**Supplementary Materials**

**Supplementary Note 1**. Consent Language

The following language was included in the survey to provide information about the survey and data use:

*Our research team is trying to understand how major medical events, such as undergoing a medical procedure or starting to use a medical device, impact activity and behavior. Our first step is this survey.*

*If you choose to complete the survey, we may contact you with follow up Offers based on the answers provided here to help further our research efforts. Your responses may be linked back to your activity data, but we will never share your name or individual responses. This survey should take less than 5 minutes and we'll award you 100 points for completing it!*

*Thanks for your help!*

**Table 1:** Weekly Means of Step Features. Mean and standard deviations of patients’ (N=118) features means for each week in the observation window. Wilcoxon tests determine if the distribution of weekly means are different than that of the baseline week (week -12).

|  |  |  |
| --- | --- | --- |
|  | Total Daily Step Count | Fraction of Minutes per Day with >0 Steps  |
| Week | Mean (±SD)  | % of Baseline | Wilcoxon p-value  | Mean (±SD)  | % of Baseline | Wilcoxon p-value  |
| -12 | 7030 (±3438) | 100% | NaN | 0.17 (±0.07) | 100% | NaN |
| -11 | 7113 (±3325) | 101% | 0.718 | 0.17 (±0.06) | 99% | 0.363 |
| -10 | 7259 (±3537) | 103% | 0.483 | 0.18 (±0.06) | 102% | 0.442 |
| -9 | 7228 (±3474) | 103% | 0.403 | 0.18 (±0.06) | 100% | 0.726 |
| -8 | 7011 (±3210) | 100% | 0.935 | 0.17 (±0.06) | 100% | 0.889 |
| -7 | 7008 (±3279) | 100% | 0.590 | 0.17 (±0.05) | 98% | 0.401 |
| -6 | 7062 (±3302) | 100% | 0.650 | 0.17 (±0.06) | 99% | 0.468 |
| -5 | 6842 (±3492) | 97% | 0.285 | 0.17 (±0.06) | 96% | 0.084 |
| -4 | 7050 (±3574) | 100% | 0.948 | 0.17 (±0.06) | 98% | 0.412 |
| -3 | 6900 (±3491) | 98% | 0.286 | 0.17 (±0.06) | 97% | 0.085 |
| -2 | 6972 (±3685) | 99% | 0.478 | 0.17 (±0.06) | 97% | 0.241 |
| -1 | 6911 (±3471) | 98% | 0.273 | 0.17 (±0.06) | 97% | 0.171 |
| 0 | 4310 (±3620) | 61% | <0.001\*\*\* | 0.11 (±0.07) | 61% | <0.001\*\*\* |
| 1 | 5637 (±3696) | 80% | <0.001\*\*\* | 0.14 (±0.06) | 80% | <0.001\*\*\* |
| 2 | 6015 (±3571) | 86% | <0.001\*\*\* | 0.15 (±0.06) | 84% | <0.001\*\*\* |
| 3 | 6379 (±3368) | 91% | 0.018\* | 0.15 (±0.06) | 88% | <0.001\*\*\* |
| 4 | 7045 (±3736) | 100% | 0.810 | 0.16 (±0.06) | 94% | 0.021\* |
| 5 | 6934 (±3494) | 99% | 0.742 | 0.17 (±0.06) | 95% | 0.080 |
| 6 | 7396 (±3788) | 105% | 0.386 | 0.17 (±0.06) | 98% | 0.382 |
| 7 | 7302 (±3784) | 104% | 0.375 | 0.17 (±0.06) | 98% | 0.657 |
| 8 | 7606 (±3860) | 108% | 0.047\* | 0.18 (±0.06) | 101% | 0.531 |
| 9 | 7737 (±4230) | 110% | 0.081 | 0.18 (±0.06) | 100% | 0.745 |
| 10 | 8034 (±4133) | 114% | 0.006\* | 0.18 (±0.06) | 103% | 0.365 |
| 11 | 7853 (±3914) | 112% | 0.004\* | 0.17 (±0.06) | 100% | 0.803 |

\* Significant at alpha=0.5

\*\* Significant after correcting for running multiple tests per feature (23 tests, alpha=0.00217)

\*\*\* Significant after correcting for running all tests (138 tests, alpha=0.00036)

**Table 2:** Weekly Means of Heart Rate Features. Mean and standard deviations of patients’ (N=66) features means for each week in the observation window. Wilcoxon tests determine if the distribution of weekly means are different than that of the baseline week (week -12).

|  |  |  |
| --- | --- | --- |
|  | Resting Heart Rate (bpm) | 95th Percentile Heart Rate (bpm)  |
| Week | Mean (±SD) | % of Baseline | Wilcoxon p-value  | Mean (±SD) | % of Baseline | Wilcoxon p-value  |
| -12 | 69.4 (±8.9) | 100% | NA | 100.8 (±10.0) | 100% | NA |
| -11 | 69.0 (±8.7) | 99% | 0.216 | 100.3 (±9.7) | 99% | 0.421 |
| -10 | 69.2 (±9.0) | 100% | 0.364 | 101.1 (±10.5) | 100% | 0.803 |
| -9 | 69.4 (±9.0) | 100% | 0.984 | 101.6 (±10.0) | 101% | 0.131 |
| -8 | 68.9 (±8.7) | 99% | 0.395 | 101.4 (±10.3) | 101% | 0.572 |
| -7 | 68.9 (±8.6) | 99% | 0.234 | 100.9 (±11.1) | 100% | 0.759 |
| -6 | 69.0 (±8.3) | 99% | 0.706 | 101.9 (±10.3) | 101% | 0.196 |
| -5 | 69.5 (±8.4) | 100% | 0.458 | 102.0 (±10.7) | 101% | 0.216 |
| -4 | 69.4 (±8.5) | 100% | 0.995 | 101.2 (±10.2) | 100% | 0.718 |
| -3 | 69.4 (±8.2) | 100% | 0.822 | 102.2 (±10.3) | 101% | 0.157 |
| -2 | 69.5 (±8.2) | 100% | 0.608 | 101.6 (±9.7) | 101% | 0.438 |
| -1 | 68.6 (±8.1) | 99% | 0.385 | 101.6 (±11.8) | 101% | 0.992 |
| 0 | 67.5 (±8.3) | 97% | 0.017\* | 95.6 (±12.9) | 95% | <0.001\*\*\* |
| 1 | 67.0 (±8.5) | 97% | 0.012\* | 98.7 (±13.6) | 98% | 0.036\* |
| 2 | 66.5 (±8.4) | 96% | 0.006\* | 98.7 (±10.4) | 98% | 0.053 |
| 3 | 64.6 (±8.4) | 93% | <0.001\*\*\* | 98.3 (±11.7) | 97% | 0.012\* |
| 4 | 63.6 (±8.5) | 92% | <0.001\*\*\* | 98.4 (±13.0) | 98% | 0.007\* |
| 5 | 63.2 (±8.3) | 91% | <0.001\*\*\* | 97.2 (±12.0) | 96% | <0.001\*\*\* |
| 6 | 62.9 (±8.4) | 91% | <0.001\*\*\* | 97.6 (±13.2) | 97% | <0.001\*\*\* |
| 7 | 63.1 (±8.3) | 91% | <0.001\*\*\* | 98.2 (±13.2) | 97% | 0.001\*\* |
| 8 | 63.0 (±8.3) | 91% | <0.001\*\*\* | 98.4 (±13.5) | 98% | 0.004\* |
| 9 | 62.6 (±8.4) | 90% | <0.001\*\*\* | 97.1 (±12.4) | 96% | <0.001\*\*\* |
| 10 | 62.2 (±8.3) | 90% | <0.001\*\*\* | 97.4 (±11.3) | 97% | 0.001\*\* |
| 11 | 62.5 (±8.9) | 90% | <0.001\*\*\* | 97.6 (±12.5) | 97% | 0.002\* |

\* Significant at alpha=0.5

\*\* Significant after correcting for running multiple tests per feature (23 tests, alpha=0.00217)

\*\*\* Significant after correcting for running all tests (138 tests, alpha=0.00036)

**Table 3:** Weekly Means of Sleep Features. Mean and standard deviations of patients’ (N=87) features means for each week in the observation window. Wilcoxon tests determine if the distribution of weekly means are different than that of the baseline week (week -12).

|  |  |  |
| --- | --- | --- |
|  | Total Sleep Time (minutes) | Sleep Efficiency  |
| Week | Mean (±SD) | % of Baseline | Wilcoxon p-value  | Mean (±SD) | % of Baseline | Wilcoxon p-value  |
| -12 | 415 (±77) | 100% | NA | 91.0 (±8.9) | 100% | NA |
| -11 | 416 (±72) | 100% | 0.286 | 91.0 (±9.2) | 100% | 0.891 |
| -10 | 416 (±82) | 100% | 0.738 | 91.2 (±8.6) | 100% | 0.231 |
| -9 | 423 (±81) | 102% | 0.044\* | 90.9 (±8.8) | 100% | 0.587 |
| -8 | 416 (±79) | 100% | 0.344 | 91.1 (±9.0) | 100% | 0.605 |
| -7 | 424 (±80) | 102% | 0.101 | 91.0 (±9.0) | 100% | 0.890 |
| -6 | 420 (±79) | 101% | 0.209 | 91.1 (±9.2) | 100% | 0.574 |
| -5 | 416 (±71) | 100% | 0.414 | 91.2 (±9.0) | 100% | 0.292 |
| -4 | 419 (±75) | 101% | 0.381 | 91.2 (±9.1) | 100% | 0.544 |
| -3 | 420 (±75) | 101% | 0.093 | 91.2 (±8.8) | 100% | 0.531 |
| -2 | 420 (±73) | 101% | 0.084 | 90.8 (±9.7) | 100% | 0.847 |
| -1 | 427 (±75) | 103% | 0.049\* | 91.0 (±9.0) | 100% | 0.477 |
| 0 | 429 (±104) | 103% | 0.081 | 91.5 (±7.7) | 101% | 0.342 |
| 1 | 450 (±73) | 108% | <0.001\*\*\* | 91.7 (±8.6) | 101% | 0.007\* |
| 2 | 444 (±81) | 107% | <0.001\*\*\* | 92.1 (±8.6) | 101% | <0.001\*\*\* |
| 3 | 441 (±71) | 106% | 0.001\*\* | 91.7 (±9.0) | 101% | 0.006\* |
| 4 | 435 (±71) | 105% | 0.001\*\* | 91.9 (±9.2) | 101% | 0.001\*\* |
| 5 | 435 (±80) | 105% | 0.004\* | 91.8 (±9.8) | 101% | <0.001\*\* |
| 6 | 425 (±75) | 102% | 0.125 | 91.7 (±10.0) | 101% | 0.001\*\* |
| 7 | 421 (±71) | 102% | 0.301 | 91.7 (±9.8) | 101% | 0.002\*\* |
| 8 | 424 (±78) | 102% | 0.177 | 92.1 (±8.4) | 101% | <0.001\*\*\* |
| 9 | 421 (±74) | 102% | 0.209 | 91.8 (±8.7) | 101% | 0.002\*\* |
| 10 | 418 (±77) | 101% | 0.839 | 91.7 (±9.9) | 101% | 0.003\* |
| 11 | 426 (±73) | 103% | 0.040\* | 91.7 (±9.8) | 101% | 0.001\*\* |

\* Significant at alpha=0.5

\*\* Significant after correcting for running multiple tests per feature (23 tests, alpha=0.00217)

\*\*\* Significant after correcting for running all tests (138 tests, alpha=0.00036)

**Table 4:** Sample sizes resulting from applying different data density thresholds for the 520 patients with any Fitbit data during the observation window.

|  |  |
| --- | --- |
| Density Parameters | Sample Sizes following Density Enforcement |
| Enforcement Period | Maximum Data Gap | Steps, HR *and* Sleep | Steps | Heart Rate | Sleep |
| ± 84 days | 7 days | 41 | 118 | 66 | 87 |
|  | 14 days | 85 | 160 | 124 | 128 |
|  | 21 days | 92 | 187 | 138 | 151 |
| ± 60 days | 7 days | 64 | 146 | 98 | 115 |
|  | 14 days | 104 | 189 | 148 | 151 |
|  | 21 days | 122 | 226 | 179 | 183 |

**Figure 1:** Data coverage throughout the 24 week observation window for cohorts with dense data (step feature cohort: N=118; heart rate feature cohort: N=66; sleep feature cohort: N=87). After enforcing data density, data coverage is high throughout the observation window except in the first few days following the procedure. The first day after the operation is associated with the lowest data coverage for all three cohorts, corresponding to data for 71%, 80%, and 51% of patients in the step, heart rate, and sleep cohorts, respectively.

