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## Subclinical Disability in Valued Life Activities among Individuals with Rheumatoid Arthritis

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### Abstract

**Background**—“Subclinical disability,” the need for modifications in task performance or frequency without reporting difficulty in the task, has been identified as a stage along the disability continuum. We estimate the prevalence of subclinical disability in valued life activities (VLAs) among individuals with rheumatoid arthritis (RA), identify characteristics of individuals with VLA subclinical disability, and estimate the ability of VLA subclinical disability to predict later decrements in functioning.

**Methods**—Data were from three years of a longitudinal panel study of individuals with RA, for which annual structured telephone interviews are conducted (n=508 in year 1, 442 in year 3). Respondents rated difficulty in VLAs and then reported whether they used any of four behavioral modifications (limitations, extra time, help, equipment) for each. Subclinical disability was defined for each VLA as no reported difficulty with use of any modification. Multiple regression analyses identified predictors of subclinical disability in year 1, and the role of year 1 subclinical disability in development of overt disability between year 1 and year 3.

**Results**—Almost three quarters exhibited subclinical disability in at least one VLA in year 1. Duration of RA was consistently associated with subclinical disability. Individuals with subclinical disability at baseline were significantly more likely to experience increases in functional limitations (OR=1.09 [1.01,1.18]) and VLA disability (Total VLA: OR=1.14 [1.06,1.23]) over a prospective two-year period.

**Conclusion**—Subclinical disability may be a valuable marker of individuals in a disability transition phase who are particularly susceptible to intervention to enable them to maintain functioning.

### Keywords

disability; functioning; subclinical disability; rheumatoid arthritis

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Fried and colleagues identified “subclinical” disability as a stage along the disability continuum, described as the need for modifications in either task performance or task frequency without recognition or acknowledgement of difficulty in the task (1–5). Subclinical disability is apparent in two primary ways: first, a general decrease in either the frequency or amount of time an activity is performed, without altering the manner in which the activity is performed; or second, use of a compensatory strategy, such as a modification in the way an activity is performed or use of assistance. In either case, individuals would not rate themselves as having difficulty with the activity.

The concept of subclinical disability has been validated through use of physical performance tests, such as walking gait speed, stair climbing, and hand grip strength. Among a sample of elders divided into three groups – those with reported task difficulty (reported either difficulty, inability, or dependence); those with task modification (no difficulty, inability, or dependence, but reported either a change in method or a decrease in frequency); and those reporting neither difficulty nor modification – persons with modifications, particularly in mobility tasks, showed intermediate levels of performance, between individuals reporting difficulty and those reporting neither difficulty nor modifications (3).

Subclinical disability appears to be an important risk factor for subsequent development or worsening of functional limitations and disability (4,6,7). Fried reported that subclinical disability in mobility tasks such as walking or stair climbing was a strong predictor of later onset of disability in those tasks (4). Wolinsky found that subclinical disability measures were the primary predictors of the onset of task difficulty after one and two years (6), and that subclinical disability in lower body functioning such as walking, stooping, and climbing stairs was a significant predictor of disability in ADLs and IADLs, as well as health care utilization, three years after initial assessment (7).

This paper estimates the prevalence of subclinical disability, defined as use of behavioral accommodations while reporting no difficulty with activities, in valued life activities (VLAs) among individuals with RA, identifies characteristics of individuals who exhibit VLA subclinical disability, and estimates the ability of VLA subclinical disability to predict later decrements in functioning.

## Methods

### Subjects

The sample for the present study was drawn from three waves of the Rheumatoid Arthritis Panel Study, 2004 (n=508; Year 1), 2005 (n=467; Year 2), and 2006 (n=442; Year 3). The RA Panel was constructed in 1982 from a random sample of rheumatologists practicing in Northern California. Participants have been recruited from lists maintained by participating rheumatologists of all persons with RA presenting to their offices over a one-month period who expressed an interest in participating in the study. The original RA Panel consisted of 822 patients enrolled between June 1982 and July 1983. There were subsequently four additional enrollment periods in 1989–90, 1995, 1999, and 2003, during which 203, 131, 122, and 169 individuals were enrolled, respectively. Retention from year to year has averaged 93%; the 7% attrition includes deaths. The principal data source for the RA Panel is an annual structured telephone interview that includes questions on demographics, RA symptoms, comorbidities, and functioning. Interviewers are trained and follow an interview script. The study was approved by the University's Committee on Human Research, and all participants provided consent.

### Variables

**Valued life activity (VLA) disability**—The VLA scale has been developed and refined over the past decade (8). A wide spectrum of activities is included, ranging from obligatory activities, such as self-care, to discretionary activities, such as recreation and social participation. Using the Verbrugge and Jette model of disablement (9), the VLA scale clearly measures disability, which is defined in the model as difficulty performing activities of daily life. In terms of the International Classification of Functioning, Disability, and Health (ICF) (10), the VLA scale measures participation. In contrast, most of the items from the Health Assessment Questionnaire (HAQ), the most commonly used measure of functioning among individuals with RA (11), assess what would be termed “functional

limitations” in the Verbrugge model – restrictions in performing generic, fundamental physical actions used in daily life in many circumstances – and “activity limitations” in the ICF model (12,13). Use of a measure that is clearly focused on disability (or participation according to the ICF) reflects theoretical refinement, but may also reflect advances in the expectations from treatment. When the HAQ was first developed, treatments for RA were less successful and expectations of functional outcomes were less optimistic; with today’s improved treatments, however, examination of a broader range of activities may be more consistent with patients’ expectations of their functional outcomes.

In addition to the focus on disability, the VLA scale takes personal value into account. Activities that are not applicable to an individual (e.g., “taking care of children” if the individual has no children) or are not important to the individual (e.g., “cooking” if the spouse does all of the cooking) are not included in scoring of the scale.

The version of the VLA scale used in these analyses includes 26 activity domains. Activities were defined as obligatory, committed, or discretionary based on the definitions of these activity categories by Verbrugge (9,14,15). According to Verbrugge, obligatory activities are those required for survival and self-sufficiency, including ADL-type activities such as hygiene and self-care, walking inside, walking outside, and using transportation or driving; committed activities are those associated with one’s principal productive social roles, such as paid work, household responsibilities, and child and family care; and discretionary activities are activities such as socializing, exercise, engaging in leisure time activities and pastimes, participating in religious or spiritual activities, and pursuing volunteer work or hobbies, or other activities that individuals engage in for relaxation and pleasure. The full text of the scale items is shown in Table 1.

In the telephone interview, participants rated the difficulty of performing each activity because of their RA using a 4-point scale (0 = no difficulty, 1 = some difficulty, 2 = a great deal of difficulty, 3 = unable to perform). Activities that participants deemed unimportant to them, or that they did not do for reasons unrelated to RA, were not rated and were not included in scoring. VLA disability scores were calculated as the average difficulty for all activities (total), and for obligatory, committed, and discretionary activity components individually.

**Accommodations and subclinical disability scores**—Following the VLA difficulty ratings, participants were asked whether they had made four types of behavioral accommodations: (a) limitations in the amount or kind of activity within the domain, (b) taking extra time to perform activities, (c) needing help from another person, and (d) using special devices or aids. Using “Light housework” as an example, the specific questions asked for each activity were:

- How much difficulty do you have with light housework because of your RA?  
0 = none, 1 = a little, 2 = a great deal, 3 = unable
- Do you limit the amount or kind of light housework you do because of your RA?
- Because of your RA, does it take you more time to perform light housework tasks?
- Do you need help from another person?
- Do you use special devices or aids?

Subclinical disability scores were calculated as the number of activities with “no difficulty” for which any accommodation was used, overall and for the obligatory, committed, and discretionary activity components individually. For supplemental analyses, the number of

activities with no difficulty using specific accommodations was also calculated (e.g., number of activities with no difficulty and reported use of limitations, number of activities with no difficulty and use of extra time).

### Statistical analysis

Proportions of respondents in each of four categories – no difficulty and no accommodations, difficulty with accommodations, difficulty without accommodations, and no difficulty with accommodations (subclinical disability) – were calculated for each VLA. Total and component subclinical disability scores were calculated.

To determine variables associated with subclinical disability, multiple linear regression analyses were performed, with VLA subclinical disability scores (total and for each component) as dependent variables, and age, sex, years of education, marital status (married or with partner vs. other), duration of RA, and self-reported number of painful joints, and HAQ score as independent variables. HAQ scores were also included as independent variables. In the disablement model (and the ICF), functional limitations (or ICF activity limitations) may be seen as precursors of disability (or ICF difficulty in participation) (12,13), which would be expected to be precursors to the development of disability. HAQ scores are generally calculated by increasing difficulty ratings if individuals report use of assistance or equipment for functions. For these analyses, however, HAQ scores were calculated without adjustment for use of devices or personal assistance, because the use of modifications was part of the definition of the dependent variables.

To determine if subclinical disability was associated with subsequent changes in functioning, 15 specific VLAs were examined. These VLAs were chosen because more than 15% of respondents reported subclinical disability in the activity. Additionally, several of these activities (e.g., walking outside, preparing meals, shopping) have been examined in previous research. For each activity, respondents were divided into three categories at Year 1: no difficulty and no accommodations; any level of difficulty, with or without accommodations; and no difficulty, but with accommodations (subclinical disability group). Chi-square analyses were used to compare the proportion in each of the three categories who reported increases in difficulty between Year 1 and Year 3. A further analysis included only individuals who reported no difficulty in Year 1. Multivariate logistic regression analyses were used to examine the likelihood of the onset of difficulty between Year 1 and Year 3, if accommodations were reported in Year 1. These analyses controlled for age, sex, education, marital status, duration of RA, and number of painful joints.

The final analyses examined the role of aggregated subclinical disability scores in predicting increases in functional limitations and disability. Multiple regression analyses were used, in which a 0.5 standard deviation increase in HAQ or VLA disability scores (total and component scores) was the dependent variable. One half standard deviation was chosen as the critical change because it has been shown to approximate a minimum clinically important difference (16). The primary independent variables were VLA subclinical disability scores, and analyses controlled for age, sex, education, marital status, duration of RA, number of painful joints, and the baseline value of the dependent variable. For the analyses of increase in HAQ and increase in total VLA disability, the total subclinical disability score was used as the primary independent variable; for analyses of increases in obligatory, committed, and discretionary VLA disability, the obligatory, committed, and discretionary subclinical disability scores, respectively, were used. In supplemental analyses, the role of specific types of subclinical disability (e.g., limitations, extra time) in predicting onset of disability in HAQ and total VLA was examined using multivariate regression in a similar manner.

All analyses were conducted using the Statistical Package for the Social Sciences (SPSS), version 14.0 (SPSS, 2005, Chicago, IL).

## Results

### Subject characteristics

Mean ( $\pm$ SD) age of the sample in Year 1 was 60 ( $\pm$ 13) years. Eighty-four percent were female, 81% were white non-Hispanic, and 62% were married or living with a partner. Mean duration of RA was 20 ( $\pm$ 12) years. From a possible 17 joints, a mean number of 4.5 were reported as painful. Mean HAQ score, calculated without adjustment for assistance or equipment, was 0.78 ( $\pm$  0.65); calculated in the usual manner, adjusting for assistance and equipment, the mean HAQ was 1.04 ( $\pm$ 0.74).

### Prevalence of subclinical disability

A notable proportion of participants reported subclinical disability on each activity in Year 1 (Table 2). Between 18% and 25% reported no difficulty but use of accommodations on each of the obligatory activities. The range was wider for committed activities (9%–26%) and discretionary activities (8%–29%).

The mean total subclinical disability score was 3.25 (i.e., a mean of 3.25 activities with no difficulty but accommodations used; Table 3). Mean subclinical disability scores for obligatory, committed, and discretionary activities were 0.88, 0.84, and 1.53, respectively. Almost three quarters of the panel (72.2%) reported subclinical disability in at least one activity. Subclinical disability was most common in discretionary activities, with 62.0% reporting such disability in at least one of the thirteen discretionary activities. Slightly less than half reported subclinical disability in at least one of the committed (45.9%) and discretionary (49.4%) activities.

### Characteristics associated with subclinical disability

Overall, greater total, committed, and discretionary subclinical disability scores were significantly associated with greater age (total:  $\beta=0.033$ ,  $p=.003$ ; committed:  $\beta=0.009$ ,  $p=.02$ ; discretionary:  $\beta=0.017$ ,  $p=.007$ ) and longer duration of RA (total:  $\beta=0.03$ ,  $p=.007$ ; committed:  $\beta=0.015$ ,  $p=.001$ ; discretionary:  $\beta=0.015$ ,  $p=.03$ ). Greater total ( $\beta=-0.938$ ,  $p<.0001$ ) and committed ( $\beta=-0.510$ ,  $p<.0001$ ) subclinical disability were also associated with lower unadjusted HAQ scores (fewer physical limitations). Subclinical disability in obligatory activities was significantly associated only with duration of RA ( $\beta=0.15$ ,  $p=.001$ ).

### Association of subclinical disability with functional decline

When examining the individual activities, for 13 of the 15 activities, difficulty increased between Year 1 and Year 3 for a significantly larger proportion of those with subclinical disability in Year 1 than for those with no difficulty and no accommodations or those with any difficulty (Table 4). For example, for walking inside, 3.7% of those with any difficulty in Year 1 and 8.1% with no difficulty and no accommodations experienced an increase in difficulty, compared to 33.3% of those with subclinical disability. Among those with no difficulty in Year 1, use of accommodations in Year 1 (subclinical disability) was associated with significantly greater odds of an increase in difficulty for 12 of the 15 activities. Odds of increased difficulty ranged from 2.06 (95% CI 1.01, 4.20; taking care of basic needs) to 7.82 (2.59, 23.60; religious/spiritual activities).

Year 1 subclinical disability scores were also significant predictors of increases in functional limitations and disability (Table 5). Adjusting for covariates, greater Year 1 total subclinical disability was significantly associated with increases in both unadjusted HAQ (OR 1.09

[1.01, 1.18]) and total VLA disability score (OR=1.14 [1.06, 1.23]). Likewise, Year 1 obligatory subclinical score was associated with an increase in obligatory VLA disability (OR=1.78 [1.44, 2.19]), Year 1 committed subclinical score was associated with an increase in committed VLA disability (OR=1.56 [1.27, 1.91]), and Year 1 discretionary subclinical score was associated with an increase in discretionary VLA disability (OR=1.17 [1.03, 1.33]).

Examination of specific types of subclinical disability (limitations, extra time, help, or devices) revealed that each was significantly associated with the subsequent onset of difficulty. Odds ratios for limitations, extra time, and use of devices were similar, ranging from 1.10 to 1.16 for increase in both HAQ and VLA total disability score. The number of activities for which subclinical disability defined by use of help from another person yielded somewhat larger odds ratios of 1.32 (1.09, 1.61) for HAQ and 1.47 (1.21, 1.78) for VLA disability score.

## Discussion

Subclinical disability, defined as use of accommodations for activities without concomitant reports of difficulty, was common in this group of individuals with rheumatoid arthritis. For the 26 activities queried, proportions of respondents classified as having subclinical disability ranged from 8% to 29%. Subclinical disability appeared to be more common in discretionary activities than in committed or obligatory activities.

In these analyses, subclinical disability was clearly a risk factor for a prospective increase in both functional limitations and disability. These results are consistent with previous findings reported by Fried and others (1,3,4,6,7). However, while Fried and colleagues focused on mobility disability, this study extends the relevance of subclinical disability to a broader range of activities, ranging from basic self-care to discretionary activities such as leisure outside the home. The association of subclinical disability in an activity with later onset of disability was consistent, whether focusing on individual activities or with the total number of activities.

Previous studies have reported wide use of behavioral accommodations among individuals with RA (17–19). A number of studies have shown that use of assistive devices and personal assistance reduce disability (19–22). Others have shown that behavioral accommodations are a means of adapting to disability (23,24). In the case of subclinical disability, accommodations are occurring before difficulty, or disability, is acknowledged. Subclinical disability may then be a marker for a transition period on the pathway to disablement, a point at which individuals may particularly benefit from intervention. Weiss suggests that during this transition period individuals are experiencing enough limitations to benefit from intervention, but have not reached a point where improvement is impossible (25). If this is the case, it is crucial to be able to detect this transition period; however, common measures of disability currently used do not address use of accommodations and thus cannot detect the presence of subclinical disability.

The phenomenon of subclinical disability raises the question of why individuals decide they are having difficulty with activities. One of the major reasons appears to be the need for task modification (26). In a qualitative study of difficulty ratings, Porter found that women often denied having difficulty with a task, but described it as more time-consuming or requiring extra effort (27). This again supports the concept of subclinical disability as a transition phase from no difficulty to overt disability, and is consistent with our findings that subclinical disability was a precursor to functional decline or the onset of disability.

There are potential limitations to this study. The assessment of VLAs may have been incomplete. However, there is no reason to believe that the overall tenor of these results would change as a result with the consideration of additional activities. The way the questions were asked may have affected the results. Participants were not specifically asked to rate activity difficulty with or without the use of accommodations. It is possible that if individuals had been asked to rate difficulty without use of accommodations, they would have in fact reported some level of difficulty and different categorizations of individuals with or without subclinical disability would have emerged. The RA Panel cohort may be unrepresentative of individuals with RA in some way; however, the cohort is very similar in measured characteristics to other large cohorts (28). Additionally, because participants were recruited from community rheumatologists rather than through an academic medical center or tertiary care center, it is probable that the distribution of disease severity and other relevant characteristics is more similar to the population of individuals with RA. Nonetheless, it is possible that individuals who visit rheumatologists for care are systematically different from those who do not; in particular, they may have more education and thus be better able to make accommodations to maintain functioning (29).

## Conclusion

Subclinical disability was common in this group of individuals with fairly long-duration RA, and was a significant risk factor for development or increase in disability over a prospective two-year period. For primary prevention, it is important to identify people who are at risk of developing disability (25,30). Individuals who do not report difficulty with tasks but who use modifications are at significant risk of decline, but – importantly – have not yet experienced the decline. Subclinical disability may be a powerful marker of individuals in a transition phase who are particularly amenable to intervention to enable them to maintain functioning. In order to identify subclinical disability, however, the use of accommodations must be queried in addition to task difficulty. Thus, a standardized method of ascertaining subclinical disability would be a valuable addition to both research and clinical practice.

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**Table 1****Valued Life Activity Domains****Obligatory activities**

- Taking care of basic needs, such as bathing, washing, getting dressed, or taking care of personal hygiene
- Walking or getting around **INSIDE** your home
- Walking outside, just to get around, in the area around your home or other places you need to go on a regular basis
- Getting around your community by car or public transportation

**Committed activities**

- Going to appointments, such as going to the doctor or dentist, or going to have your hair cut/done
- Preparing meals and cooking
- Light housework such as dusting or laundry
- Heavier housework, such as vacuuming, changing sheets, or cleaning floors
- Other work around the house, such as making minor home repairs or working in the garage fixing things
- Shopping and doing errands
- Taking care of your children/grandchildren or doing things for them (if you have them)
- Taking care of other family members, such as your spouse or parent, or other people close to you
- Working at a job for pay
- Household business, such as paying bills or scheduling repairs

**Discretionary activities**

- Participating in leisure activities **IN** your home, such as reading, watching television, or listening to music
- Participate in religious or spiritual activities
- Having friends and family members visit you in **YOUR** home
- Visiting with friends or family members in **THEIR** homes
- Participating in leisure activities **OUTSIDE** your home, such as playing cards or bingo, or going to movies or restaurants
- Going to parties, celebrations, or other social events
- Traveling out of town
- Participating in activities with your children/grandchildren (if you have them)
- Volunteer work
- Working on hobbies or crafts, or creative activities, such as sewing, woodwork, or painting
- Gardening or working in your yard
- Participating in moderate physical recreational activities, such as dancing, playing golf, or bowling
- Participating in vigorous physical recreational activities, such as walking for exercise, jogging, bicycling, swimming or water aerobics
- Social communications, such as writing letters, sending emails, or making telephone calls
- Going to school or participating in other educational activities, like taking computer classes or adult education

Table 2

## Prevalence of Disability and Accommodations by Activity

	Difficulty, accommodations % (n)	Difficulty, no accommodations % (n)	No difficulty, no accommodations % (n)	No difficulty, accommodations (subclinical disability) % (n)
<b><u>Obligatory activities</u></b>				
Basic needs	38.8 (197)	3.5 (18)	36.8 (187)	20.9 (106)
Walk inside	37.4 (190)	3.5 (18)	41.7 (212)	17.3 (88)
Walk outside	48.1 (244)	2.8 (14)	24.3 (126)	24.9 (123)
Car/transit	22.9 (116)	5.3 (27)	54.2 (275)	17.6 (89)
Appointments	24.8 (126)	2.4 (12)	51.0 (259)	21.9 (111)
<b><u>Committed activities</u></b>				
Meals/cook	44.7 (218)	7.0 (34)	32.8 (160)	15.6 (76)
Light housework	39.3 (191)	6.6 (32)	28.2 (137)	25.9 (126)
Shopping/errands	46.4 (232)	5.2 (26)	31.4 (157)	17.0 (85)
Child care	39.5 (107)	13.3 (36)	37.3 (101)	10.0 (27)
Other family care	28.7 (95)	10.0 (33)	45.6 (151)	15.7 (52)
Heavy housework	58.5 (276)	19.3 (91)	13.1 (62)	9.1 (43)
Paid work	38.3 (98)	27.7 (71)	25.0 (64)	9.0 (23)
Minor repairs	44.4 (142)	25.9 (83)	16.9 (54)	12.8 (41)
<b><u>Discretionary activities</u></b>				
Leisure in	10.3 (52)	2.6 (13)	69.5 (351)	17.6 (89)
Religious/spiritual activities	17.0 (68)	5.8 (23)	60.8 (243)	16.5 (66)
Having others visit	35.6 (174)	2.0 (10)	32.9 (161)	29.4 (144)
Visiting others	24.7 (120)	7.6 (37)	54.1 (263)	13.6 (66)
Leisure out	34.2 (169)	4.0 (20)	38.9 (192)	22.9 (113)
Parties/events	34.2 (163)	5.7 (27)	46.4 (221)	13.7 (65)
Travel	45.9 (219)	5.5 (26)	32.7 (156)	15.9 (76)
Activities with children	46.9 (134)	9.4 (27)	31.5 (90)	12.2 (35)
Volunteer work	25.7 (84)	17.7 (58)	33.0 (108)	23.5 (77)
Hobbies	43.3 (181)	18.7 (78)	25.6 (107)	12.4 (52)

	Difficulty, accommodations % (n)	Difficulty, no accommodations % (n)	No difficulty, no accommodations % (n)	No difficulty, accommodations (subclinical disability) % (n)
Gardening	58.6 (231)	22.8 (90)	10.7 (42)	7.9 (31)
Moderate physical activities	41.0 (168)	35.9 (147)	15.6 (64)	7.6 (31)
Vigorous physical activities	46.2 (214)	26.6 (123)	14.0 (65)	13.2 (61)

**Table 3**

## Subclinical Disability Scores

<b>Subclinical disability score*</b>	<b>Obligatory</b>	<b>Committed</b>	<b>Discretionary</b>	<b>Total</b>
Mean (SD)	0.88 (1.10)	0.84 (1.16)	1.53 (1.72)	3.25 (3.14)
Median (Q1-Q3)	0 (0, 2)	0 (0, 1)	1 (0, 2)	3 (0, 5)
% (n) with no difficulty and accommodation in at least one activity	49.4 (251)	45.9 (233)	62.0 (315)	72.2 (367)

\* Calculated as number of activities with subclinical disability

**Table 4**

Association of Difficulty and Accommodations in 2004 with Increase in Difficulty between 2004 and 2006 in Specific Activities

	Difficulty increased, 2004–2006, % (n)			
	Difficulty, with or without accommodations, in 2004	No difficulty, no accommodations in 2004	No difficulty, with accommodations (subclinical disability) in 2004	Among those with no difficulty in 2004, likelihood of onset of difficulty if accommodations in 2004
Basic needs	1.7 (3) <sup>*,†</sup>	11.7 (20)	26.6 (25)	2.06 (1.01, 4.20) <sup>§</sup>
Walking inside	3.7 (6)	8.1 (16)	33.3 (26)	5.49 (2.63, 11.46)
Walking outside	31.9 (68)	0	0	--
Getting around by car or public transportation	7.3 (8)	8.2 (21)	12.6 (55)	5.72 (2.81, 11.62)
Appointments	2.9 (3)	5.5 (13)	22.4 (22)	4.00 (1.82, 8.82)
Meals/cooking	5.9 (12)	14.7 (21)	48.4 (31)	5.01 (2.43, 10.32)
Light housework	6.4 (11)	13.9 (17)	33.0 (38)	2.26 (1.13, 4.53)
Shopping or errands	8.8 (18)	12.8 (19)	45.9 (34)	5.60 (2.71, 11.57)
Family care	42.1 (32)	0	0	---
Religious/spiritual	13.3 (8)	3.9 (8)	23.4 (11)	7.82 (2.59, 23.60)
Leisure in home	0	4.8 (15)	25.4 (18)	5.96 (2.75, 12.93)
Having others visit	5.4 (8)	5.5 (8)	24.2 (31)	4.55 (1.94, 10.70)
Leisure outside home	7.6 (11)	8.0 (14)	34.0 (3)	5.09 (2.44, 10.61)
Travel	11.1 (22)	16.3 (23)	31.3 (21)	1.83 (0.88, 3.79)
Volunteer	10.7 (9)	8.8 (7)	33.3 (7)	4.44 (1.62, 12.23)

\* Interpretation: 1.7% of subjects with reported difficulty in basic need in 2004 experienced an increase in difficulty from 2004 to 2006; 11.7% of those with no difficulty and no accommodations experienced an increase (onset) of difficulty between 2004–2006, and 26.6% of those with no difficulty but using accommodations (with subclinical disability) experienced the onset of difficulty between 2004 and 2006.

<sup>†</sup> Chi-square analyses for differences in proportions among groups significant at  $p < .001$  for all activities.

<sup>§</sup> OR (95% CI) from logistic regression analyses including only individuals with no difficulty in the specific activity in 2004, controlling for age, sex, education, marital status, duration of RA, and number of painful joints

**Table 5**  
 Association of Subclinical Disability Scores with Increases in Functional Limitations and Disability

Subclinical disability score used*	Likelihood of increase from 2004–2006 <sup>†</sup>			
	HAQ, unadjusted <sup>‡</sup>	VLA disability, total	VLA disability, obligatory	VLA disability, committed and discretionary
Total	1.09 (1.01, 1.18) <sup>§</sup>	1.14 (1.06, 1.23)		
Obligatory			1.78 (1.44, 2.19)	
Committed				1.56 (1.27, 1.91)
Discretionary				1.17 (1.03, 1.33)

\* Subclinical disability score = number of activities in which accommodations but no difficulty reported. Calculated as total for all VLAs, and for VLA categories (obligatory, committed, and discretionary). To predict increase in HAQ and VLA total disability score, total subclinical disability score was used. To predict increase in obligatory, committed, and discretionary VLA disability, obligatory, committed, and discretionary subclinical disability scores, respectively, were used.

<sup>†</sup> Increase defined as presence 0.5 SD increase in HAQ or VLA scores between 2004 and 2006.

<sup>§</sup> Adjusted for age, sex, education, married/partner, duration of RA, number of painful joints, and baseline value of measure of functioning

**Table 6**

Association of Specific Types of Subclinical Disability with Increases in Difficulty

Specific accommodation subclinical disability score used, *	Specific accommodation subclinical disability score, mean (SD)	% (n) with subclinical disability in at least one activity	Likelihood of increase from 2004–2006 <sup>†, §</sup>	
			HAQ, unadjusted <sup>†</sup>	VLA disability, total
Limits only	2.22 (2.29)	73.2 (372)	1.10 (1.00, 1.22)	1.15 (1.04, 1.27)
Extra time only	2.38 (2.45)	74.0 (376)	1.11 (1.01, 1.22)	1.11 (1.01, 1.21)
Help only	0.78 (1.17)	41.1 (209)	1.32 (1.09, 1.61)	1.47 (1.21, 1.78)
Devices only	0.55 (1.44)	26.0 (132)	1.14 (0.97, 1.35)	1.16 (1.00, 1.36)

\* Specific accommodation subclinical disability score = number of activities in which the specific accommodation but no difficulty reported.

<sup>†</sup> Increase defined as presence 0.5 SD increase in HAQ or VLA scores between 2004 and 2006.

<sup>§</sup> Adjusted for age, sex, education, married/partner, duration of RA, number of painful joints, and baseline value of measure of functioning