# Analysis Plan

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**Introduction**

While there is some literature regarding correlations between back pain and backpack load, fitting, etc. in military personnel and school children, the same research is lacking in recreational hikers and backpackers. The aim of this research is to examine back pain in recreational day hikers and back packers, and to explore correlations between backpack fit and back pain. The goal is to provide some baseline research for future development of safety guidelines to minimize back pain in recreational hikers and backpackers.

**Hypotheses and/or research questions and/or specific aims**

**Hypothesis:** The prevalence of back pain in recreational backpackers will be comparable to the prevalence found in other populations.

**Secondary Hypothesis:** The lumbar spine with have the highest prevalence compared to thoracic and cervical spine.

**Hypothesis:** Individuals that have been properly fit for their backpack will have less back pain.

**Data description**

**Back pain:** “Over the last 3 years have you experienced back pain?”

**Back pain location:** “If you experience back pain, choose the area from the picture below where you have the most pain (choose one).”

**Exposure:** “Have you ever had someone professionally fit your backpack?”

**Other:** Descriptive variables including (but not limited to) age, gender, height, weight, and activity level will be included in a table 1 for both the full cohort and for day hikers and backpackers separately.

**Analysis Methods**

Descriptive statistics (mean and SD for normally distributed, median and IQR for non-normal, and percentages for categorical variables) for anthropometric and demographic variables will be calculated and presented in two tables. The first will be for the full cohort and the other one by group (day hikers and backpackers). Variables will be compared between the two groups using either t tests or Kruskal-Wallis rank sum tests for normally distributed variables, and chi-squared or Fisher’s exact tests for categorical variables.

Prevalence of general back pain and back pain location will be reported as percentages, again for the full cohort and by group. For now, pain prevalence will not require any hypothesis testing although this is subject to change after initial analysis.

The effect of professional backpack fitting on back pain will be assessed using a chi-squared or Fisher’s exact test. If investigators decide to adjust for other covariates (perhaps age), logistic regression will be used instead. Covariates to include in a potential logistic model will be based on clinical relevance as determined by the investigators, and the results of univariate analyses.

Normality will be assessed using the Kolmogorov-Smirnov test and p values < 0.05 will be considered significant for all hypothesis tests.

**Proposed tables/figures**

Table 1a. Characteristics of Study Participants (Full Cohort)

Table 1b. Characteristics of Study Participants by Group

Table 2. Prevalence of Back Pain

If logistic regression is used, model results will be reported in Table 3.

**Other info**:

This is really just a preliminary analysis to help the investigators develop further research questions. For now we are keeping it as simple as possible, to get an overview of the data. After this initial report, the investigators may request a more in-depth analysis, which would require another meeting and new analysis plan. The deadline for the initial report is relatively flexible, and investigators will follow up regarding timeline soon.