Statistical methods

Data analyses will be performed using SPSS Statistics 24 and R software. Here, we will first calculate descriptive statistics from demographic and clinical characteristics of the sample including age, years since cancer diagnosis, type of cancer, type of treatment(s) disease reoccurrence and remission status and worst, least and average pain intensity over the previous four weeks.

Secondly, we will use a paired T-Test to determine any mean differences from baseline in pain intensity, stress, anxiety, depression, nausea, drowsiness, lack of appetite, well-being and shortness of breath and levels of immersion between HMD 3D and 2D VR interventions. However, because this study features a repeated measures design, we also used linear mixed models analysis with post 3D and 2D VR pain and immersion scores as dependent variables. These regressions included a factor for the condition (HMD 3D and 2D VR), the sequence (randomised sequence of conditions between subjects) and time (randomised sequence of conditions within subjects). We further conducted mediation analysis to understand relationships between levels of VR immersion, the type of VR (3 and 2D) and post VR pain scores.

We will also use Pearson’s correlation coefficient (r) to measure strength of association between baseline questionnaire data and post-test and control VR pain ratings and other cancer related variables.

Given evidence from recent studies investigating the effects of VR in both cancer and other chronic disease samples, we expect to observe decreases in mood, well-being and drowsiness variables. Concerning pain intensity, we also expect to observe decreases during VR use followed by a gradually return to pre-VR pain levels over a period of 15 minutes post VR session. We are unsure how VR will effect nausea and shortness of breath.