

Let  $\Delta$  = the difference in current and optimal sodium intake.  
Let  $\beta_1$  = the change in SBP per unit increase in sodium intake.  
Let  $\beta_2$  = the change in risk per unit increase in SBP.

Recall that, we define  $RR$  as  $= \exp(\Delta\beta_1\beta_2)$ .

The unit for  $\Delta$  is mg/day.

The unit for  $\beta_1$  is mmHg/(1000mg/day)

The unit for  $\beta_2$  is "risk" / 10mmHg.

The units are not consistent with each other. We need  $\Delta\beta_1\beta_2$  to be in units of "risk" but as is, the product is in units of "risk"/( $10*1000$ ). So if we divide by the product by  $10*1000$ , we will be using the desired units.

$$\begin{aligned}
& \Delta mg/day * \beta_1 \frac{mmHg}{1000mg/day} * \beta_2 \frac{"risk"}{10mmHg} \\
&= \Delta \cancel{mg/day} * \beta_1 \frac{\cancel{mmHg}}{1000\cancel{mg/day}} * \beta_2 \frac{"risk"}{10\cancel{mmHg}} \\
&= \Delta * \beta_1 * \beta_2 \frac{"risk"}{10 * 1000} \\
&= \frac{\Delta * \beta_1 * \beta_2}{10 * 1000} "risk"
\end{aligned}$$

Or, another way of thinking about it is that we are simply just making sure all our units are consistent:

$$\begin{aligned}
& \Delta mg/day * \beta_1 \frac{mmHg}{1000mg/day} * \beta_2 \frac{"risk"}{10mmHg} \\
&= \Delta mg/day * \beta_1 \frac{mmHg * \frac{1}{1000}}{1000mg/day * \frac{1}{1000}} * \beta_2 \frac{"risk" * \frac{1}{10}}{10mmHg * \frac{1}{10}} \\
&= \Delta mg/day * \beta_1 \frac{mmHg * \frac{1}{1000}}{\cancel{1000}mg/day * \cancel{\frac{1}{1000}}} * \beta_2 \frac{"risk" * \frac{1}{10}}{\cancel{10}mmHg * \cancel{\frac{1}{10}}} \\
&= \Delta mg/day * \beta_1 \frac{mmHg * \frac{1}{1000}}{mg/day} * \beta_2 \frac{"risk" * \frac{1}{10}}{mmHg} \\
&= \Delta mg/day * \frac{\beta_1}{1000} \frac{mmHg}{mg/day} * \frac{\beta_2}{10} \frac{"risk"}{mmHg} \\
&= \Delta \cancel{mg/day} * \frac{\beta_1}{1000} \frac{\cancel{mmHg}}{\cancel{mg/day}} * \frac{\beta_2}{10} \frac{"risk"}{\cancel{mmHg}} \\
&= \frac{\Delta\beta_1\beta_2}{10 * 1000} "risk"
\end{aligned}$$