**APPENDIX B**
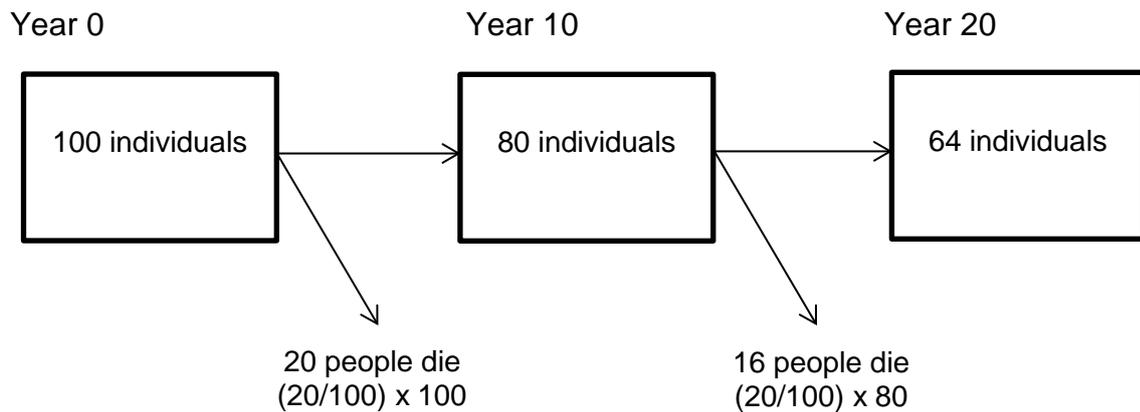
**Informing decisions on investment to reduce health inequalities (III) in Scotland: explaining the delayed mortality effect**

**December 2014**

## Comparison group

Year 0                    Year 10                    Year 20

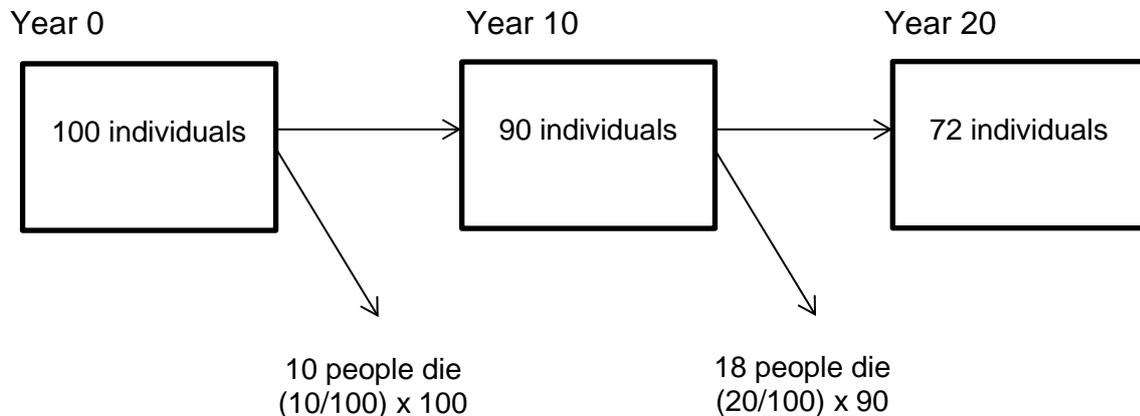| | | |
|---|---|---|
| 100 individuals | 80 individuals | 64 individuals |

20 people die
(20/100) x 100

16 people die
(20/100) x 80

Mortality rate is 20/100 per 10 years in the unaffected (comparison) group, and this is unchanged over the 20-year period.

The years of life lost (YLL) at 10 years is therefore 500 (0.5 (to represent the steady decline over time) x average 50 years life lost for each person x 20 people) and at 20 years is 900 (500 (from the first 10 years) + 400 (16 people x 0.5 (because average of 8 people over the time) x 50 years of life lost for each person).

## Intervention group

Year 0                    Year 10                    Year 20

| | | |
|---|---|---|
| 100 individuals | 90 individuals | 72 individuals |

10 people die
(10/100) x 100

18 people die
(20/100) x 90

Here we assume that the intervention reduces the mortality rate in the first 10 years to 10/100 per 10 years, but the effect of the intervention stops at 10 years and the mortality rate returns to the baseline rate of 20/100 per 10 years. The YLL are 250 (10 people x 0.5 x 50 years) in the first 10 years and 450 in the second 10 years (18 people x 0.5 x 50 years), a total of 700. Over the 20 years this is less YLL (700 v 900), but in the first 10 years the difference is much less (250 v 500) and the second 10 years is slightly more (450 v 400).

As can be seen, the number of people dying in the second 10-year period in the intervention group is greater than in the comparison group. This is simply because of

the greater population at risk of death (i.e. the denominator is greater). The YLL lost per year (in crude terms) can therefore increase in the intervention group, and be higher than in the comparison group.

Importantly, this increase in YLL can be seen even where the overall survival remains higher in the intervention group (e.g. 72 survivors at 20 years in the intervention group and 64 survivors at 20 years in the comparison group).