eAppendix

The numerator of the proportion eliminated (PE) on the risk difference scale can be interpreted as a differential in risk reduction due to the intervention between the exposed (i.e., $\mathrm{E}\left[Y_1 - Y_{1m}\right]$) and the unexposed (i.e., $\mathrm{E}\left[Y_0 - Y_{0m}\right]$) groups because the PE on the risk difference scale can be rewritten as follows:

$$\begin{aligned}\frac{\left\{\mathrm{RD(TE)} - \mathrm{RD(CDE}(m))\right\}}{\mathrm{RD(TE)}} &= \frac{\mathrm{E}\left[\left(Y_1 - Y_0\right) - \left(Y_{1m} - Y_{0m}\right)\right]}{\mathrm{E}\left[Y_1 - Y_0\right]} \\ &= \frac{\mathrm{E}\left[\left(Y_1 - Y_{1m}\right) - \left(Y_0 - Y_{0m}\right)\right]}{\mathrm{E}\left[Y_1 - Y_0\right]}.\end{aligned}$$

One can interpret the PE on the excess relative risk scale from the perspective of comparing the excess relative risk due to the intervention among the exposed (i.e., $\left(\mathrm{E}\left[Y_1\right] - \mathrm{E}\left[Y_{1m}\right]\right)/\mathrm{E}\left[Y_{1m}\right]$) and the excess relative risk due to the intervention among the unexposed (i.e., $\left(\mathrm{E}\left[Y_0\right] - \mathrm{E}\left[Y_{0m}\right]\right)/\mathrm{E}\left[Y_{0m}\right]$). The PE on the excess relative risk scale can be rewritten as follows:

$$\begin{aligned}&\frac{\left\{\mathrm{E}\left[Y_1\right]/\mathrm{E}\left[Y_0\right]\right\} - \left\{\mathrm{E}\left[Y_{1m}\right]/\mathrm{E}\left[Y_{0m}\right]\right\}}{\mathrm{E}\left[Y_1 - Y_0\right]/\mathrm{E}\left[Y_0\right]} \\ &= \frac{\left(\mathrm{E}\left[Y_1\right]\mathrm{E}\left[Y_{0m}\right] - \mathrm{E}\left[Y_0\right]\mathrm{E}\left[Y_{1m}\right]\right)/\mathrm{E}\left[Y_0\right]\mathrm{E}\left[Y_{0m}\right]}{\mathrm{E}\left[Y_1 - Y_0\right]/\mathrm{E}\left[Y_0\right]} \\ &= \frac{\left[\left\{\mathrm{E}\left[Y_1\right]\mathrm{E}\left[Y_{0m}\right] - \mathrm{E}\left[Y_{1m}\right]\mathrm{E}\left[Y_{0m}\right]\right\} - \left\{\mathrm{E}\left[Y_0\right]\mathrm{E}\left[Y_{1m}\right] - \mathrm{E}\left[Y_{0m}\right]\mathrm{E}\left[Y_{1m}\right]\right\}\right]/\mathrm{E}\left[Y_0\right]\mathrm{E}\left[Y_{0m}\right]}{\mathrm{E}\left[Y_1 - Y_0\right]/\mathrm{E}\left[Y_0\right]} \\ &= \frac{\left[\left\{\mathrm{E}\left[Y_{0m}\right]\left(\mathrm{E}\left[Y_1\right] - \mathrm{E}\left[Y_{1m}\right]\right)\right\} - \left\{\mathrm{E}\left[Y_{1m}\right]\left(\mathrm{E}\left[Y_0\right] - \mathrm{E}\left[Y_{0m}\right]\right)\right\}\right]/\mathrm{E}\left[Y_0\right]\mathrm{E}\left[Y_{0m}\right]}{\mathrm{E}\left[Y_1 - Y_0\right]/\mathrm{E}\left[Y_0\right]} \\ &= \frac{\mathrm{E}\left[Y_{0m}\right]\mathrm{E}\left[Y_{1m}\right]\left\{\left(\mathrm{E}\left[Y_1\right] - \mathrm{E}\left[Y_{1m}\right]\right)/\mathrm{E}\left[Y_{1m}\right] - \left(\mathrm{E}\left[Y_0\right] - \mathrm{E}\left[Y_{0m}\right]\right)/\mathrm{E}\left[Y_{0m}\right]\right\}/\mathrm{E}\left[Y_0\right]\mathrm{E}\left[Y_{0m}\right]}{\mathrm{E}\left[Y_1 - Y_0\right]/\mathrm{E}\left[Y_0\right]} \\ &= \frac{\mathrm{E}\left[Y_{1m}\right]\left\{\left(\mathrm{E}\left[Y_1\right] - \mathrm{E}\left[Y_{1m}\right]\right)/\mathrm{E}\left[Y_{1m}\right] - \left(\mathrm{E}\left[Y_0\right] - \mathrm{E}\left[Y_{0m}\right]\right)/\mathrm{E}\left[Y_{0m}\right]\right\}/\mathrm{E}\left[Y_0\right]}{\mathrm{E}\left[Y_1 - Y_0\right]/\mathrm{E}\left[Y_0\right]} \\ &= \frac{\left(\mathrm{E}\left[Y_1\right] - \mathrm{E}\left[Y_{1m}\right]\right)/\mathrm{E}\left[Y_{1m}\right] - \left(\mathrm{E}\left[Y_0\right] - \mathrm{E}\left[Y_{0m}\right]\right)/\mathrm{E}\left[Y_{0m}\right]}{\mathrm{E}\left[Y_1 - Y_0\right]/\mathrm{E}\left[Y_{1m}\right]}.\end{aligned}$$

In other words, this can be summarized as follows:

$$\frac{\left\{\mathrm{RR(TE)} - \mathrm{RR(CDE}(m))\right\}}{\left\{\mathrm{RR(TE)} - 1\right\}} \times \frac{\mathrm{E}\left[Y_0\right]}{\mathrm{E}\left[Y_{1m}\right]} = \frac{\left\{\left(\mathrm{E}\left[Y_1\right] - \mathrm{E}\left[Y_{1m}\right]\right)/\mathrm{E}\left[Y_{1m}\right]\right\} - \left\{\left(\mathrm{E}\left[Y_0\right] - \mathrm{E}\left[Y_{0m}\right]\right)/\mathrm{E}\left[Y_{0m}\right]\right\}}{\mathrm{E}\left[Y_1 - Y_0\right]/\mathrm{E}\left[Y_0\right]}.$$