



### Web appendix 1: Segmented regression interaction model for a controlled interrupted time series

Intervention group in blue, control group in red.  $T$  = time since the start of the study,  $X$  = intervention (pre-intervention period = 0, post-intervention period = 1),  $G$  = group (control group = 0, intervention group = 1).  $\beta_0, \beta_2, \beta_4$  and  $\beta_6$  relate to intercepts,  $\beta_1, \beta_3, \beta_5$  and  $\beta_7$  relate to slopes. Curved arrows represent differences between the intervention group and control group. (Adapted from Linden and Adams 2011)[1]

Segmented regression equation for slope change with a control series:

$$Y_t = \beta_0 + \beta_1 T + \beta_2 X_t + \beta_3 T X_t + \beta_4 G + \beta_5 G T + \beta_6 G X_t + \beta_7 G X_t T$$

$Y_t$  is the outcome variable at time  $t$ ,  $T$  is a variable representing the time since the start of the study and  $X$  is a dummy variable indicating the pre- or post-intervention period.  $G$  represents the intervention group ( $G = 1$ ) or control group ( $G = 0$ ). Where  $\beta_0$  represents the intercept at  $T=0$ ,  $\beta_1$  is the change in outcome associated per time unit increase (representing the underlying pre-intervention trend),  $\beta_2$  is the level change following the intervention in the intervention group and  $\beta_3$  indicates the slope change following the intervention (using the interaction between time and intervention:  $T X_t$ )  $\beta_4$  represents the difference in intercept at  $T=0$ ,  $\beta_5$  represents the slope difference between the intervention and control group in the pre-intervention period,  $\beta_6$  represents the difference between the change in level in the control and intervention group associated with the intervention,  $\beta_7$  represents the difference between the change in slope in the control and intervention group associated with the intervention (Figure 4). Therefore  $\beta_6$  and  $\beta_7$  are the parameters of interest for the measures of effect.

1. Linden, A. and J.L. Adams, *Applying a propensity score-based weighting model to interrupted time series data: improving causal inference in programme evaluation*. *J Eval Clin Pract*, 2011. **17**(6): p. 1231-8.