Sex, health, and years of sexually active life gained due to good health: evidence from two US population based cross sectional surveys of ageing

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ABSTRACT
Objectives To examine the relation between health and several dimensions of sexuality and to estimate years of sexually active life across sex and health groups in middle aged and older adults.

Design Cross sectional study.

Setting Two samples representative of the US population: MIDUS (the national survey of midlife development in the United States, 1995–6) and NSHAP (the national social life, health and ageing project, 2005–6).

Participants 3032 adults aged 25 to 74 (1561 women, 1471 men) from the midlife cohort (MIDUS) and 3005 adults aged 57 to 85 (1550 women, 1455 men) from the later life cohort (NSHAP).

Main outcome measures Sexual activity, quality of sexual life, interest in sex, and average remaining years of sexually active life, referred to as sexually active life expectancy.

Results Overall, men were more likely than women to be sexually active, report a good quality sex life, and be interested in sex. These gender differences increased with age and were greatest among the 75 to 85 year old group: 38.9% of men compared with 16.8% of women were sexually active, 70.8% versus 50.9% of those who were sexually active had a good quality sex life, and 41.2% versus 11.4% were interested in sex. Men and women reporting very good or excellent health were more likely to be sexually active compared with their peers in poor or fair health: age adjusted odds ratio 2.2 (P<0.01) for men and 1.6 (P<0.05) for women in the midlife study and 4.6 (P<0.001) for men and 2.8 (P<0.001) for women in the later life study. Among sexually active people, good health was also significantly associated with frequent sex (once or more weekly) in men (adjusted odds ratio 1.6 to 2.1), with a good quality sex life among men and women in the midlife cohort (adjusted odds ratio 1.7), and with interest in sex. People in very good or excellent health were 1.5 to 1.8 times more likely to report an interest in sex than those in poorer health. At age 30, sexually active life expectancy was 34.7 years for men and 30.7 years for women compared with 14.9 to 15.3 years for men and 10.6 years for women at age 55. This gender disparity attenuated for people with a spouse or other intimate partner. At age 55, men in very good or excellent health on average gained 5–7 years of sexually active life compared with their peers in poor or fair health. Women in very good or excellent health gained 3–6 years compared with women in poor or fair health.

Conclusion Sexual activity, good quality sexual life, and interest in sex were higher for men than for women and this gender gap widened with age. Sexual activity, quality of sexual life, and interest in sex were positively associated with health in middle age and later life. Sexually active life expectancy was longer for men, but men lost more years of sexually active life as a result of poor health than women.

INTRODUCTION
Human sexuality is increasingly recognised by doctors and policymakers as an important aspect of health and quality of life throughout the life course.1–3 Sexual activity has been associated with health benefits and longevity.4,5 Recent data from the US national social life, health and ageing project (NSHAP) indicate that more than half of people aged 57–85 and about a third of those aged 75–85 are sexually active and that physical health is significantly correlated with sexual activity and many aspects of sexual function, independent of age.1

Since 2000, a focus on sexuality in older adults has been heavily driven by the availability of drugs to treat male erectile dysfunction. Effective treatment of this condition is likely to extend the duration of sexually active life for men and their partners as they age. Problems with sexual functioning are prevalent among older adults in the United States and other countries.1,7 About half of all sexually active men and women aged 57–85 in the United States report at least one bothersome sexual problem; one third report at least two. Yet doctors rarely address sexual concerns in older adults, particularly in women.1 As the older population grows in developed and developing nations,8 projecting the population structure of sexual activity is useful for anticipating need for public health resources, expertise, and services related to maintaining sexual function, regaining sexual function lost as a consequence of disease or treatments for common medical conditions that occur in later life, and preventing sexually transmitted diseases or risky sexual behaviour.
behaviour among older adults. Population estimates of sexual activity in later life can help motivate and inform the design of policies pertaining to sexual expression and rights among cognitively impaired and institutionalised elderly people. In addition, expectations about the duration of sexually active life may influence important health behaviours. For example, patients may be motivated to stop smoking or to adhere to drug regimens if the behaviour changes are expected to prolong or preserve a sexually active or sexually satisfying life.

Using two nationally representative datasets, we examined the association between sexuality (sexual activity and quality of sexual life) and global self-rated physical health in middle aged and older men and women. We also estimated the average remaining years of sexually active life gained as a result of good health, using sexually active life expectancy, a new health expectancy indicator for clinical and public health application.

METHODS

The study populations were drawn from two large, publicly available and nationally representative recent health surveys with sufficiently large numbers of older respondents and comparable data on sexuality: the national survey of midlife development in the United States (MIDUS, or midlife cohort) and the national social life, health and aging project (NSHAP, or later life cohort).

The 1995-6 wave of MIDUS provides nationally representative data on adults aged 25 to 74. Participants were selected by using a random digit dial sample of the non-institutionalised, English speaking population of the 48 conterminous United States. Participants completed a telephone interview and postal questionnaire. The response rate was 60.8%, with 3032 respondents (1561 women, 1471 men) for both parts of the survey. Sampling weights correcting for differential probabilities of selection and non-response allow estimates from this sample to be generalisable to the United States population in terms of age, gender, race, and education. Details on the design, field procedures, and sampling weights of MIDUS have been described previously.9

The 2005-6 wave of NSHAP provides a nationally representative probability sample of community dwelling people aged 57-85, generated from households screened in 2004 across the United States. African-Americans, Latinos, men, and the oldest old (75 to 84 years at the time of screening in 2004) were oversampled. Interviews at home and collection of biomarkers were carried out in English and Spanish by professional interviewers, yielding 3005 respondents and a response rate of 75.5% weighted (74.8% unweighted). Sampling weights account for differential probabilities of selection and differential non-response. Details on the design, field procedures, and sampling weights have been described previously.9 Both datasets are available to researchers through the National Archive of Computerized Data on Aging collection (www.icpsr.umich.edu/NACDA/). This analysis uses version 1.4 of the NSHAP dataset.

Measures

Self-rated health is widely regarded as an appropriate measure of health, correlating well with other measures of morbidity and survival.9 11 In both MIDUS and NSHAP, respondents were asked to rate their physical health using the standard five point scale responses to the question: “Would you say your health is excellent, very good, good, fair, or poor?” Both surveys included measures of partnership, sexual activity, sexual frequency, quality of sexual life, and interest in sex. Additionally, NSHAP assessed the degree to which sex was regarded an important part of life. Table 1 summarises and compares the items used in each survey.

NSHAP defined sexual activity for respondents as “any mutually voluntary activity with another person that involves sexual contact, whether or not intercourse or orgasm occurs.” MIDUS defined sexual activity broadly as having “had sex with anyone.” In MIDUS, 97.1% of men and 97.8% of women were identified as heterosexual, or “sexually attracted only to the opposite sex.” In NSHAP, 96.4% of men and 95.0% of women reported only heterosexual contacts during their lifetime.

Non-response to items in both surveys was low for measures of sexual activity, quality, and, in MIDUS, sexual interest (0.3% to 5.1%). Non-response for the NSHAP questions about sexual interest ranged from 7.4% to 11.3%. Non-response to questions on sexuality was higher among women compared with men and older people compared with younger people. For a random subset of NSHAP respondents, these questions were modularised to a questionnaire that was self-completed after the face to face interview and returned by post to the investigators. In general, non-response to items was the same or higher for questions asked on this questionnaire compared with identical questions asked face to face. Overall, 84% of respondents returned the questionnaire.13

Statistical analysis

Distributions of race, education, marital status, self-rated health, and sexuality variables are summarised separately by gender for MIDUS and NSHAP. We carried out analyses for each dataset separately to establish external validity of the findings.

We used logistic regression14 to model the likelihood of being sexually active, having a good quality sex life, and being interested in sex. These models included age group and self-rated health (excellent or very good, good, and fair or poor) as covariates, which were fit separately by gender. Models for quality of sex life and frequency of sex were fit for participants who had a spouse or other intimate partner. We present results as odds ratios with 95% confidence intervals, indicating the multiplicative change in the odds of the
Table 1 Comparison of health and sexuality measures used in national survey of midlife development in the United States (MIDUS) and national social life, health and ageing project (NSHAP)

| Characteristic                     | MIDUS (1995-6) | NSHAP (2005-6) |
|-----------------------------------|---------------|----------------|
| Age range (years)                 | 25-74         | 57-85          |
| Self reported physical health     | "Would you say your health is excellent, very good, good, fair, or poor?" | "Would you say your health is excellent, very good, good, fair, or poor?" |
| Partnership                       | Respondents who were married or cohabiting at time of survey, even if they were not sexually active, were defined as having a partner | Respondents who were married or cohabiting at time of survey, even if they were not sexually active, were defined as having a partner |
| Sexual activity                    | Respondents who had sex with at least one partner in previous six months were considered to be sexually active | Respondents who had sex with at least one partner in previous 12 months were considered to be sexually active* |
| Frequency of sex                   | "Over the past six months, on average, how often have you had sex with someone? Responses ranged from: 'never or not at all' to 'two or more times a week.' Respondents having sex 2-3 times a month or more were defined as having sex regularly | "During the last 12 months, about how often did you have sex with [partner]? Responses ranged from "once a month or less" to "once a day or more." Respondents having sex 2-3 times a month or more were defined as having sex regularly |

Quality of sex life:

| Positive physical quality          | NA             | "How physically pleasurable did/do you find your relationship with [partner] to be: extremely pleasurable, very pleasurable, moderately pleasurable, slightly pleasurable, or not at all pleasurable?" Individuals who reported their most recent relationship to be extremely or very pleasurable were defined as having a good quality of physical sexual life |
| Positive emotional quality         | NA             | "How emotionally satisfying did/do you find your relationship with [partner]: extremely satisfying, very satisfying, moderately satisfying, slightly satisfying, or not at all satisfying?" Individuals who reported their most recent relationship to be extremely or very satisfying were defined as having a good quality of emotional sexual life |
| Overall good quality               | "How would you rate the sexual aspect of your life these days? Responses ranged from 0, "the worst possible situation," to 10, "the best possible situation." Individuals with a rating of ≥6 were considered to have an overall good quality of sexual life | Individuals having good quality of both physical and emotional components of sexual life were considered to have an overall good quality of sexual life |
| Interest in sex                    | "How much thought and effort do you put into the sexual aspect of your life? Responses ranged from 0, "none," to 10, "very much." Respondents with rating of ≥6 were considered to be interested in sex | Estimated using the following question: "About how often do you think about sex?" with six variants ranging from "never" to "several times a day." Respondents who reported thinking about sex "once a day or more" were considered to be interested in sex |

*A 12 month, rather than 6 month, time frame was used in consideration of older age of NSHAP population, and for comparability to only other comprehensive, nationally representative study of adult sexuality in the United States.12

We calculated sexually active life expectancy by Sullivan's method, using publicly available data from life tables and prevalence data on sexual activity to divide the number of person years into years with and without sexual activity.22,23 We obtained US age and gender specific population and death counts for 1995 and 2004 from the human mortality database24 and we calculated age specific person years using standard methods for life tables. Prevalence data on sexual activity from MIDUS and NSHAP by age, gender, partnership status, and health status were used to calculate sexually active life expectancy. Life tables for 1995 (the year of enrolment of the midlife cohort) and 2004 (the year for which data were available closest to the 2005 enrolment of the later life cohort) were used in conjunction with MIDUS and NSHAP data, respectively. Using guidelines provided by the International Network on Health Expectancy22 we calculated standard errors and confidence intervals for sexually active life expectancy. The proportion of life spent as sexually active means the proportion of years of any sexual activity with a partner out of all remaining years of life.

Taking into account that a substantial proportion of the older population lives in institutions, we adjusted for no sexual activity among such a population. This adjustment decreased sexually active life expectancy measured at age 55 years by 2% for men and women. A sensitivity analysis, assuming a 20% rate of sexual activity among the institutionalised elderly population, had...
no effect on final estimates for sexually active life expectancy (data not shown). Data were taken from the 2000 US Bureau of Census table on age and gender specific proportions of the institutionalised population. We fitted the age specific proportions of the institutionalised population older than age 60 with a two variable model of exponential growth using additional information on the age distribution of elderly people living in nursing homes.

RESULTS
The key personal characteristics in the midlife and later life cohorts were similarly distributed and closely matched those from the 1995 and 2002 current population surveys, respectively. Men were more likely than women to be married; women were more likely than men to be widowed (table 2). The distribution of self rated health was similar for men and women; the prevalence of poor or fair health was higher in the later life cohort.

Partnership
Tables 3 and 4 show the distributions of partnership, sexual behaviour, and sexual attitudes, by age and gender, in MIDUS and NSHAP. Most men reported having a current partner: 79.8% (95% confidence interval 77.6% to 82.0%) in the midlife cohort and 79.9% (77.6% to 82.1%) in the later life cohort. Prevalence of partnership was stable across all age groups of men. In contrast, the prevalence of partnership among women declined steadily across age groups: 69.9% (95% confidence interval 67.5% to 72.4%) in the midlife cohort compared with 57.8% (55.0% to 60.6%) in the later life cohort. Only 38.5% of women compared with 72.0% of men aged 75-85 had a partner (table 4).

Sexual activity
The prevalence of sexual activity in the midlife cohort declined across age groups for both sexes, but more so for women (table 3). By age 75, 16.8% of women compared with 38.9% of men were sexually active (table 4). For respondents having a partner, however, these gender differences were much smaller and not statistically significant. Among sexually active respondents, the proportion engaging in sex once or more weekly declined across age groups but was similar among men and women in both cohorts (tables 3 and 4).

Attitudes about sexual life
Among sexually active middle aged respondents, about two thirds of men (69.7%) and women (65.6%) reported a good quality sex life (table 3). Only 51.8% of women in the later life cohort reported a good quality sex life (table 3). Only 51.8% of women in the later life cohort reported a good quality sex life (table 3).
quality sexual life compared with 71.1% of men, and this difference was statistically significant (table 4). Men were significantly more likely to report being interested in sex compared with women (66% v 59% in the midlife cohort and 62% v 21% in the later life cohort). For men, interest in sex was relatively stable across all age groups and did not vary by partner status. For women, interest in sex dropped off significantly in the middle of the sixth decade and was much lower among those without partners.

**Cohort comparisons**

Both the midlife and the later life cohort included people aged 57-64 and 65-74. When these age groups were compared across the cohorts, surveyed 10 years apart, the distributions of prevalence estimate for partnership, sexual activity, sexual frequency, and good quality of sex life (among sexually active individuals) were highly consistent. Interest in sex among women in this age group surveyed 10 years apart was also stable (17.5% in 1995, 19.1% in 2005-6). In contrast, a significantly higher proportion (75.3%) of men aged 57-64 in the later life cohort reported an interest in sex compared with only 44.6% of men of the same age surveyed 10 years earlier (midlife cohort; tables 3 and 4).

**Health and sexuality**

Health was strongly associated with having a partner, particularly for women, in the later life cohort (table 5). Sexual activity, particularly for men and for women in the later life cohort, was also positively associated with health (table 5). Among sexually active respondents, good health was significantly associated with frequent sex (once or more weekly) in men (adjusted odds ratio 1.6 to 2.1) and with a good quality sex life among men and women in the midlife cohort (1.7). People in very good or excellent health were 1.5 to 1.8 times more likely to report an interest in sex than those in poorer health.

### Sexually active life expectancy

Table 6 summarises gender differences in sexually active life expectancy and the estimated proportion of remaining sexually active life at age 30 years (based on the midlife cohort) and age 55 years (based on the midlife and later life cohorts). Among all people at age 30, including those without a partner, sexually active life expectancy was about 10 years lower than demographic life expectancy for men (34.7 v 44.8 years) and nearly 20 years lower for women (30.7 v 50.6 years). This translated to significant gender differences in the proportion of remaining lifetime spent as sexually active: 78% for men versus 61% for women. In contrast, among those with a partner at age 30, sexually active life expectancy was higher for women compared with men (38.2 v 36.7 years). Regardless, women with a partner were estimated to spend a smaller proportion of their remaining lifetime as sexually active as men owing to women’s longer life expectancy. Both men and women reporting very good or excellent health had more years of sexually active life expectancy compared with people reporting fair or poor health. At age 57-64, the expected remaining number of sexually active years was 11.1 years for men and 7.4 years for women. Among those aged 65-74, the expected number of remaining sexually active years was 4.5 years for men and 2.4 years for women.
30, men in very good or excellent health were projected to gain more years of life as sexually active (6.4 additional years) compared with women (4.8 years).

At age 55, sexually active life expectancy was 15 years for men and 10.6 years for women; the two datasets generated nearly identical estimates. For men, sexually active life expectancy was 8-9 years less than demographic life expectancy (14.9 ± 23 years for the midlife cohort and 15.3 ± 24.6 years for the later life cohort); for women this difference was 17-18 years (10.6 ± 27.4 years for the midlife cohort and 10.6 ± 28.3 years for the later life cohort). Sexually active life expectancy was similar for men and women in the United States. Women had consistently higher demographic life expectancy at all ages, whereas men had consistently higher values for sexually active life expectancy. Wider differences were shown in sexually active life expectancy by health status for men compared with women at all age groups. The sexually active life expectancy curves for men and women reporting poor or fair health were similar. In contrast, in all but the oldest age group, men in very good or excellent health had significantly higher sexually active life expectancy than similarly healthy women.

**DISCUSSION**

This study used two nationally representative, population-based cohorts to deepen an understanding of the relation between health and sexuality in middle and later life and to project population estimates of sexually active life expectancy, a new measure to quantify expectations about future sexual life. Using two datasets, the study affirmed a positive association between later life health and both sexual partnership and any sexual activity. In addition, a consistently strong association was found between good health and other domains of sexuality not previously linked to health in later life, including the frequency of sexual activity (weekly or more often) in men, a good quality sex life, and a higher interest in sex. Sexual activity, a good quality sex life, and interest in sex were higher for men than for women and this gender gap widened with age. Sexually active life expectancy was longer for men, but men lost more years of sexually active life as a result of poor health than women.

Partnership drives sexual activity, particularly in later life. Between 70% and 80% of men across all age

Table 4 | Partnership status and characteristics of sexuality among participants of national social life, health and ageing project (NШАР), by age. Values are percentages (95% confidence intervals) unless stated otherwise

| Characteristic                                      | No*       | All ages | 57-64 | 65-74 | 75-85 |
|----------------------------------------------------|-----------|----------|-------|-------|-------|
| Marital status                                     |           |          |       |       |       |
| Married or living with partner                     | 1099/1455 | 79.9 (77.6 to 82.1) | 84.2 (80.7 to 87.6) | 79.3 (75.5 to 83.0) | 72.0 (67.1 to 76.8) |
| Sexually active over past 12 months:               | 906/1381  | 68.7 (65.9 to 71.5) | 84.0 (80.7 to 88.1) | 67.4 (62.8 to 72.0) | 38.9 (33.1 to 44.6) |
| Living with partner                                | 765/1035  | 76.2 (73.3 to 79.1) | 90.5 (87.3 to 93.7) | 73.9 (69.1 to 78.8) | 46.3 (39.1 to 53.4) |
| Not living with partner                            | 141/346   | 39.6 (33.7 to 45.6) | 52.3 (40.5 to 64.0) | 43.6 (33.7 to 53.4) | 19.8 (11.7 to 27.8) |
| Have sex once or more weekly                       | 312/858   | 34.8 (30.9 to 38.8) | 39.7 (33.6 to 45.8) | 31.2 (25.7 to 36.7) | 22.9 (15.3 to 30.4) |
| Positive physical quality of sex life              | 743/892   | 79.1 (76.5 to 81.7) | 82.4 (78.3 to 86.6) | 75.1 (70.8 to 79.4) | 78.9 (74.1 to 83.8) |
| Positive emotional quality of sex life             | 740/896   | 79.0 (76.5 to 81.5) | 81.0 (76.9 to 85.0) | 75.9 (71.6 to 80.1) | 80.1 (75.6 to 84.5) |
| Overall good quality of sex life                   | 678/892   | 71.1 (68.3 to 74.0) | 74.3 (69.7 to 79.0) | 67.3 (62.7 to 72.0) | 70.8 (65.5 to 76.1) |
| Interested in sex:                                 |           |          |       |       |       |
| Married or living with partner                     | 779/1296  | 62.0 (58.9 to 65.3) | 75.3 (70.7 to 80.0) | 58.1 (53.1 to 63.2) | 41.2 (35.2 to 47.3) |
| Sexually active over past 12 months:               | 609/986   | 63.3 (59.7 to 66.8) | 76.7 (71.7 to 81.7) | 56.3 (50.7 to 62.1) | 43.7 (36.3 to 51.3) |
| Living with partner                                | 765/1035  | 57.0 (50.5 to 63.5) | 67.8 (55.6 to 80.0) | 65.1 (55.1 to 75.1) | 34.6 (24.8 to 44.4) |
| Not living with partner                            | 170/310   |           |       |       |       |

*Numbers who answered question affirmatively of total number of respondents to question. Numbers of respondents varies within survey as some declined to answer some questions.

Numbers and percentage estimates are weighted to account for differential probabilities of selection and differential non-response.

*Number who answered question affirmatively of total number of respondents to question. Numbers of respondents varies within survey as some declined to answer some questions.

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groups reported having a partner, compared with 67.5% of women aged 25-54 and fewer than 40% of women aged 75 and older. This finding reflects the longer life span of women, the age structure of marriage in the United States and other countries whereby men tend to marry younger women, and the higher proportion of older men with much younger partners.\(^1\)\(^{27,28}\) As found by others, men and women with partners in middle and later life were equally likely to be sexually active, but the frequency of sexual activity declined across age groups for women more than for men.\(^29\) Many sexually active people in this study rated the quality of their sex life as less than good, including about half of sexually active older women. Particularly little has been known about the quality of older women’s sexual lives.

Sexually active life expectancy was calculated as a function of gender and health. Overall, the study found that men live a significantly greater proportion of their adult life as sexually active (due at least in part to more years of partnership than women) yet lose significantly more years of sexually active life as a result of poor health than do women. This resonates with findings from a previous analysis using the NSHAP dataset, showing that men’s physical health problems were most commonly cited by both sexes as the reason for sexual inactivity in later life.\(^1\) The stronger association between sexually active life expectancy and health found in men may be explained in part by the effects of common chronic illnesses (for example, diabetes, cardiovascular disease, prostate cancer) and their treatments on erectile function.\(^30,34\) Loss of erectile function diminishes or prohibits penetrative intercourse and is often accompanied by a decline in or cessation of a man’s sexual activity and sexual satisfaction.\(^35,36\)

In contrast, the effects of illness or drug use on sexual function in women are poorly understood. Sexual problems, including low desire, vaginal dryness, difficulties with orgasm, and pain with intercourse are prevalent among sexually active older women,\(^1\) are associated with decreased sexual satisfaction,\(^35\) but typically do not render a woman physically incapable of sexual intercourse. Women’s sexual interest or motivation may be more resilient to illness or sexual problems than men’s.\(^37\) may be more contextually dependent on the partner or situational factors,\(^38\) or, as seen in younger populations, older women may have less agency over their sexual activity than men.\(^38\)

Interest in sex among women of the same age in the two nationally representative cohorts surveyed 10 years apart was relatively stable. In contrast, significantly more men aged 57-64 in the later life cohort reported an interest in sex than men of the same age surveyed 10 years earlier. This was true for men with and without a partner in both cohorts and corroborates a positive secular trend in attitudes about sex found among older men surveyed 30 years apart in a 2001 study of 70 year olds in Gothenburg, Sweden.\(^39\) The difference may partly reflect the introduction of the highly effective and widely promoted male erectile dysfunction drugs to the US and European markets.

### Table 5: Association with self rated health for selected measures of sexuality. Values are age adjusted odds ratios (95% confidence intervals)

| Measures of sexuality and partnership | Self rated health status, MIDUS | Self rated health status, NSHAP |
|--------------------------------------|--------------------------------|---------------------------------|
|                                      | Good                           | Very good or excellent          |
| Partnership                          |                                |                                 |
| Men                                  | 1.2 (0.78 to 1.80)             | 1.1 (0.76 to 1.68)              |
| Women                                | 0.9 (0.61 to 1.23)             | 1.2 (0.61 to 1.23)              |
| Sexual activity                       |                                |                                 |
| Men                                  | 2.0** (1.2 to 3.1)             | 2.2** (1.4 to 3.5)              |
| Women                                | 0.8 (0.5 to 1.2)               | 1.6* (1.1 to 2.3)               |
| Living with partner:                 |                                |                                 |
| Men                                  | 2.3* (1.2 to 4.5)              | 2.5** (1.3 to 5.0)              |
| Women                                | 0.8 (0.4 to 1.5)               | 1.9 (1.0 to 3.9)                |
| Not living with partner:             |                                |                                 |
| Men                                  | 1.2 (0.3 to 3.9)               | 1.8 (0.5 to 5.6)                |
| Women                                | 0.9 (0.3 to 2.7)               | 1.6 (0.3 to 2.7)                |
| Having sex once or more weekly among sexually active | | |
| Men                                  | 1.5 (0.9 to 2.5)               | 1.6* (1.0 to 2.6)               |
| Women                                | 1.3 (0.8 to 2.1)               | 1.4 (0.9 to 2.2)                |
| Overall good quality sex life among sexually active | | |
| Men                                  | 1.3 (0.9 to 2.0)               | 1.7* (1.1 to 2.6)               |
| Women                                | 1.1 (0.8 to 1.7)               | 1.7** (1.2 to 2.5)              |
| Interest in sex                      |                                |                                 |
| Men                                  | 1.3 (0.9 to 1.9)               | 1.4 (1.0 to 2.1)                |
| Women                                | 0.9 (0.6 to 1.3)               | 1.5* (1.1 to 2.2)               |
| Living with partner:                 |                                |                                 |
| Men                                  | 1.1 (0.7 to 1.7)               | 1.3 (0.9 to 2.1)                |
| Women                                | 1.1 (0.7 to 1.6)               | 1.6* (1.1 to 2.5)               |
| Not living with partner:             |                                |                                 |
| Men                                  | 2.3* (1.1 to 4.9)              | 1.8 (0.9 to 3.7)                |
| Women                                | 0.7 (0.4 to 1.3)               | 1.3 (0.7 to 2.3)                |

**MIDUS**=national survey of midlife development in the United States; **NSHAP**=national social life, health and ageing project.

*\(P<0.05; **P<0.01; ***P<0.001.\)

Age adjusted odds ratios (95% confidence intervals) are based on logistic regression, with age and self rated health status included as covariates. Estimates are obtained separately for men and women. The group reporting poor or fair health was used as the reference. Confidence intervals are based on inversion of the Wald test constructed with use of design based standard errors.

†Respondents who were married or cohabiting at time of survey, even if they were not sexually active, were defined as having a partner.
beginning with sildenafil in 1998. More than 14% of US men surveyed in 2005-6 by NSHAP reported that they had taken prescription or non-prescription drugs or supplements to improve sexual function in the previous 12 months. With this secular increase in sexual interest among older men, the gender gap in later life interest in sex has also increased: among men aged 57-64 with partners, 76.7% reported an interest in sex compared with 35.9% of women with partners (only 12% of women without partners compared with 68% of men without partners were interested). Consistent with this finding, sexually active life expectancy at age 55 was longer for men surveyed in 2005-6 compared with men surveyed 10 years earlier (4.8 months longer overall, 12 months longer for men with partners), and increased only for women with a partner (7.2 month increase).

Strengths and limitations of the study
Although the data were collected by separate research groups using different sexuality measures, the use of two generally comparable population based probability samples for these analyses shows external validity of the study findings and made it possible to create the new sexually active life expectancy measure. Prevalence estimates for partnership, sexual activity, sexual frequency, and good quality sex life were highly consistent when the overlapping age groups in the two studies were compared and are consistent with previous findings for men and younger women. In addition, use of the two datasets allowed examination of secular trends in various aspects of sexuality measured 10 years apart. Comparison with the 1971 and 2001 Swedish studies of 70 year olds provides additional evidence of external validity of the cross sectional and secular trend findings. For example, the 2001 Swedish study found similar frequencies of sexual activity and satisfaction among women with and without partners as found in the 2005-6 US cohort. These frequencies were higher than those found in the 1995-6 US cohort of 65-74 year olds and notably higher than in the 1971 Swedish cohort of 70 year olds.35-37

Longitudinal data are needed to determine whether regular sexual activity, a good sex life, or high sexual interest promote health or whether good health promotes these positive sexual attributes; this study relies
although the period is longer for men, they lose more years of sexually active life as a result of
At age 55, sexually active life expectancy is 15 years for men and 10.6 years for women;
About half of sexually active older women report a poor quality sex life
Interest in sex among middle aged and older men in the United States has increased since
Frequency of sexual activity, a good quality sex life, and interest in sex are positively
WHAT THIS STUDY ADDS
WHAT IS ALREADY KNOWN ON THIS TOPIC
Many older people are sexually active
Partnership and sexual activity have been positively associated with health in middle age
and later life
Knowledge about patterns of sexual activity in the population informs public health policy
and patient education and counselling
WHAT THIS STUDY ADDS
Frequency of sexual activity, a good quality sex life, and interest in sex are positively
associated with health in middle age and later life
Interest in sex among middle aged and older men in the United States has increased since
About half of sexually active older women report a poor quality sex life
At age 55, sexually active life expectancy is 15 years for men and 10.6 years for women;
although the period is longer for men, they lose more years of sexually active life as a result of poor health than women

In this study we assumed the same mortality for people with different health and partnership statuses. This assumption might underestimate sexually active life expectancy for those with very good or excellent health or for those with a partner and might overestimate sexually active life expectancy for those with poor or fair health owing to the possibility of differential survival among people with different health statuses and partnership.48 49 Our analytical approach used official life tables to predict mortality accurately but was limited by the lack of accessible and reliable age and gender specific estimates of survival by health and partnership status.

Conclusions and policy implications
Sexual partnership, frequency of sexual activity, a good quality sex life, and interest in sex are positively associated with health among middle aged and older adults in the United States. Interest in sex among middle aged and older men in the United States has increased since 2000. Overall, the study found that men have a longer sexually active life expectancy and that most sexually active men report a good quality sex life. In contrast, only about half of sexually active women reported a good quality sex life. This disparity, and its implication for health, requires further exploration.

Men lose more years of sexually active life as a result of poor health than women. The estimation of sexually active life expectancy is a new life expectancy tool that can be used for projecting public health and patient needs in the arena of sexual health. Projecting the population patterns of sexual activity in later life is useful for anticipating need for public health resources, expertise, and medical services. Translation of expectations about the duration and quality of sexually active life may, at the individual level, influence important health behaviours to promote or prolong sexual functioning, such as adherence to medical treatment or maintenance of a healthy lifestyle. One study found that parents of children with cancer exhibited differential medical decision making and healthcare utilisation when they had more accurate expectations of their child’s life expectancy.50 Further research is needed to evaluate the potential impact of sexually active life expectancy projection on individual health behaviour.

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Competing interests: All authors have completed the United Competing Interest form at http://www.icmje.org/coiDisclosure.pdf (available on request from the corresponding author) and declare that (1) no company has had involvement in the submitted work; (2) no authors have relationships with any companies that might have an interest in the submitted work in the previous 3 years; (3) their spouses, partners, or children have no financial relationships that may be relevant to the submitted work; and (4) no authors have any non-financial interests that may be relevant to the submitted work.

Ethical approval: The NHSAP data analysis was carried out under expedited approval from the University of Chicago institutional review board (No 16950A, 4/24/09). The MIDUS data analysis was carried out under exempt protocol from the University of Chicago institutional review board (No 13996G, 6/2/05). This research was carried out with deidentified, publicly available data with approval of the University of Chicago institutional review board. For neither study did the authors have access to any personally identifiable information or information that would link the data to individuals’ identities. All data are reported in aggregate to eliminate the possibility of deducitive identification of individuals.

Data sharing: Data for the National Social Life Science and Aging Project are available at www.cscpr.umn.edu/NACDA/news.htm#nshap. Data for the MIDUS project are available to researchers at webapp.cscpr.umn.edu/cpsrweb/ICPSR/studies/02760. Calculation of sexually active life expectancy used publicly available life tables and the Excel spreadsheet available at http://reves.site.ined.fr/en/resources/computation_online/sullivan. Statistical codes are available from NG at ngavlinova@babiesbsd.uchicago.edu.

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