Purpose: Shielding calculations for megavoltage radiotherapy facilities with mazes are generally straightforward but highly critical. Excel spreadsheets are often used to expedite the process; but with numerous parameters and variables setting up the spreadsheet can be more time consuming than hand calculations. In busy clinical departments the patient load may leave the physicist unable to dedicate the desirable amount of resources to pay the detailed attention due for a timely and accurate shielding calculation.

The purpose of this investigation is to automate this process by streamlining workload calculations, programming lookup tables for easy access, and calculate the necessary dimensions of the primary shielding. The results of a newly written automated shielding calculator program will be compared with hand calculations performed according to NCRP Report 151.

Methods: A visual basic program was written, using NCRP Report 151 as a model, to calculate the shielding needed for a linear accelerator in a simple treatment vault. In an attempt to streamline the coding of the program, a set of conditional calculations is used to accurately calculate the thickness of secondary shielding.

Results: The visual basic program was able to accurately calculate the thickness of primary and secondary shielding to NCRP Report 151 calculations.

Conclusion: The program can be used to calculate shielding thicknesses with accuracy for radiotherapy rooms. To make the program more pragmatic, maze shielding and neutron shielding calculations should be added. The detail of the programming steps to accommodate the NCRP 151 formulas and parameters will be presented.