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Sexual Expression in Later Life: A Review and Synthesis

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In the past decade, researchers have begun to study the sexual functioning of typical older persons. This review summarizes literature on the sexuality of men and women over age 50 as researched by social and health scientists. Research on the relationship of biological factors (changes accompanying aging), health (physical, mental, and medication use), psychological factors (attitudes, information about sex), relationship factors (status, satisfaction), and sexual functioning (desire, dysfunctions, treatment) to sexual behavior is reviewed. The review suggests that (a) men and women remain sexually active into their 70s and 80s, (b) aging-related physical changes do not necessarily lead to decline in sexual functioning, and (c) good physical and mental health, positive attitudes toward sex in later life, and access to a healthy partner are associated with continued sexual activity. In turn, regular sexual expression is associated with good physical and mental health. Progress in understanding later life sexuality requires development of comprehensive theoretical models, a broad focus on intimacy, attention to measures and samples, and research on couples. Progress in understanding is especially important, given the aging of populations.

The sexual expression of typical, healthy older persons is a relatively neglected topic of research. There are hundreds of studies of the negative impact of specific illnesses, medical conditions, or medication on sexual functioning of persons over 55 years of age. Most of this work reflects a biomedical perspective. Recently, the advent of Viagra® and other forms of treatment have stimulated a substantial literature on the prevalence and pharmaceutical treatment of various sexual dysfunctions in later life. As noted by Tiefer (2007), much of this research also is based on a biomedical perspective, although there are exceptions (e.g., Laumann, Das, & Waite, 2008). The absence of research on sexuality in close relationships in later life was noted by Blieszner (2006) in a review of the literature. Neglect of the topic is strikingly evident in its omission from official documents. The World Health Organization (WHO) issued two reports in 2010: *Developing Sexual Health Programmes: A Framework for Action* (2010a) and *Measuring Sexual Health: Conceptual and Practical Considerations and Related Indicators* (2010b). Neither discusses sexual health/sexual functioning in later (post-reproductive) life. Similarly, there is no mention of the topic in *Older Americans 2010: Key Indicators of Well-Being*, published by the (United States) Federal Interagency Forum on Aging-Related Statistics (2010). Another striking indicator is the absence of research on sexuality from *Living Long and Well in the 21st Century: Strategic Directions for Research on Aging*, a document laying out "broad strategic goals and objectives" for future research on aging by the (United States) National Institute of Aging (2007).

This neglect is unfortunate. The dominance of research on problems of sexual functioning in later life creates a one-sided view and encourages the stereotype that healthy older people do not have or are not interested in sex. The lack of research based on representative samples of healthy people makes it difficult to develop generalizable models of sexual relationships in later life. Also, we cannot provide accurate information and support for older persons who wish to remain sexually active. Furthermore, there is little data on the potential benefits of sexual activity for quality of life, or data on which to base policy decisions regarding housing, sexual health care, and related programs for this age group.

I have been conducting research and writing on sexuality in later life for the past decade. Many individuals have contributed to this work, especially Janet Hyde, Laura Carpenter, Amelia Karraker, Sara Moorman, Morgan Sill, and Elise Guthmann. The quality of the work has benefitted from presentations to the Social Psychology and Microsociology, Center for Demography and Ecology, Center for Demography of Health and Aging, and Interdisciplinary Sexuality seminars, all at the University of Wisconsin–Madison. The quality of the article benefitted greatly from comments by anonymous reviewers and the editor. My sincere thanks to all.

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An understanding of the realities and potentials of sexual function at older ages is important for many reasons. First, the number of older adults in the United States is large; in 2009, there were 37.8 million persons 65 and older, comprising 12.5% of the population (U.S. Census Bureau, 2010b). The U.S. Census Bureau projects that this group will more than double in size to 88.5 million in 2050, then comprising one in five Americans. Second, men and women in the United States are living longer; life expectancy at birth increased from 70.8 in 1970 to 77.7 in 2006, and is expected to increase to 79.5 by 2020 (U.S. National Center for Health Statistics, 2009). Even more significantly, *active life expectancy* at age 65 (i.e., years with no health-related difficulty performing instrumental activities of daily living) is estimated to increase by 2.5 years by 2022 (Manton, Gu, & Lamb, 2006) These changes significantly increase the number of years of potential sexual activity in later life. Third, as families are smaller, and men and women are living longer, they no longer spend most of their adult years bearing and raising children; new stages of the later life course are emerging, including "empty nest" and "retirement" (Burgess, 2004). Individuals and couples may experience greater solitude and privacy during these years, and have greater opportunity to engage in sexual activity. All of these changes are occurring in many societies around the world.

Most importantly, regular (consensual) sexual expression contributes to physical and psychological well-being, and may reduce physical and mental health problems associated with aging (Burgess, 2004; Edwards & Booth, 1994). Brody (2010), reviewing the literature, reported that engaging in penile-vaginal intercourse is correlated with higher quality of intimate relationships, lower rates of depressive symptoms, improved cardiovascular health, and slimmer waist and hips in both men and women. In response to an online survey of 1,487 persons age 40 and older, more than 80% of the men of all ages and more than 62% of the women under 70 rated a "satisfying sexual relationship" as important to their quality of life (American Association of Retired Persons [AARP], 2010).

Method

The goal of this review was to identify typical patterns in sexual expression in later life. A variety of considerations were used in preparing the review.

Major surveys of sexual activity conducted before 2005 generally limited samples to persons under 60, so relatively little is known about older men and women. In the past six years, results from several large studies of older populations have been published. Although the ages included in each study vary widely, results are usually reported using age categories, often including one beginning at age 50. Where possible, therefore, I review data on persons 50 and older. Including the category 50 to 60 years of age allows assessment of the degree of continuity between this group and older groups.

As noted, there have been hundreds of studies of small samples of older persons who have been diagnosed or treated for accident or illness, or were taking some medication. Although informative, such research provides little indication of typical patterns of sexual expression among healthy older adults, who comprise most people over 50. This population is growing and living longer, and so such information is increasingly important. This review emphasizes research using representative, or community-based, samples.

Most published research on sexual activity is biased by a focus on partnered activity. As discussed later, the increasing reality for older adults in many societies, especially women, is living alone. Although partner loss is associated with cessation of sexual behavior for many (Karraker, DeLamater, & Schwartz, 2011), it may lead to masturbation for others, providing them with continued sexual gratification. Accordingly, sexual behavior is defined to include both partnered activity and masturbation. I include masturbation to highlight continuing sexual expression among single persons.

The vast majority of participants in research using community-based or representative samples are heterosexual, due to their predominance in populations. Thus, the data reviewed here is about partnered heterosexual activity and masturbation. There is only limited published research on typical patterns of sexual expression among older lesbian, gay, bisexual, and transgender (LGBT) persons; this may reflect their small numbers, or the fact that elderly LGBT persons may be closeted.

There are several recent surveys of large, representative, or community samples of persons over 40 years. Six of these were conducted in the United States. This review also includes results from survey research conducted in Australia, England, Finland, Germany, the Netherlands, and Sweden, among other countries.

Relevant research was identified by a search of databases, including Academic Search, PsycINFO®, and PubMed. Keywords included *sexual activity, sexual behavior, aging, mature, later life*, and *old.* Other research was identified during my tenure as the editor of a major international sexuality journal for 10 years (ending in 2008), and through the regular updating of a human sexuality textbook (most recently in 2010).

A major problem with research in this area is variation in terminology and measures. To accurately represent results, this review uses the terminology used by those whose work is reviewed. Thus, the review of research on sexual activity below uses several different terms, including "sexually active," "in a sexually intimate relationship," and "engaging in sexual intercourse."

Most of the research cited has been published since 2000, and provides data on persons over 50 years of

age. An obvious question is whether persons aged 20 to 30 today will be similar to or different from today's 50- to 60–year-olds when they are 50 to 60. This is the issue of cohort effects—the influence of when one is born and grows into adulthood—on later outcomes. What changes might occur with time that will influence type and frequency of sexual expression of younger cohorts? This review identifies four such changes: improvements in health, more positive attitudes toward sexual activity in later life, greater access to accurate sexual knowledge, and changes in patterns of intimate relationships.

I will begin by defining *sexual functioning.* I present recent data on frequency of sexual activity (which reflects functioning) among men and women 50 and older. An interdisciplinary, biopsychosocial model (DeLamater & Karraker, 2009) provided the structure for the review. These influences—biological (aging, health), psychological (attitudes, information), and relationships—can be thought of as mechanisms by which life events affect sexual functioning (Das, Laumann, & Waite, in press). Having considered these contributors to sexual functioning in later life, I reviewed the literature on sexual dysfunctions and aging and recent literature on the incidences and influences on two major components of sexual expression—sexual desire and sexual behavior—in later life. I consider the issue of cohort differences in relation to differences in sexual expression as people age. The review concludes with a discussion of limitations and needed future directions.

Sexual Function

A first task was to define *sexual functioning.* Until recently, the published literature on sexuality and aging has concentrated on sexual dysfunctions, particularly among older men. This reflects the medicalization of sexual functioning (Tiefer, 1996). Thus, much of the literature deals with sexual interest or desire, capacity for sexual intercourse, and erectile dysfunction. However, a broader perspective was necessary to appreciate the role of sexuality in later life. We need to consider the range of sexual activities, including solo and partnered masturbation and oral sex. Also, the definition should include both objective and subjective components (Araujo, Mohr, & McKinlay, 2004). Laumann et al. (2006) focused on ''subjective sexual well-being'' in their survey of men and women from 29 countries, defined as the ''cognitive and emotional evaluation of an individual's sexuality'' (p. 145). It referred to the perceived quality of or satisfaction with the person's sexual life and relationships.

A technical consultation convened by WHO (2010b) did not discuss sexual functioning, and was unable to agree on a definition of *healthy sexuality.* Drawing on their discussion, I propose the following definition: Sexual functioning refers to one's ability to engage in sexual expression and sexual relationships that are rewarding, and the state of one's physical, mental, and social well-being in relation to his or her sexuality.

Sexual Behavior

Data on frequency of sexual behavior among older persons in the United States is available from three recent surveys: the AARP (2010) survey conducted in 2009; the National Social Life, Health, and Aging Project (NSHAP; see Waite, Laumann, Das, & Schumm, 2009) survey conducted from 2005 through 2006; and the National Survey of Sexual Health and Behavior (Herbenick et al., 2010) conducted in 2009. The latter is a cross-sectional survey of persons aged 14 to 94 and, therefore, covers the broadest age range. The sampling frame was constructed via a complex process, described in Herbenick et al. (2010). Persons in the frame were invited to complete a survey via the Internet; 52% of the adults contacted participated. There are 950 male and 958 female participants over the age of 50.

Table 1 presents data on the sexual activity reported by persons over 50 in the year prior to the survey. The data included all respondents, whether partnered or not. Solo masturbation was common among older American men and women; 46% of the oldest men (70+) and 33% of the oldest women reported engaging in the behavior. This was a clear indicator of the extent of continuing sexual expression in this population. The incidence did decline with age, and men were more likely to report the behavior. Men with partners were less likely to engage in solo masturbation, whereas, among women, this behavior was not related to partnered status.

Men were somewhat more likely to report giving and receiving oral sex with a female partner (48% and 44%, respectively, for men 50–59) than women were to report

Table 1. *Sexual Behaviors in the Past Year by Gender and Age*

	Male (Age)			Female (Age)		
Variable	**50–59**[a]	**60–69**[b]	**70+**[c]	**50–59**[d]	**60–69**[e]	**70+**[f]
Masturbated alone	72.1%	61.2%	46.4%	54.1%	46.5%	32.8%
Masturbated with partner	27.9%	17.0%	12.9%	17.7%	13.1%	5.3%
Received oral sex from female	48.5%	37.5%	19.2%	0.9%	0.6%	1.5%
Received oral sex from male	8.4%	2.6%	2.4%	34.2%	24.8%	7.8%
Gave oral sex to female	44.1%	34.3%	24.3%	0.9%	0.9%	1.5%
Gave oral sex to male	8.0%	2.6%	3.0%	36.2%	23.4%	6.8%
Vaginal intercourse	57.9%	53.5%	42.9%	51.4%	42.2%	21.6%
Inserted penis into anus	11.3%	5.8%	1.7%	—	—	—
Received penis in anus	4.6%	6.0%	1.7%	5.6%	4.0%	1.0%

Note. Data are taken from the National Survey of Sexual Health and Behavior.
[a] $n = 454$; [b] $n = 317$; [c] $n = 179$; [d] $n = 435$; [e] $n = 331$; [f] $n = 192$.

these behaviors with a male partner (34% and 36%, respectively, among those 50 to 59). Nineteen and 24% of the men aged 70 or older reported these behaviors, compared to 8% and 7% of the women 70 or older. Vaginal intercourse was reported by 58% of men and 51% of women aged 50 to 59; the incidence declined to 43% among men 70+, and more sharply to 22% among women 70 and older. Analyses of these data indicated that the decline among women was primarily related to relationship status—that is, loss of a male partner (Schick et al., 2010). Self-reported health was a significant predictor of frequency of several of these activities among both men and women.

These results were consistent with those reported by the NSHAP (Waite et al., 2009). In the age range 57 to 85, men were more likely to have a sexual partner and, as a result, more likely to engage in partnered sexual activity. A high proportion of those who are sexually active reported that they always or almost always engage in vaginal intercourse. Also, among those who remain sexually active, rates of activity remain fairly consistent through age 75. A survey of 2,341 German men and women aged 18 to 93 found that engaging in sexual intimacy was primarily related to having a partner (Beutel, Stobel-Richter, & Brahler, 2007).

Data from Finland (Kontula, 2009) indicate that men aged 65 to 74 reported engaging in sexual intercourse about 2.7 times per month, in a survey conducted in 2007. Women in the same age range reported engaging in intercourse about 1.8 times per month.

Hyde et al. (2010) reported data from a longitudinal study of men over 75, residing in Perth, Australia. Some 2,783 men provided data on their sexual activity in 2008 and 2009. Among men aged 75 to 79, 40% were sexually active in the previous year. For men aged 80 to 84, 27% were sexually active; among men aged 85 to 89, 19% were sexually active; and among men aged 90 to 95, 11% were sexually active.

Thus, sexual activity remains a significant component of life and relationships well into the 70s. Having a sexual partner and being in good health are the primary influences or mechanisms (Karraker et al., 2011). As noted earlier, maintaining sexual activity will likely increase in importance as more people live longer and live more years in better health.

Influences on Sexual Expression

The literature on sexual expression has identified biological, psychological, and social factors as important. Each is considered in turn.

Biological Factors

Biological factors include physical changes associated with aging, physical health, mental health, and medications taken for health-related conditions. Physical and mental well-being are important to sexual expression.

Physical changes associated with aging. Aging is associated with physical changes in women and in men—changes that may impact sexual functioning. The most noticeable changes in women are related to declining functioning of the ovaries during the climacteric. Women may experience vaginal dryness and atrophy, due to the gradual decline in levels of estrogen in the body. It is estimated that as many as 60% of postmenopausal women experience these conditions (Krychman, 2007); consequences, however, vary a great deal, from none to severe. Serious symptoms include aches and itching in the vulva and vagina, burning, and dyspareunia. Obviously, these may lead to reduced frequency or cessation of sexual activity. The experience of serious symptoms does not appear to be common. A study of a random sample of urban women 40 to 79 years of age in Australia found that vaginal dryness was reported as always present by only 11.5%, and never present by 35.8% (Howard, O'Neill, & Travers, 2006). Dyspareunia was experienced one-half of the time or more by only 14.6% of the women. The incidence of dryness and of dyspareunia did not significantly differ by age.

The incidence of these symptoms varies by country. The Global Survey of Sexual Attitudes and Practices surveyed 6,725 women in 11 countries (Leiblum, Hayes, Wanser, & Nelson, 2009). Reported rates of vaginal dryness varied from 5.8% (Italy) to 19.7% (Brazil). Reports of dryness significantly increased with age in seven countries. Among women reporting the condition, the proportion who considered it very bothersome varied from 5.6% (United Kingdom) to 26.4% (Germany). Reports of bothersomeness were significantly greater in older women (50–65) in only two countries (Argentina and Canada).

Menopause refers to the cessation of menstruation, which is perhaps the most visible change related to the climacteric. Many studies have attempted to assess the impact of menopause on sexual functioning. Some researchers found that women report less frequent sexual activity in association with menopause, whereas others found that women report no change (Koch, Mansfield, Thurau, & Carey, 2005). Hinchliff and Gott (2008) conducted in-depth interviews with heterosexual women aged 50 and older. They reported that there is no evidence that these women experienced declining sexual desire as a result of menopause. The effect of menopause on sexual activity depends, in part, on the meaning women attribute to it. Dillaway (in press) found that some women reported that sex was more exciting and desirable after menopause, whereas others were upset by the loss of reproductive capacity and had negative feelings about sexuality.

The analogous change in men is a slow decline in testosterone production; this is much more gradual than the decline in estrogen production in women, and so its consequences may take much longer to appear and

may be subtle. Consequences for sexual functioning may include slower erections, less firm erections, decreased likelihood of orgasms, and longer refractory periods (Aubin & Heiman, 2004).

In short, there is little evidence that the normal physical changes that accompany aging necessarily or irreversibly impact sexual functioning.

The meanings—and, therefore, their impact on sexual functioning—of the physical changes associated with aging that people experience are derived from social values. Many persons experience age-related changes in physical appearance, including changes in skin tone and firmness, amount and coloring of hair, physical vitality, and so forth. These changes are reminders of biological aging, and may be stressful for those who live in an ageist society (Slevin & Mowery, in press). The United States and other Western societies are youth oriented. Residents are surrounded by youthful images in the media, and most celebrities are young and attractive by conventional standards. Aging means movement away from that youthful status, and may have negative effects on one's self-image and body image. Aging men and women may feel they are no longer physically or sexually attractive, undermining their sexual desire, even though their physical capacity has not declined. Burgess (2004) argued that this is especially problematic for women. Koch and colleagues (2005) found that midlife women who reported declining sexual desire and frequency of activity also reported that they were less physically attractive than 10 years earlier, regardless of age.

Another influence on women's interest in and desire for sexual activity is pronatalism—social pressure to reproduce and an emphasis on reproduction—as the (only) goal of sexual activity (Baker, 2005). Some men and women define womanhood in terms of motherhood; loss of the ability to reproduce at menopause may result in the belief that there is no longer any reason to engage in sexual activity. Thus, social values may result in cessation of sexual activity by some (older) persons.

Health and sexual functioning.

Physical health. Much of the research on health relies on self-reported health, usually a single item asking the respondent to rate his or her health as excellent, very good, good, fair, or poor. The AARP (2010) survey included 503 men and 547 women aged 40 and older; the data were collected by Knowledge Networks. Self-rated health, using a five-category measure, did not vary by age; 78% of men and women aged 50 and older rated their health "good," "very good," or "excellent."

Lindau and Gavrilova (2010) calculated sexually active life expectancy, "defined as the average number of years remaining spent as sexually active" (p. 3). Their estimates took into account the likelihood of having a partner and of being institutionalized at specific ages. At age 55, they estimated sexually active life expectancy at 15 years for men and at 10.6 years for women. For people with a partner, the expectancy was very similar for men and women (i.e., the overall difference reflects the greater likelihood that women will lose their partner in later life). Men in excellent or good health are estimated to gain five to seven additional years of sexual activity compared to men in fair or poor health; women in excellent or good health were estimated to gain three to six years.

Older men and women who report that their health is excellent or good are more likely to be sexually active than those who report that their health is fair or poor (Lindau & Gavrilova, 2010). In the AARP (2010) results, there is a strong, positive association between the rating of one's health and reports of engaging in sexual intercourse at least once per week. Reporting results from two nationally representative surveys in Finland in the 1990s, Kontula and Haavio-Mannila (2009) concluded that good health and active sexual history were predictive of sexual activity for men, and sexual desire and a healthy partner were predictive of sexual activity for women. Thus, good health is related to continuing sexual activity, and self-reported health does not inevitably decline with age.

We noted earlier the substantial literature on the impact of chronic conditions and illness on sexual functioning. The AARP (1999) conducted a questionnaire survey of 1,384 respondents aged 45 and older. Participants were asked which serious medical conditions they had been diagnosed with; one-third of men and women had been diagnosed with high blood pressure, 19% of men and 31% of women with arthritis, 15.6% of men with swollen prostate, and 14% of men and 12% of women with diabetes. However, asked whether they had a condition that restricted their sexual activity, $<16\%$ of the men and 6% of the women said that they did (see Table 2).

Lindau et al. (2007) reported results from the NSHAP, based on face-to-face interviews with a national probability sample of 3,005 adults aged 57 to 85. Respondents who reported that their health was fair or poor, ranging from 20% of the younger to 33% of the older participants, were less likely to be sexually active and reported a higher incidence of sexual problems. In correlational analyses, diabetes was associated with reduced female sexual activity and increased erectile difficulties among males; it was also associated with less frequent masturbation by both men and women. Reports of pain during intercourse were associated with diabetes in men and arthritis in women. Finally, lack of pleasure was associated with reports of hypertension among men. Thus, the results indicate that diabetes and hypertension are associated with sexual dysfunctions among older men and women; the AARP (1999) results indicate the incidence of these diseases is $<12\%$.

Table 2. *Conditions That Respondents Think Restrict Sexual Activity*

	Male (Age)			Female (Age)		
Variable	**45–59**[a]	**60–74**[b]	**75+**[c]	**45–59**[d]	**60–74**[e]	**75+**[f]
Have conditions that restrict sexual activity	18.2%	39.0%	44.6%	15.8%	10.4%	13.3%
High blood pressure	8.2%	15.6%	11.1%	2.7%	4.0%	3.4%
Arthritis or rheumatism	4.4%	4.9%	4.4%	5.7%	5.9%	4.2%
Diabetes	3.5%	10.7%	6.7%	1.1%	2.0%	2.5%
Depression	4.1%	0.5%	1.1%	4.1%	2.0%	1.7%
Enlarged or swollen prostate	2.1%	9.3%	7.8%	—	—	—
Prostate cancer	0.3%	4.4%	11.1%	—	—	—

Note. Source: American Association of Retired Persons (1999).
[a]$n = 341$; [b]$n = 205$; [c]$n = 90$; [d]$n = 368$; [e]$n = 253$; [f]$n = 119$.

Moreira et al. (2008) reported results of a telephone survey of 750 men and 750 women aged 40 to 80 in Australia. Diabetes was a significant correlate of erectile difficulties in men.

Howard et al. (2006) studied sexual functioning in a sample of 474 Australian women aged 40 to 79. These women reported a variety of medical conditions including breast cancer, diabetes, hypertension, and osteoarthritis; their surgical history was also assessed. Howard et al concluded, ''Overall, women with medical conditions showed no increase in sexual distress compared with women without medical conditions'' (p. 363). In the same vein, Kontula and Haavio-Mannila (2009), based on analyses of the Finnish survey data, concluded that illness seldom causes sexual problems.

Thus, the evidence does not support the contention that medical illnesses are a major influence on declining sexual desire and behavior or increasing sexual distress and dysfunction in later life. The literature does suggest that improvements in the health of a population will increase rates of sexual activity in later life.

Mental health. Mental health also influences sexual functioning in later life. Laumann et al. (2008), analyzing data from NSHAP, reported that scores on an anxiety scale were related to sexual difficulties among both men and women. Increased anxiety was associated with lack of sexual interest in both women and men, and with increased anorgasmia and lack of pleasure from sex among women (also see Moreira et al., 2008). Symptoms of depression were associated with anorgasmia and erectile problems among men. Self-ratings of mental health as fair or poor were correlated with reports of problems in sexual functioning among women. Among men, low scores on at least one of three measures—anxiety, depression, or self-rated mental health—were related to reports of several sexual problems (also see Brody, 2010). Laumann et al. (2008) concluded that stress, a major contributor to anxiety and depression, may be a primary cause of reduced sexual functioning (in later life).

A common experience for older persons is caring for a sick partner (Blieszner, 2006). This experience can be stressful, especially if the partner is frail or suffering from dementia. Family caregivers may experience exhaustion, guilt or resentment, financial pressures, and other worries, which will likely impact sexual functioning in their intimate relationships (Burgess, 2004). Thus, there is a positive relationship between mental health and sexual functioning in later life.

Medications. As noted in the introduction of this article, there is substantial literature on the influence of prescription drugs on sexual functioning in small samples of older persons. Significant numbers of older adults take various drugs, some of which are known to impact sexual functioning. The impression is created that drugs are a major reason why older people stop engaging in sexual activity. Thus, it is important to assess this relationship in large samples of typical adults.

The AARP (2010) survey asked adults aged 50 and older what prescription drugs they take. Overall, 47% of men and of women reported taking blood pressure medication, 41% of men and 36% of women reported taking medication to lower cholesterol, and medication to relieve pain was being taken by 39% of men and 43% of women. The frequency of use of all three drugs increased with age in both genders. Thus, three medications were reportedly taken by more than one-third of the respondents (see Table 3).

DeLamater and Sill (2005) conducted extensive analyses of the AARP data from 1999 focused on influences on sexual desire. The measure of desire included two items: frequency of sexual thoughts and of sexual desire. A two-item index of desire was negatively related to regular use of anticoagulants, cardiovascular medications, medications to control cholesterol, and drugs to reduce hypertension among women. It was negatively related to taking anticoagulants and medications for hypertension among men. These correlations were significant and uniformly small; the largest was $-.19$. In multivariate analyses, the total number of drugs being taken regularly was significantly related to desire, but the coefficients were much smaller than those for the rated importance of sex to the person (an attitude) and presence of a partner for women.

DeLamater and Moorman (2007) conducted regression analyses of the 1999 AARP data focused on influences on frequency of sexual behavior. Diagnosed illnesses and medication use were generally unrelated to frequency of sexual activity. Sexual attitudes were significantly related to frequency of partnered behavior,

Table 3. *Prescription Drug Use*

Variable	Male (Age)				Female (Age)			
	45–49[a]	50–59[b]	60–69[c]	70+[d]	40–49[e]	50–59[f]	60–69[g]	70+[h]
Blood pressure pills	30%	36%	48%	69%	16%	40%	50%	54%
Medications for cholesterol	23%	28%	53%	56%	16%	23%	40%	51%
Pain killers	29%	32%	47%	43%	26%	39%	47%	46%
Pills or other medications to thin blood	11%	11%	37%	39%	5%	9%	11%	18%
Pills/paste patches or anything for heart or heartbeat	4%	7%	25%	27%	5%	7%	8%	9%
Medications for depression	12%	8%	14%	7%	16%	18%	18%	10%
Sleeping pills or other medications to help you sleep	13%	13%	18%	11%	16%	20%	14%	22%
Medications for a nervous condition, such as tranquilizers	3%	5%	11%	2%	8%	11%	7%	9%
Medications to improve sexual functioning	6%	10%	13%	9%	1%	1%	0%	0%
Any androgens, testoderm, or bromocriptine	1%	2%	1%	4%	0%	0%	0%	0%

Note. Source: American Association of Retired Persons (2010).
[a]$n = 82$; [b]$n = 198$; [c]$n = 151$; [d]$n = 92$; [e]$n = 77$; [f]$n = 205$; [g]$n = 188$; [h]$n = 113$.

and sexual desire was related to frequency of masturbation among both women and men. Satisfaction with the physical relationship with a partner was strongly related to behavior. Age remained significant after all other factors were controlled.

Psychological Factors

Attitudes about sex. As reported by DeLamater and Moorman (2007), attitudes about sexuality are an important influence on frequency of partnered sexual behavior. The AARP (1999) data they analyzed, a survey of persons aged 45 and older, included three measures of the importance of sex to a relationship (e.g., ''Sexual activity is a critical part of a good relationship''). One-third to one-half of men and women agreed with each item. Three additional items measured the importance of sex to the person (e.g., ''Sexual activity is important to my overall quality of life,'' and ''I would be quite happy never having sex again''). Fifty-nine percent of the men agreed or strongly agreed with the first statement, compared to 35% of the women. Conversely, 3% of the men agreed with the second statement, compared to 20% of the women. Thus, men were more likely to rate sex as important than women were. Results from the AARP (2010) online survey conducted 10 years later are similar.

A survey of a community sample of 844 adults over aged 65 living in Melbourne, Australia found that men and women who rated sexual expression as important to their well-being were more likely to be in a sexual relationship (Minichiello, Plummer, & Loxton, 2004).

The AARP (1999) survey included two items measuring attitudes toward sex at older ages: ''Sex becomes less important to people as they age,'' and ''Sex is only for younger people.'' Thirty-nine percent of men and 37% of women agreed/strongly agreed with the former statement, and only 2% and 5% agreed with the latter statement.

The Associated Press—LifeGoesStrong.com Relationships Survey (Knowledge Networks, 2010) surveyed 945 adults aged 45 to 75. Asked to choose between ''Sexual activity is a critical part of a strong relationship,'' or ''Couples can have a strong relationship without sexual activity,'' 45% of persons aged 45 to 65 chose the former statement, compared to 29% of the persons aged 65 and older; these results are consistent with those reported by the AARP (1999). With regard to attitudes about sex as people age, 51% of respondents aged 45 to 65 endorsed the statement, ''Sex becomes less important to most people as they get older,'' as did 76% of those over age 65.

The NSHAP survey included the attitude statement, ''Sexual ability decreases with age.'' Among men, 68% of those aged 57 to 64 agreed, as did 72% of those aged 65 to 74 and 78.5% of men aged 75 to 85. Among women, the comparable percentages were 71%, 83%, and 89%, respectively (Waite et al., 2009).

Thus, substantial percentages of older persons do believe that sex declines in importance as they age. The results of two surveys in Finland indicate that men and women (of all ages) who rated sex as important reported more frequent sexual activity (Kontula, 2009). DeLamater and Sill (2005), analyzing the 1999 AARP data, constructed three-item indexes of attitudes about the importance of sex for the self and of sex for relationships. Both attitude measures were significantly correlated with reported sexual desire; men and women who agreed that sex was important to them reported significantly greater desire ($r = .31$ and $r = .19$, respectively). Men and women who agreed they would be happy never having sex again reported significantly lower sexual desire ($r = -.47$ and $r = -.57$, respectively). In regression analyses with desire as the outcome variable, attitudes were associated with the largest beta coefficients after age.

This research demonstrates the importance of positive attitudes to continuing sexual activity. A later section suggests that attitude change may be related to cohort effects on sexual expression.

Information about sexuality. It is plausible that information about sexuality, and especially sexuality in later life, influences sexual activity. There is almost no systematic empirical research on this issue. One exception is the survey of adults in Melbourne (Minichiello et al., 2004). Higher scores on a six-item sexual knowledge scale were associated with being in a sexual relationship, for both men and women. There are many anecdotal reports of elderly persons ceasing to engage in partnered sexual activity because they mistakenly believe that one should not do so following major health events (e.g., a heart attack or fears about negative health consequences for self or partner). "Older adults are misinformed about normative patterns of aging and often rely on stereotypes in order to understand sexuality and older adults" (Burgess, 2004, p. 439). The need for accurate sex education for older adults is recognized by the recent development of a curriculum for that group in the United States (Brick, Lunquist, Sandak, & Taverner, 2010).

Relationships/Social Well-Being

Most sexual activity is coupled (Gagnon, Giami, Michaels, & de Colomby, 2001). The foundation of couple relationships or partnering is a desire for sexual and emotional intimacy (Sassler, 2010). The research summarized earlier indicates that coupled relationships are typically beneficial for physical and mental health. Couple relationships provide instrumental and emotional support, social support, and meaningful activity (Blieszner, 2006); as people age, the partner may become more important as one, or the only, source of these rewards.

Relationship status. Table 4 describes the marital status of men and women over age 45 in the United States (U.S. Census Bureau, 2010a). Among men, 67% to 72% are married. Among women aged 45 to 64, about 63% are married; the percentage sharply declines to 40% among women over age 65. This reflects two demographic characteristics. Women in the United States marry men who are, on average, 2.6 years older (England & McClintock, 2009). Women live longer than men, as noted earlier—typically, five to seven years. Thus, many older women are widowed.

Married men and women report more frequent partnered sexual activity than formerly married or single persons, particularly at older ages (Lindau & Gavrilova, 2010). This reflects cultural norms limiting intimate sexual activity to persons in committed relationships. The prevalence of sexual activity declines with age (particularly between 57 and 85 years of age), especially among women (Lindau et al., 2007; see Table 1). The most significant contributor to the decline among women is the increase in the percentage widowed (DeLamater & Moorman, 2007), as reflected in Table 4.

Across the range of statuses, frequency of sexual activity is highest among the currently married, intermediate among never married and divorced persons, and lowest among widowed persons (Smith, 2006). Smith primarily attributed this variation to availability of a partner, recognizing that health becomes a factor as people age.

Population level changes in types or incidences of relationships may impact rates of sexual activity (Karraker et al., 2011). New relationship forms have emerged in the United States in the past two decades. Manning and Brown (2009) estimated that, in 2009, 2% of older Americans were cohabiting. They suggested that one reason these couples do not marry is a desire to maintain financial autonomy. Research on sexual activity in a national representative sample indicates that cohabitors report more frequent partnered activity than married couples (Yabiku & Gager, 2009; i.e., 12 times per month vs. six times per month). Several analysts have noted the development of "living apart together" (i.e., maintaining an intimate relationship while living in separate residences) relationships. Blieszner (2006) and Manning and Brown (2009) stated that these relationships are becoming more common among older persons in Scandinavian countries; the arrangement allows for intimacy while maintaining autonomy and limiting the demands of the traditional gendered division of household labor. Living in separate residences may be associated with less frequent sexual activity.

Table 4. *Marital Status, United States, 2009*

Age and Sex	Total	Now Married[a]	Widowed	Divorced	Separated	Never Married
Males						
45–54	21,493,896	66.80%	1.00%	15.60%	2.60%	14.00%
55–64	15,712,993	72.40%	2.50%	15.20%	2.00%	7.90%
65 and older	16,027,330	71.40%	13.80%	8.90%	1.30%	4.60%
Females						
45–54	22,152,876	64.10%	3.20%	18.40%	3.60%	10.80%
55–64	16,888,360	62.30%	9.10%	19.20%	2.40%	7.00%
65 and older	21,973,540	43.40%	43.40%	10.60%	1.00%	4.60%

Note. Source: 2005–2009 American Community Survey (U.S. Census Bureau, 2010a, Table S1201).
[a]Except separated couples.

Nine to 19% of men and women over age 45 in the United States are divorced (see Table 4). As noted, frequency of sexual activity in this group is intermediate between married and widowed persons. Research using the National Health and Social Life Survey (NHSLS) data on persons aged 18 to 59 found that resuming sexual activity following divorce or dissolution of a cohabiting relationship was related to recency of the event. There was a significant, positive relationship between having left a relationship within the past year and more frequent sexual activity (Wade & DeLamater, 2002). Stack and Gundlach (1992), analyzing older General Social Survey data, reported that men were more likely to be sexually active following divorce than women, and that likelihood of being sexually active declined with age. Qualitative research (Lichtenstein, in press) suggests that whether divorced women reenter the dating scene and become sexually active partly depends on whether they are financially independent. Data from the Associated Press—LifeGoesStrong.com Relationships Survey (Knowledge Networks, 2010) poll indicates that one of three divorced persons between the ages of 45 and 65 is dating, compared to only one in ten of divorced persons over age 65. Poor adjustment to the stresses of divorce/dissolution greatly reduces one's chances of forming a new romantic relationship (Coleman, Ganong, & Leon, 2006). Women face the structural barrier to forming a new relationship of an increasingly lopsided sex ratio as they age (England & McClintock, 2009). The likelihood is further reduced by the fact that White men over 60 years of age marry women who are nine years younger, on average; Black men over 60 marry women who are 12 years younger.

The AARP (2004) conducted a study of divorced persons in 2004. Interviews were conducted with 1,147 persons aged 40 to 79 who were divorced at least once during their 40s, 50s, or 60s. Thirty percent were aged 60 to 69 at the time of the interview, whereas 13% were age 70 to 79. Seventy-five percent reported a divorce between the ages of 40 and 49. Most (87% of the men and 79% of the women) dated after the divorce, and 54% of the men who dated and 39% of the women who dated remarried. At the time of the interview, 56% were divorced/separated, 31% remarried, 9% cohabiting, and 5% widowed. Whether the person engaged in sexual activity and frequency of sexual activity in the preceding six months was primarily associated with being (re)married.

These data indicate that relationship or marital status is perhaps the major influence on the frequency of heterosexual sexual activity in later life.

Relationship satisfaction. For those in committed relationships, the quality of or satisfaction with that relationship is a major influence on sexual activity. The AARP (1999) survey asked each respondent how satisfied she or he was with their sex life. Sixty percent of the men and women between the ages of 45 and 59 were satisfied, declining to 35% of men and women over age 75. In regression analyses of the data, satisfaction was significantly associated with frequency of partnered sexual activity, with greater satisfaction associated with more frequent hugging and kissing, oral sex, and vaginal intercourse (DeLamater & Moorman, 2007). Smith (2006) reported that, across the adult age range, rating one's marriage as happier is associated with more frequent sexual intercourse. Laumann et al. (2008) reported that, among men and women aged 57 to 85, satisfaction with the relationship was associated with less frequent reports of reduced sexual interest, lack of pleasure, and women's anorgasmia.

Huang et al. (2009) reported data on an ethnically diverse sample of 1,971 women aged 45 to 80. Overall, the percentage reporting being moderately or very sexually satisfied during the preceding three months slightly declined from 61% of those aged 45 to 54 to 54% of those over age 65. The same trend was observed among sexually active women. Note the decline is just 7%. In multivariate analyses, sexually active Latina women were more likely to report being sexually satisfied than sexually active White women. It should be noted that 29% to 45% of sexually inactive woman reported being satisfied.

Finally, Yabiku and Gager (2009) used the National Survey of Families and Households data to examine the relationship between frequency of sexual activity and union dissolution. Using reported sexual frequency in 1987 through 1988, they looked at whether unions were intact in 1992 through 1994. The data included 5,440 marital unions and 462 cohabiting unions. Forty-seven percent of the cohabiting unions versus 10% of the marital unions dissolved in the interim. The results indicated that low sexual frequency was significantly associated with dissolution, and the relationship was stronger among cohabiters.

Sexual functioning.

Sexual desire. Much of the literature on sexual functioning presumes, implicitly or explicitly, that sexual desire is important. Desire is thought to index motivation for sexual activity and gratification.

Reported sexual desire sharply declines with age, although there is some variation across studies. In the AARP (1999) data, 76.5% of men aged 45 to 59 reported desire a few times per week, declining to 43% among men aged 60 to 74, and 17% among men over age 75. Among women, the comparable percentages were 36%, 11%, and 4%, respectively. Thus, women were much less likely to report frequent sexual desire than men. These percentages appear similar to those reported for these age groups by Kontula (2009) for Finnish adults.

Howard and colleagues (2006) collected questionnaire data from 474 Australian women; about 120

women were in each of four age groups: 40 to 49, 50 to 59, 60 to 69, and 70 to 79. Sexual interest was assessed by three questions: frequency of sexual thoughts, of enjoyment of sex, and of sexual arousal. Mean sexual interest scores declined from 15.1 among the youngest to 13.0 among those aged 70 to 79; decline in reported sexual arousal was much more substantial.

Huang and colleagues (2009) assessed sexual desire/interest using items from the Female Sexual Function Index. The sample was an ethnically diverse group of women participating in the Kaiser Permanente Medical Program; women had to have been enrolled since age 24. Scores indicating at least moderate sexual desire were obtained by 56% of women aged 45 to 54, 35% of women aged 55 to 64, and 29% of women aged 65 and older. This decline is less substantial than those reported in the AARP (1999) survey and by Kontula (2009). The percentages of women reporting at least moderate desire by race or ethnicity were 41% of White, 50% of Black, 46% of Latina, and 39% of Asian women.

Lindau and Gavrilova (2010) analyzed data from two surveys (the national survey of Midlife Development in the United States, with 3,032 respondents aged 25 to 74; and the NSHAP, with 3,005 respondents aged 57 to 85). Both surveys assessed sexual interest. The results indicated that, among men, sexual interest was stable across age groups, and did not vary by whether the respondent had a partner. For women, interest significantly declined after age 60, and was much lower among women without a partner.

Thus, the relationship between age and reported sexual desire varies across studies. In the AARP (1999) data, and the results reported by Kontula (2009), desire sharply declines with age among both men and women. Lindau and Gavrilova (2010) found that it declines only among women after age 60. In the research by Howard and colleagues (2006) and Huang and colleagues (2009), the decline among women is less pronounced. Clearly, desire does not always decline as men and women age, suggesting that other variables, such as partnered status and health/stress, are influential.

Is level of desire related to sexual behavior? Kontula and Haavio-Mannila (2009), analyzing data from two surveys of adults in Finland, reported that frequency of desire predicted frequency of sexual intercourse in both samples. Analyzing the AARP (1999) data, DeLamater and Moorman (2007) found that sexual desire was significantly associated with reported frequency of sexual touch and sexual intercourse for both men and women; desire was also associated with frequency of masturbation. The effect sizes tended to be substantial. Thus, desire is significantly associated with frequency of sexual activity in later life.

Sexual dysfunctions. As noted earlier, much of the recent literature on sexuality among older adults is focused on sexual dysfunctions, contributing to the stereotype that later life is a time of diminished or no sexual activity. The following discussion considers issues related to desire, arousal, orgasm, and sexual pain/use of lubricants.

Problems of desire. Among men, analyses of the NHSLS found that 17% of men aged 50 to 59 reported lack of interest in sex in the past year (Laumann, Paik, & Rosen, 1999). Analyses of NSHAP data found that 28% of the 57- to 74-year-olds and 24% of those aged 75 to 85 reported lack of interest in the preceding year, with no trend by age. Black men were significantly more likely to report lack of interest in sex (Laumann et al., 2008). In the AARP (1999) data, the percentage reporting no sexual desire at all increased from 2% of those aged 45 to 59 to 16.5% of men over age 75. Note the substantial difference between incidence reported in the NSHAP interviews (higher) and on the AARP (1999) questionnaire (lower). Kontula and Haavio-Mannila (2009) reported data from two surveys in Finland, with data from 705 men aged 45 to 74; they asked whether lack of sexual desire caused problems very or quite often in the past year. The percentage saying "yes" was 13% among 45- to 54-year-olds, 12% among 55- to 64-year-olds, and 30% among men age 65 to 74 (age-trend significant). These data indicate that, for men, reported lack of sexual interest/desire does increase with age. On the other hand, Moreira et al. (2008) found that 18% of 750 Australian men aged 40 to 80 reported lack of sexual interest, with no variation by age.

Among women, analyses of the NHSLS data found that one-third of the respondents reported lack of interest in sex in the past year, with little variation by age. Analyses of NSHAP data for women aged 57 to 85 found that 45% of the 57- to 64-year-olds and 49% of those aged 75 to 85 reported lack of interest in the preceding year, with no significant trend by age. In the AARP (1999) data, on the other hand, the percentage reporting no sexual desire at all increased from 7% of those aged 45 to 59 to 59% of women over age 75. Note the substantial difference between incidence reported by younger women in the NSHAP interviews (higher) and on the AARP (1999) questionnaire (lower). The AARP (1999) sample was recruited by mail and is, in some sense, a convenience sample, whereas the NSHAP sample may be more representative; thus, AARP (1999) respondents may be healthier, on average, accounting for the lower incidence of reports of no sexual desire.

In the Finnish survey data, 32% of women aged 45 to 54 and 54% of women aged 55 to 74 reported that lack of desire caused problems (age-trend significant; Kontula & Haavio-Mannila, 2009). Howard and colleagues (2006), based on data from 474 Australian women aged 40 to 79, reported a slight decline in scores on a three-item index of sexual interest, and a substantial

increase in the percentage of women saying they "never" have sexual thoughts, from 8.3% of women aged 40 to 49 to 54.5% of women aged 70 to 79. On the other hand, Moreira et al. (2008) found that lack of sexual interest was reported by 33% of 750 Australian women aged 40 to 80, with no variation by age. Huang and colleagues (2009), in their ethnically diverse sample of 1,977 women aged 45 to 80, found that lack of interest in sex was reported as the primary reason for sexual inactivity (by 39%), followed by lack of partner (36%). Hayes et al. (2007) studied samples of women aged 20 to 70 from Europe (France, Germany, Italy, and the United Kingdom) and the United States, using a self-administered questionnaire that included the Profile of Female Sexual Functioning. They found an increase in the percentage of women with low desire in Europe, from 11% of those aged 20 to 29 to 53% of those aged 60 to 70. In the U.S. sample ($N = 1{,}547$), there was a slight increase from 22% of the youngest to 32% of the oldest. Thus, among women, the relationship between age and loss/lack of sexual desire varies across studies. Note the variety of questions used to measure lack of interest/desire and the variation in the samples studied; these account for some of the variations in results.

Hypoactive Sexual Desire Disorder (HSDD) is defined as "the persistent or recurrent deficiency (or absence) of sexual fantasies/thoughts, and/or desires for, or receptivity to, sexual activity, which causes personal distress" (Aubin & Heiman, 2004, p. 481). This is considered a serious disorder. Hayes et al. (2007) measured HSDD by combining their measure of desire from the PFSF with a validated measure of sexual distress. They found that, whereas lack of desire increased with age, especially in the European sample, the percentage of women distressed by their lack of desire declined from two-thirds of women aged 20 to 29 to 37% of women aged 60 to 70 in the United States and 22% of women that age in Europe. They concluded that HSDD among women is not associated with age.

Problems of sexual arousal. Huang and colleagues (2009) reported the incidence of low or very low arousal among the almost 2,000 women they studied. The incidence was 19% among women aged 45 to 54, 21% among women aged 55 to 64, and 18% among women over age 65; the age trend is not significant. The occurrence of vaginal lubrication is an indicator of physiological arousal; the percentage of women reporting that lubrication was difficult, very difficult, or impossible increased from 17% among the younger women, to 28% among women aged 55 to 64, and to 27% among women over age 65. As noted earlier, insufficient lubrication is related to postmenopausal status, as well as to inadequate sexual self- or partner stimulation (see Laan & van Lunsen, 1997). Kontula and Haavio-Mannila (2009) reported that, among Finnish women, 13% of those aged 45 to 54, 36% of women aged 55 to 64, and 31% of women aged 65 to 74 reported lubrication difficulties quite often in the past year. The age trend was significant. Among 750 Australian women aged 40 to 80, 26% reported lubrication difficulties; reports were more frequent among women aged 50 to 59 (Moreira et al., 2008).

The most common disorder among men is erectile dysfunction. Laumann and colleagues (1999), analyzing NHSLS data, found that men aged 50 to 59 were three times more likely (17%) than men aged 18 to 29 to experience erectile difficulties in the past year. Results from NSHAP (Laumann et al., 2008) indicate that the incidence in the preceding year was 31% in men aged 57 to 64, 45% in men aged 65 to 74, and 43.5% in men aged 75 to 85. Among 750 Australian men aged 40 to 80, erectile problems were significantly related to age (Moreira et al., 2008). Thus, there is a strong, positive relationship between age and erectile difficulties. The AARP (1999) questioned men about impotence, defining it as "being unable to get and keep an erection that is rigid enough for sexual activity" (p. 30). Among men aged 45 to 59, only 2.5% rated themselves "completely impotent," increasing to 16% among men aged 60 to 74, and 38% among men over age 75. Frequencies reported in the 2010 online survey are similar. However, in response to an open question about what conditions restricted their sexual activity, only 2% to 4% of the men wrote "impotence." Thus, many men with difficulties maintaining erections may be engaging in sexual activities other than those involving penile penetration. Among respondents to the surveys in Finland, the percentage reporting erectile difficulties "quite often" in the past year increased from 8% (among 45- to 54-year-olds) to 16% (among 55- to 64-year-olds) and 30% (among 65- to 74-year-olds); the age trend is significant.

Thus, there is some evidence that difficulties with arousal and erection increase with age; it is not clear to what degree these lead to cessation of partnered sexual activity. This issue should be investigated in future research.

Problems associated with orgasm. Among men, Waite and colleagues (2009) found that "premature climax" was reported in the preceding year by about 25% of men and 8% of women. The age trends were not significant.

In the NHSLS, with respondents aged 18 to 59, only 7% to 9% of men reported "inability to climax or achieve orgasm" in the past year (Laumann et al., 1999). In the NSHAP data, inability to climax was reported by 16%, 23%, and 33% of men aged 57 to 64, 65 to 75, and 75 to 85, respectively; the age trend is highly significant (Waite et al., 2009). The AARP (2010) survey asked respondents, "When you engaged

in sexual activity in the past 6 months, how often did you have an orgasm?'' The percentage of men saying ''never'' ranged from 0% to 5%.

Among women aged 18 to 59, inability to climax or achieve orgasm was reported in the past year by 22% to 26% of the respondents (Laumann et al., 1999). Among the older women in NSHAP, the figures were 34% of women aged 57 to 64, 33% of women aged 65 to 74, and 38% of women aged 75 to 85; the age trend is not significant (Waite et al., 2009). In response to the AARP (2010) question regarding frequency of orgasm, the percentage saying ''never'' was 4% among women aged 45 to 49, 13% among women aged 50 to 59, 5% among women aged 60 to 69, and 7% among women aged 70 and older. In a survey of almost 2,000 women aged 45 to 80, Huang and colleagues (2009) reported the percentage of women stating that achieving orgasm was difficult, very difficult, or impossible. Among those aged 45 to 54 it was 16%, among those aged 55 to 64 it was 24%, and among women over the age of 65 it was 21%. Thus, in all four of these studies, there is little evidence that orgasmic disorder increases with age among women, although the precise measure varies across studies.

Sexual pain. Among male respondents in NSHAP, reports of experiencing pain during sex in the past year were very infrequent (i.e., <4%), and did not vary by age (Laumann et al., 2008). The AARP (1999) questionnaire asked whether respondents had experienced genital pain during or after sexual intercourse in the past six months. Ninety-four percent of the men reported almost never or never. Sexual pain appears to be a very uncommon experience among older men.

Among women, the NSHAP data indicated that 12% to 19% experienced pain in the preceding year; the incidence did not vary by age. Hispanic women were significantly more likely to report this experience (31%) than Black (9%) or White (17%) women. In the AARP results, 83% of the women reported they almost never or never experienced pain in the past six months. Huang and colleagues (2009) reported the frequency with which women reported moderate, high, or very high levels of discomfort with vaginal penetration; the percentages were 11% among 45- to 54-year-olds, 18% among 55- to 64-year-olds, and 16.5% among women over 65. The 11-country Global Survey of Sexual Attitudes and Practices reported no differences by age in the frequency of reports of sexual pain (Leiblum et al., 2009). The experience of sexual pain appears to be unrelated to age among women.

A simple treatment for some cases of sexual discomfort or pain associated with penetration is the use of a lubricant. The AARP (1999) survey asked how often respondents with partners had used lubricants ''to make sex more comfortable'' in the past six months. Slightly more than 60% of men and women replied never; 6% of the men and 9% of the women replied ''always.''

Overall discomfort. It is important to consider subjective, as well as objective, indicators of sexual functioning. The Associated Press—LifeGoesStrong.com Relationships Survey poll (Knowledge Networks, 2010) asked respondents whether they had ever had problems related to sexual functioning. Twenty-nine percent of persons aged 45 to 65 and 27% of those 66 or older said yes (compared to 10% of persons aged 18–29, and 18% of those aged 30–44). According to Huang and colleagues (2009), 40% of the sexually active women in their racially diverse sample of almost 2,000 reported one or more problems with sexual activity. With the exception of difficulties involving lubrication, the prevalence of problems did not significantly differ by age. Howard and colleagues (2006) employed the Female Sexual Distress Scale as an overall measure of sexual difficulties. Five percent of the sample of 474 women aged 40 to 79 received high scores (>24) on the scale. Interestingly, more younger women attained high scores. As women aged, they reported greater indifference to sexual frequency. Vanwesenbeeck, Bakker, and Gesell (2010) reported the results of a survey of 4,147 people living in the Netherlands. The survey included measures of the sexual dysfunctions discussed earlier; the questions asked whether the problem occurred regularly and caused at least some distress. Overall, 20% of the women and 17% of the men reported at least one such problem. Reports by men were weakly related to age; among women, those aged 55 to 69 were significantly *less* likely than women aged 19 to 34 (12% compared to 25%) to report sexual dysfunctions.

Thus, the results of a variety of surveys, some based on large, representative samples, indicate that reports of problems of sexual functioning vary. One-half or more of older women report lack of interest or desire; one-third or less of older men report erectile difficulties; about one-fourth of older women report difficulties associated with climax; and 20% or less of older women report problems involving sexual pain. Reports of problems appear to be related to age among men, but not among women.

Treatment. With regard to treatment, the Associated Press—LifeGoesStrong.com Relationships Survey (Knowledge Networks, 2010) poll asked respondents whether they had ever sought treatment from a medical professional for problems related to sexual functioning. Forty-six percent of persons aged 45 to 65 said they had. Twelve percent of persons aged 45 to 65 and 14% of those aged 66 and older reported taking medication or receiving treatment for such a problem.

Participants in the AARP (1999) survey were asked whether they had sought treatment for problems related to sexual functioning. Of the 1,381 respondents, 28% of the men and 13% of the women had sought treatment; about one-half of these men and women consulted their personal physician, and one-half consulted a specialist physician. This clearly indicates the need for medical personnel to be trained to consult with older persons about sexual functioning. About 6% of the men and 4% of the women reported using medicines, hormones, or other treatments to improve sexual functioning at the time of the survey. Five percent of the men and 3% of the women reported using these in the past. Of the men who had ever received a treatment, one-half used a PDE-5 inhibitor. Among women, one-half reported using hormones. Those who received or accepted treatments did not report a significant increase in frequency of intercourse following treatment, but 60% of the men and women who were treated reported an increase in their satisfaction with sex.

Moreira et al. (2008) questioned Australian men and women aged 40 to 80; of those who reported at least one sexual difficulty, only 22% had sought help from a health professional. Most had talked to a medical doctor. Men experiencing erectile difficulties and women experiencing problems with lubrication were more likely to have sought medical help. Attitudes were also important; men and women who believed sex is a very or extremely important part of life were more likely to have sought help.

Summary: Sexual Expression in Later Life

Research indicates that men and women remain sexually active into their 80s. Men report greater incidence and frequency of sexual activity, including sexual intercourse, than women. The difference increases with age due to differential loss of partners and differences in health (Karraker et al., 2011).

Relationship status is a major influence on whether a person engages in partnered activity (as is true throughout the life span). Differences in relationship status—married, cohabiting, single, divorced, and widowed—are related to differences in incidence and frequency of activity among persons over 50 years of age. For persons within a relationship, satisfaction is an important correlate of frequent sexual activity (again, this likely is true throughout the life span).

There is little evidence that physical changes associated with aging necessarily lead to reduced sexual activity. As a result of the climacteric, some women, perhaps 25%, experience vaginal dryness or pain in relation to intercourse. This could lead to reduced frequency or cessation of coitus, but may be readily treated. Also, it need not interfere with other sexual activities.

Good physical and mental health are related to more frequent sexual activity for both men and women throughout their 50s and 60s. Diabetes and depression are associated with reduced sexual activity for both genders, but are reported by relatively small percentages of the participants in recent large-scale surveys. These associations between physical and mental health and sexual activity are found among both men and women, across several Western societies.

Positive attitudes about the importance of sexual expression for oneself and one's relationships are related to more frequent sexual activity. Men are more likely to rate sex as important to themselves, particularly at older ages. The decline in rated importance of sex for women may be related to their loss of a sexual partner, and may also be related to the impact of ageist and pronatalist attitudes.

With regard to sexual functioning, women at older ages are less likely to report frequent sexual desire, and there is a positive association between desire and engaging in sexual behavior. Again, the reduced desire reported by older women may be associated with loss of the partner in some cases. Men are more likely to report difficulties with sexual arousal and erection as they age; this may reflect the vulnerability of these processes to cardiovascular problems. Women are more likely to report at least occasional orgasmic difficulty as they age, but only small percentages of men and women report "never" experiencing an orgasm when they engage in sexual activity.

Cohort Differences

I have reviewed considerable cross-sectional data (data collected at one point in time) on persons 50 to 80 years of age. This breadth in age introduces the possibility of cohort effects, differences due to the time period in which persons were born, socialized, and lived. Persons aged 50 to 60 in 2005 were born in the years 1955 to 1945, were adolescents and young adults at the time of the sexual revolution in the late 1960s, and so were exposed to more liberal beliefs about sexuality and relationships than persons born 20 years earlier. Persons aged 70 to 80 in 2005 were born in 1935 to 1925; the oldest of them were children during the depression. Therefore, differences that we observe between oldest and youngest may reflect their membership in these cohorts, rather than phenomena associated with aging.

What will happen as the Sexual Revolution generation, persons aged 50 to 60 in 2005, ages? Will there be changes in the sexual activity patterns of older persons in successive cohorts? Research on adolescents and young adults over the past 40 years has documented several changes in their sexual activity patterns. Attitudes among young persons have become much more accepting of sexual activity before marriage. Perhaps as a result, increasing percentages of young women have experienced first intercourse before first marriage. The age of first intercourse has declined, among men, from

age 18 in the 1960s to age 15 in the 1990s, and among women from age 18.5 to age 15.5 (Wells & Twenge, 2005). An increasing percentage of high school students, men and women, report multiple sexual partners. This has led to speculation that as these younger cohorts age, they will be more sexually active than earlier cohorts.

This question was addressed by Beckman, Waern, and Gustafson (2008), who analyzed data from four cross-sectional surveys conducted in 1971 through 1972, 1976 through 1977, 1992 through 1993, and 2000 through 2001. Each survey was of a sample of 70-year-old men and women living in Gothenburg, Sweden. As expected, the proportion of 70-year-olds reporting sexual intercourse increased from 1971 to 2000. Among married men, the increase was from 52% to 68%, and among married women from 38% to 56%; among unmarried men, it increased from 30% to 54%, and among unmarried women from 0.8% to 12%. The researchers also found that more recent cohorts reported a more positive attitude toward sexuality in old age (97% of men and 94% of women in 2000), higher rates of satisfaction with sex, and fewer sexual dysfunctions. All of these changes are consistent with the hypothesis that the sexual revolution has led to more sex-positive attitudes and behaviors in younger cohorts.

Kontula (2009) reported results from surveys of Finns aged 18 and older conducted in 1971, 1992, 1999, and 2007. He reported a slight increase in the mean number of lifetime sex partners among men aged 65 to 74 from 1992 to 2007, but not among women. Looking at the four cross-sectional surveys, including respondents of all ages, there is a substantial increase in mean number of sex partners among women, from 2.6 in 1971 to 10.4 in 2007; among men, the increase was from 11.4 to 14.7 partners. There was no increase in mean frequency of sexual intercourse reported in 1991 and in 2007. Also, in 1999 and in 2007, the same proportion of respondents had had the same partner for the preceding five years, suggesting no decline in frequency of stable monogamous relationships.

Thus, there is limited evidence of more frequent sexual activity among recent cohorts of older persons. Research conducted so far suggests that changes in attitudes are primarily responsible for this cohort effect. To the extent that this trend continues, it increases the urgency of more theoretically driven, methodologically well-done research on the sexuality of older groups, with careful attention to disentangling age and cohort effects.

The State of Research on Sexuality and Aging

Several observations about the state of research on sexuality in later life flow from the foregoing review. First, the research on the topic, from whatever perspective, is overwhelmingly descriptive. There has been little effort to develop a theoretical model that encompasses all of the major influences and outcomes studied. Clearly, an interdisciplinary or biopsychosocial framework would be very beneficial. One such model is presented by Carpenter and DeLamater (in press). It elaborates the role of biological, psychological, and social influences, and places them within a life-course framework. The model argues that cumulative advantage and disadvantage is the major mechanism by which early experiences influence later sexual expression. It suggests that an individual's sexual expression in later life is a complex outcome of earlier biological, psychological, and social influences. For example, this review has shown that loss of a sexual partner and certain changes in health are disadvantageous to later life sexual expression.

Empirical work on heterosexual sexual activity has, until recently, had a narrow focus, using sexual desire and penile-vaginal intercourse as the primary indicators of sexual expression. Recent studies, including the AARP (2010) survey, NSHAP, and the HSSHB, have measured a broader range of behaviors, including not only partnered activities such as oral and anal sex, but also solo masturbation. Inclusion of the latter is especially important to make the sexual activity of unpartnered persons visible. Future research should continue to ask questions about a variety of forms of physical and sexual intimacy, and explore the relationship contexts of each. It is particularly important to explore the relationship between activities other than penile-vaginal coitus and outcomes such as frequency of orgasm, sexual satisfaction, and relationship quality in later life.

Integrative analyses such as this one are hampered by the varied measures that have been employed. The three projects listed in the preceding paragraph included questions about the same sexual behaviors, but the time period varied across studies, from the preceding 30 days, to six months, to the past year. The review of the literature on desire described several different measures that have been used, indicating that, in current research, there is no "standard" measure of the concept. Such differences make it impossible to assess consistency of results across studies. Progress in this area would be facilitated by greater agreement on standard measures or the use of multiple measures in research. Syntheses of data by age are difficult because of wide variation in the categories used to measure and represent age across studies.

The nature of the samples studied is a continuing problem. Much of the data summarized in this review is based on research using quasi-representative samples. In some cases, there are good reasons to use theoretically interesting, but non-representative, samples. However, the generalizability of the results from such research is unknown. If, as is often the case, there are few studies available, those results become *de facto* the foundation of knowledge, policy, and advice given in counseling of men and women. If groups that

significantly differ are omitted from the data, the available knowledge will be incomplete.

In this vein, much of the available data reflects White, heterosexual, and primarily middle-class patterns and behaviors. Even representative sample includes relatively few members of other sexual and racial or ethnic groups, with the exception of Blacks in the United States. We need research that includes significant numbers of members of racial or ethnic minority groups. One exception is the research reported by Huang and colleagues (2009). Asians, Blacks, and Hispanics should be the focus of empirical study, allowing us to study the intersectionality that undoubtedly influences sexual expression. We also need more research on sexual minority groups. Although research on relationships and families suggests similarities between gay and lesbian and heterosexual ones, we need research specifically focused on sexual relationships and functioning. A step in this direction is provided by a forthcoming qualitative study of sexual relationships and behavior in later-life gays and lesbians (Slevin & Mowery, in press).

There is an almost exclusive reliance on cross-sectional research designs, which measure all variables at a single point in time. This makes it impossible to begin to tease out cause and effect. One consequence is that we cannot identify the causes of the age-related declines in frequency of sexual activity that have been clearly demonstrated in two decades of research. A second consequence is the inability to separate effects of aging from cohort effects on sexual expression. We need more longitudinal research, where we can measure potential influences such as changes in health, attitudes, relationship status, and relationship satisfaction at one point in time, and outcomes such as frequency of sexual activity at a later point. Given the expense of such research, a promising strategy would be to conduct small-scale, longitudinal studies of clearly defined populations.

There has been almost no research on couples. This privileges individualistic models of sexual functioning, and makes it difficult to study the role of relationship dynamics, relationship satisfaction, and relationship stresses on sexual functioning. This review makes clear the importance of the couple relationship, and suggests that dynamics such as the interaction of the physical and mental health of each person and their satisfaction with the relationship are important influences in sexual functioning.

We have learned a lot about sexuality beyond age 50 in the past 20 years; there is a lot left to learn. This review provides a map of some of the directions in which we need to go.

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