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Are Baby Boomers Aging Better Than Their Predecessors?

Trends in Overweight, Arthritis, and Mobility Difficulty

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7.1 Introduction

Several reports describe imminent profound demographic shifts with the aging of the post-World War II Baby Boom generation, persons born from 1946 through 1964 (Day 1993; Centers for Disease Control (CDC) 2003; Kinsella and Velkoff 2001). The elderly population in the United States is expected to double in the thirty years from 2000 to 2030 (Kinsella and Velkoff 2001). Better understanding of the health risk and health status trends of the aging Baby Boomers will enhance our preparations to meet the health care needs of this new generation of elders. The first of the Baby Boomers will reach age sixty-five in the year 2011. Preventing and postponing disability will continue to be important goals for maintaining health in old age for the Baby Boom generation. Although studies have shown declines in disability rates in the older population in recent decades (Freedman, Martin, and Schoeni 2002; Manton, Corder, and Stallard 1997; Manton and Gu 2001), worrisome health behavior trends across all ages in the United States ultimately may reverse the progress in reducing

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disability. It is critical that we closely monitor trends in health in this very large cohort of aging persons in the United States.

Behavioral factors, such as physical activity, weight management, and avoidance of smoking, are key to reducing population disability, often related to musculoskeletal impairments. Unfortunately, these factors, notably physical activity and obesity, are showing hazardous trends, especially among Baby Boomers (Manson et al. 2004; Flegal et al. 2002). Access to better nutrition has improved, but so has access to high fat, high carbohydrate foods, via fast food restaurants and the wide availability of inexpensive prepared foods, endemic to hurried lifestyles. Dietary patterns show a substantial increase in carbohydrate and total energy intake in the last thirty years (CDC 2004). Rates of obesity have increased dramatically and physical activity rates have remained unchanged in recent years.

Substantial differences in prevalence of overweight (Body Mass Index [BMI] ≥ 25) have been observed among women but not men across race groups. More than three-quarters of non-Hispanic black women aged twenty and older were overweight in 1999–2002, compared to less than 60 percent of non-Hispanic white women. Prevalence of overweight in Mexican American women was intermediate (72 percent) (Hedley et al. 2004).

In coming decades, these lifestyle factors are likely to contribute to large increases in rates of arthritis, as well as diabetes and cardiovascular disease. Recent projections show that the aging Baby Boomers will double the numbers of persons aged sixty-five and older with arthritis or chronic joint symptoms (CJS) by the year 2030, when the last Baby Boomers will turn sixty-five years old (CDC 2003). However, these calculations assume stability of arthritis prevalence and likely underestimate the impending surge in arthritis rates among more obese Baby Boomers. At the population level, disability and health utilization accompany higher rates of arthritis (Dunlop et al. 2003).

To examine trends in prevalence of overweight, arthritis, and mobility difficulty among Baby Boomers and their predecessors, we analyzed data from successive waves of the National Health and Nutrition Examination Survey (NHANES) from 1971 through 2002. In addition, we studied the relationship between overweight, arthritis, and mobility difficulty among the birth cohorts using recent waves of the NHANES.

7.2 Study Design

We analyzed successive waves of data from the National Health and Nutrition Examination Survey (NHANES), which began in 1971 and is available from the National Center for Health Statistics up through the 1999–2002 survey. These publicly available data were exempted from review by our Institutional Review Board.

The NHANES has collected detailed health information from inter-

views and medical examinations on nationally representative samples of U.S. residents across age groups. The NHANES uses a complex multistage probability cluster sampling design and provides sophisticated weighting approaches to yield national prevalence estimates. The NHANES I, conducted from 1971 to 1974, included medical history interviews and examinations with 18,836 persons aged twelve to seventy-four years. The NHANES II, conducted from 1976 to 1980, included interviews and examinations of 18,447 persons aged twelve to seventy-four years. The NHANES III was conducted in two three-year phases from 1988 to 1994 and interviewed 20,050 adults aged seventeen and older. In general, examinations took place in the NHANES Mobile Examination Center (MEC), a large trailer equipped with various testing technologies; very few were conducted in participants' homes. The most recent wave of NHANES began in 1999 and continues today in two-year cycles. Data are available on the 1999–2002 interviews of 21,004 persons and include medical conditions interviews of 10,291 adults aged twenty and older.

During each wave of the NHANES, study examiners measured weight and height. For this study, body mass index (BMI: weight in kilograms/height in meters squared) was calculated and standard cut points were used to classify overweight (BMI ≥ 25 kg/m²) and obesity (BMI ≥ 30 kg/m²). Each wave of the NHANES interviews asked participants if a physician ever told them they had arthritis. Substantial variations across waves of the NHANES in clinical evaluations for arthritis, such as x-rays and physical examinations, precluded our using data other than self-report to determine prevalence of arthritis. For example, NHANES III performed hand and knee x-rays, physician's joint examinations, and physical function tests only on persons aged sixty years and older. Despite limitations of the self-report information, the participant interview question used to assess physician-diagnosed arthritis remained essentially the same over the 4 waves of NHANES that we analyzed.

Mobility difficulty was measured only during the two most recent waves of the NHANES. We classified mobility disability as report of any difficulty or inability in walking 1/4 mile or climbing ten steps without the use of special equipment. These items were not included in the earlier NHANES I and II. Thus, for each of the ten-year birth cohorts, we determined the prevalence of mobility difficulty using NHANES III and 1999–2002 data.

7.2.1 Birth Cohort Analyses

In order to examine birth cohort trends, we grouped the Baby Boom and Silent Generations into four, ten-year birth cohorts (born 1926–1935, 1936–1945, 1946–1955, and 1956–1965). This birth cohort classification, shown in figure 7.1, allowed us to depict trends in prevalence of overweight across waves of the NHANES from 1971 through 2002. For example, we followed the oldest ten-year age group, those born from 1926 to 1935, with

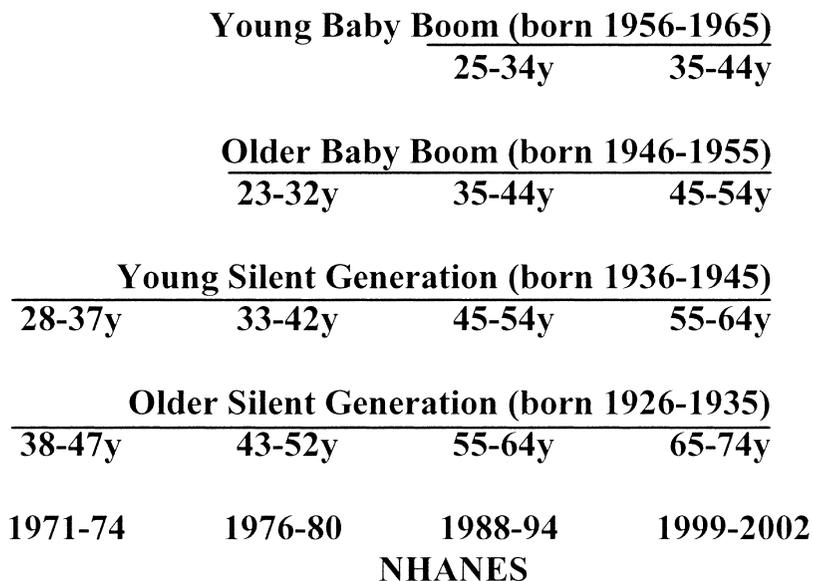


Fig. 7.1 Birth cohort analysis schema showing the ages of the birth cohorts at the time of each wave of the NHANES

Note: Age ranges were based on interviewees' ages at midpoint of each survey period.

four waves of NHANES data. This birth cohort, the older Silent Generation, was thirty-eight to forty-seven years of age at the time of the first NHANES and sixty-five to seventy-four years of age during the most recent NHANES, in 1999 to 2002. During these same time periods, the next younger birth cohort, the young Silent Generation, was aged twenty-eight to thirty-seven years and fifty-five to sixty-four years, respectively. For the older Baby Boom generation, born from 1946 to 1955, there were only three waves of NHANES during which all members of this cohort were over twenty-one years of age. Data from NHANES I for the older Baby Boom cohort were not used because members of this cohort were below age twenty-one at the time of the survey. The youngest cohort, the young Baby Boom generation, was over age twenty-one only during the two most recent waves, NHANES III and NHANES 1999–2002.

The NHANES datasets included age in years (but not birth date) for all participants. For our analyses, we assumed age at interview was age at the midpoint of the survey for all waves. For NHANES III, which took place over six years from 1988–1994 in two phases of three years each, the longest survey period of the four waves, the dataset included information about whether participants were examined in the first or second phases. Because the six year interval of the NHANES III survey data collection

was longer than the other surveys, we added one year to the age of Phase 1 participants and subtracted one year from the age of Phase 2 participants in the NHANES III, then assumed age to be the midpoint of the six year survey period.

We used SAS for Windows version 8.01 (SAS Institute, Cary, NC) for all analyses and SAS-callable SUDAAN version 8 (RTI, Research Triangle Park, NC) for analyses that accounted for cluster design and the complex multistage sampling. Appropriate interview and examination sampling weights were applied in all prevalence estimation. Adjusted odds ratios (OR) and 95 percent confidence intervals (CI) were derived from multivariate logistic regression modeling using SUDAAN, also accounting for weighting and complex sampling design using the Taylor series method. Due to the high prevalence of mobility disability and subsequent concern about overestimating the prevalence ratio, odds ratios were converted to approximate relative risks (RR) using the method described by Zhang and Yu (1998). Multivariate models were adjusted for age, sex, and race/ethnicity.

7.3 Results

The prevalence of overweight increased profoundly according to age among men and women in each of the ten-year birth cohorts during the three decades beginning in 1971 (fig. 7.2). With each younger birth cohort, the proportion with overweight rose markedly at successively younger ages. Specifically, members of the Baby Boom generation had substantially greater prevalence of overweight at younger ages than their predecessors in the Silent Generation, a difference that is most evident in the thirty-five to forty-four year old age range. This was the only age group for which NHANES data was available for the four birth cohorts (fig. 7.2). In the thirty-five to forty-four year age group, 66 percent to 70 percent of the youngest Baby Boomer men were overweight compared to 56 percent to 62 percent of their counterparts in the Silent Generation. Among women in the Baby Boom generation at ages thirty-five to forty-four, 50 percent to 60 percent were overweight or obese compared to 38 percent to 42 percent of same-aged women in the Silent Generation. In both women and men, overweight prevalence in the young Baby Boom cohort at ages twenty-five to forty-four years was comparable to that of the Silent Generation cohorts when they were ten to twenty years older. Overall, the rate of increase in prevalence of overweight among Baby Boomers appeared steeper over the three decades than in the Silent Generation (fig. 7.2).

In general, the prevalence of arthritis increased as expected with age across the birth cohorts, but we did not observe substantial intercohort differences in arthritis prevalence (data not shown). However, the older Baby Boomer cohort may have been too young during the most recent

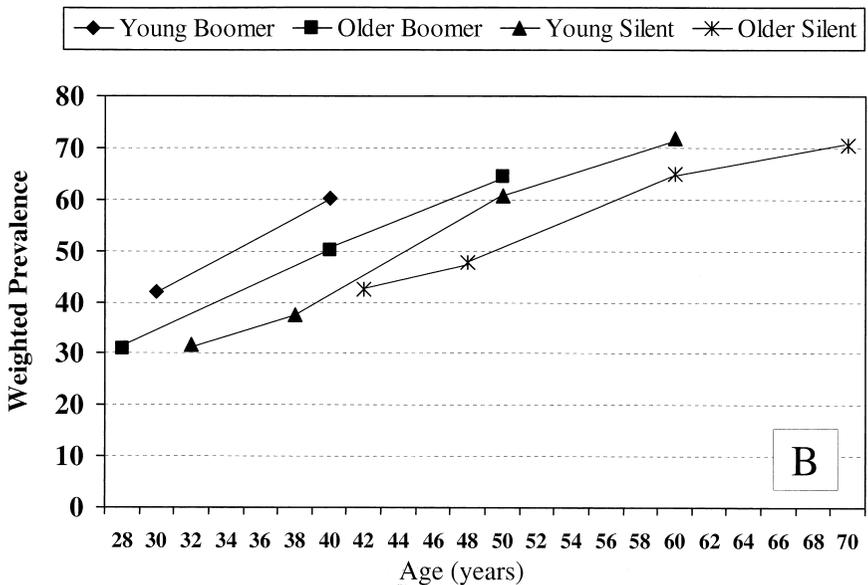
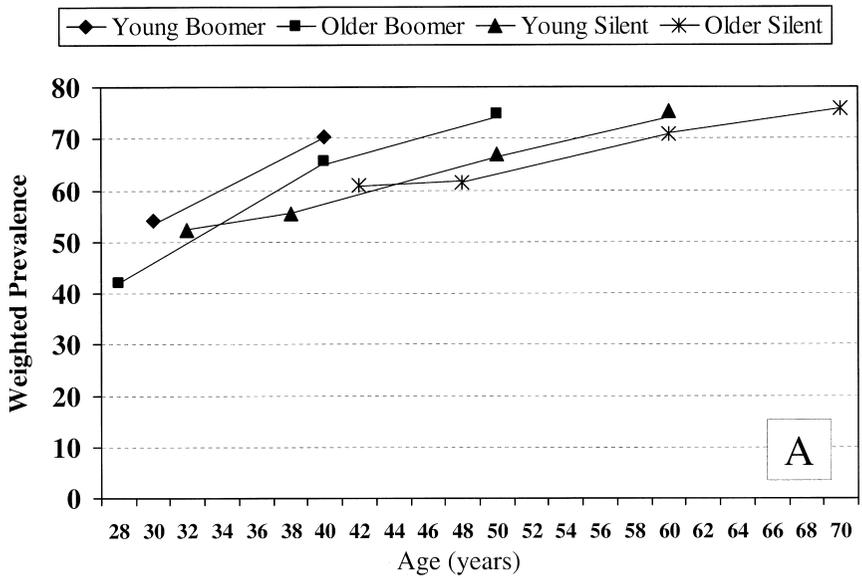


Fig. 7.2 Weighted prevalence of overweight (BMI ≥ 25) according to age in men (A) and women (B) within ten-year birth cohorts, NHANES 1971–1974, 1976–1980, 1988–1994, 1999–2002

NHANES—average approximately age fifty—to evaluate if they were more likely to have arthritis than previous birth cohorts. Thus, we examined the distribution of BMI among the proportion of each NHANES population that was aged fifty-five to sixty-four years at the time of the respective surveys, an age group that experiences a substantial onset of arthritis (fig. 7.3). Across the waves of the NHANES, more persons aged fifty-five to sixty-four with arthritis were also obese, compared to persons without arthritis. Conversely, the proportion of nonoverweight persons in this age group generally declined over time, but more so among persons with arthritis than without arthritis.

In the decade between NHANES III and NHANES 1999–2002, men and women of both cohorts of the Silent Generation showed substantial increases in prevalence of mobility disability (fig. 7.4). In contrast, the prevalence of mobility disability among the Baby Boomers, all of whom were less than age fifty-five, was essentially unchanged during the ten year period. Of note, the disability prevalence was progressively lower in each of the Baby Boomer cohorts than their same-aged counterparts both in the older Baby Boom cohort and in the Silent Generation. This is portrayed by the gap between the lines in figure 7.4 for the young Baby Boomers and the older Baby Boomers, then also between the older Baby Boomers and the young Silent Generation cohort. For example, when the young Silent Generation women were aged forty-five to fifty-four, 20 percent reported mobility disability, compared to 12.5 percent of the same-aged older Baby Boomer women. Even among the youngest Baby Boom cohort, the proportion with disability at ages thirty-five to forty-four was lower than same-aged women of the older Baby Boom (8.6 percent and 13.1 percent respectively). Similar differences were observed in the men, who had lower disability prevalence than women overall.

To understand the association between arthritis and mobility difficulty among middle-aged adults (aged forty-six to seventy-five years), we examined changes in arthritis prevalence according to disability status. The proportion of persons aged forty-six to seventy-five years with mobility difficulty who reported having arthritis increased from 1990 to 2000 (56 percent to 63 percent), while the proportion without disability who reported arthritis decreased somewhat from 30 percent to 26 percent. Conversely, the likelihood that persons with arthritis would report mobility difficulty increased over the decade from 1990 to 2000 among adults aged forty-six to seventy-five years, from 86 percent to 168 percent (table 7.1), even after adjustment for overweight and obesity. Obesity was strongly associated with mobility disability in the two recent waves of the NHANES in persons aged forty-six to seventy-five years, ages when both arthritis prevalence and disability prevalence climbs dramatically (table 7.1). Persons who were overweight but not obese did not have an increased likelihood of having mobility disability after controlling for self-reported arthritis.

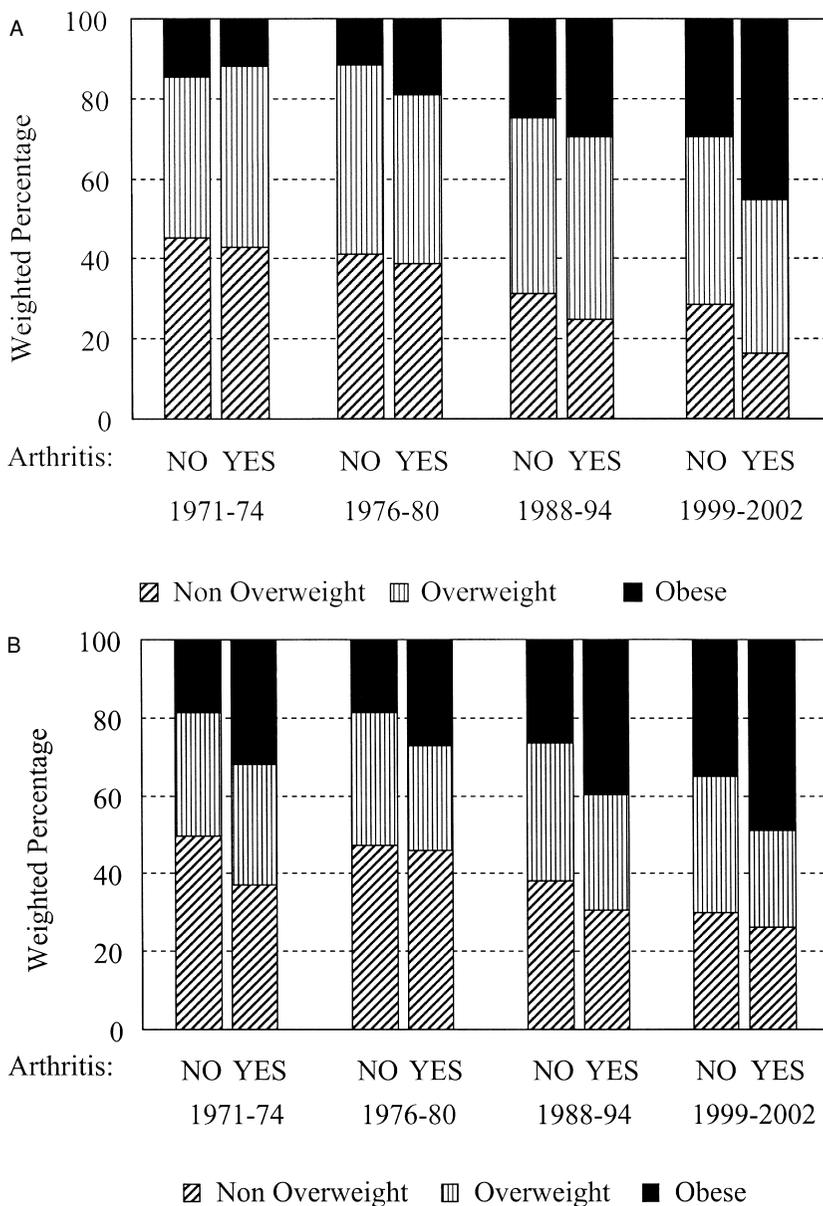


Fig. 7.3 Distribution of body mass categories among men (*A*) and women (*B*) aged 55 to 64 years with and without arthritis, NHANES 1971–2002

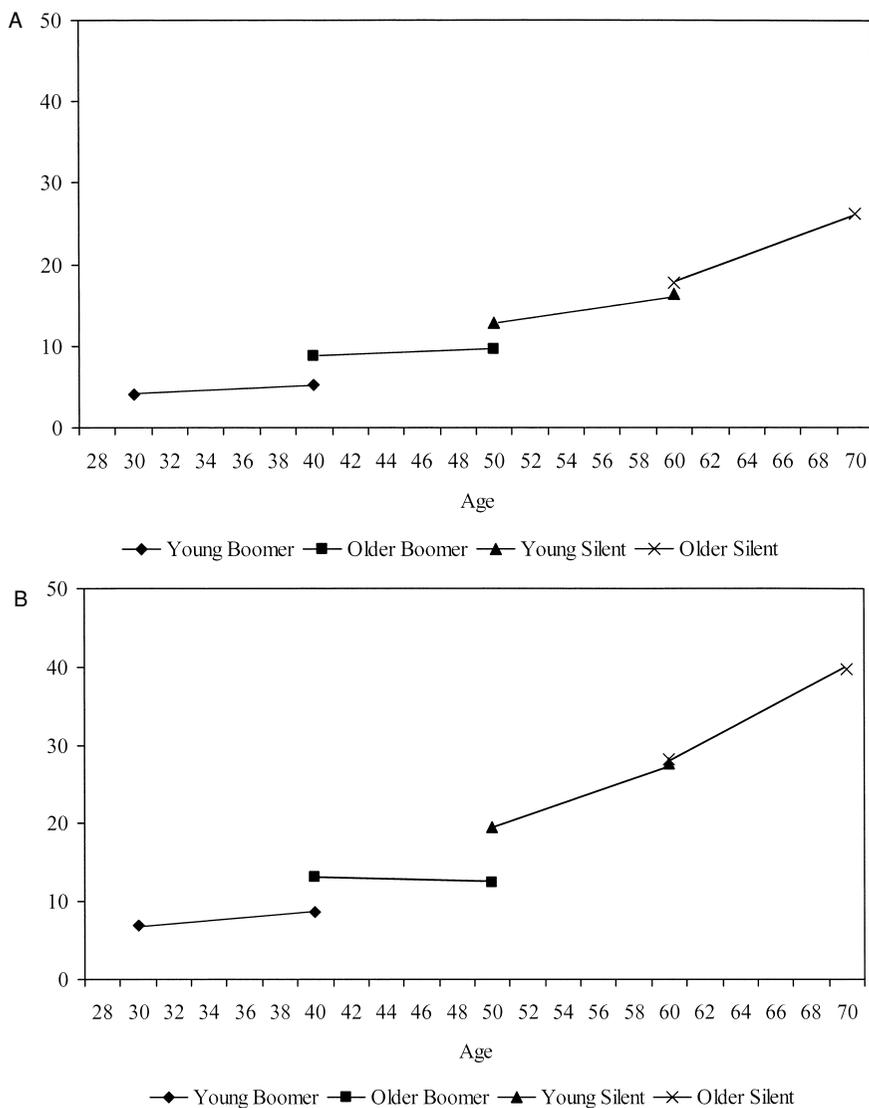


Fig. 7.4 Weighted prevalence of mobility difficulty in men (A) and women (B) within ten year age cohorts, NHANES 1988–1994, 1999–2002

7.4 Discussion

Our findings portray a mixed picture of health and health risks of the Baby Boomer cohort compared to their predecessors. The drastic increases in overweight and obesity in the last two decades raise serious concerns about future health and physical functioning of the aging Baby Boom gen-

Table 7.1 Relationship between overweight, self-reported arthritis and risk for mobility difficulty among persons aged 46 to 75 years, United States, NHANES

	NHANES III 1988–1994 RR (95% C.I.) ^a	NHANES 1999–2002 RR (95% C.I.) ^a
Overweight (BMI 25–29)	1.08 (0.93–1.26)	1.08 (0.90–1.27)
Obese (BMI ≥ 30)	1.58 (1.32–1.86)	2.02 (1.69–2.40)
Arthritis	1.86 (1.69–2.04)	2.68 (2.34–3.05)

Note: Mobility difficulty defined as any reported difficulty walking 1/4 mile or climbing ten steps.

^aDerived from logistic regression models adjusted for age, sex, race/ethnicity, accounting for complex sampling design effects; performed using Taylor series method in SUDAAN. The OR's corrected to RR approximation using method of Zhang and Yu (1998).

eration in the United States. Notably, the Baby Boomers will have spent several more years in an overweight or obese condition than their predecessors in the Silent Generation. In their thirties and forties, many more Baby Boomers were overweight or obese than members of the Silent Generation when they were in their thirties and forties. Also, the time trend toward increasing prevalence of overweight shows no evidence of leveling off even among older adults.

Arthritis prevalence may or may not change with the aging of the Baby Boomers. The NHANES data were inconclusive because the Baby Boomer cohort is only now approaching the age when arthritis prevalence begins to climb. Given the risks for arthritis related to obesity, we might have expected to see an indication that arthritis may be increasing more rapidly in the Baby Boomers than compared to the Silent Generation. Subsequent NHANES should yield answers to this question within the next decade. However, other factors may account for a possible lack of change in arthritis prevalence. For example, persons in the Silent Generation may have been subjected to greater occupational hazards that contribute to arthritis or possibly had more injuries that predispose to arthritis in later life. Findings from the first NHANES showed occupational factors to be more important than obesity as a contributor to arthritis prevalence in the early 1970s (Anderson and Felson 1988). More research is needed to determine whether arthritis risk related to occupational factors has decreased in recent years with the shift away from heavy manufacturing jobs toward less physically demanding service and technology sector employment.

Mobility disability is a major concern for the aging Baby Boomers because of their greater rates of overweight and obesity throughout adulthood. Obesity is strongly associated with many chronic conditions and health risk which lead to disability (Mokdad et al. 2003). High BMI is an independent predictor of mobility declines and disability (Stuck et al. 1999; LaCroix et al. 1993). In the most recent NHANES, we found that

obese middle-aged and older persons had twice the likelihood of reporting mobility difficulty even after controlling for arthritis. Nonetheless, we also observed that the prevalence of mobility disability was somewhat lower among the Baby Boomers compared to their predecessors. This is notable because the Baby Boomers are not yet in the age group of high disability rates. Even in middle age, we show evidence that mobility disability may be declining in the U.S. population. As we stated in our introduction, others have reported on general declining rates of disability among the elderly (Freedman, Martin, and Schoeni 2002; Manton, Corder, and Stallard 1997; Manton and Gu 2001), but our finding of a decline in disability rates in middle-aged adults as well signals an important continuing trend toward health improvement among Baby Boomers as they approach old age compared to their predecessors. The marked declines in mobility disability in Baby Boomer women is particularly encouraging given that women in old age bear a greater burden of disability overall.

Whether the mobility declines will be reversed as a result of increased hazards from obesity is a question that will require ongoing research. The impact of obesity on life expectancy is another major concern. A recent analysis of the forty year follow-up of the Framingham Study showed that obese forty-year-old non-smokers lost six to seven years of life expectancy compared to normal weight peers (Peeters et al. 2003). Comparable results were found using national data with a shorter follow-up period (Fontaine et al. 2003). Although cardiovascular disease deaths continue to decline (Kochanek and Smith 2004), rates of diabetes mirror the rise in obesity prevalence (CDC 2005) and may predict a reversal in the gains we have witnessed in cardiovascular disease morbidity and mortality.

Figure 7.3, which shows the BMI distribution among persons with self-reported physician-diagnosed arthritis, portrays the differences among the birth cohorts in the relationship between overweight, obesity, and arthritis. A greater proportion of men and women with arthritis were obese in the two most recent waves, compared to earlier waves of the NHANES. It remains unclear whether the increase in obesity prevalence will ultimately lead to an increase in arthritis prevalence among the Baby Boomers compared to the Silent Generation. These data support the probability that obesity will remain a significant risk factor for arthritis among aging Baby Boomers.

This study used a series of cross-sectional surveys; thus we could not conduct statistical tests to compare the prevalence or risk estimates across the birth cohorts. Also, the population was in a dynamic state across the waves of NHANES, and racial and ethnic minorities comprise a growing proportion of the U.S. population. Some of the increase in prevalence of overweight could be due to the changing composition of the population rather than exclusively to weight increases among the stable sectors of the population.

Others have shown the age trends over the past several decades in rising

population obesity rates (Flegal et al. 2002). However, our findings suggest that the profound cultural changes leading to the high prevalence of overweight and obesity has progressed rapidly across generations. How will this shift influence life in old age among the Baby Boomers? Arthritis and mobility disability are just two of many obesity-related chronic conditions which could consume considerable health care resources, generate wide-ranging societal costs, and reduce quality of life. Both obesity and arthritis contribute to disability and are especially limiting as comorbid conditions (Jordan et al. 1996; Ettinger et al. 1994). Will the aging of the heavier Baby Boom generation halt or reverse the trend toward decreasing disability that has been observed in the older population in the past decade (Freedman, Martin, and Schoeni 2002; Manton, Corder, and Stallard 1997; Manton and Gu, 2001)? The trends we examined will require continued surveillance as the Baby Boomers continue to age.

The first of the Baby Boom generation will reach age sixty-five in the year 2011. If rates of overweight and obesity continue to climb with the aging of the Baby Boom generation, the consequences for musculoskeletal conditions and disability will place an unprecedented burden on the generation and the society as a whole. Urgent public health and research efforts are needed to develop interventions to mitigate the impact of obesity on chronic disease and disability in older adults.

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