



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 β_6 relate to intercepts, $\beta_1, \beta_3, \beta_5$ and β_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 β_0 represents the intercept at $T=0$, β_1 is the change in outcome associated per time unit increase (representing the underlying pre-intervention trend), β_2 is the level change following the intervention in the intervention group and β_3 indicates the slope change following the intervention (using the interaction between time and intervention: $T X_t$) β_4 represents the difference in intercept at $T=0$, β_5 represents the slope difference between the intervention and control group in the pre-intervention period, β_6 represents the difference between the change in level in the control and intervention group associated with the intervention, β_7 represents the difference between the change in slope in the control and intervention group associated with the intervention (Figure 4). Therefore β_6 and β_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.