Purpose: To describe an algorithm for determining appropriate physics staffing for radiation treatment. Motivation for this work came from the age of current guidelines which predate the recent evolution in techniques and technology, and also several significant adverse incidents where a lack of physics staffing was identified as a contributing factor to excessive radiation exposure of patients.

Methods: Guided by published times required per procedure, we developed an algorithm adaptable to local practice which estimates staffing requirements for medical physics with parameters derived from clinical procedures and service workload, equipment inventory, training, clinical development and administration. The predictive power was evaluated using data from 32 Canadian centres. This algorithm was used to model staffing requirements for the next 10 years to aid regional, institutional and educational program planning with consideration given to the “4Rs” of human resources planning: Requirements, Recruitment, Retention and Residency.

Results: For centre-specific human resource planning, we propose a grid of coefficients addressing specific workload factors for each group. For larger scale planning, case-based ratios were determined at 260, 300 and 600 annual radiotherapy cases for medical physicists, dosimetrists and electronics technologists respectively. Assuming a 2.5% growth in incidence of cancer and stable utilisation, our supply and demand model predicts a requirement for an additional 39 medical physicists for Ontario by the year 2020. If an additional 3% annual growth in radiation therapy utilisation is included, the number rises to 87.

Conclusions: We describe a robust algorithm to determine medical physics staffing levels adaptable to centre-specific workload and evolving local radiation treatment practice. Although annual caseload has been used in the past as a major parameter for global physics staffing determination, our results indicate that local clinical services and equipment as well as academic activity cause significant deviations from predictions based solely on caseload.