaiq data in database records. The software cross-checks data accuracy and consistency by following rules that are pre-defined according to the clinical requirements and treatment sties. It interacts with dosimetrists and presents instantaneous results via graphical user interface.

Results: DosCheck has been implemented in C#. It performs a full check for a patient with 20 seconds. It has been clinically commissioned and is used daily by all dosimetrists at our institution. Retrospective analysis shows that DosCheck identifies 30% to 40% of previously reported dosimetrist human errors. Additional ~30% errors are checked by other tools that could be integrated DosCheck in the near future.

Conclusions: As an electronic data checking tool, DosCheck can obtain and process data and documents from multiple clinical computer systems in the radiation oncology department, and perform checks according to clinical rules. It is able to improve the accuracy and efficiency of clinical data and document process, and therefore to reduce any potential inconsistencies and errors.