

Subclinical Hypothyroidism and Functional Mobility in Older Adults

Eleanor M. Simonsick, PhD; Anne B. Newman, MD, MPH; Luigi Ferrucci, MD, PhD; Suzanne Satterfield, MD, DrPH; Tamara B. Harris, MD, MS; Nicolas Rodondi, MD, MAS; Douglas C. Bauer, MD; for the Health ABC Study

Background: Health risks associated with subclinical hypothyroidism in older adults are unclear. Our objective was to compare the functional mobility of people aged 70 to 79 years by thyroid function categorized by thyrotropin (TSH) level as euthyroid (≥ 0.4 to < 4.5 mIU/L), mild subclinical hypothyroid (≥ 4.5 to < 7.0 mIU/L), or moderate subclinical hypothyroid (≥ 7.0 to ≤ 20.0 mIU/L with a normal free thyroxine level) cross-sectionally and over 2 years.

Methods: A total of 2290 community-dwelling residents participating in the year 2 clinic visit (July 1998–June 1999) of the Health, Aging, and Body Composition (Health ABC) Study, who had measured TSH level, had the capacity to walk 20 m unaided, and were not taking thyroid medication or had TSH levels consistent with hyperthyroidism or hypothyroidism. Main outcome measures included self-reported and performance-based measures of mobility (usual and rapid gait speed and endurance walking ability) assessed at study baseline (year 2) and 2 years later.

Results: In age- and sex-adjusted analyses, the mild subclinical hypothyroid group (vs the euthyroid group) demonstrated better mobility (faster mean usual and rapid gait speed [1.20 vs 1.15 m/s and 1.65 vs 1.56 m/s, respectively; $P < .001$] and had a higher percentage of those with good cardiorespiratory fitness and reported walking ease [39.2% vs 28.0% and 44.7% vs 36.5%, respectively; $P < .001$]). After 2 years, persons with mild subclinical hypothyroidism experienced a similar decline as the euthyroid group but maintained their mobility advantage. Persons with moderate subclinical hypothyroidism had similar mobility and mobility decline as the euthyroid group.

Conclusion: Generally, well-functioning 70- to 79-year-old individuals with subclinical hypothyroidism do not demonstrate increased risk of mobility problems, and those with mild elevations in TSH level show a slight functional advantage.

Arch Intern Med. 2009;169(21):2011-2017

PREVALENCE OF SUBCLINICAL hypothyroidism, defined as elevated thyrotropin (TSH) level with free thyroxine (FT₄) level in the normal range, increases with age, affecting approximately 6% of persons aged 70 to 79 years and 10% of those 80 years or older.¹ Although a chief concern with subclinical hypothyroidism

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has been the risk of progression to overt hypothyroid disease,^{2,3} elevated lipid levels,⁴⁻⁶ increased risk of cognitive impairment,⁷ and cardiovascular conditions, including myocardial infarction⁸ and mortality,⁹⁻¹¹ research findings have not consistently supported these concerns,¹²⁻¹⁴ particularly in elderly individuals¹⁵⁻¹⁷ and those with only mild elevations in TSH level.^{9,14}

In fact, findings in a cohort of persons aged 85 years suggest that subclinical hypothyroidism may be associated with a prolonged survival.¹⁸ In addition, an analysis of age-specific distributions of serum TSH and antithyroid antibody levels in the US population indicates a shift toward higher concentrations of TSH with increasing age,¹ suggesting a resultant upward shift in normal concentrations.

In the present study we sought to evaluate the potential meaning and importance of various levels of TSH that have been traditionally defined as in the normal to subclinical hypothyroidism range by examining associations with several dimensions of walking ability concurrently and prospectively over 2 years. We focused on functional mobility because it is widely considered a global marker of current health status and risk of future negative health events in older adults.^{19,20}

Author Affiliations are listed at the end of this article.

Group Information: The Health ABC Study Group members are listed at the end of this article.

The few studies of older adults that have distinguished levels of subclinical hypothyroidism have generally found the mild group to exhibit the most favorable profile.¹⁸ On the basis of studies restricted to older adults,¹⁶ we hypothesized that persons with moderate subclinical hypothyroidism would exhibit similar mobility status and rates of mobility decline as persons with traditionally defined normal thyroid function and those with mild subclinical hypothyroidism would demonstrate a slightly more favorable mobility profile and less decline.

METHODS

STUDY POPULATION

The study population was derived from the Health, Aging, and Body Composition (Health ABC) Study, a population-based biracial cohort study of 3075 men and women residing in Memphis, Tennessee, or Pittsburgh, Pennsylvania, aged 70 to 79 years at the baseline enrollment period (year 1) extending from April 1997 through June 1998. Potential participants were identified from a random sample of white and all age-eligible black Medicare beneficiaries living in designated zip code areas surrounding the study sites who were screened to select well-functioning individuals, ie, those reporting no difficulty walking one-quarter mile (400 m), climbing 1 flight of stairs, or performing basic activities of daily living. These individuals are representative of the approximately 50% of US residents aged 70 to 79 years with no apparent mobility limitations. Persons participating in behavioral intervention studies, planning to leave the area within 3 years, or having a diagnosis of a life-threatening cancer were excluded.

Participants eligible for the present study had a valid fasting blood draw and measurement of TSH level in year 2 (n=2800). Persons taking either thyroid antagonist (n=2) or exogenous thyroid hormone (n=276) medications and those with evidence of overt hypothyroidism (TSH level >20 mIU/L [n=13] or TSH level \geq 7.0 mIU/L and a thyroxine level <0.8 ng/dL [n=7]) or low TSH level consistent with hyperthyroidism (TSH level <0.45 mIU/L [n=51]) were excluded. Given the interest in mobility parameters, persons unable to walk 20 m without a walking aid (n=88) or who had a home visit (n=73) and therefore were not administered the 20-m walk test were also excluded, yielding an analysis cohort of 2290. This group of 161 excluded individuals did not differ with respect to thyroid function from those included in the study ($P=.70$).

MEASURES

Thyroid Function

Thyrotropin levels were measured at a central laboratory (University of Vermont, Burlington) in all participants who had a clinic or home visit and agreed to and had a blood draw (n=2800) by immunoassay (ACS; Chiron Diagnostics Corp, Emeryville, California). The normal range provided by the manufacturer for this assay is 0.35 to 5.5 mIU/L, with a lower limit of detection of 0.03 mIU/L and a coefficient of variation of 3.6% at a level of 1.26 mIU/L. Free thyroxine was assessed by competitive immunoassay (ACS) on all participants with a TSH level of 0.1 mIU/L or lower or 7.0 mIU/L or higher. The normal range provided by the manufacturer for this assay is 0.8 to 1.8 ng/dL (to convert to picomoles per liter, multiply by 12.871). For the main analyses, the following 3 groups were distinguished: eu-

thyroid (TSH level, 0.4 mIU/L to <4.5 mIU/L), mild subclinical hypothyroid (TSH level, \geq 4.5 mIU/L to <7.0 mIU/L), and moderate subclinical hypothyroid (TSH level, \geq 7.0 mIU/L to \leq 20.0 mIU/L with normal FT₄ level), based on the definitions used by the US Preventive Services Task Force.¹⁴ We selected a TSH level of 7.0 mIU/L to distinguish mild from moderate subclinical hypothyroidism because it represents the 97.5th percentile in a representative US population 70 years and older and free of thyroid disease.¹ As a secondary analysis to better understand the relation between mobility and thyroid function over a continuum of TSH levels, we constructed a 9-level variable in which the first 7 levels were defined in 1.0 mIU/L increments and the last 2 encompass moderate subclinical hypothyroidism subdivided at 10.0 mIU/L.

Mobility Parameters

The mobility parameters include both self-reported and performance-based measures designed to tap the full continuum of mobility from perceived difficulty and ease of walking and basic to advanced walking performance. Reported mobility capacities and limitations were determined from responses to a series of questions beginning with, "Because of a health or physical problem, do you have any difficulty walking a quarter of a mile that is about 2 or 3 blocks, without stopping?" Those reporting difficulty were asked whether they had a little, some, or a lot of difficulty or were unable to walk. Persons expressing no difficulty were asked how easy it is for them to walk a quarter of a mile—very, somewhat, or not so easy—followed by whether they have any difficulty walking 1 mile (1.6 km) and the ease of walking 1 mile if no difficulty was reported.²¹ Responses to these questions were combined to create a walking ability index ranging from 0 to 9, where 0 represents unable to walk a quarter of a mile and 9 indicates walking 1 mile is very easy. We also examined separately the prevalence of walking limitation (any difficulty walking a quarter of a mile) and good walking capability (reporting that walking 1 mile is very easy).

Performance-based evaluations included usual and rapid gait speed and measures of basic and reserve capacity, assessed over a 20-m course. Participants were asked first to walk at their "usual walking pace" and then "as fast as [they] can" for the return trip. Total time recorded to the hundredth of a second was divided by 20 to obtain usual and rapid gait speed in meters per second. At the follow-up examination, mean change and proportion experiencing meaningful decline defined as a reduction in gait speed of 4% annually on average,²² were evaluated. For persons alive at year 4 who did not have a clinic visit but had a home visit, timed gait over 4 m was used. Self-report of severe walking difficulty (a lot of difficulty or inability to walk a quarter of a mile) was considered indicative of decline among those with telephone contact only. Anyone requiring a walking aid was also considered to have a decline.

Cardiorespiratory fitness was determined from performance on the Long Distance Corridor Walk (LDCW), a 2-stage, self-paced endurance walk test performed over a 20-m course.^{23,24} Persons with any of the following electrocardiogram abnormalities were excluded from testing: Wolff-Parkinson-White or ventricular preexcitation; idioventricular rhythm; ventricular tachycardia; third-degree or complete atrioventricular block; evidence of acute injury or ischemia or marked T-wave abnormality; systolic or diastolic blood pressure exceeding 199 mm Hg or 109 mm Hg, respectively; or heart rate below 40/min or above 110/min. Participants reporting a myocardial infarction, angioplasty, or heart surgery in the prior 3 months or experiencing new or worsening symptoms of chest pain, shortness of breath, fainting, or angina were also excluded.

Heart rate was monitored during testing (Polar Pacer, Model 61190; Polar Electro, Oy, Finland) and participants were stopped if their heart rate exceeded 135/min (85% to 95% of the age-predicted maximum heart rate²⁵) or they experienced debilitating pain, shortness of breath, syncope, or excessive fatigue. Meeting exclusion criteria, inability to complete the test, time needed to complete 400 m and fitness categories were examined. At the follow-up examination, only those persons who completed the LDCW in year 2 were evaluated for decline, defined as exclusion from or inability to complete the LDCW in year 4 or needing 8% more time to walk 400 m.

Covariates

Covariates encompass sociodemographic factors including age, self-designated white or black race, sex, and study site; self-reported physician-diagnosed thyroid disease obtained from the year 1 interview and behavioral factors known to affect walking ability in late life including walking-related physical activity, measured weight, smoking status (current and late-life quitters vs never and former smokers who quit before age 50 years), and self-perceived health status. Use of thyroid hormone medications for study exclusion in year 2 and to adjust for treatment in year 3 was determined from an inventory of all medications taken within the past 2 weeks coded using the Iowa Drug Information System by trained interviews from the containers participants brought to their clinic visit.

STATISTICAL ANALYSES

For analysis, the population was divided into 3 groups: euthyroid, mild subclinical hypothyroid, and moderate subclinical hypothyroid. Participant characteristics within each thyroid function group were compared using a χ^2 or t test as appropriate. Baseline (year 2) differences in the walking ability parameters across the 3 thyroid function categories were evaluated using least squares means adjusted initially for age and sex and then for race, study site, smoking, reported thyroid disease, body weight, self-rated health, walking behavior, and any significant interactions between thyroid function category and sex and race. Differences in usual and rapid gait speed and walking index score over 9 TSH categories were evaluated using least square means adjusted for age and sex. In the longitudinal analyses conducted 2 years later, for each mobility parameter we compared the mean change and percentage decline between year 2 and year 4 and mean value in year 4 across categories of thyroid function assessed in year 2. In the analyses of mean change in addition to age and sex, year 2 status of the outcome of interest was included in the modeling, as was new use of thyroid agonists during the follow-up period, which was obtained from the medication data collected in year 3. These longitudinal analyses were limited to individuals with complete follow-up data. All analyses used SAS version 9.1.3 software (SAS Institute Inc, Cary, North Carolina).

RESULTS

CONCURRENT ASSOCIATIONS

The 2290 participants examined had a mean age of 74.6 years, and 10.6% of men and 12.3% of women met criteria for subclinical hypothyroidism. With the exception of a higher percentage of blacks in the euthyroid group and greater walking activity in the mild subclinical hypothyroid group, participant characteristics did not

Table 1. Baseline Characteristics by Thyroid Status in the Health ABC Study

Characteristic	TSH, mIU/L		
	0.45-4.49	4.50-6.99	7.00-20.00 ^a
Participants, No. (N = 2290)	2028	191	71
Age, mean (SD), y	74.6 (2.9)	75.0 (2.8)	75.0 (2.5)
Female, %	47.0	50.8	52.1
Black, %	41.5	23.6	22.5
Memphis site, %	50.1	52.4	45.1
Current or recent smoker, %	29.0	23.0	33.8
Reported diagnosis of hypothyroidism	2.5	4.7	2.8
Reported diagnosis of hyperthyroidism	2.5	2.1	4.2
Very good to excellent self-rated health, %	47.5	48.2	48.6
Fair to poor self-rated health, %	14.4	15.7	14.3
Weight, mean (SD), kg	75.7 (15.1)	73.2 (14.6)	75.2 (15.9)
Walks less than 30 min/wk, %	44.2	35.6	39.4

Abbreviations: Health ABC, Health, Aging, and Body Composition; TSH, thyrotropin.

^aWith normal free thyroxine levels (0.8-1.8 ng/dL for assay used [to convert to picomoles per liter, multiply by 12.871]).

differ across categories of thyroid function (**Table 1**). Mobility status, however, was somewhat better in the mild subclinical hypothyroid group, who in age- and sex-adjusted analyses demonstrated faster mean usual and rapid gait speeds, better cardiorespiratory fitness as indicated by a higher percentage having good fitness and an overall faster mean 400-m walk time in persons completing the test, and better perceived walking ability as indicated by a higher percentage who reported that walking for 1 mile is very easy and by a higher mean walking ability score (**Table 2**). The extent of differences observed for mean usual and rapid gait speeds of 0.05 m/s and 0.10 m/s, respectively, is considered clinically meaningful.²² The mobility status of persons with moderate subclinical hypothyroidism was generally no worse than the euthyroid group with the exception of having higher rates of exclusion from the LDCW and reported walking difficulty.

The mobility advantage of the mild subclinical hypothyroid over the euthyroid group with respect to usual and rapid gait speeds and cardiorespiratory fitness remained after adjustment for race, study site, smoking status, body weight, reported thyroid disease diagnosis, self-rated health, walking behavior, and the interaction between race and thyroid function (Table 2). After adjustment, persons with moderate subclinical hypothyroidism continued to show a higher prevalence of mobility deficits with respect to meeting exclusion criteria for endurance walk testing and reported walking difficulty. There was no interaction between sex and thyroid function group and any mobility parameter ($P = .13$ to $P = .73$), but there was a significant interaction between race and thyroid function with respect to 400-m walk time ($P = .01$).

Table 2. Baseline Mobility Parameters by Thyroid Status^a and Fully Adjusted Thyroid Status^b

Walking Ability Parameters	TSH, mIU/L		
	0.45-4.49	4.50-6.99	7.0-20.0 ^c
Thyroid Status			
Participants, No. (N = 2290)	2028	191	71
Usual gait speed, mean (SD), m/s	1.15 (0.20)	1.20 (0.22) ^d	1.17 (0.23)
Rapid gait speed, mean (SD), m/s	1.56 (0.31)	1.65 (0.33) ^d	1.59 (0.32)
Excluded from LDCW, %	13.3	10.8	22.3 ^e
Incomplete LDCW, %	17.0	14.4	14.5
400-m Walk time, mean, s	321.7	311.1 ^e	314.8
Good cardiorespiratory fitness, %	28.0	39.2 ^d	28.3
Reports difficulty walking a quarter of a mile (400 m), %	16.2	14.7	26.2 ^e
Reports walking 1 mile (1.6 km) is very easy, %	36.5	44.7 ^e	36.1
Walking ability index score, mean	6.74	7.08	6.23
Fully Adjusted Thyroid Status			
Participants, No. (N = 2290)	2028	191	71
Usual gait speed, mean (SD), m/s	1.15 (0.20)	1.18 (0.22) ^e	1.17 (0.23)
Rapid gait speed, mean (SD), m/s	1.56 (0.31)	1.62 (0.33) ^f	1.57 (0.32)
Excluded from LDCW, %	13.1	12.3	23.9 ^e
Incomplete LDCW, %	16.8	16.7	16.1
400-m Walk time, mean, s	321.6	312.5 ^e	314.6
Good cardiorespiratory fitness, %	28.3	36.2 ^e	28.6
Reports difficulty walking a quarter of a mile, %	16.0	17.0	26.8 ^e
Reports walking 1 mile is very easy, %	37.0	40.0	34.0
Walking ability index score, mean	6.76	6.87	6.16 ^e

Abbreviations: TSH, thyroid-stimulating hormone; LDCW, Long Distance Corridor Walk.

^aAdjusted for age and sex.

^bAdjusted for age, sex, race, study site, smoking, reported thyroid disease, body weight, self-rated health, walking behavior, and the interaction between race and thyroid function.

^cWith normal free thyroxine levels (0.8-1.8 ng/dL for assay used [to convert to picomoles per liter, multiply by 12.871]).

^d $P < .001$ for comparison with euthyroid category.

^e $P < .05$ for comparison with euthyroid category.

^f $P < .01$ for comparison with euthyroid category.

The **Figure** provides age- and sex-adjusted means for usual and rapid gait speed across 9 TSH categories. Both mean usual and rapid gait speeds increased with TSH level up to approximately 7.44 mIU/L, with the zenith occurring at the TSH category ranging from 6.45 to 7.44 mIU/L. Mean usual and rapid gait speed at this level were statistically different from the first 4 categories, with TSH levels ranging from 0.45 to 4.44 mIU/L ($P < .001$ to $P = .04$). For rapid gait speed, TSH categories 3 through 6 (2.45-6.44 mIU/L) were also statistically different from categories 1 and 2 (TSH level, 0.45-2.44 mIU/L; $P < .001$ to $P = .02$), supporting a mild protective association between mild subclinical hypothyroidism and mobility defined by gait speed. An analysis of walking index score revealed no association.

Two years later, at the year 4 visit, of the 2290 individuals included in the concurrent analyses, 102 had died, 4 had withdrawn from the study, and 46 had a missed visit and therefore unknown mobility status, leaving 2138 available for evaluation. Neither mortality nor visit status varied by thyroid function ($P > .60$). Decline in usual and rapid gait speeds, defined as newly developed inability to walk at least 4 m without a walking aid or a reduction of 8% or more in speed,²² occurred overall in 28.2% and 35.9%, respectively, of individuals and did not vary by thyroid function (**Table 3**). Mean percentage decline in the euthyroid and mild and moderate subclinical hypothyroid groups for usual gait speed was 3.9%, 4.6%, and 3.9%, respectively, and 7.3%, 8.0%, and 8.3%, respectively, for rapid gait speed, which also did not vary by thyroid function in adjusted analyses. Among the 1652 participants completing the LDCW in year 2, 1444 (87.4%) had a year 4 clinic visit, the likelihood of which did not vary by thyroid function ($P > .80$). Just more than 25% had evidence of decline in cardiorespiratory fitness (exclusion from or inability to complete the LDCW or 8% slower time to walk 400 m), which also did not vary by thyroid function. Lastly, overall, 34% experienced at least a 1-point decrease in their walking ability score, which did not differ by thyroid status.

Even though the likelihood of decline was uniform across categories of thyroid function, persons with mild subclinical hypothyroidism retained a slight functional advantage relative to the euthyroid group 2 years later with respect to usual and rapid gait speeds, time to walk 400 m among those completing the test, and reported function (percentage responding that walking 1 mile is very easy and mean walking ability score) (**Table 4**).

COMMENT

Study findings indicate that generally well-functioning persons in their seventies with a TSH level falling in the mild subclinical hypothyroidism range (4.5-7.0 mIU/L) do not have poorer functional mobility than their euthyroid counterparts. On the contrary, on the most demanding mobility parameters examined, these individuals appear to have a slight mobility advantage. Although persons in the moderate subclinical range (7.0-20.0 mIU/L) had higher rates of perceived walking difficulty and contraindication to endurance activity compared with those in the euthyroid range, they demonstrated similar function on other mobility parameters. An examination of gait speed by finer categorizations of TSH level indicates that functional reserve increases with increasing TSH level until 7.44 mIU/L, when it begins to decline. Remarkably, even in persons with TSH levels up to 10 mIU/L rapid gait speed was statistically significantly faster than persons at the lowest level of TSH (0.45-1.44 mIU/L; all $P < .001$ except the second category [$P = .01$]).

Few studies have examined functional status by thyroid function in older individuals. The Leiden 85-Plus Study¹⁸ found no association between TSH level and preva-

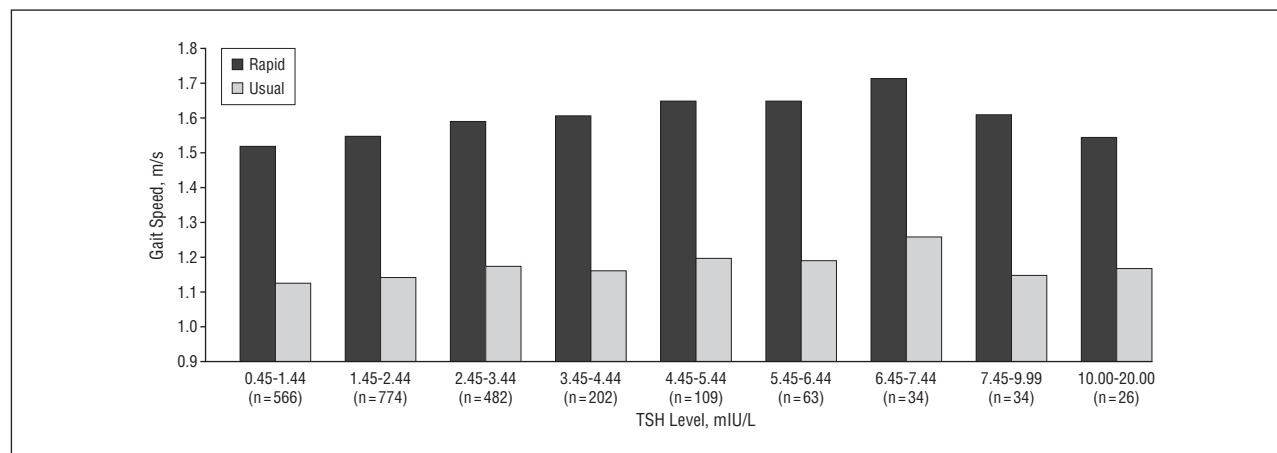


Figure. Mean usual and rapid gait speed by thyrotropin (TSH) level.

Table 3. Prevalence of Decline in Walking Ability After 2 Years^a by Baseline Thyroid Status

Walking Ability Parameters	TSH, mIU/L		
	0.45-4.49	4.50-6.99	7.00-20.00 ^b
Participants, No. (n = 2138)	1897	176	65
Declined in usual gait speed, %	28.1	31.3	22.2
Declined in rapid gait speed, %	36.4	31.5	33.0
Declined in cardiorespiratory fitness, % ^c	25.4	23.5	25.2
Declined in walking ability score, %	34.1	29.9	41.0

Abbreviation: TSH, thyrotropin.

^aAdjusted for age, sex, baseline walking ability, and use of thyroid agonists in year 3.

^bWith normal free thyroxine levels (0.8-1.8 ng/dL for assay used [to convert to picomoles per liter, multiply by 12.871]).

^cAmong the 1444 participants completing the Long Distance Corridor Walk in year 2 having a year 4 clinic visit.

lence of disability in basic and instrument activities of daily living; however, those with higher TSH levels had less decline in instrumental activities of daily living over 4 years. Even though measures of functional mobility are not directly comparable with activities of daily living competence, findings from the present study are generally consistent with the Leiden 85-Plus Study¹⁸ in that thyroid function was not found to be associated with functional deficits, and when differences emerged, persons with mildly elevated TSH levels demonstrated a functional advantage. The findings reported herein provide further support for a positive association between TSH level and functional independence and extends the association to a slightly younger group. Another study involving community-dwelling men 73 years and older in the Netherlands found greater grip strength and better lower extremity performance in persons with higher FT₄ levels.²⁶ The association between TSH level and physical performance was not reported.

Even though findings indicate that older adults with subclinical hypothyroidism function as well as, if not better than, those with normal thyroid function, it is not

Table 4. Walking Ability After 2 Years^a by Baseline Thyroid Status

Walking Ability Parameters	TSH, mIU/L		
	0.45-4.49	4.50-6.99	7.00-20.00 ^b
Participants, No. (n = 2138)	1897	176	65
Usual gait speed in year 4, mean, s	1.10	1.15 ^c	1.14
Rapid gait speed in year 4, mean, s	1.44	1.55 ^d	1.50
Good cardiorespiratory fitness, % ^e	23.0	31.6 ^c	27.0
400-m Walk time in year 4, mean, s	328.5	312.3 ^d	316.3
Reports difficulty walking a quarter of a mile (400 m), %	21.0	17.5	25.2
Reports walking 1 mile (1.6 km) is very easy, %	36.9	46.4 ^c	28.9
Walking ability score in year 4, mean	6.46	6.90 ^c	6.10

Abbreviation: TSH, thyrotropin.

^aAdjusted for age, sex and use of thyroid agonists in year 3.

^bWith normal free thyroxine levels (0.8-1.8 ng/dL for assay used [to convert to picomoles per liter, multiply by 12.871]).

^c $P < .05$ for comparison with euthyroid category.

^d $P < .01$ for comparison with euthyroid category.

^eAmong the 1959 participants having a year 4 clinic visit.

known whether individuals with subclinical hypothyroidism who initiate treatment would experience improved or less decline in mobility. According to medication data collected in year 3, just under half (n=31 [47.7%]) of the 65 individuals with moderate subclinical hypothyroidism in year 2 who were alive in year 4 with complete follow-up data began new use of thyroid agonists. Examining gait speed decline, we found no significant difference between those who did and did not initiate treatment (27.7% vs 18.9% [$P = .41$] for usual gait and 44.4% vs 24.2% [$P = .10$] for rapid gait); however, the sample size was too small to make a definitive judgment. If anything, those initiating treatment tended to exhibit higher rates of decline.

It remains unclear if a mildly elevated TSH level directly contributes to better mobility status or reflects an underlying positive adaptation that fosters robust health.

Recent observations of a right shift in the distribution of TSH with age¹ and the apparent protective association with mortality in advanced age¹⁸ have led to speculation that increased TSH secretion may be an adaptive response to an accumulation of thyroid antibodies that frequently occurs with age¹⁶ and thus may be a marker of pituitary resiliency and health. Others have suggested that a lower metabolic rate may protect against excessive catabolism.²⁶

An important study limitation concerns incomplete assessment of thyroid function. As in most other observational cohort studies,^{5,8,10} TSH level was measured on a single occasion. Given that acute stress, high physical activity, and several pharmacologic agents can affect TSH level, a single high reading may represent a transient benign elevation.^{14,16} Free thyroxine was not measured in participants with a TSH between 4.5 and 6.9 mIU/L; therefore, some persons with overt hypothyroidism may have been included with the mild subclinical hypothyroid group, which would tend to bias the findings toward poorer mobility function and underestimate any mobility advantage. In as much as casual assessment of TSH undertaken in a routine medical visit may serve as the basis for follow-up testing and possible treatment, the findings reported herein suggest that for individuals in their seventies, a mildly elevated TSH level is no cause for concern. The small number of participants in the moderate subclinical hypothyroid group constitutes another limitation, and thus findings of no difference between groups should be treated with caution.

Even though few studies have considered new treatment in examining differential outcomes by thyroid function over time,²⁶ assessment of medication use over the follow-up period was limited to year 3 only. Because participants received their TSH level reports after their year 2 clinic visit, we would expect most new use to occur in year 3, and new use was not found to affect the rate of mobility decline. Therefore, the lack of medication data from year 4 does not appear to present a major shortcoming.

In conclusion, in generally well-functioning community-dwelling residents in their seventies, mildly elevated TSH levels do not appear to indicate or confer health risks as reflected by multiple parameters of functional mobility. Despite the Institute of Medicine's recommendation against routine TSH screening and thus against treatment of asymptomatic subclinical hypothyroidism,²⁶ controversy remains as to whether and when treatment should be initiated even in older adults.²⁷ We believe the findings reported herein provide supportive evidence that mild to moderate elevations in TSH level with a normal FT₄ level pose little threat to the health and functioning of older adults. A better understanding of the meaning of the age-related increase in TSH level and its potential benefit warrants further study and consideration.

Accepted for Publication: August 14, 2009.

Author Affiliations: Clinical Research Branch, National Institute on Aging, and Division of Geriatric Medicine and Gerontology, Johns Hopkins School of Medicine, Baltimore, Maryland (Drs Simonsick and Ferrucci); Depart-

ments of Epidemiology and Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania (Dr Newman); Department of Preventive Medicine, University of Tennessee, Memphis (Dr Satterfield); Laboratory of Epidemiology, Demography and Biometry, National Institute on Aging, Bethesda, Maryland (Dr Harris); Department of Ambulatory Care and Community Medicine, University of Lausanne, Switzerland (Dr Rodondi); and Department of Medicine, Epidemiology & Biostatistics, University of California, San Francisco (Dr Bauer). **Correspondence:** Eleanor M. Simonsick, PhD, Clinical Research Branch, National Institute on Aging, Harbor Hospital, 3001 S Hanover St, Fifth Floor, Baltimore, MD 21225 (simonsickel@mail.nih.gov).

Author Contributions: Dr Simonsick had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Simonsick, Newman, and Ferrucci. *Acquisition of data:* Simonsick, Satterfield, Harris, and Bauer. *Analysis and interpretation of data:* Simonsick, Ferrucci, Rodondi, and Bauer. *Drafting of the manuscript:* Simonsick. *Critical revision of the manuscript for important intellectual content:* Simonsick, Newman, Ferrucci, Satterfield, Harris, Rodondi, and Bauer. *Statistical analysis:* Simonsick and Rodondi. *Obtained funding:* Newman and Harris. *Administrative, technical, and material support:* Simonsick, Satterfield, and Harris.

The Health ABC Study Group: Douglas C. Bauer, Jane Cauley, Steven R. Cummings, Melissa E. Garcia, Tamara B. Harris, Stephan B. Kritchevsky, Michael C. Nevitt, Anne B. Newman, Susan M. Rubin, Suzanne Satterfield, Eleanor M. Simonsick, and Frances A. Tylavsky.

Financial Disclosure: None reported.

Funding/Support: This research was supported in part by the Intramural Research Program of the National Institutes of Health (NIH), National Institute on Aging, and NIH contracts N01-AG-6-2101, N01-AG-2103, and N01-AG-6-2106.

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