Sex Differentials in Health

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IT IS COMMON KNOWLEDGE that females tend to live longer than males in the United States and that female death rates are lower than male rates for all age groups and for most leading causes of death. But while they are alive, females' health seems to be worse than males'. Health surveys repeatedly show that females have higher rates of illness, of disability days, and of health services use. Intuitively, these statements seem contradictory. Why should the sex with a health disadvantage end up with a mortality advantage?

After reviewing sex differentials in health for the United States and offering explanations for them, I will look at the contradiction of higher female morbidity but higher male mortality and suggest why it occurs. Definitions of the terms used in this paper and the data sources for the statistics cited are listed on pages 434–435.

Mental health is not considered in this paper. Sex differentials in mental health have been presented recently by several researchers (*1–5*).

Acute Conditions

The National Health Interview Survey (NHIS) of the National Center for Health Statistics collects extensive data on incidence rates for acute conditions and on disability from those conditions. In addition, findings in several community studies have provided medical measures of acute conditions. The interviews and medical data both show higher rates of acute illnesses for females, but higher injury rates for males. Restricted activity for acute conditions is greater for females.

Incidence. According to interview data, 12 percent more females than males had acute conditions in 1980 (table 1), and there was a similar elevation in earlier years. The female excess appears for infective and parasitic diseases, respiratory conditions, digestive system conditions, and "all other acute conditions." The fourth group includes problems due to pregnancy and childbirth; even when these are removed, female rates for "all other acute conditions" exceed male rates.

There are some intriguing differences for specific conditions (data not shown) within the four groups in table 1. The gap between female and male rates is very large for genitourinary disorders and for headaches. It is also sizable for unspecified viruses, influenza, bronchitis, upper gastrointestinal disorders, and musculoskeletal problems. The more complex reproductive system and menstrual problems of females probably account for their higher rates of genitourinary ailments, but their excess rates for other problems—especially for headaches and stomach-intestinal troubles—are curious. There is no obvious reason that females have higher physical risks for these conditions than males do.

For injuries, males have higher rates than females. This finding is compatible with males' generally greater exposure to health hazards from their jobs, travel, and sports.

Medical data on the incidence of acute conditions are scarce since continuous surveillance of a population, with specimens taken and tested when people feel ill, is required to obtain such information. There have been no such studies on a national sample, but two

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Table 1. Incidence of acute conditions and restricted activity for acute conditions, by sex, United States 1980

Condition group or age group	Acute conditions per 100 persons per year			Restricted activity days per 100 persons per year			Bed disability days per 100 persons per year			Restricted activity days per condition		Bed disability days per condition		School loss or work loss days per 100 persons per year [1]		
	M	F	F:M	M	F	F:M	M	F	F:M	M	F	M	F	M	F	F:M
Condition																
All acute conditions ..	204	239	1.12	870	1,096	1.26	354	495	1.40	4.3	4.6	1.7	2.1			
Infective and parasitic diseases	23	26	1.13	86	102	1.19	46	55	1.30	3.7	3.9	2.0	2.1			
Respiratory conditions	104	128	1.23	379	482	1.27	190	251	1.32	3.6	3.8	1.8	2.0			
Digestive system conditions	11	12	1.09	37	53	1.43	18	25	1.39	3.4	4.4	1.6	2.1			
Injuries	39	28	0.72	255	189	0.74	62	57	0.92	6.5	6.8	1.6	2.0			
All other acute condiitons:																
Including pregnancy and delivery problems	27	46	1.70	113	270	2.39	37	106	2.86	4.2	5.9	1.4	2.3			
Excluding pregnancy and delivery problems	27	41	1.52	113	203	1.80	37	79	2.14	4.2	5.0	1.4	1.9			
Age group																
Under 6 years	394	406	1.03	1,266	1,122	0.89	603	559	0.93	3.2	2.8	1.5	1.4	...	...	...
6–16 years	284	292	1.04	945	1,015	1.07	416	512	1.23	3.3	3.4	1.5	1.7	432	544	1.26
17–44 years	190	254	1.34	839	1,114	1.33	312	510	1.63	4.4	4.4	1.6	2.0	364	372	1.02
45 years or older	111	147	1.32	741	1,107	1.49	296	450	1.52	6.7	7.5	2.7	3.1	254	380	1.50

[1] School loss days are for children 6–16 years. Work loss days are for employed persons 17–44 years and 45 years and older. 1980 data not available by condition for work or school loss days.

SOURCE: National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 139.

KEY: . . . Inapplicable. M male. F female. F:M ratio of number for females to number for males.

community studies have shown higher incidence rates for females at most ages. In the Tecumseh, Mich., studies, acute respiratory illness was more common among females than males after age 3 years (*6,7*). The sex differentials appear for adults whether there are children in the household or not, so the difference cannot be attributed solely to mothers' higher risks of infection from their greater contact with children. Similarly, women in a Cleveland study had higher rates of respiratory disease and acute gastrointestinal illness than men (*8*).

Do the sex differentials in NHIS data and the medical data sources reflect true physical status differences? Not entirely; consider how the data are collected. In NHIS, an acute condition is counted only if it resulted in restricted activity or medical care. In effect, health behavior is included in the morbidity rates. Incidence rates could be similar for males and females, but if one sex tends to take more curative actions, a sex differential will appear. In the community studies, each participating household had a designated informant who told researchers when a family member had symptoms; a specimen was then obtained from that family member. Informants are not always aware of family members' symptoms and, therefore, illnesses may not be recorded. Because most informants were women, illness rates were probably underestimated for men, and possibly for children too. Incidence rates could be similar for men and women, but the proxy reporting by women would lead to sex differentials in the rates. Overall, the interview and medical data suggest that females have higher incidence rates of acute conditions, but this conclusion may be affected by the confounding effects just mentioned.

Restricted activity for acute conditions. Since females apparently have more acute health problems, it is not surprising that they limit their usual activities and have more days of bed disability per year than males do. In 1980, females' restricted activity rates were 26 percent higher than males', and their bed disability rates were 40 percent higher. These gaps are larger than the 12 percent difference in incidence rates. Consequently, females have more restricted activity per condition than males do. In 1980, they averaged 4.6 restricted activity days per condition and 2.1 bed disability days, compared to 4.3 and 1.7 for males. Short-term disability rates in table 1 are higher for females

for all five groups of acute conditions—including injuries. For the "all other acute conditions" category, the female excess persists even when pregnancy and childbirth events are removed.

Sex differentials by age. The largest sex differentials for acute conditions appear during adult years—sometimes at women's reproductive ages (17–44), sometimes at older ages (45 or more). There is a smaller female excess for girls 6–16 years.

Among children under 10 years, however, sex differentials show a strikingly different picture: young boys tend to have higher rates of acute conditions and acute disability than young girls. In NHIS findings, boys have higher rates for respiratory conditions (except influenza), injuries, and all other acute conditions. Medical data from the community surveys also show higher rates of acute respiratory illness and gastrointestinal illness among boys. Boys have more days of disability per condition than girls do, especially for respiratory problems. This observation suggests that boys' problems are more serious, and surveillance data confirm that boys have more severe types of acute respiratory conditions. Year after year, NHIS shows elevated morbidity for boys; it is especially pronounced for children under 10 years old.

There is one interesting anomaly in the NHIS data for children: girls have more school–loss days per year than boys. This statistic suggests that girls are more likely to stay home when ill, whereas boys try to attend school anyway.

Chronic Conditions

Numerous surveys have yielded information about chronic health problems. Both NHIS and the National Health and Nutrition Examination (NHANES) have interview data on chronic conditions. In addition, the National Hospital Discharge Survey (NHDS) provides hospital discharge rates for specific chronic conditions. The National Health Examination Survey (NHES) and NHANES also have collected medical measurements for some conditions through physical examinations. NHIS and the U.S. Bureau of the Census have collected information on people's limitations from chronic conditions. A review of all these sources indicates that sex differentials are complex and not always consistent. In general, it appears that women have more chronic conditions than men do, but their conditions are less severe and are not usually life-threatening.

Prevalence. NHES and NHANES have medical data on some specific conditions (heart disease, hypertension, arthritis) and on symptoms associated with high blood pressure, high blood glucose levels, low blood hematocrit counts, and high serum cholesterol levels. Table 2 presents selected data on rates for adults.

Until about 45–50 years of age, more men have problems with heart disease, hypertension, and high serum chloresterol levels; after that age, the rates for the women begin to exceed the rates of the men. Although men over age 45 continue to have the higher rates for coronary heart disease, women 45 and older have strikingly higher rates of hypertensive heart disease, more hypertension, and higher serum cholesterol.

At all adult ages, women have a higher prevalence of anemia (low blood hematocrit counts), diabetes (high blood glucose levels), moderate and severe osteoarthritis, and rheumatoid arthritis than men. Men experience more cases of mild arthritis and more skin problems.

Community studies in Tecumseh, Mich., (*9*) and Framingham, Mass. (*10,11*) also provided examination data. Tecumseh showed sex differentials similar to NHES and NHANES for coronary heart disease, hypertensive heart disease, diabetes, osteoarthritis, and rheumatoid arthritis (*9*). In addition, Tecumseh men had higher rates of chronic bronchitis than women at all ages. At all or most ages, women had higher rates of goiter, cancer, and rheumatic heart disease. Sex differentials for stroke and asthma "flipflop" across age groups. The Framingham study focused on cardiovascular morbidity and mortality of middle-aged and older adults. With few exceptions, men in these age groups had higher rates of diagnosed coronary heart disease and stroke (cerebrovascular accident) than women (*10,11*).

From 1957 to 1967, NHIS interviewers asked people if they had any chronic conditions and, if so, how many. The data showed that females were more likely to have a chronic condition than males (*12*). For example, in 1957–58, 64 percent of all women aged 45–64 reported having one or more chronic conditions, compared with 58 percent of men those ages. For ages 65 and older, the proportions were 81 percent for the women and 75 percent for the men.

Prevalence rates for specific conditions are available for NHIS, NHANES (medical histories), and NHDS. The various surveys' questions about chronic conditions differed considerably, so that it is not surprising that sex differentials vary across them. However, for a particular chronic condition, the same sex is always disadvantaged in the several surveys, with rare exceptions. This consistent picture appears even for specific age groups. Table 3 summarizes results from the surveys.

For the majority of conditions, females had higher prevalence rates. The most important rates are for

Table 2. Prevalence of chronic conditions and symptoms among adults, based on medical examinations, United States

Chronic condition or symptom	Percent		Which sex has higher rates? [1]
	Men	Women	
Heart disease, NHES			
Definite heart disease	12.6	13.7	Men to age 55, then women
Rheumatic heart disease	1.2	1.1	...
Hypertensive heart disease	7.7	11.1	Men to age 50, then women
Coronary heart disease	3.7	2.0	Men
Congenital heart disease	0.3	0.1	...
Syphilitic heart disease	0.2	0.1	...
Other heart disease	0.2	0.3	...
Suspect heart disease	13.9	9.7	Men except ages 55–64
Hypertensive heart disease	5.1	3.5	Men except ages 55–64
Coronary heart disease	2.2	2.2	Men to age 40, then women
Other heart disease	7.8	5.5	...
Hypertension			
Definite hypertension, NHES	14.1	16.4	Men to age 50, then women
Definite hypertension, NHANES	19.2	17.1	Men to age 55, then women
Borderline hypertension, NHES	17.2	12.2	Men except those 75 and older
Borderline hypertension, NHANES	21.3	15.6	Men except those 65 and older
Arthritis, NHES [2]			
Osteoarthritis	37.4	37.3	Men to age 54 ,then women
Mild osteoarthritis	31.2	26.3	Men except rates are equal for 55–64 group
Moderate or severe osteoarthritis	6.2	11.0	Women
Rheumatoid arthritis	1.7	4.6	Women
Skin conditions, NHANES, ages 1–74			
Significant skin pathology	34.0	28.7	Men
Needs care ("not now under best care")	9.3	7.2	Men
Symptoms of chronic diseases [3]			
Average blood glucose, NHES (mg per 100 ml)	115.7	126.4	Women
Average hematocrit count, NHES (mg per 100 ml)	46.5	42.4	Men (less anemia)
Average serum cholesterol [4], NHES (mg per 100 ml)	217.4	223.1	Men to age 45, then women
Average serum cholesterol [4], NHANES (mg per 100 ml)	221.8	224.9	Men to age 45, then women
Percent with serum cholesterol of 260 mg per 100 ml or higher, NHES	17.6	22.7	Men 25–44, women 18–24 and 45 and older
Percent with serum cholesterol of 260 mg per 100 ml or higher, NHANES	14.7	17.5	Men 25–44, women 18–24 and 45 and older

malignant neoplasms, benign and unspecified neoplasms, thyroid conditions, diabetes, anemia, rheumatic heart disease, hypertensive heart disease, hypertension, digestive system conditions (except peptic ulcer and hernia), diseases of the urinary system, arthritis, and rheumatism. But males had higher rates for some chronic problems—tuberculosis, gout, ear problems, coronary heart disease, cerebrovascular disease, arteriosclerosis, emphysema-asthma, peptic ulcer, hernia, slipped disc, congenital anomalies, and impairments.

If one compares the interview and hospital records data (table 3) with the medical examination data (table 2), the agreement is high. The same sex tends to have higher rates in both tables. The sex differentials, therefore, are robust across different kinds of data—showing at least which sex is disadvantaged. The levels of the rates and the size of sex differentials do vary, an interesting topic in its own right that will be covered in another report by the author.

Several inconsistencies in tables 2 and 3 are intriguing. First, females of all ages report more hypertensive heart disease and hypertension at all ages, but medical examinations show higher rates for them only after age 50. Possibly, men under 50 are less likely than women to have their hypertension diagnosed. Second, more females of all ages report arthritis, and they have more medically severe cases; but males show higher prevalence of mild cases. Possibly, males tend to ignore the aches of arthritis and are not diagnosed early; this circumstance would lead to underreporting in interviews. NHANES has medical history data on people's experience of prolonged joint pain and medical care for joint pain, which buttress this interpretation.

Table 2 (continued). Prevalence of chronic conditions and symptoms among adults, based on medical examinations, United States

Chronic condition or symptom	Percent		Which sex has higher rates? [1]
	Men	Women	
Dental status			
1 or both arches edentulous, NHES	24	30	Women
1 or both arches edentulous, NHANES	10	12	Women
Average DMF score, NHES [5]	17.2	18.5	Women
Average DMF score, NHANES [5]	12.4	13.5	Women
Periodontal disease, NHES	79	69	Men
Periodontal disease, NHANES	46	36	Men
Person needs dental care, NHES [6]	45	36	Men
Person needs dental care, NHANES [6]	68	61	Men
Vision status			
Binocular visual acuity, uncorrected, NHES [7]:			
Distance vision 20/100 or worse	13	21	Women
Near vision 14/70 or worse	31	35	Women
Monocular visual acuity, corrected, NHANES: distance vision 20/50 or worse in better eye	2.9	3.6	Women except for 6–11 and 55–64 age groups
Hearing status, NHES [8]			
Median hearing level for better ear:			
1,000 cycles per second	−5	−6	Higher (worse hearing) for men to age 65, then women
3,000 cycles per second	−1	−4	Higher for men
6,000 cycles per second	+20	+9	Higher for men
Ability to hear speech	−3	−5	Higher for men

[1] Age-specific rates are provided in the sources for most conditions and symptoms. The sex indicated has higher rates for all age groups, except where noted.

[2] NHANES provides data for specific joints, and also respondents' reports of prolonged pain in specific joints; see Series 11, No. 213.

[3] High blood glucose is a sign of diabetes mellitus; low hematocrit is a sign of anemia; and high serum cholesterol is associated with coronary heart disease.

[4] Rates are age-adjusted to the age-sex distribution of the total U.S. population for each survey period.

[5] Sum of decayed, missing, filled, and nonfunctional teeth. It is calculated for dentulous persons only.

[6] For NHES, need-for-care was determined by the examining dentist, based on the presence and severity of periodontal disease, the number of decayed and missing teeth, and any other clinical finding. The data are for dentulous persons only. For NHANES, a broader denition of needs was used; see Series 11, No. 214. Data are for all adults.

[7] Figures are for whites; those for blacks show similar sex differentials.

[8] For details about the test, see Series 11, No. 11. NHANES reports distributions of hearing levels (rather than medians); see Series 11, No. 215.

SOURCE: National Center for Health Statistics, Vital and Health Statistics, Series 11, Nos. 6, 7, 11–13, 15, 17, 18, 22, 24, 25, 36, 201, 203, 205, 212–215.

KEY: NHES National Health Examination Survey, 1960–62 (ages 18–79). NHANES National Health and Nutrition Examination Survey, 1971–74 (ages 18–74, except where noted). . . . No age-specific rates are available.

According to all sources, then, females appear more troubled by chronic conditions, especially after ages 45–50. But the shorter list of conditions with an excess among males is ominous because many of these conditions are leading causes of death (coronary heart disease, cerebrovascular disease, arteriosclerosis, pneumonia, emphysema-asthma, peptic ulcer, congenital anomalies) or are problems closely linked to leading causes (injuries, which are linked to accident and homicide mortality). Cancer is missing from the shorter list; females consistently report higher cancer rates in health surveys, but cancer mortality rates are higher for males. Possibly, cancer is detected and controlled earlier for females; in contrast, males are less aware of the disease in its early stages and their cases are less amenable to control after diagnosis. If so, this accounts for underreporting of males' cases in health interviews, despite the likelihood that males actually have higher cancer incidence rates.

Sensory, dental, and nutritional statuses. Women have better dental status and better hearing than men. But women have worse uncorrected vision, and their nutritional status appears worse. Some details follow. First, although women have fewer natural teeth and more signs of prior dental work, they have less periodontal disease and less need for immediate dental care (table 2). Second, medical data show that women have worse uncorrected vision (without glasses or contact lenses) than men (table 2). However, men have more visual impairments such as detached retina, color blindness, or severe vision problems even with glasses (table 3). Color blindness is a genetic problem, so these data do reveal a biological disadvantage for

Table 3. Sex differences in chronic conditions (and several acute conditions) for adults, based on health interviews and hospital records, United States

Condition [1]	*Which sex has higher rates?* [2]
Infective and parasitic diseases: tuberculosis [3-5]	Males
Neoplasms:	
Malignant neoplasms [4-6]	Females except for males 65 years and older in [4] and [6]
Benign neoplasms and neoplasms of unspecified nature [4-6]	Females
Endocrine, nutritional, and metabolic diseases:	
Thyroid conditions [3,5]	Females
Diabetes [3-6]	Females
Gout [3,5]	Males
Diseases of the blood and blood-forming organs:	
Anemia, all forms [3]	Females
Coagulation defects [5]	Females
Mental disorders: mental and nervous conditions [4,5]	Females
Diseases of the nervous system and sense organs:	
Epilepsy or chronic convulsions [3]	Females except equal rates for 45 years and older
Migraine [3]	Females except equal rates for under 17 years
Sciatica [3]	Females
Neuralgia and neuritis [3]	Females
Cataract [6]	Females
Diseases of the ear and mastoid process [6]	Males
Diseases of the circulatory system:	
Heart conditions [3-5]	Males except for females 17–44 years in [3]
Active rheumatic fever and chronic rheumatic heart disease [3,5]	Females
Hypertensive heart disease [3]	Females
Coronary (ischemic) heart disease [3,5,6]	Males
Other specified heart disease, including heart murmur [3,5]	Females except for males under 17 years
Ill-defined heart disease ("heart trouble") [3]	Males
Hypertensive disease without heart involvement (also called hypertension or high blood pressure) [3-5]	Females
Cerebrovascular disease (stroke) [3-6]	Males
Arteriosclerosis [3,6]	Males
Varicose veins [3,4]	Females
Hemorrhoids [3,4]	Females in [3], males in [4]
Other circulatory system conditions, for example, phlebitis, thrombophlebitis [3-5]	Females
Diseases of the respiratory system:	
Pneumonia, all forms [6]	Males
Chronic bronchitis [3-5]	Females 25–54 years, but males at younger and older ages
Emphysema [3,4]	Males
Asthma [3-5]	Males except for females 45–64 years
Chronic sinusitis [3,4]	Females except for males under 17 years in [4]
Hay fever [3-5]	Females except for males under 25 years in [3] and [5] and males of all ages in [4]
Pleurisy [3,5]	Females
Chronic cough [5]	Males

males. Men's other visual impairments may be due to delayed or incomplete care of eye problems. This speculation would explain why fewer women suffer severe vision impairments even though more of them have imperfect vision. Third, table 2 shows that women have better hearing at all frequencies than men do. Fourth, dietary intake reports show that males of all ages consume more nutrients (such as protein, calcium, iron, vitamins) than females do (*13*). Clinical data on nutritional deficiencies indicate that females' rates are higher than males' for niacin, vitamin A and essential fatty acids, iodine, and calcium (*14*). Larger percentages of males have signs of deficiency for protein, vitamin C, and vitamin D. Females actually tend to choose foods with higher nutritional value than males do but, because they eat less, females end up with

Table 3 (continued). Sex differences in chronic conditions (and several acute conditions) for adults, based on health interviews and hospital records, United States

Condition [1]	*Which sex has higher rates?* [2]
Diseases of the digestive system:	
Peptic ulcer [3-6]	Males
Hernia [3-6]	Males
Enteritis and colitis [3,5]	Females
Gallbladder conditions [3,5]	Females
Other digestive system conditions [3-6]	Females for most titles
Diseases of the genitourinary system: diseases of the urinary system (kidney, ureter) [3-5]	Females except for males 55–64 years in [3]
Diseases of the skin and subcutaneous tissue:	
Eczema, dermatitis, and urticaria (hives) [3,5]	Females
Allergies, all types [5]	Females
Psoriasis and similar disorders [3]	Females except for males 45 years and older
Corns and callosities [3]	Females
Diseases of nail [3]	Females except for males under 17 years
Diseases of sebaceous glands (acne) [3]	Males
Diseases of the musculoskeletal system and connective tissues:	
Arthritis [3-6]	Females
Rheumatism [3]	Females except for males 65 years and older
Displacement of intervertebral disc (slipped disc) [3]	Males
Bunion [3]	Females
Synovitis, bursitis, and tenosynovitis [3]	Females
Congenital anomalies [6]	Males
Accidents, poisonings, and violence:	
Fractures, all sites [5,6]	Males until late middle age, then females
Sprains and strains of back, including neck [6]	Females
Lacerations and open wounds [6]	Males
Impairments:	
Visual impairments [3,4]	Males except for females 65 years and older
Hearing impairments [3,4]	Males
Speech defects [3]	Males
Paralysis, complete or partial [3-5]	Males except for poliomyelitis, which has higher rates for females
Absence of major extremity, finger, or toe [3]	Males
Orthopedic impairments of back, spine, upper extremity, shoulder, lower extremity, or hip (excludes paralysis or absence) [3,4]	Males except for females 65 years and older for most sites. Also back and spine has higher rates for females under 45 years

[1] Condition titles are those of the International Classification of Diseases 8th Revision. Impairments are classified by a special scheme developed by the National Center for Health Statistics. The acute conditions included are pneumonia, fractures, sprain and strains, and lacerations and open wounds.

[2] Age-specific rates are provided in the sources for most conditions. The sex indicated has higher rates for all or almost all age groups, except where noted. Data from 4 national surveys are identified by footnote numbers.

[3] National Health Interview Survey, supplement questionnaires, 1968–73. Interviewers named specific conditions and asked if respondents had experienced them in the past 12 months.

[4] National Health Interview Survey, standard questionnaire 1974. Respondents were asked if they are limited in activities or mobility by a chronic condition; if so, they named the condition.

[5] National Health and Nutritional Examination Survey, medical history questionnaire, 1971–74. For specified conditions, respondents were asked: "Has a doctor ever told you that you had . . .?" and "Do you still have . . . .?"

[6] National Hospital Discharge Survey, 1975. Main diagnosis at discharge.

SOURCE: For the NHIS supplements, National Center for Health Statistics, Vital and Health Statistics, Series 10, Nos. 83, 84, 92, 94, 99, 109, 124. For the NHIS Standard Questionnaire: calculated from NCHS, Vital and Health Statistics, Series 10, No. 111. For NHANES, unpublished tabulations provided by NCHS. For NHDS: NCHS, Vital and Health Statistics, Series 13, No. 35.

more nutritional deficiencies. Obesity is another indicator of nutritional problems, and skinfold tests show that women are more likely to be obese than men (*14*).

Disability from chronic conditions. Serious chronic diseases and impairments force people to change their work and recreational activities, and they can hamper physical activity and mobility. Data on chronic disability are difficult to interpret in a medical sense because limitations depend not only the kind of condition and its severity, but also on the person's social roles and obligations.

Because of the prevalence data cited previously, more women might be expected to have limitations, but probably milder ones than men. Moreover, if women tend to accept limitations more readily, this

Table 4. Disability due to chronic conditions, by sex and age, United States (percentages)

Type of disability	Age group (years) and sex							
	Under 17		17–44		45–64		65	
	M	F	M	F	M	F	M	F
Limitation in social activities, NHIS 1980:								
Limited in major activity	2.3	1.8	5.8	5.3	20.2	17.4	44.2	35.3
Limited in secondary activity only	2.0	1.5	3.4	2.8	5.1	5.2	4.6	7.4
Has no chronic condition or has one that does not limit social activities	95.7	96.7	90.8	91.9	74.7	77.4	51.2	57.3
Mobility limitation, NHIS 1972: [1]								
Confined to the house	([2])	([2])	0.2	0.1	1.2	1.4	5.0	5.4
Needs help in getting around	([2])	([2])	0.2	0.2	1.2	1.0	6.0	7.2
Has trouble getting around alone	0.1	0.1	0.5	0.4	2.6	2.3	5.4	6.1
Has no chronic condition or has one that does not limit mobility	99.7	99.7	99.0	99.1	95.0	95.4	83.8	81.4
			18–44		45–54		55–64	
			M	F	M	F	M	F
Work disability, 1970 census:								
Complete (cannot hold a job)			1.7	2.3	4.4	6.6	10.8	13.4
Partial (limited in kind or amount of work at a job)			5.9	3.4	10.4	6.5	13.5	8.1
	Rates per 100 persons per year							
	Under 17		17–44		45 and older			
	M	F	M	F	M	F		
Short-term disability for chronic conditions, NHIS, 1980: [3]								
Restricted activity days for chronic conditions	102	118	501	561	2,061	2,246		
Bed disability days for chronic conditions	31	10	123	172	587	711		
School loss or work loss days for chronic conditions [4]	49	3	114	119	246	187		

[1] Percents in a column may not add to 100.0 because of rounding.
[2] Less than 0.5 percent.
[3] Computed by author from data in Vital and Health Statistics, Series 10, No. 139.
[4] School loss days are for children 6–16 years; work loss days are for currently employed people 17–44 years and those 45 and older.

KEY: M male. F female.
SOURCE: For NHIS, National Center for Health Statistics, Series 10, Nos. 96, 139. For the census, U.S. Bureau of the Census: "1970 Census of Population. Persons with Work Disability." Subject Report PC (2)–6C, 1973.

factor would also increase their disability rates. On the other hand, if men's roles are more physically demanding, men with chronic conditions will encounter problems more readily and they will be forced to accept limitations. The data examined subsequently are consistent with these interpretations, but do not prove them.

In NHIS, men are asked if they are now able to work at a job or business. Women who were mainly employed in the past year are asked about job limitations; women who have been housewives in the past year are asked about housework limitations. People who report chronic limitations are asked if they are completely unable to do their main activity (of the past year), if they have partial restrictions, or if only secondary activities are limited. Table 4 shows that at all ages, more males are limited in performing their usual activity. Among people who have some limitation, males are much more likely than females to have complete limitation (data not shown). More females, therefore, have partial limitation. Before age 45, males also report more problems in their secondary activities. It appears that males' chronic conditions are more severe—less frequent, but more advanced.

The census data on work disability are quite different. People were asked if they cannot hold a job at all because of a health problem or if they are limited in the kind of job or amount of work at a job. At all ages, more men reported partial work disability, but more women reported complete disability.

This contradiction is resolved by the wording of the NHIS and census questions. NHIS asks men about job disability, but women were asked about either housework or job disability. The census asks everyone about job disability. Women with health problems who quit their jobs or never seek employment probably report few housework limitations to NHIS, but to the census interviewer they say that they cannot work. By con-

trast, men probably feel greater pressures to work and therefore stay in the labor force even when quite ill. They make adjustments, such as changing their specific tasks or changing the type of job, but they resist quitting altogether. In NHIS then, more men would report problems in usual activity (job), and for the census they report partial rather than complete disability. This interpretation is buttressed by census data on the duration of work disability (data not shown). Sex differences are not large, but they indicate that partially disabled men have had their problem longer than comparable women, but completely disabled women have been troubled longer than comparable men. This observation is consistent with the notion that chronically ill men try to remain employed, but women leave the labor force or remain outside it more readily.

In sum, both NHIS and census data suggest that men have more severe chronic conditions. But social factors also affect men's and women's role occupancy and performance; these factors can obscure physiological differences.

Women seem more troubled by limitation in mobility and short-term disability for chronic conditions. More middle-aged women are confined to the house and, at elderly ages, more women have mobility problems of all kinds (table 4). Only in the middle-age groups do men show an excess—and only for mild mobility problems. On a short-term basis, more women also reduce their daily activities for chronic problems. They have higher rates of restricted activity and bed disability for chronic conditions. Among employed people, however, men equal or exceed women in work-loss days for such problems.

From a medical perspective, women's conditions could be considered more severe, but there is another interpretation, involving social factors. If men resist confinement to home and do their best to get around and keep working, they may actually have worse medical conditions but less disability. By contrast, if women are more willing or able to take time off when chronic conditions flare up, their actions could account for their higher limitation. Also, for people 65 or older, the higher rates for women partly reflect their older average age than men in that age group.

Institutionalization. People with extremely serious chronic diseases or impairments are sometimes institutionalized. They enter chronic disease hospitals, homes for the aged and dependent, or mental hospitals. Table 5 shows census data on institutional residents for 1960 and 1970. Mental hospitals are included since some residents have physical as well as mental problems. At all ages, males were more likely to be in chronic disease hospitals and mental hospitals. Up to age 65, they also had higher residence rates in homes for the aged and dependent but, after age 65, females had higher rates of residence in these homes.

The Resident Places Survey (RPS) shows that male residents under 65 years are sicker than female residents those ages (*15,16*). More of the men require nursing care because they cannot take care of their personal needs, and they tend to have more chronic conditions. At age 65 and older, women residents are sicker according to all indicators.

The data on institutionalized persons suggest that men under age 65 are more seriously ill from chronic problems. But important social factors are involved in decisions to institutionalize people, especially role expectations and availability of home care (*17*). Disabled men under 65 may be very upset and hard to care for, since they are "supposed to be working" and want to do so. Their wives and other family members may increase job activity in order to boost family income; this leaves the men with less care at home and may lead to earlier institutionalization for the men, compared to ill women, who may manage to care for themselves better. At the elderly ages, work responsibilities and expectations disappear. Disabled elderly men are

Table 5. Rates per 10,000 population for institutional residence, by sex, United States, 1960 and 1970

Type of Institution	1960		1970		Which sex has higher rates? [1]
	Males	Females	Males	Females	
Chronic disease hospital	4	3	5	4	Males
Tuberculosis hospital	7	3	2	1	Males
Home for the aged or dependent	31	[2]43	42	[2]80	Males to 65 years, then females
Mental hospital	43	45	33	24	Males except at ages 75 and over in 1960

[1] Age-specific rates are provided in the sources. The sex indicated has higher rates for all age groups, except where noted. Rates shown are for people 14 years and older.

[2] Overall rates are higher for females because most people in these institutions are elderly, and elderly women have much higher rates than elderly men. But at all ages under 65, males have higher rates than females.

SOURCE: U.S. Bureau of the Census: "1960 Census of Population. Inmates of Institutions." Subject Report PC(2)–8A, 1963; "1970 Census of Population. Persons in Institutions and Other Group Quarters." Subject Report PC(2)–4E, 1973.

Table 6. Health services use, by sex and age, United States

Type of health services	Age group (years) and sex											
	Under 17		17–24		25–44		45–64		65–74		75 and older	
	M	F	M	F	M	F	M	F	M	F	M	F
Doctor visits, NHIS 1980 [1]												
Average number of doctor visits per year	4.5	4.3	2.8	5.2	3.4	5.8	4.4	5.7	5.5	7.0	6.7	6.4
									65 and older			
Percent who saw a doctor in the past 6 months	59	59	46	65	45	64	54	63	65	71		
	Under 15		15–24		25–44		45–64		65 and older			
	M	F	M	F	M	F	M	F	M	F		
Ambulatory care, NAMCS 1975 [2]												
Average number of ambulatory care visits per year	2.0	1.8	1.5	2.9	1.9	3.6	2.8	4.0	4.0	4.5		
Prior visit status (percent)[3]:												
New patient	15	16	24	20	23	15	13	11	10	8		
Old patient with "old" problem	50	47	47	55	53	64	68	69	74	76		
Percent of problems considered "serious" or "very serious" by the doctor	12	10	15	10	21	15	28	21	31	28		
	Under 17		17–24		25–44		45–64		65 and older			
	M	F	M	F	M	F	M	F	M	F		
Dentist visits, NHIS 1980 [4]												
Average number of dentist visits per year	1.5	1.9	1.2	2.0	1.6	1.9	1.7	1.9	1.3	1.4		
Percent who saw a dentist in the past 6 months	35	37	33	39	36	40	35	38	24	26		
	Under 17		17–24		25–34		35–44		45–64		65 and older	
	M	F	M	F	M	F	M	F	M	F	M	F
Hospital stays, NHIS 1972, 1980 [5,6]												
Discharges per 1,000 persons per year, 1980	69	56	79	190	86	208	103	152	167	164	307	256
Average length of stay, 1980 (days)	5.5	4.8	7.3	4.4	7.0	5.0	9.9	7.1	10.7	8.2	9.7	10.3
Discharge rate excluding deliveries, 1972 [7]	76	67	72	100	83	143	107	173	157	163	284	247
Average length of stay, excluding deliveries, 1972 [7]	5.9	4.9	6.8	4.7	8.6	6.1	9.8	7.7	11.1	10.0	11.0	12.1

[1] Consultation with a doctor or doctor's assistant, either in person or by telephone, for examination, diagnosis, treatment, or advice.
[2] Visits to office-based physicians. Telephone calls and visits to emergency rooms and industrial clinics are excluded.
[3] An "old" problem is one previously treated by the physician. A third visit-status (old patient with new problem) is not shown.
[4] Visit to a dentist's office for treatment or advice; services from a technician or hygienist are included.
[5] Stay in the hospital overnight or longer.
[6] Discharge rates are also available from the Hospital Discharge Survey. It shows similar sex differentials; see Vital and Health Statistics, Series 13.
[7] The first 2 age groups are "under 15 years" and "15–24 years."
SOURCE: National Center for Health Statistics, Vital and Health Statistics Series 10, Nos. 107, 139; Series 13, No. 33.
KEY: M male F female.

likely to have a living spouse available to care for them, but disabled elderly women are often widowed and must move to an institution for care. RPS data show that at time of entry into nursing and personal care homes, a higher percentage of the women are widowed. Entering men are more likely to be never married, divorced, or separated (*16*).

Sex differentials by age. We have looked extensively at data on chronic conditions, limitations, and institutionalization of adults. A few words are needed about children. Few children have chronic conditions, but the data consistently show that boys are more likely than girls to have such conditions and to be limited by them.

Self Ratings of Health

In health interviews, respondents are often asked to sum up their health status. (Examples of questions are

"Do you consider your health excellent, good, fair, or poor?" and "Compared to other people your age, is your health better, worse, or about the same as theirs?") Women consistently report worse health status than men do. In the 1975 NHIS, 13.5 percent of females said their health was "fair" or "poor," compared to 11.2 percent of males (*18*). By contrast, 51.3 percent of males and 45.3 percent of females reported "excellent" health. Females' poorer evaluations of their health occur at all ages.

Answers to these questions reflect not only real morbidity but also perception of symptoms, evaluation of their seriousness, and lifetime experiences of illness and injury. Although the questions are simple, the factors that influence answers are complex. Sex differentials in these responses are rich with meaning and should not be interpreted hastily.

Use of Health Services

Women use more outpatient services than men do, but they have similar or lower rates of hospitalization when stays related to reproductive functions are excluded. At all adult ages, women have more physician visits per year and also a shorter time interval since their last visit (table 6). The same is true for dentist visits. These sex differentials are largest in early and middle adult years, and they become small for elderly people. Men are less likely to have a regular source of medical care, and even those with a regular source see a specific physician less regularly than women do (*19*).

Hospitalization data show a different picture for the sexes; between 17 and 44 years, women have higher annual discharge rates for short-stay hospitals, but for older age groups, men have higher rates. The gap for the 17–44 age group is partly influenced by women's stays for childbirth. When these stays are excluded, the gap narrows, but it does not entirely disappear. When all sex-specific conditions are excluded (mainly disease of prostate and female reproductive disorders), the sex differential does virtually disappear for ages 17–44 (*20,21*). In sum, for conditions which both sexes can have, men and women 17–44 are equally likely to be hospitalized. After about age 50, men have notably higher hospitalization rates. And at all ages except 65 and older, men tend to have longer hospital stays than women. This statement remains true when childbirth and other sex-specific problems are excluded.

Men's higher hospitalization rates after age 50 and their longer hospital stays at most ages suggest that they have more serious conditions. Women may indeed experience acute and chronic conditions more often, but if those conditions are less serious, they can manage with outpatient care. In addition, women may be more willing and able to seek outpatient medical help when ill. So, even if the sexes had similar illness and injury rates, the rates of physician and dentist visits for women would be higher.

For children, the evidence points uniformly to more health services for boys. They have more physician visits, higher hospitalization rates, and longer hospital stays. When visiting a physician, they are more likely to be "old" patients than "new" ones, to receive treatment for an "old" problem, and to be diagnosed as having a serious problem (*22*). Only one indicator shows more health services for girls—they receive more dental care than boys do.

Table 7. Use of prescription and nonprescription drugs, by sex

Type of drug	*Age group (years) and sex*									
	Under 17		*17–24*		*25–44*		*45–64*		*65 and older*	
	M	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*
Prescription drugs, United States, 1973										
Average number of acquisitions per year[1]	3.0	3.1	2.3	5.7	3.4	7.3	6.7	9.5	11.2	14.3
Average cost per purchase	$3.60	$3.70	$4.30	$3.80	$4.90	$4.50	$5.70	$5.30	$5.50	$5.30
	Under 2		*2–5*		*6–14*		*15–44*		*45–64*		*65 and older*	
	M	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*
Medicine use, Baltimore, 1968–9												
Percent using prescribed medicine in the past 2 days	21	30	18	18	13	13	14	26	31	44	42	67
Percent using nonprescribed medicine in the past 2 days	14	23	22	21	18	19	32	42	26	34	14	29

[1] Number of acquisitions equals the number of different prescriptions filled times the number of times each was (re)filled.

SOURCE: For United States, 1973: National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 108. For Baltimore, 1968–69: references *29,35*.

KEY: M male. F female.

Drug Use

In this section I will review data on prescription and nonprescription drugs used for medical purposes; drug use for nonmedical and recreational purposes is excluded. In most surveys interviewees are asked about "prescribed" and "nonprescribed" medicines. The first group includes both prescription-only drugs and recommended over-the-counter drugs.

NHIS data show that females obtain more prescribed medicines per year, especially at ages 17–44 (table 7). Males are slightly more likely to obtain medicines with no out-of-pocket expense—in other words, obtained free from a physician or public organization, or paid entirely through health insurance. When some out-of-pocket payment is required, males pay more for their medicine than females do. But when total expenses for prescribed drugs are added up, females spend more per year (*19,23,24*).

Other surveys also show greater use of prescribed drugs by females (*25–29*). Women are especially heavy users of psychotherapeutic drugs compared with men (*30–32*). Women often report that they take pills to relieve stress, whereas more men report alcohol consumption for stress (*26,30*). It is sometimes claimed (but remains to be demonstrated) that physicians prescribe psychotherapeutic drugs more readily for women than men for the same complaint. I have discussed this issue further elsewhere (*33,34*).

Females of all ages also use nonprescribed drugs more frequently than males do (*25,27,28,35*). Some common examples are cold pills, tonics, cough medicine, and aspirin. Females are especially likely to use pain relievers (*35*). When total expenses for nonprescribed drugs are added up, males and females spend about the same amount per year (*19*). This suggests that the per-item cost is lower for women.

What do the sex differentials in drug use imply? The data on prescriptions may reflect more frequent illness for females, but more serious problems for males (if we assume that more expensive medicines are for more serious problems). Alternatively, physicians may overprescribe drugs, recommending more medication to female patients than to male patients with the same ailment. But females' drug use is certainly influenced by their more frequent use of health services. If the probability of getting a prescription during a visit is the same for both sexes, females still get more prescriptions because they see physicians more often. The statistics on nonprescribed drugs also allow several interpretations. Females may be more ill from acute problems and therefore buy more drugs to relieve their symptoms. Or they may be more likely to self-medicate when they feel symptoms; in other words, symptom rates could be similar for the sexes, but females take drugs more readily. Higher health services use and higher drug use by females suggest they are more willing to take all kinds of curative action for a discomfort, compared to men.

Table 8. Preventive health behaviors, by sex, United States (percentages)

Preventive behavior	*Males*	*Females*
Vitamin use		
Using vitamins now [1]	19	25
Using "tonics for the blood" now [1]	3	4
Regularly use vitamin pills or vitamin supplements [2]	27	40
Reducing diet		
On reducing diet sometime in past 3 years [1]	16	31
On reducing diet now [1]	5	14
On a reducing diet [3]	2	6
Exercise		
Exercise regularly [4]	44	45
Walk for exercise	38	41
Ride a bicycle	16	17
Swim	16	10
Do calisthenics	12	14
Jog	8	3
Lift weights	5	1
Other	6	4
Percent who "often": [2]		
Take long walks	37	36
Ride a bicycle	10	12
Swim in the summer	27	25
Do calisthenics or physical exercise	27	28
Go jogging or running	16	9
Work on a physically active hobby, such as dancing or gardening	45	44
Other active sports	32	17
Participated in 1 or more sport in past 12 months [5]	47	36
Participated as a member on an organized team	14	8
Participated in tournaments, as an individual or as a team member	10	4
Eating and sleep		
Eat breakfast almost every day [2]	53	56
7 or 8 hours of sleep each day, on average [2]	67	69
9 or more hours of sleep each day, on average [2]	9	12

Preventive Health Behavior

Sex differentials in positive health habits and preventive health care are presented in the following section. Avoidance behaviors (such as not smoking, low alcohol consumption, low caffeine intake) are excluded from this analysis. National data on these behaviors have been reported elsewhere (*18,36–39*).

The prevention picture is not uniform; the sexes differ in the kinds of measures that they take. National

Table 8 (continued). Preventive health behaviors, by sex United States (percentages)

Preventive behavior	Males	Females
Preventive examinations		
Ever had examination: [6]		
Electrocardiogram, 40 years and older	65	57
Glaucoma test, 40 years and older	50	57
Chest X-ray, 17 years and older	80	80
Eye examination to determine need for glasses, or change in glasses prescription, 3 years and older	86	90
Routine physical examination (not for illness), under 17 years	86	86
Among those who ever had examination, percent who had it in past year: [6]		
Electrocardiogram	42	39
Glaucoma test	36	36
Chest X-ray	40	38
Eye examination	48	46
Routine physical examination	60	56
Had examination during office visit: [7,8]		
Limited history or examination	50	52
General history or examination	16	16
X-ray	9	6
Blood pressure check	27	37
Had blood pressure check in past 6 months [9]	40	54
Had general physical examination while feeling well, in past year [2]	37	49
Had blood pressure check in past year [2]	74	83
Had eye examination in past year [2]	36	39

[1] Study of Health Practices and Opinions, 1969, reference *72*. Adults.
[2] National Survey of Personal Health Practices and Consequences, 1979, reference *39*. Adults 20–64 years.
[3] National Health and Nutrition Examination Survey, 1971–75, reference *18*. Persons 12–74 years.
[4] National Adult Physical Fitness Survey, 1972. Adults. President's Council on Physical Fitness and Sports: Newsletter, Special Edition, May 1973.
[5] National Health Interview Survey, 1975, reference *18*.
[6] National Health Interview Survey, 1973. National Center for Health Statistics, Vital and Health Statistics, Series 13, No. 33.
[7] National Ambulatory Medical Care Survey, 1975. All ages.
[8] May include examination for symptoms.
[9] National Health and Nutrition Examination Survey, 1974. Persons 17–74 years. National Center for Health Statistics, Advance Data, No. 2, Nov. 8, 1976.

surveys indicate that more women than men take vitamins, tonics, and similar products for their health (table 8). A substantially higher percentage of women have followed a weight-reducing diet at least once, and more are currently on such a diet. Recall that in the medical data, a higher percentage of women were classified as obese. More women than men reported that they were overweight (*39*).

Similar percentages of men and women engage in regular exercise, but men tend to pursue more strenuous sports that give them higher cardiovascular benefits.

Recent data on sleeping and eating habits show few sex differences. Similar percentages of men and women sleep 7–8 hours a night, but more women sleep longer hours. Slightly more than half of each sex eat breakfast regularly. Results of an earlier survey of Alameda, Calif., residents are reported by Belloc and Breslow (*40*).

Recently, the National Center for Health Statistics created an index of good health habits (weight control, exercise, sleep, alcohol consumption, and cigarette smoking). Women score higher on this index; 24 percent have five good habits compared to 15 percent of the men (*39*).

Table 8 also contains data about preventive examinations for early diagnosis of health problems. More men have had an electrocardiogram during their lives. Among people who have ever had electrocardiograms or chest X-rays, more men than women had the examinations recently. Females are more active in obtaining eye examinations for glasses and glaucoma, and they are more likely to have had a recent blood pressure check.

The sexes are equally likely to receive a general examination when they visit a physician, but the females' examinations are more likely to be voluntary and recent (*19*), partly because they make more total visits per year. Men's examinations are more likely to be required by their employers. Young children are an exception to this pattern: boys have more recent and more voluntary examinations than girls. Apparently young boys receive more preventive care as well as more curative care.

Summary of Sex Differentials in Health

A cursory review of the data suggests that women have greater morbidity than men. After early childhood, females have higher rates of acute conditions and more restricted activity per condition. They are more likely to have a chronic condition. Women have more physican and dentist visits, and they use more drugs. They get less physical exercise than men, and they are less likely to have preventive examinations such as electrocardiograms and chest X-rays for some important chronic conditions.

But men appear to have poorer health in some important respects. They have higher prevalence rates for many chronic conditions related to the leading causes of death, higher prevalence rates of heart disease before age 50, and higher injury rates at all ages. Their chronic conditions are probably more severe. Hospitalization rates are higher for them after about age 50, and hospital stays are longer at most ages. In addition, young boys have poorer health and more health care than young girls.

Explaining Sex Differentials in Health

Why do females have more acute conditions during adult ages and more chronic conditions after age 45?

Why do they have more restricted activity and visits to physicians? I suggest that there are four general reasons for sex differentials in health status and health behavior: inherited risks of illness, acquired risks of illness and injury, illness and prevention orientations, and health reporting behavior. In the next section, I shall discuss how males and females may differ on these factors. Many of the statements are speculative, and more research will be needed to support or refute them.

Inherited risks of illness. The sexes may differ in their inherent vulnerability to disease. Mortality rates are higher for males from the moment of conception. They have higher fetal death rates, infant mortality rates, and death rates from congenital anomalies (*41–45*). These facts suggest—but do not prove—that some genetic differences in disease vulnerability exist in males and females, and that males are disadvantaged.

In addition, diseases that are specifically linked to the sex chromosomes are more numerous among males than females (*46,47*). Examples are X-linked ichthyosis, haemophilia, certain types of muscular dystrophy, and red-green color blindness. Research also suggests that boys are more susceptible to infections than girls are (*48,49*).

Finally, reproductive systems also influence health problems for males and females. It is thought that the hormone estrogen has a protective effect, somehow improving a person's resistance to degenerative diseases (*50,51*). If so, women enjoy an important advantage until menopause; then estrogen production drops sharply. Nevertheless, pregnancy complications and reproductive disorders increase women's morbidity. There are far fewer possible problems with men's reproductive organs, and men's problems tend to be easier to diagnose and treat. Thus, in the reproductive ages (17–44), females have both an advantage and a disadvantage due to their reproductive biology and roles.

Overall, males may be less durable biologically than females, and male morbidity consequently may be greater than female morbidity. This effect is somewhat offset during women's reproductive years, because of risks associated with pregnancy.

Acquired risks of illness and injury. Males and females are exposed to different physical risks of disease and injury because their work and leisure activities, lifestyles, and (possibly) levels of stress and reactions to stress differ.

First, men are more likely to be employed and to work full-time, and their jobs tend to be more hazardous than women's. Men are therefore exposed to higher risks of occupation-related diseases and injuries. (Full-time housework is not necessarily a safe activity, but it tends to be safer than many jobs outside the home). Men's nonwork activities (leisure, sports, work-related travel) increase their risks of injury compared to women. Sex differences in work and nonwork activities appear early in life; boys' play activities typically pose more injury risks than girls'.

Women's social roles may increase their health risks in one respect. Women tend to have more contact with young children than men do, and so they are more likely to contract infectious diseases, especially acute respiratory ones.

Second, men tend to smoke, drink, and drive more than women. These lifestyle behaviors increase men's risks of chronic conditions such as bronchitis-emphysema, heart diseases, cirrhosis of the liver, and injury.

Third, there is evidence that prolonged stress is related to some chronic illnesses and to injuries. This can occur in two ways: stress may encourage risky lifestyles, or it may directly trigger biochemical processes that cause chronic illnesses. Until recently, researchers thought that men feel more stress than women, because of their heavy economic responsibilities. But some now say that women are more stressed, because of frustrations as homemakers and as employees in unchallenging jobs. In several surveys women reported more stress and anxiety, but some researchers believe this finding is an artifact of the way that questions are worded. Which sex really feels more stressed on a daily or long-term basis is not known for sure.

Another issue is how the sexes react to stress. It is speculated that men cope with stress in two principal ways—by trying to tolerate it silently or by overt behaviors such as drinking more or smoking more. Women may talk to friends more about their troubles, take mood-modifying drugs, and seek medical or psychological help. If so, men's reactions boost their chances of disease and injury, even if the original levels of stress are similar for both sexes. Thoughtful discussions of sex differences in stress levels and stress reactions and of the link between stress and disease have been published (*52–55*).

Illness and prevention orientations. People vary in their perception of symptoms, assessment of symptoms' severity, and readiness to take curative health actions. These factors can be called illness orientation. People also vary in their readiness to take actions to prevent health problems or to detect asymptomatic ones; this

attitude is called prevention orientation. Both orientations refer to social and psychological factors which influence health perceptions and health behavior. Medical sociologists such as Mechanic (*56–58*) call illness orientation illness behavior. I use the word "orientation" to emphasize that the factors precede curative actions.

There is widespread belief—and limited evidence—that the sexes differ in their illness orientations:

First, females may be more sensitive to discomfort—more likely to perceive an ailment and also more likely to consider it painful or bothersome. This reaction may have biological origins (such as intrinsic differences to pain sensitivity), but its chief cause is probably social. Boys are taught to ignore symptoms (*59*), and men traditionally have responsibilities that discourage them from noticing symptoms. Females may not be overtly encouraged to feel ill; they are simply not discouraged as much as males are during childhood and adulthood. (Hypotheses change with the times, and recently some researchers claim that women's usual responsibilities discourage them from noticing symptoms—more so than for men. The essence of the argument is that women have so many tasks—housework, child care, care for ill family members—that they cannot afford to perceive their own symptoms or take care of themselves when ill.)

Second, it may be more socially acceptable for girls and women to report discomforts to family, friends, and professionals. Friends may recommend restricted activity or medical care, helping to legitimate curative actions. During physician visits, women may also report more details about their symptoms, thereby improving the chances of correct diagnosis and appropriate treatment. Wallen and co-workers offer some intriguing evidence on this point (*60*).

Third, females may be more willing and able to cut down on their usual activities when ill or injured. They may believe that bed rest or other restrictions will speed recovery or prevent a problem from worsening. Also, females' schedules may have more discretionary time periods. And income loss from illness is usually lower for women, since they are less likely to be employed or a family's main income-earner. This situation is changing as more women become household heads, and as more married women have full-time jobs.

Fourth, females may be more willing and able to seek medical and dental help and use medicines to cure them. Surveys of health attitudes show that women have more confidence in physicians and in the efficacy of medicines and treatments (*61*). Also, if women do have more discretionary time, they may find it easier to make time for a medical or dental visit or for a hospital stay. One impediment to medical care for women is their poorer health insurance coverage (*62,63*), which boosts personal costs for health care (*24*). But other "costs" of illness (such as lost work income) may be less for them.

The sexes may also differ in prevention orientations. Females may be more eager and able than males to take preventive health actions. The reasons are similar to those just cited. More than males, females may believe that preventive actions aid health. And with more discretionary time, they may be able to visit physicians and dentists for preventive examinations more easily than males can. In addition, routine visits for reproductive health care often include tests for chronic problems such as high blood pressure. So women's attentiveness to reproductive health has "spin-off" benefits for other health problems.

Overall, females' illness and prevention orientations act to increase their morbidity rates, compared to males. But why are they more body-sensitive, willing to talk about health problems, and ready to take preventive and curative actions? Two main reasons have been suggested.

First, females are more involved than males in health and health care throughout life. Girls are allowed to voice body discomforts more than boys are, and more attention is given to girls' puberty. Even without such attention, menarche makes a girl keenly aware of her body and her feelings over time. Boys are more likely to move through puberty without radical changes in symptom perception. As adults, women usually become responsible for family members' health—watching for signs of illness, helping them when ill, and making appointments or escorting them to physician and dentist offices (*64*). To fulfill this role, women become more informed about health and health services. Still another aspect of health socialization has been suggested—that females are taught to define their life problems in physical and personal terms, whereas males focus on the social (external) causes of their problems. If this is true, distressed women are more likely to self-medicate or seek professional help.

Second, more flexible schedules do not necessarily mean that women have more leisure time than men; it simply means they can alter their routines more easily. Similarly, it is not necessarily true that women have fewer role obligations than men. But their obligations may be less time-restricted. Various hypotheses about time constraints and their effect on health behavior have been suggested. I suspect that the crucial feature is flexibility in a schedule rather than the

amount of free time, and that women have greater flexibility than men do; these hypotheses need to be tested.

Health reporting behavior. Health surveys are usually conducted in face-to-face or telephone interviews; occasionally respondents fill out questionnaires. The wording and placement of questions and the way interviewers probe for answers can influence replies. If men and women differ in their reactions to these survey procedures, the data will be affected. For example, if they differ in willingness to report past health events, then rates will be underestimated for the less-willing group. There are three ways that health reporting behavior might affect sex differentials.

First, health socialization may make women better respondents in that they may remember both major and minor health problems and actions better than men do. And they may be more willing to talk about health with an interviewer—simply an extension of their greater willingness to discuss symptoms with friends and professionals. By contrast, men may forget their health problems more quickly, have a sparser health vocabulary, and be less eager to discuss health matters with a stranger. There is very little evidence to support these hypotheses. Researchers have observed that people tend to underreport the number of physician visits, hospitalizations, and diagnosed chronic conditions; but there is no sex difference in the degree of underreporting for these major events (*65–67*).

Second, proxy respondents tend to underreport illnesses and disability of other household members (*68–71*). Proxies are usually asked to report for children and for adults not present at the interview. They can be unaware of chronic conditions of other members and of acute conditions that cause no visible disability or medical care, and proxy respondents are more likely to forget others' conditions than their own. Because women often serve as proxy respondents for men (and rarely vice versa), proxy effects tend to reduce male morbidity rates.

Third, interviewers in health surveys are usually women. Female respondents may relate their own health problems to them more readily than males do. Little is known about the effect of same-sex versus opposite-sex pairings of respondent and interviewer (*72*).

Discussion. The relative importance of the four reasons for sex differentials varies, depending on the kind of data. When the data's sources are medical examinations or laboratory tests of a general population, sex differentials should be most attributable to differences in inherited and acquired risks. Illness and prevention orientations and health reporting behavior become more important with interview data. For these, a sex differential in reported morbidity partly reflects risks that men and women incur, but it also reflects awareness of the condition and willingness to report it. Social and psychological factors are important in interpreting health behaviors such as restricted activity, limitations, medical care, drug use, and so forth. In sum, intrinsic and acquired risks are important for understanding all types of health data, but the importance of risks (compared with social and psychological factors) declines as we move from medical data to interview data on morbidity, and then to health behavior data.

If one adopts a strictly medical perspective, morbidity rates reflect "real" illness and health behavior rates reflect "needs for care." This view takes only inherited and acquired risks into account, and it can lead to false conclusions. Health interview data—the most common kind of information on a population's health—should always be viewed from a sociomedical perspective, which takes all four factors into account.

Such a perspective is critical for understanding sex differentials in health. A medical view leads to the simplistic conclusion that females are "sicker" than males and that their greater disability, health services use, and drug use are a direct outcome of that. But if the social and psychological factors are taken into account, female morbidity rates may be elevated because of women's illness and prevention orientations and, possibly, their health reporting behavior. Males appear to have higher inherited and acquired risks of illness, and it is likely that morbidity rates are actually higher for them, especially for many chronic conditions. For conditions that do have a female excess (possibly acute conditions and chronic ones such as arthritis), social and psychological factors act to increase the sex differential. And, females' more active health behavior is probably extremely dependent on their reactions to illness and injury.

In a nutshell, inherited and acquired health risks are greater for males, boosting their illness and injury rates relative to females. But females' rates are elevated by their keener symptom perception and by their better recall and willingness to report health problems. Males' poorer physical status increases their disability and needs for medical care. But females' health socialization and time flexibility strongly encourage short-term disability, medical care, and drug use. Thus, females' poorer health profile in surveys is strongly affected by social and psychological factors, which act to offset an underlying physical disadvantage

of males. In the short run, men may appear healthier than women. But in the long run, their disadvantage asserts itself—in higher mortality rates.

The foregoing summary is a set of hypotheses, not demonstrated facts. Other workers have discussed these hypotheses (*20,51,73–75*).

An additional factor: health behavior as a cause. Health behavior is usually viewed as the result of illness and injury, but it can also influence future morbidity and promote health, too. How can this occur?

First, slowing down when ill may promote long-term health by speeding recuperation from the current problem and possibly improving general resistance to disease. What seems like poor health at one point may therefore bode well for future health. Second, medical care for one problem promotes early diagnosis of others, and it encourages continuous monitoring and therapy for chronic problems. Although choosing a physician and making a first visit may seem arduous, it makes later visits easier. Women are more likely than men to have such familiarity with health services. In addition, physicians recommend followup visits more often for women patients than for men patients (*34*); the reasons are not fully understood.

In sum, restricted activity and care for current problems may give females a long-term health advantage by ultimately reducing older women's acute incidence rates and chronic prevalence rates and especially the severity of their conditions. Health behavior also spurs other health behaviors, so older women's active use of health services and medicine are partly a continuation of earlier behaviors, reflecting attentiveness to health and familiarity with health services. Older men begin to catch up in restricted activity and medical care as their problems worsen and urge attention.

Comparing Health and Mortality

Throughout this century, females have had a longevity advantage over males. Females' death rates are currently lower than males' at all ages and for all leading causes of death. How is it that "females are sicker, but males die sooner?" The answer is twofold.

First, the reversal—that females live longer but have more morbidity—is partly due to an "aggregation effect." For both acute and chronic conditions, the sex with higher death rates for a particular condition usually has higher morbidity rates too. For life-threatening chronic conditions, males have both higher prevalence rates and higher death rates. (Cancer, the sole exception, was discussed previously.) Similarly, males' injury rates and their accident and homicide mortality rates exceed females'. Females have a higher prevalence of many chronic conditions, but these are rarely causes of death. Males tend to have higher death rates than females for acute diseases. Up to about age 17, boys show higher acute morbidity, too. But after that age, women have higher rates in interview data and sometimes in medical surveillance data. Epidemiologic data for adults are sparse, so it is difficult to know whether women have higher rates of "real" acute morbidity by medical criteria.

How does this lead to an "aggregation effect"? Conditions that figure importantly in morbidity are not very important in mortality, and vice versa. Acute conditions are the most common causes of illness, disability, and health services use, but they seldom cause death. Highly prevalent chronic conditions (such as arthritis or hemorrhoids) cause frequent and extensive morbidity, but seldom death. By contrast, the chronic conditions likely to cause death are often not so bothersome on a daily basis.

Consequently, when general illness rates are computed, they often show a female excess—because conditions with higher female rates are common and therefore are weighted heavily. By contrast, when general death rates are computed, they show a male excess—because the chronic conditions with higher male rates are weighted heavily. This "aggregation effect" accounts in part for the reversal of sex morbidity versus sex mortality differentials. (*76*). It reflects the rather low relationship between a condition's prevalence and its mortality risk.

Second, mortality is mainly the outcome of inherited and acquired risks; but morbidity (as measured in surveys) is also strongly affected by social and psychological factors. If females perceive symptoms more readily, take care of themselves more when ill, and willingly discuss their health with others, these actions boost their morbidity rates. The more a morbidity indicator includes such factors, the greater the chance it will show a female excess. It is very likely that the more "discretionary" a symptom or a health behavior is, the more important social and psychological factors are in the reports. For example, health attitudes are probably more involved in perceiving a stomachache than a fracture, and more important for taking cold medication than perceiving the cold itself.)

So the reason for the reversal lies, first, in the weak tie between the prevalence of a condition and mortality from that cause and, second, in how the sexes react differently to their health problems.

Conclusion

Most people hope for a long and healthy life. What happens to them varies greatly by sex: males have

shorter lives than females, and they are probably less healthy while living—from a medical viewpoint. But from a sociomedical viewpoint, females have less healthy lives. They simply do not feel well as often as males do. Clinical epidemiologists might say this obscures the "truth," but social epidemiologists and medical sociologists view it as an important truth in its own right. Poor health causes disruption of work and social activities, involves discomfort and depression, and leads to high health care expenses. Females experience these consequences of illness and injury more than males at all ages, except during early childhood.

There are now ample health data which show sex differentials in health and mortality, but little research has been devoted to explaining those differentials. This situation is being remedied by contemporary researchers, and their results—testing hypotheses stated in this article and others—can be expected in the next few decades.

References

1. Guttentag, M., Salasin, S., and Belle, D., editors: The mental health of women. Academic Press, New York, 1980.
2. Horowitz, A.: The pathways into psychiatric treatment: some differences between men and women. J Health Soc Behav 18: 169–178, June 1977.
3. Radloff, L.: Sex differences in depression: the effects of occupation and marital status. Sex Roles 1: 249–265 (1975).
4. Weissman, M. M., and Klerman, G. L.: Sex differences and the epidemiology of depression. Arch Gen Psychiatry 34: 98–111 (1977).
5. Williams, J. H.: Psychology of women: behavior in a biosocial context. W. W. Norton and Co., New York, 1977.
6. Monto, A. S., and Ross, H.: Acute respiratory illness in the community: effect of family composition, smoking, and chronic symptoms. Brit J Prev Soc Med 31: 101–108, June 1977.

Principal Data Sources and Definitions

All the health surveys listed are conducted by the National Center for Health Statistics, Department of Health and Human Services. The Census of Population is conducted by the U. S. Bureau of the Census, Department of Commerce.

National Health Interview Survey (NHIS)

The Health Interview Survey has been conducted continuously since 1957. A national sample of households is interviewed about household members' recent illnesses and injuries, chronic conditions, short-term and long-term disability, and health services use. Annual rates are published in Series 10 of Vital and Health Statistics.

National Health Examination Survey (NHES) and National Health and Nutrition Examination Survey (NHANES)

The Health Examination Survey was conducted in the 1960s, in three separate phases for age groups 6–11, 12–17, and 18–79. A national sample of people had a health interview and medical examination. In the 1970s, the survey was expanded to include information on nutritional status; it was renamed the Health and Nutritional Examination Survey. NHANES covers the population ages 1–74. NHES and NHANES provide data on anthropometric measurements, chronic diseases, food intake and nutritional deficiencies (NHANES only), vision, hearing, dental status, and psychological distress.

National Hospital Discharge Survey (NHDS)

Since 1973, data have been collected annually from non-Federal short-stay hospitals about their patients and facilities.

Resident Places Survey (RPS) and National Nursing Home Survey (NNHS)

The Resident Places Survey covered facilities providing care to the aged and chronically ill in 1963, 1964, and 1969. The survey was redesigned in the 1970s and named the National Nursing Home Survey. The surveys provide information about residents' demographic and health characteristics and about the services provided to them.

National Ambulatory Medical Care Survey (NAMCS)

Initiated in 1973, NAMCS has been an annual survey of visits to office-based physicians. It provides data on symptoms, medical diagnoses, services ordered or given, and plans for referral or followup. (In the 1980s, it will be conducted less frequently.)

Census of Population (Census)

The Census regularly collects information about institutionalized people (in chronic disease hospitals, homes for the aged and dependent, mental hospitals, and correctional facilities). The 1970 Census had a question about work disability due to poor health. The 1980 Census included items on work disability and on people's ability to use public transportation.

Health Terms and Definitions

Morbidity—any measure of specific conditions or symptoms.

Condition—illness or injury with a medical name (for example, diabetes mellitus).

Acute condition—illness or injury of short duration, typically less than 3 months.

7. Monto, A. S., and Ullman, B. M.: Acute respiratory illness in an American community. JAMA 227: 164–169, Jan. 14, 1974.

8. Dingle, J. H., Badger, G. F., and Jordan, W. S.: Illness in the home. The Press of Case Western Reserve University, Cleveland, Ohio, 1964.

9. Epstein, F. H., et al.: Prevalence of chronic diseases and distribution of selected physiologic variables in a total community, Tecumseh, Michigan. Am J Epid 81: 307–322 (1965).

10. Shurtleff, D.: Some characteristics related to the incidence of cardiovascular disease and death: Framingham study, 16-year follow-up. Sec. 26 *In* The Framingham study: an epidemiological investigation of cardiovascular disease, edited by W. B. Kannel and T. Gordon. U.S. Department of Health, Education, and Welfare, Washington, D.C., 1970.

11. Shurtleff, D.: Some characteristics related to the incidence of cardiovascular disease and death: Framingham study, 18-year follow-up. Sec. 30 *In* The Framingham study: an epidemiological investigation of cardiovascular disease, edited by W. B. Kannel and T. Gordon. U.S. Department of Health, Education, and Welfare, Washington, D.C., 1974.

12. Verbrugge, L. M.: Females and illness: Recent trends in sex differences in the United States. J Health Soc Behav 17: 387–403, December 1976.

13. Abraham, S., Carroll, M. D., Dresser, C. M., and Johnson, C. L.: Dietary intake findings, United States, 1971–1974. Vital and Health Statistics, Series 11, No. 202. National Center for Health Statistics, Hyattsville, Md., 1977.

14. Abraham, S., Lowenstein, F. W., and O'Connell, D. E.: Preliminary findings of the first Health and Nutrition Examination Survey, United States, 1971–1972: Anthropometric and clinical findings. DHEW Publication No. (HRA) 75–1229. National Center for Health Statistics, Rockville, Md., 1975.

15. Ingram, D. K.: Measures of chronic illness among residents of nursing and personal care homes, United States, June-August 1969. Vital and Health Statistics, Series 12, No. 24. National Center for Health Statistics, Rockville, Md., 1974.

16. Mathis, E. S.: Characteristics of residents in nursing and personal care homes, United States, June-August 1969.

Chronic condition—illness or injury lasting 3 months or more.

Chronic disease—degenerative illness.

Impairment—long-term or permanent defect, usually static, that has resulted from disease, injury, or congenital malformation.

Symptom—discomfort described in lay terms (for example, runny nose).

General health status—self-rated health (for example, excellent, good, fair, or poor).

Disability—any restriction in activities because of illness, injury, or impairment.

Short-term disability or restricted activity days—days a person cuts down usual activities for all or part of the day because of an acute condition or flareup of a chronic condition.

Bed days—days spent in bed.

Work loss days—days absent from work.

School loss days—days absent from school (usually refers only to children).

Other restricted activity days—days when other activities besides work or school were reduced.

Long-term disability or limitation—permanent limitation in activity or mobility.

Limitation in social activity—problems in performance of social roles and activities such as employment, school, housework, or sports (examples: cannot hold a paid job; cannot do strenuous sports; limited in type of job).

Limitation in mobility—problems in going from one place to another, in home or outside home (examples: cannot drive a car; uses special aid to get around; confined to wheelchair or bed).

Limitation in physical activity—problems in body movement and personal care activities (examples: cannot lift heavy objects; cannot climb stairs; needs assistance in eating).

Health services use—contact with medical and dental professionals for curative or preventive purposes.

Physician visit—contact with a physician, in person or by telephone (may refer just to medical doctors, or also include nonmedical practitioners such as chiropractors, public health nurses, psychiatric social workers, and so forth).

Dentist visit—visit to a dentist's office for treatment or advice from a dentist or dental hygienist.

Short-stay hospital—overnight or longer stay in a facility which does not have permanent residents.

Long-term care facility or institution—residence in a facility for ill and disabled people, which has nursing services available.

Lay conversations about health—conversations with family, kin, or friends about symptoms, conditions, or health behaviors.

Drug use—use of pills, medicines, or treatments for curative or preventive purposes.

Preventive health behaviors—actions to prevent illness or injury or to detect disease early while it is asymptomatic.

Positive health habits—overt actions to prevent illness or injury (examples: eating nutritious meals; exercising regularly; wearing seat belts).

Avoidance behaviors—stay away from substances or places that are known or believed to harm health (examples: not smoking, not drinking alcoholic beverages).

Preventive health care—examinations or tests for early detection of disease.

Vital and Health Statistics, Series 12, No. 19. National Center for Health Statistics, Rockville, Md., 1973.
17. Verbrugge, L. M.: Marital status and health. J Marriage and Family 41: 267–285, May 1979.
18. Office of the Assistant Secretary for Health: Health, United States 1978. DHEW Publication No. (PHS) 78–1232. National Center for Health Statistics and National Center for Health Services Research, Hyattsville, Md., 1979.
19. Andersen, R., Lion, J., and Anderson, O. W.: Two decades of health services. Ballinger Publishing Company, Cambridge, Mass., 1976.
20. Nathanson, C. A.: Sex, illness, and medical care: A review of data, theory, and method. Soc Sci Med 11: 13–25 (1977).
21. Glickman, L.: Inpatient utilization of short-stay hospitals by diagnosis, United States, 1978. Vital and Health Statistics, Series 13, No. 35. National Center for Health Statistics, Hyattsville, Md., 1978.
22. Koch, H., and McLemore, T.: The National Ambulatory Medical Care Survey: 1975 summary (United States, January-December 1975). Vital and Health Statistics, Series 13, No. 33. National Center for Health Statistics, Hyattsville, Md., 1978.
23. Choi, J. W.: Out of pocket cost and acquisition of prescribed medicines, United States, 1973. Vital and Health Statistics, Series 10, No. 108. National Center for Health Statistics, Hyattsville, Md., 1977.
24. Wilder, C. S.: Personal out-of-pocket health expenses, United States, 1975. Vital and Health Statistics, Series 10, No. 122. National Center for Health Statistics, Hyattsville, Md., 1978.
25. Bush, P. J., and Osterweis, M.: Pathways to medicine use. J Health Soc Behav 19: 179–189, June 1978.
26. Mellinger, G. D., et al.: An overview of psychotropic drug use in the United States. *In* Drug use: epidemiological and sociological approaches, edited by E. Josephson and E. E. Carroll. John Wiley & Sons, Inc., New York, 1974, pp. 333–366.
27. Rabin, D. L.: Prescribed and nonprescribed medicine use. *In* Perspectives on medicine in society, edited by A. I. Wertheimer and P. J. Bush. Drug Intelligence Publications, Washington, D.C., 1977, pp. 55–87.
28. Rabin, D. L., and Bush, P. J.: Who's using medicines? J Community Health 2: 106–117 (1975).
29. Rabin, D. L., and Bush, P. J.: Who's using prescribed medicines? Drugs in Health Care 3: 89–100 (1976).
30. Abelson, J., Cohen, R., Schrayer, D., and Rappeport, M.: Drug experience, attitudes and related behavior among adolescents and adults. *In* Vol 1 Appendix by the National Commission on Marihuana and Drug Abuse. U.S. Government Printing Office, Washington, D.C., 1973, pp. 488–867.
31. Parry, H. J., et al.: National patterns of psychotherapeutic drug use. Arch Gen Psychiatry 28: 769–784 (1973).
32. Suffet, F., and Brotman, R. E.: Female drug use: some observations. Int J Addict 11: 19–33 (1976).
33. Verbrugge, L. M.: Sex differences in complaints and diagnoses. J Behav Med 3: 327–355 (1980).
34. Verbrugge, L. M., and Steiner, R. P.: Physician treatment of men and women patients—sex bias or appropriate care? Med Care 19: 609–632, June 1981.
35. Bush, P. J., and Rabin, D. L.: Who's using nonprescribed medicines? Med Care 14: 1014–1023 (1976).
36. Cahalan, D., Cisin, I. H., and Crossley, H. M.: American drinking practices, a national study of drinking behavior and attitudes. College and University Press, New Haven, Conn., 1969.
37. Center for Disease Control: Adult use of tobacco—1975. Atlanta, 1976.
38. National Safety Council: Accident facts 1978. Chicago, 1978.
39. Schoenborn, C. A., Danchik, K. M., and Elinson, J.: Basic data from Wave I of the National Survey of Personal Health Practices and Consequences, United States, 1979. Vital and Health Statistics, Series 15, No. 2. National Center for Health Statistics, Hyattsville, Md., 1981.
40. Belloc, N. B. and Breslow, L.: Relationship of physical health status and health practices. Prev Med 1: 409–421 (1972).
41. Dublin, L. I., Lotka, A. J., and Spiegelman, M.: Length of life. Ronald Press, New York, 1949.
42. McMillen, M. M.: Differential mortality by sex in fetal and neonatal deaths. Science 204: 89–91, Apr. 6, 1979.
43. National Center for Health Statistics: Advance report: final mortality statistics, 1978. Monthly Vital Statistics Report, 29 (6, Suppl. 2), Sept. 17, 1980.
44. Shapiro, S., Schlesinger, E. R., and Nesbitt, R. E. L., Jr.: Infant, perinatal, maternal, and childhood mortality in the United States. Harvard University Press, Cambridge, Mass., 1968.
45. Stolnitz, G. J.: A century of international mortality trends: II. Population Studies 10: 17–42 (1956).
46. Carter, C. O.: Sex differences in the distribution of physical illness in children. Soc Sci Med 12B: 163–166 (1978).
47. Stevenson, A. C., and Kerr, C. B.: On the distributions of frequencies of mutation to genes determining harmful traits in man. Mutat Res 4: 339–352 (1967).
48. Childs, B.: Genetic origin of some sex differences among human beings. Pediatrics 35: 798–812 (1965).
49. Washburn, T., Medearis, D., and Childs, B.: Sex differences in susceptibility to infection. Pediatrics 35: 57–64 (1965).
50. Waldron, I.: Why do women live longer than men? Soc Sci Med 10: 349–362 (1976).
51. Waldron, I.: An analysis of causes of sex differences in mortality and morbidity. *In* The fundamental connection between nature and nurture, W. R. Gove and G. R. Carpenter, editors. Lexington Books, Lexington, Mass., 1982, pp. 69–116.
52. Cassel, J.: Physical illness in response to stress. *In* Social stress, S. Levine and N. A. Scotch, editors. Aldine Publishing Company, Chicago, 1970, pp. 189–209.
53. Crandell, D. L., and Dohrenwend, B. P.: Some relations among psychiatric symptoms, organic illness, and social class. Am J Psychiatry 123: 1527–1537 (1967).
54. Markush, R. E., and Favero, R. V.: Epidemiologic assessment of stressful life events, depressed mood, and psychological symptoms—a preliminary report. *In* Stressful life events: their nature and effects, edited by B. S. Dohrenwend and B. P. Dohrenwend. John Wiley & Sons, Inc., New York, 1974, pp. 171–205.
55. Rabkin, J. G., and Struening, E. L.: Life events, stress, and illness. Science 194: 1013–1020, Dec. 3, 1976.
56. Mechanic, D.: The concept of illness behavior. J Chronic Dis 15: 189–194 (1962).

57. Mechanic, D.: Response factors in illness: The study of illness behavior. Social Psychiatry 1: 11–20 (1966).
58. Mechanic, D.: Medical sociology. Ed. 2. Free Press, New York, 1978.
59. Mechanic, D.: The influence of mothers on their children's health attitudes and behavior. Pediatrics 33: 444–453 (1964).
60. Wallen, J., Waitzkin, H., and Stoeckle, J. D.: Physician stereotypes about female health and illness: A study of patient's sex and the informative process during medical interviews. Women and Health 4: 135–146, summer 1979.
61. National Analysts Inc.: A study of health practices and opinions. Final report. NTIS No. PB–210–978. National Technical Information Service, Springfield, Va., 1972.
62. U.S. Commission on Civil Rights: Proceedings of the Consultation on Discrimination Against Minorities and Women in Pensions and Health, Life, and Disability Insurance. Washington, D.C., 1978.
63. Wilder, C. S.: Hospital and surgical insurance coverage, United States, 1975. Vital and Health Statistics, Series 10, No. 117. National Center for Health Statistics, Hyattsville, Md., 1977.
64. Carpenter, E. S., Ousterhout, P. A., and Perry, B. H.: Women's roles in extra-market health services. Department of Health Planning and Administration, School of Public Health, University of Michigan, Ann Arbor, Mich., 1976.
65. Cannell, C. F.: Reporting of hospitalization in the Health Interview Survey. Vital and Health Statistics, Series 20, No. 6. National Center for Health Statistics, Washington, D.C., 1965.
66. Cannell, C. F., and Fowler, F.: Comparison of hospitalization reporting in three survey procedures. Vital and Health Statistics, Series 2, No. 8. National Center for Health Statistics, Washington, D.C., 1965.
67. Cannell, C. F., Marquis, K. H., and Laurent, A.: A summary of studies of interviewing methodology. Vital and Health Statistics, Series 2, No. 69. National Center for Health Statistics, Hyattsville, Md., 1977.
68. Cartwright, A.: The effect of obtaining information from different informants on a family morbidity inquiry. Applied Statistics 6: 18–25, March 1957.
69. Koons, D. A.: Quality control and measurement of nonsampling error in the Health Interview Survey. Vital and Health Statistics, Series 2, No. 54. National Center for Health Statistics, Rockville, Md., 1973.
70. Kovar, M. G., and Wright, R. A.: An experiment with alternate respondent rules in the National Health Interview Survey. Proc Am Stat Assoc (Social Statistics): 311–316 (1973).
71. Monteiro, L.: Monitoring health status and medical care. Ballinger Publishing Company, Cambridge, Mass., 1976.
72. Sudman, S., and Bradburn, N.: Response effects in surveys. Aldine Publishing Company, Chicago, 1974.
73. Cole, P.: Morbidity in the United States. *In* Mortality and morbidity in the United States, edited by C. L. Erhardt and J. E. Berlin. Harvard University Press, Cambridge, Mass., 1974, pp. 65–104.
74. Mechanic, D.: Sex, illness behavior, and the use of health services. J Human Stress 2: 29–40, December 1976.
75. Verbrugge, L. M.: Female illness rates and illness behavior: testing hypotheses about sex differences in health. Women and Health 4: 61–79, spring 1979.
76. Verbrugge, L. M.: Sex differentials in morbidity and mortality in the United States. Social Biology 23: 275–296 (1976).

SYNOPSIS

VERBRUGGE, LOIS M. (University of Michigan): *Sex differentials in health. Public Health Reports, Vol. 97, September–October 1982, pp. 417–437.*

Health status and health behavior of males and females in the United States are compared; the data employed in the analysis are from community studies and the surveys of the National Center for Health Statistics. Females generally show a higher incidence of acute conditions, higher prevalence of minor chronic conditions, more short-term restricted activity, and more use of health services (especially outpatient services) and medicines. By contrast, males have higher prevalence rates for life-threatening chronic conditions, higher incidence of injuries, more long-term disability, and after about age 50, higher rates of hospitalization. These sex differences appear at all ages, except for early childhood when boys have a worse health profile than girls.

The following interpretations are consistent with the data; they are hypotheses rather than demonstrated facts. Women are more frequently ill than men, but with relatively mild problems. By contrast, men feel ill less often, but their illnesses and injuries are more serious. These morbidity differences help to explain sex differentials in health behavior; frequent symptoms lead to more restricted activity, physician and dentist visits, and drug use for women; severe symptoms lead to more permanent limitations and hospitalization for men.

But attitudes about symptoms, medical care, drugs, and self-care are also extremely important. Males may be socialized to ignore physical discomforts; thus, they are unaware of symptoms that females feel keenly. Also, men may be less willing and able to seek medical care for perceived symptoms. When diagnosis and treatment are finally obtained, men's conditions are probably more advanced and less amenable to control. Finally, men may be less willing and able to restrict their activities when ill or injured.

Four important factors that underlie sex differentials in health are discussed: inherited risks of illness, acquired risks of illness and injury, illness and prevention orientations, and health reporting behavior.

Statistics show that women ultimately have lower mortality rates than men—despite women's more frequent morbidity and possibly because of more care for their illnesses and injuries. The apparent contradiction between sex differences in morbidity and mortality (females are sicker but males die sooner) is explored.