Planned Simulations

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In all experiments the sample size for the calibration is to 20,000 and the sample size for the observation is to be 500. The number of replications of the dose estimation will be 10,000.

Non-parametric simulations

Full body

Using the Barquniero et al. 1997 table one data

```
barquinero1
```

```
##       d   X0  X1 X2 X3 X4 X5    m   s
## 1  0.00 8802   9  0  0  0  0 8811   9
## 2  0.10 5034  14  0  0  0  0 5048  14
## 3  0.25 1968  36  1  0  0  0 2005  38
## 4  0.50 1942  69  1  0  0  0 2012  71
## 5  0.75 1503 103  1  0  0  0 1607 105
## 6  1.00 1185 105  2  0  0  0 1292 109
## 7  1.50  582  93  7  0  0  0  682 107
## 8  2.00  303  88 11  1  0  0  403 113
## 9  3.00  105  72 25  2  1  0  205 132
## 10 4.00   71  73 41 16  3  0  204 215
## 11 5.00   31  66 64 24 13  2  200 328
```

the quasi-optimal experimental designs

```
qI500; qI50; qca1; qD
```

```
##            [,1]     [,2]      [,3]
## [1,] 0.00000000 1.000000 5.0000000
## [2,] 0.05974919 0.534389 0.4058618
```

```
##            [,1]      [,2]      [,3]
## [1,] 0.00000000 1.0000000 5.0000000
## [2,] 0.08362495 0.5100378 0.4063372
```

```
##            [,1]      [,2]       [,3]
## [1,] 0.00000000 0.7500000 5.00000000
## [2,] 0.09801916 0.8071877 0.09479319
```

```
##           [,1]      [,2]      [,3]
## [1,] 0.0000000 1.0000000 5.0000000
## [2,] 0.3333333 0.3333333 0.3333333
```

will be considered over the range of doses

```
d1
```

```
##  [1] 0.00 0.10 0.25 0.50 0.75 1.00 1.50 2.00 3.00 4.00 5.00
```

at 100% irradiation fraction.

Partial body

Using the Barquniero et al. 1997 table two data

```
barquinero2
```

```
##    d irr_frac  X0 X1 X2 X3 X4 X5 X6   m   s
## 1  2    1.000 303 88 11  1  0  0  0 403 113
## 2  2    0.875 362 83 13  0  1  0  0 459 113
## 3  2    0.750 436 58 12  2  0  0  0 508  88
## 4  2    0.500 452 43  7  3  0  0  0 505  66
## 5  2    0.250 676 21  4  0  0  0  0 701  29
## 6  2    0.125 488 11  1  0  0  0  0 500  13
## 7  3    1.000 105 72 25  2  1  0  0 205 132
## 8  3    0.875 201 63 19  2  0  0  0 285 107
## 9  3    0.750 255 59 17  3  1  0  0 335 106
## 10 3    0.500 487 39 15  4  0  0  0 545  81
## 11 3    0.250 493 23  3  1  1  0  0 521  36
## 12 3    0.125 498  9  3  0  0  0  0 510  15
## 13 4    1.000  71 73 41 16  3  0  0 204 215
## 14 4    0.875  75 42 20  7  2  0  0 146 111
## 15 4    0.750 113 44 17  8  3  0  0 185 114
## 16 4    0.500 260 38 21  8  0  1  0 328 109
## 17 4    0.250 457 29 11  2  1  0  0 500  61
## 18 4    0.125 480 16  9  0  1  0  0 506  38
## 19 5    1.000  31 66 64 24 13  2  0 200 328
## 20 5    0.875  82 48 39 20  8  1  1 199 229
## 21 5    0.750 167 19 18 12  5  1  0 222 116
## 22 5    0.500 296 24 20 12  3  1  0 356 117
## 23 5    0.250 480  8  9  7  1  1  0 506  56
## 24 5    0.125 484  6  3  4  0  1  0 498  29
```

the same designs will also be considered at the doses

```
d2
```

```
## [1] 2 3 4 5
```

at the range of irradiation fractions

```
f
```

```
## [1] 0.875 0.750 0.500 0.250 0.125
```

Parametric simulations

The optimal experimental designs

```
I500; I50; ca1; D
```

```
##            [,1]      [,2]      [,3]
## [1,] 0.00000000 1.2282570 5.0000000
## [2,] 0.05448417 0.5463052 0.3992106
```

```
##            [,1]      [,2]      [,3]
## [1,] 0.00000000 1.2520610 5.0000000
## [2,] 0.07106817 0.5267302 0.4022016
```

```
##            [,1]      [,2]      [,3]
## [1,] 0.00000000 0.8899079 5.0000000
## [2,] 0.09603236 0.7979872 0.1059804
```

```
##           [,1]      [,2]      [,3]
## [1,] 0.0000000 1.0216810 5.0000000
## [2,] 0.3333333 0.3333333 0.3333333
```

will be considered at the range of doses

```
d1
```

```
##  [1] 0.00 0.10 0.25 0.50 0.75 1.00 1.50 2.00 3.00 4.00 5.00
```

and the range of irradiation fractions

```
c(1, f)
```

```
## [1] 1.000 0.875 0.750 0.500 0.250 0.125
```