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Assessing Physical Activity in Persons with Rheumatoid Arthritis Using Accelerometry

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Abstract

Purpose—To empirically investigate if the nonwear threshold and the ‘valid day’ definition for accelerometer data from the general adult US population are appropriate for accelerometer data from persons with rheumatoid arthritis (RA).

Methods—This study analyzed data from 107 persons with RA participating in the baseline (2006–2008) accelerometer assessment from two studies with common inclusion/exclusion criteria. We examined candidate nonwear thresholds ranging from 20 to 300 minutes of zero activity count. The effect of the selected nonwear threshold is examined in regard to 1) mean daily activity counts, 2) activity counts per wear hour, 3) mean daily minutes of moderate to vigorous physical activity (MVPA) according to count thresholds that occur in 10 minute bouts, and 4) MVPA bout minutes per wear hour. The effect of ranging the definition of a valid day of accelerometer data from 8 hours of wear time to 12 hours on data retention was also examined.

Results—In 737 days of accelerometer data analyzed, the average daily wear hours increased with length of nonwear threshold of allowed continuous zero activity count minutes. The mean number of nonzero activity count minutes increased with the chosen nonwear threshold until it stabilized at 478 minutes per day of activity, which corresponded to the 90 minute nonwear threshold. Choosing this threshold and requiring at least 10 hours of wear time to constitute a valid day was associated with 92.8% of days of collected data defined as ‘valid’.

Conclusion—Data supported increasing the allowed nonwear threshold in this RA subpopulation from 60 to 90 minutes, while retaining the 10 hour day as the measure of the ‘valid day’.

Keywords

Accelerometer; Nonwear Time; Data Reduction; Valid Day

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Objective measurement of physical activity (PA) using accelerometry is now used in large scale epidemiologic studies (24) and clinical trials including studies of persons with arthritis (6,9,15). Rheumatoid arthritis (RA) affects about 1% of adults in the US, and has been recognized as one of the most critical rheumatologic conditions in the developed world (21), largely due to the associated joint damage, declines in functional status, and premature mortality (14,18). The disease process leads to chronic and progressive inflammation involving multiple joints as well as other organ systems. RA is associated with substantial disability, economic losses (5), and even reduced life expectancy as a result of disease consequences (16). Physical activity has been found to reduce pain and improve function in persons with RA, hence the recent interest in measuring PA in this population. An important advantage of objective PA measurement by accelerometers is that they capture salient behavior characteristics including the frequency, intensity, and duration of physical activity, as well as periods of rest. Recently, waist-mounted accelerometers were used in population surveillance of PA in the National Health and Nutrition Examination Survey (NHANES) indicating they can be used in population and clinical studies.

An important analytical step is the translation of accelerometer counts into physical activity measurements. Numerous validation studies have focused on interpreting accelerometer counts by defining thresholds that correspond to light-, moderate-, and vigorous-intensity physical activity (7,23). In contrast, little has been published on data issues related to extracting meaningful physical activity descriptions from accelerometer output. Masse and colleagues coined the term ‘accelerometer data reduction’ (11) for the software process that translates accelerometer counts into physical measurements of activity intensity, frequency and duration. A basic building block in this process is the assessment and interpretation of ‘nonwear time’. Nonwear relates to periods when activity counts on the accelerometer read-out register as ‘0’, because the monitor is not being worn by the subject. Time spent in sedentary activities, which can also register as ‘0’, is often indistinguishable from nonwear in accelerometer readouts. Thus some upfront decisions must be made regarding the maximum number of minutes of consecutive ‘0’ counts that will be allowed in the data before considering those minutes ‘nonwear’. Nonwear time is a structural foundation in the data reduction process. Using a predetermined threshold for the number of hours that constitute a ‘valid day’ of accelerometer wear, nonwear time becomes the key variable in deciding which days ‘rule in’. Thus, how one defines ‘nonwear’ has major ramifications in data reduction. The influence of these arbitrary procedural decisions on the assessment of physical activity outcomes was illustrated by Masse and colleagues (11). To our knowledge, these parameter definitions for accelerometer data reduction have not been examined for persons with arthritis.

A landmark physical activity study in the general US adult uninstitutionalized population was based on accelerometer measurements from the National Health and Nutritional Examination Survey (NHANES) published by Troiano and colleagues (24). An important contribution of that study was the report of their accelerometer data parameter definitions of 1) nonwear time and 2) a valid day of monitoring (determined from unpublished internal empirical analyses [personal communication, October 18, 2008]). This information provided a valuable starting point for other studies that require data reduction from accelerometer output. However, parameter value definitions from this benchmark study of the general US population may not be applicable to subpopulations with chronic conditions. For example, physical activity patterns in persons with arthritis may differ from the general population due to pain and stiffness that necessitate frequent extended rest breaks.

The purpose of this study was to empirically investigate if data reduction parameter value definitions derived from the general adult US population were appropriate to apply to accelerometer data from persons with rheumatoid arthritis (RA) for the purpose of

evaluating physical activity outcomes, and to explore the impact of applying alternate parameter definitions to that accelerometer data.

Methods

Study Population and Sample

This study analyzed data from 107 persons with rheumatoid arthritis (RA) who participated in the baseline (2006-2008) accelerometer assessment from two concurrent studies with common inclusion/exclusion criteria: an ongoing randomized clinical trial, Increasing Motivation for Physical Activity in Arthritis Clinical Trial (IMPAACT) and a second study of lifestyle physical activity measurement in adults with arthritis (LPAM). The IMPAACT study is an on-going randomized trial of lifestyle physical activity promotion. Participants were randomized to receive either the IMPAACT intervention, a tailored physical activity counseling program in addition to a brief physician encounter promoting physical activity, or a control intervention consisting only of the physician advice to increase physical activity. Follow-up measures include repeated accelerometer, health status, and physical function assessments every few months for two years. The LPAM study examined the relationship between 7-day accelerometry, physiologic fitness parameters, and a measure of self-reported physical activity. Both studies received IRB approval at Northwestern University, and written informed consent was obtained from each of the participating subjects. **Inclusion criteria** for RA participants were 1) aged 18 years or older, 2) satisfy American College of Rheumatology criteria for RA (1-2), 3) able to ambulate at least 50 feet, 4) English speaking. **Exclusion criteria** were 1) planned total joint replacement in the subsequent 12 months, 2) contraindication to physical activity due to comorbid condition including a history of peripheral vascular disease, spinal stenosis, residual lower extremity neuromuscular effects of stroke, major signs or symptoms suggestive of pulmonary and cardiovascular disease, 3) unable to perform basic self-care activities, or 4) plans to relocate away from the Chicago area within 24 months. No instructions were given for daily activity or exercise before accelerometer measures were obtained in these pre-intervention assessments.

Accelerometer Measures and Procedures

Physical activity was monitored in all study participants using a GT1M Actigraph accelerometer. The GT1M Actigraph is a small uniaxial accelerometer that measures vertical acceleration and deceleration (12). The acceleration signal is filtered and digitized by an 8-bit analog-digital (A-D) converter at 30 samples per second. The A-D converter measures the magnitudes of the accelerations. Accelerometer output displays as activity counts (vertical movements per one minute epochs). Spurious accelerometer counts were identified by negative counts; these spurious values were set to missing on a minute by minute basis. The validity and reliability of Actigraph accelerometers under field conditions have been established in many populations including RA (3,8,13,25).

Participants were instructed to wear the accelerometer upon arising in the morning, and wear continuously (except for water activities) until going to bed at night for seven consecutive days. The unit was worn on a belt at the natural waistline on the right hip in line with the right axilla (Figure 1). Participants also maintained a daily log (time sheet) to record when the accelerometer was put on in the morning and removed at night. Skipped days reported on the time sheet were excluded from the analysis.

Accelerometer Data Reduction Parameter Definitions

Nonwear refers to a sustained period showing little or no activity that may represent an interruption in accelerometer monitoring. A benchmark definition for nonwear applied by

Troiano and colleagues to US adult accelerometer data consisted of an interval of at least 60 minutes of zero activity counts that contained no more than 2 minutes of counts between 0 and 100. In this RA sample we examined candidate nonwear periods ranging from 20 to 300 minutes of zero activity count. A rolling window algorithm (i.e., started from the beginning of each day, scanned each minute and began a potential nonwear period when a zero activity count was found) was used to identify nonwear periods. Consistent with the Troiano approach, a nonwear period ended when either a third minute of activity counts fell in the range 0-100, or a one minute activity count was greater than 100 (17). Although nonwear has been frequently indistinguishable from sedentary activity, for the purposes of this paper, Masse's 'nonwear' terminology is used throughout. The definition of a *valid day* was based on wear hours that exceed a threshold. The benchmark valid day definition from Troiano and colleagues for US adults was a day containing 10 or more hours of wear time, defined as 24 hours minus nonwear time. Most importantly, the 10 hours of wear time did not need to be continuous to be considered valid.

Physical Activity Outcomes

The effects of selected parameter definitions were examined in regard to physical activity outcomes. The amount of physical activity was evaluated for each person in four ways: 1) mean daily activity counts, 2) activity counts per wear hour, 3) mean daily minutes of moderate to vigorous physical activity (MVPA) according to count thresholds that occur in 10 minute bouts, and 4) MVPA bout minutes per wear hour. Mean daily activity counts represented the summed activity counts for all wear hours divided by the number of days monitored. Activity counts per wear hour was the ratio of total activity counts from the wearing periods to the total wear hours during the 7-day monitoring period. Mean daily minutes of MVPA (occurring during bouts) was obtained by applying count thresholds corresponding to moderate- or vigorous- physical activity summed over all wear hours divided by the number of monitored days for each person. This outcome is often relevant for the assessment of activity relative to meeting public health guidelines. MVPA bout minutes per wear hour was calculated as the ratio of total minutes of MVPA (occurring during bouts) to the total wear hours during the 7-day monitoring period. For analytic purposes in this paper, we used the 10 minute activity bout definition applied by Troiano and colleagues. A 'bout' then, was defined as the activity minutes that occurred during a period of at least 10 consecutive minutes of activity above the moderate/vigorous threshold of 2020 counts, allowing for up to 2 minutes of interruptions below that threshold during the bout. A potential bout was therefore begun with an activity level above 2020 counts per minute, and terminated when 3 minutes of activity counts occur below that threshold. Only potential bouts that lasted more than 10 minutes were included in this definition of bouts.

Analysis

Descriptive analyses graphically depicted the relationship between nonwear parameter definitions and daily wear outcomes: daily wear hours and daily nonzero minutes. This process was used to identify candidate nonwear parameter values that were associated with stable results in regard to daily wear outcomes when applied to accelerometer data from RA patients.

We compared candidate nonwear parameter definitions applied to the RA data with the Troiano 60-minute nonwear benchmark based on the US adult population on the following variables: mean daily activity counts, activity counts per wear hour, mean daily MVPA bout minutes, and MVPA bout minutes per wear hour. Statistical testing using studentized t-statistics evaluated within person paired differences in physical activity outcomes related to selected wear time parameter values (e.g. 90-min, 120-min). Specifically, nonparametric comparisons of physical activity outcomes resulting from the application of candidate and

benchmark parameter values were performed using quantile regression to estimate the median difference and standard error due to skewed distributions. The related studentized t-statistic based on the ratio of the median difference to its standard error was used to maintain overall testing at an $\alpha=.05$ level of testing (10). A studentized t-statistic mirrors a t-test, correcting for experiment-wise error rate to account for multiple comparisons. A weighted Kappa coefficient was used to describe the agreement in the estimated number of valid days resulting from the application of different parameter values. A Kappa coefficient is a statistical index which compares the agreement against that which might be expected by chance, and ranges from +1 (perfect agreement) to -1 (complete disagreement). A weighted Kappa extends a Kappa statistic to ordinal data; it assigns less weight to categories which are further apart (4). We used Stata/SE 10.0 for quantile regression (22). Other analyses were performed using SAS software version 9.2 (20).

Results

A total of 107 participants meeting ACR criteria for RA participated in accelerometer monitoring. The age distribution of the sample was broad (range 23 to 80yrs, mean age= 54yrs), but skewed to older ages. As expected, subjects were predominantly female (85%), college educated (64%), and the vast majority of the subjects were White (76%). On average, participants had RA disease duration of 13.8 years (SD= 11). Overall, 35% of the participants reported having co-morbidities that may have affected their ability to be mobile. All 38 participants with co-morbidities reported having secondary osteoarthritis; additional comorbidities included back problems (n=37), respiratory conditions (n=35), cardiovascular conditions (n=33), depression (n=20), and osteoporosis (n=20). Accelerometer assessment employed 7 days of continuous monitoring during waking hours using a GT1M Actigraph motion sensor (except for skipped days noted on log, which were removed from analyses). These 107 RA patients collectively contributed 737 days of accelerometer data.

Nonwear represents interruptions in accelerometer data collection. However, it is important to note that both nonwear and very sedentary activities register as '0' counts in accelerometer readouts, requiring investigators to develop an arbitrary threshold for defining nonwear. In this study, participants were permitted to remove the units if they took a nap, bath, or shower during the day. On average, units were removed 1.2 times per day, which included taking the unit off at bedtime (calculated from on/off times reported by participants via logs). Candidate nonwear definitions ranging from thresholds of 20 – 300 consecutive minutes of zero activity counts allowing for up to 2 minutes of very light activity (<100 activity counts) were investigated to identify potential interruptions in wear time as part of the data reduction process.

Graphs show the relationship between candidate nonwear definitions and the following daily wear outcomes: mean daily wear hours (Figure 2A), and mean daily nonzero activity count minutes (Figure 2B). As expected, Figure 2A shows that the average daily wear hours increased with length of maximum continuous minutes of zero counts allowed (labeled as 'nonwear threshold'). Figure 2B shows that the mean number of nonzero activity count minutes levels increased with the nonwear parameter value until it stabilized at 478 minutes per day of activity, which corresponded to the 90 minute maximum continuous minutes nonwear definition.

The influence of nonwear parameter values on physical activity outcomes was investigated graphically for activity counts in Figure 3A and minutes of MVPA bout minutes in Figure 3B. Activity counts presented in Figure 3A were evaluated in terms of mean daily activity counts and activity counts per wear hour. The mean daily activity counts shown in Figure 3A increased as the nonwear parameter value increased (labeled "nonwear threshold") but

stabilized near the 90-120 minute maximum continuous minutes nonwear definition. In contrast, activity counts per wear hour did not stabilize, but consistently decreased as nonwear parameter values increased. Minutes of MVPA (occurring during bouts), presented in Figure 3B, were evaluated in terms of the mean of daily MVPA bout minutes and MVPA bout minutes per wear hour. It was evident that the mean of daily MVPA bout minutes was invariant to the nonwear parameter values. This invariance was expected because the nonwear period was terminated by definition when a minute of MVPA occurred. As a result, the same amount of MVPA minutes occurring in bouts over a day were captured by all nonwear parameter values. In contrast, the MVPA bout minutes per wear hour decreased as the nonwear parameter values increased because the numerator was stable but the denominator was increasing.

Summaries of physical activity outcomes resulting from the application of nonwear parameter values of the benchmark 60 minute threshold and candidate 90 and 120 minute thresholds are shown in Table 1. There were significant differences between paired comparisons of average daily activity counts captured by the 60 minute nonwear parameter value compared to each of the 90 and 120 minute values based on studentized t-tests, but these differences were very small (less than 0.1%). There was no significant difference in average daily total activity counts between the 90 versus 120 minute nonwear parameter values, consistent with Figure 3A which shows stabilization at these values. Table 1 shows significant differences related to activity counts per wear hour for all contrasts; these differences were moderate in magnitude, ranging from 5%-7%. Statistical testing was precluded for MVPA minutes which was identical for all parameter values (i.e., variance=0). No statistical differences were demonstrated for pairwise contrasts of MVPA bout minutes per wear hour, and the magnitude of differences was small.

A valid day of wear was defined based on the number of wear hours that exceeded a predetermined arbitrary threshold. Figure 4 shows the proportion of data retained as a function of the definition of a valid day and the nonwear parameter definition. For example, at the 60 minute nonwear parameter benchmark, the 10 hour daily wear minimum resulted in 11% data loss (i.e., corresponding to 89% data retention). Increasing the daily wear minimum requirement to 12 hours more than doubled data loss to 24%. The curves from this RA sample related to the 8 and 10 hour valid day thresholds stabilized and captured over 90% of monitored days near the 90-120 minute nonwear parameter values. In contrast, a 12 hour wear threshold required much larger nonwear threshold values to capture over 90% of monitored days. These graphs suggest that the benchmark threshold of 10 wear hours or more used in the general US adult population to identify a valid day is applicable in the context of RA, even when nonwear parameter values of 90 or 120 minutes are used.

Agreement in the distribution of valid days for this RA sample was evaluated using weighted Kappa coefficients for nonwear parameter values of 60, 90, and 120 minutes in Table 2. Consistent with Figure 4, the frequency of valid days was greatest for the 120 minute nonwear parameter definition, followed by the 90 and 60 minute definitions. The agreement in the number of valid days was very strong for the 90 and 120 minute nonwear parameter values (weighted Kappa=0.92). Agreement between the 60 minute nonwear parameter value and the higher parameter values was moderate (0.67-0.75).

Discussion

This paper describes accelerometer methodology applied to the special population of persons with rheumatoid arthritis. There are important reasons to strive for the most accurate measure of physical activity possible in persons with potential movement limitations. First and foremost, those with movement limitations are at high risk for becoming disabled over

time, adding tremendous financial burden to health care costs as the population ages. It is known that persons with arthritis report physical activity levels below that of the general population (19). Appropriate physical activity programs cannot be formulated for targeting this segment without a clear picture of baseline activity levels and patterns. Similarly, evaluating the effectiveness of public health programs that seek to increase physical activity in any population will be difficult without adequate instrumentation and interpretive technology. For this study, a uniaxial accelerometer was chosen over a triaxial model such as the Stay Healthy RT3 because the uniaxial was less expensive at the time units were purchased for this study, and had been used in other large epidemiologic studies. No one instrument is preferable in persons with RA.

Using data reduction parameters honed on a sample of the general population is especially problematic in persons with rheumatoid arthritis, who may be more sedentary secondary to joint pain and stiffness, and have fatigue issues that require longer rest breaks. Indeed, Figure 2B indicates that for persons with RA, alternate definitions of nonwear that allow a maximum of 90 minutes of zero activity may be more appropriate than the nonwear definition based on 60 minutes of allowable zero activity applied to the NHANES sample of general population adults. This finding supports the revision of data reduction parameters for those with RA that exceed Troiano's '60 minute rule'. The result of this adjustment is that while allowing for these longer periods of rest does not change the final data very much, it does allow the retention of more valid measurement days in this population.

It is also interesting to note that descriptions of physical activity outcomes shown in Table 1 are similar for 60, 90, and 120 minute nonwear parameter definitions. This finding might be explained by considering the person who takes a rest break to nap or watch a movie, activities which would not be registering accelerometer counts; their overall activity for the day would probably remain the same, whether the nap or the movie lasted 90 or 120 mins, hence the similarity in MVPA bout minutes (both tabled entries). Data regarding employment was not collected for this study, but it is feasible that a similar pattern would emerge for persons with sedentary office jobs who must sit for long periods of time during meetings or computer work.

Possibly the most intriguing finding of the analyses was that total activity counts and MVPA bouts seemed to be more robust physical activity descriptors than ratios based on wear hours. This is especially critical if one's goal is to compare physical activity behaviors across studies utilizing accelerometry. What might account for this finding? One must consider potential sources of '0' counts reading out during accelerometry wear. While one is tempted to write off '0' readings to nonwear (thus reducing the total amount of valid wear hours), subjects may in fact be sitting very quietly, as one might during prolonged periods of sitting that involve reading, watching TV, or computer activities. Thus, perhaps a better term to use is 'non-movement time', rather than assume the presence of zeros reflects nonwear time. Indeed, in a study involving persons sitting quietly for a resting metabolic rate prior to activity while simultaneously wearing an accelerometer, all corresponding accelerometer readouts for that time period registered as '0' counts (unpublished data). Sitting activities, already prevalent in the general population, may be especially attractive to those with painful or stiff joints. In fact, any persons who may have received physical or occupational therapy will have been encouraged to take frequent rest breaks to accommodate their symptomatic joints.

While extending the allowed limit on continuous zero count minutes in those with arthritis appears reasonable, the 'valid day' definition based on Troiano's 10 hour rule appears to be applicable for this population. Accepting the 10 hour daily wear minimum resulted in 11% data loss (i.e., corresponding to 89% data retention), while increasing the daily wear

minimum to 12 hours more than doubled data loss to 24%. It may be impractical to expect a 12-hour activity day from persons with a condition that includes fatigue and joint pain as its most prominent symptoms. The curves from this RA sample related to the 8 and 10 hour valid day thresholds stabilized and allowed for almost 90% data retention, but insisting on a minimum of 12 hours of wear more than doubled data loss. Because the average wear time for the accelerometers in this sample was 14 hrs, it is reasonable that the 10 hour rule would include 93% of the study sample (Figure 4). However, in samples with less compliance to wearing the accelerometer during all waking hours, the 10 hour rule may cause excessive elimination of subjects from data analyses.

Finally, in performing these analyses, it is evident that Masse's plea for more attention to methodology disclosure in studies using accelerometer data is well founded, as variability may exist from population to population, and may alter data interpretation considerably. Not having exact information about how Troiano et al accomplished their data reduction made comparison of methods impossible, but having information about the parameters used in their rigorous study of the general US population was extremely useful nonetheless, as no benchmarks on a large sample had been established.

In summary, this study examined data reduction techniques applied to accelerometry output in persons with rheumatoid arthritis, compared with parameters applied to the general public. Due to the difficulty of attributing bouts of continuous zeros to nonwear vs. inactivity, we suggest referring to bouts of continuous zeros as non-movement time. Based on findings from this study, we argue for increasing the allowed non-movement time bouts of continuous zeros in this RA subpopulation from 60 to 90 minutes, while retaining the 10 hour day as the measure of the 'valid day'.

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Figure 1.
Placement of the waist-mounted accelerometer

Figure 2.

Figure 2A. Mean daily wear hours by threshold minutes from 107 persons with rheumatoid arthritis contributing 737 days of accelerometer monitoring.

Figure 2B. Mean daily activity minutes (nonzero counts) by nonwear threshold minutes from 107 persons with rheumatoid arthritis contributing 737 days of accelerometer monitoring.

Figure 3.

Figure 3A. Accelerometer activity counts by nonwear threshold minutes from 107 persons with rheumatoid arthritis contributing 737 days of accelerometer monitoring.

Figure 3B. Minutes of moderate/vigorous activity bouts by nonwear threshold minutes from 107 persons with rheumatoid arthritis contributing 737 days of accelerometer monitoring.

Figure 4. Percentage of monitored days with daily wear hours exceeding 8, 10, and 12 hours by nonwear threshold minutes from 107 persons with rheumatoid arthritis contributing 737 days of accelerometer monitoring.

Table 1

Physical activity outcomes by nonwear threshold minutes from 107 persons with rheumatoid arthritis contributing 737 days of accelerometer monitoring.

Physical Activity Outcome	Nonwear Parameter Values			Differences and 95% Confidence Interval from Tukey t-test*		
	A. 60 Minutes Continuous Zero counts	B. 90 Minutes Continuous Zero counts	C. 120 Minutes Continuous Zero counts	90 vs 60	120 vs 60	120 vs 90
Mean daily activity counts	220843	220907	220925	41.43 (19.25, 63.61)	53.00 (31.98, 74.02)	2.29 (-2.79, 7.36)
Activity count per wear hour	16314	15426	14862	-713.55 (-882.57, -544.52)	-1204.38 (-1453.17, -955.59)	-488.12 (-592.98, -383.25)
Mean daily MVPA bout minutes	9.08	9.08	9.08	-	-	-
MVPA bout minutes per wear hour	0.67	0.62	0.60	-0.01 (-0.01, 0.00)	-0.01 (-0.03, 0.00)	-0.00 (-0.00, 0.00)

* Since the distributions of the differences are skewed, medians and standard errors of medians from median regression are used in the Tukey t-test.

Table 2

Distribution of valid days by nonwear threshold minutes from 107 persons with rheumatoid arthritis contributing 737 days of accelerometer monitoring.

Number of Valid Days (with >10 hours Wear Time)	Nonwear Parameter Values			Weighted Kappa (95% CI)		
	A. 60 Minutes Continuous Zero counts	B. 90 Minutes Continuous Zero counts	C. 120 Minutes Continuous Zero counts	A vs B	A vs C	B vs C
7 days	57 (53%)	70 (65%)	73 (68%)	0.75 (0.61, 0.88)	0.67 (0.52, 0.83)	0.92 (0.85, 0.99)
6 days	28 (26%)	23 (21%)	22 (21%)			
5 days	11 (10%)	7 (7%)	6 (6%)			
4 days	6 (6%)	4 (4%)	4 (4%)			
1-3 days	5 (5%)	3 (3%)	2 (2%)			
Total people	107 (100%)	107 (100%)	107 (100%)			