STATISTICAL ANALYSIS PLAN

Remote Exercise iNtErvention for Wellbeing (RENEW) Trial: A 2-arm Randomized At-home, App-based Exercise Trial to Improve Adherence, Mental Health, and Wellbeing of British Columbian Healthcare Workers

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November 10, 2026

Statistical Analysis Plan

Where appropriate, data will be tested for normality and corrected for non-normality where needed. Means and standard deviations, or number and percentages, will be reported for continuous and categorical demographic variables, respectively. Random forest-based imputation will be utilized when participants partially complete a multi-item measure within a single assessment period. Imputation will not be performed for cases where participants completed none of the items of an instrument for a given survey, since robust maximum likelihood estimation (used for our intention to treat analyses) allows for such missing data. All randomized participants will be included in these analyses (i.e. intention-to-treat), as in our pilot trial.

Hypothesis 1: Primary outcome. We will test weekly minutes of moderate-to-vigorous physical activity (MVPA) as the primary outcome, operationalized as a composite score derived from (a) minutes of exercise app use and (b) minutes of MVPA detected by the Actigraph™ LEAP accelerometer not coinciding with app usage. Quadratic growth models, using a Structural Equation Modeling framework, will be used to estimate a latent intercept, linear slope, and quadratic curve for the primary outcome, and the dummy coded treatment condition (Apps+QEP = 1; Apps-Only = 0) will be regressed on the latent intercept, slope, and curve to quantify the treatment effects, in a similar framework to traditional multilevel regression models. Monthly effect sizes will be computed using the Feingold approach, which creates a Cohen's d equivalent at each assessment, allowing us to examine *when* the intervention started to have significant treatment effects and *whether* the effects lasted throughout the program delivery.

Hypothesis 2: Secondary outcomes (mental health, wellbeing, occupational functioning, physical health). The same analysis used for the primary outcome (i.e., intention-to-treat quadratic growth models) will be used for the 14 secondary outcomes, adjusted for the Benjamini-Hochberg false discovery rate. If the outcome data is non-normally distributed and the model as specified does not converge, we will refit the model treating the outcome as count data (e.g., zero-inflated Poisson).

Abbreviations

Apps = Applications
QEP = Qualified exercise professional
MVPA = Moderate-to-vigorous physical activity