

$x_{i,p}$ = binary variable that takes a value 1 if patient i receives p proton fractions (and 15-p photon fractions), and 0 otherwise.

i = the patient index (from 0 to 16)

p = the number of proton fractions (from 0 to 15)

C = capacity for the proton fractions (=100)

$$\text{Maximize} \quad \sum_{i=0}^{16} \sum_{p=0}^{15} BED_i(p, 15 - p) \times x_{i,p}$$

$$\text{Subject to:} \quad \sum_{i=0}^{16} \sum_{p=0}^{15} p \times x_{i,p} \leq C$$

$$\sum_{p=0}^{15} x_{i,p} = 1 \text{ for each patient } i$$

$$x_{i,p} \in (0, 1)$$