APPENDIX 1 (as supplied by the authors): Details of segmented regression analysis

The effects of recent system constraint on cataract surgery rates among recent graduates and established ophthalmologists in Ontario, Canada were quantified using segmented regression analysis of interrupted time-series data.

Between 1994 and 2006 the total number of cataract operations performed in Ontario grew steadily from approximately 12,000 to 36,000 cases per quarter. In contrast, from 2007 onward, the total number of cataract operations performed in Ontario remained leveled off at approximately 36,000 cases per quarter. Hence, the study period was divided into two segments:

1) Period A (from quarter 1 of 1994 to quarter 4 of 2006): steady growth in total provincial cataract surgery volumes in Ontario.

2) Period B (from quarter 1 of 2007 to quarter 2 of 2013): no growth in total provincial cataract surgery volumes in Ontario.

We examined models using the time point when total provincial cataract caseloads stopped growing (quarter 1 of 2007) as the intervention point.[1] A linear functional form that included an immediate effect on the level (i.e., intercept) of the cataract surgery rate time series, and an ongoing effect on the trend (i.e., slope) of the cataract surgery rate time series at the beginning of period B was specified for each group (recent graduates and established ophthalmologists).

Specifically the model took the form:

$$Y_t = \beta_0 + \beta_1(T) + \beta_2(W1) + \beta_3(TW1) + \beta_4(N) + e_t$$

where Y_t is the cataract surgery rate at quarter t in the series; T is the time since the start of the observation period; W1 is indicator variables equal to 0 before the leveling off of total provincial cataract surgery volume and equal to 1 after; TW1 is a continuous variable equal to 0 in period A, and equal to the number of quarters after the beginning of period B; N is the number of ophthalmologists per population; and the error term (e_t) consists of a normally distributed random error and an error at time t that may be correlated with errors at preceding time points.

Coefficient β_0 estimates the quarterly cataract surgery rate at baseline; β_1 estimates the baseline slope parameter representing the change in the cataract surgery rate that occurred every quarter during period A; β_2 estimates the change in cataract surgery rate immediately after the end of period A (intercept change); β_3 corresponds to the change in the trend (slope) of the cataract surgery rate at the end of period A; β_4 estimates the

Appendix to: Campbell RJ, El-Defrawy SR, Bell CM, et al. Effect of cataract surgery volume constraints on recently graduated ophthalmologists: a population-based cohort study. *CMAJ* 2016. DOI:10.1503/cmaj.150674.

effect of the number of ophthalmologists per population on the mean cataract surgical rate.

APPENDIX REFERENCE

1. Wagner A, Soumerai S, Zhang F, et al. Segmented regression analysis of interrupted time series studies in medication use research. J Clin Pharm Ther 2002; 27:299-309.