A B S T R A C T
Aim: To create a presentation method of TCP and NTCP distributions calculated based on dose distribution for a selected CT slice.

Materials and methods: Three 24-bit colour maps – of dose distribution, delineated structures and CT information – were converted into m-by-n-by-3 data arrays, containing intensities of red, green, and blue colour components for each pixel. All calculations were performed with Matlab v.6.5. The transformation function, which consists of five linear functions, was prepared to translate the colour map into a one-dimensional data array of dose values. A menu-driven application based on the transformation function and mathematical models of complication risk (NTCP) and treatment control probability (TCP) was designed to allow pixel-by-pixel translation of colour maps into one-dimensional arrays of TCP and NTCP values.

Results: The result of this work is an application created to visualize the TCP and NTCP distribution for a single CT scan based on the spatial dose distribution calculated in the treatment planning system. The application allows 10 targets (PTV) and 10 organs at risks (OaR) to be defined. The interface allows alpha/beta values to be inserted for each delineated structure. The application computes TCP and NTCP matrices, which are presented as colour maps superimposed on the corresponding CT slice. There is a set of parameters used for TCP/NTCP calculations which can be defined by the user.

Conclusion: Our application is a prototype of an evaluation tool. Although limited to a single plane of the treatment plan, it is believed to be a starting point for further development.

Keywords: TCP, NTCP, Evaluation tool, Radiobiological model, Dose distribution