

Women, Men, and Osteoarthritis

Lois M. Verbrugge

Objectives and Methods. Gender differences in the prevalence and impact of arthritis are discussed, using data and analytic results from national health surveys.

Results. Most cases of arthritis are osteoarthritis, an ancient disease that causes pain, physical dysfunction, and social disability, but not death. Arthritis prevalence rates rise sharply with age; it is the leading chronic condition in mid and late life. Women's rates exceed men's at all ages. Women's higher rates of disability and medical services for arthritis in the population are due mainly to higher prevalence. Among persons with arthritis, women are only a little more likely than men to be disabled or receive medical services. Persons with arthritis often have other chronic conditions as well (called comorbidity). Combining arthritis and visual problems gives a strong exacerbating push to disability.

Conclusions. Because biomedical research emphasizes pathogenesis and therapies for fatal conditions, Americans' health future will become dominated by nonfatal ones, especially arthritis. I recommend a better balance and new orientation for arthritis research that stays true to older persons' health and disability experience.

Key words. Osteoarthritis; Gender; Prevalence; Disability; Comorbidity.

Introduction

Several centuries ago, adults suffered and died from a different repertoire of diseases than today. Life expectancy (the average number of years a person could

expect to live) was about 40; relatively few people managed to live to ages 60, 65, or higher. What we now call midlife was late life. Acute conditions such as influenza/pneumonia, accidents and injuries, and chronic conditions ensuing from acute ones such as tuberculosis were the principal causes of morbidity and mortality¹. By contrast, today the diseases of midlife (45-64) and later life (65+) are mostly progressive chronic conditions that emerge slowly in adulthood. Most are nonfatal (arthritis, bunions, migraine headache, tinnitus, constipation, incontinence, vision and hearing loss, etc.), and they are the main causes of daily symptoms and longterm disabilities. The leading fatal conditions (heart disease, cerebrovascular disease, and numerous malignancies) were scarcely evident centuries ago because people succumbed earlier than the peak incidence ages or possibly because the conditions did not exist (due to absence of initiating risk factors).

Throughout these massive changes in morbidity and mortality, there are some diseases that have existed at all times among humans and been prominent features of mid and late life if people got there. Arthritis is one. It is both an ancient and contemporary disease. Arthritis has been and is so common, many older persons consider it a normal aspect of aging until it becomes sufficiently painful or disabling to prompt medical care. Because it is more prevalent among women and because a majority of the older population is female, arthritis might be called a "women's health problem". Recognizing that its burden is largely endured by women, I still resist the label since it promotes stereotype and disserves men with the condition.

In this article, I present rates of arthritis for U.S. women and men; discuss arthritis-related disability and medical care; show how often arthritis co-occurs with other chronic conditions and how such comorbidity affects people's functioning; and discuss new orientations for research on arthritis that stay true to older persons' whole health and disability experiences.

The terms arthritis and osteoarthritis will be used

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Table 1. Prevalence of Arthritis in Gender-Age Groups, U.S.^a
 (Conditions per 1,000 persons. Ranks are shown in brackets.^b)

Ages:	Males					Females						
	<45	45-64	65+	65-74	75+	<45	45-64	65+	65-74	75+		
1993	28.0 [12]	182.7 [4]	407.8 [1]	373.8 [1]	467.2 [1]	36.6 [12]	280.6 [1]	555.0 [1]	533.3 [1]	583.2 [1]		
1986-88	<18 1.9 [**]	18-44 38.0 [10]	45-64 205.8 [2]	65+ 382.6 [1]	65-74 354.2 [1]	75+ 402.2 [1]	<18 2.9 [**]	18-44 64.2 [5]	45-64 332.0 [1]	65-74 527.6 [1]	75+ 611.5 [1]	
1983-85	<18 1.8 [**]	18-44 40.7 [9]	45-64 213.7 [2]	65+ 382.6 [1]	65-74 370.6 [1]	75+ 405.2 [2]	<18 2.9 [**]	18-44 63.6 [5]	45-64 338.9 [1]	65+ 544.1 [1]	65-74 528.5 [1]	75+ 566.2 [1]
1979-81	<17 2.7 [**]	17-44 36.6 [9]	45-64 201.4 [2]	65+ 364.4 [1]	<17 3.6 [23]	17-44 60.7 [4]	45-64 305.2 [1]	65+ 524.0 [1]				
1976	<17 1.5	17-44 32.5	45-64 197.1	65+ 337.9	<17 3.0	17-44 57.7	45-64 309.3	65+ 505.5				
1969	<17 *	17-44 28.0	45-64 148.0	65+ 287.0	<17 *	17-44 51.3	45-64 255.3	65+ 450.1				

		Ratio of Rates (F/M)				
Ages	<18 ^c	18-44 ^c	45-64	65+	65-74	75+
1993	(<45):1.81		1.54	1.36	1.43	1.25
1986-88	1.5	1.69	1.61		1.49	1.52
1983-85	1.6	1.56	1.59	1.42	1.43	1.40
1979-81	1.3	1.66	1.52	1.44		
1976	2.0	1.78	1.57	1.50		
1969	*	1.83	1.73	1.57		

SOURCES: National Health Interview Survey for the years noted. Data are for the noninstitutionalized population. The rates are published as follows: 1969³³, 1976³⁴, 1979-81³⁵, 1983-85³⁶ (and unpublished worktables), 1986-88³⁴, 1993³⁷.

* indicates high sampling error (>30% relative standard error).

** indicates rank >25.

^a For some series, data are pooled across years to achieve stable results; average annual rates are shown.

^b Ranks cannot be determined for 1969 and 1976.

^c For some series, <17 and 17-44.

interchangeably because osteoarthritis constitutes the great majority of cases of arthritis in the population. Most data presented are for arthritis broadly defined; data specifically for osteoarthritis are so indicated.

Gender Differences in Arthritis

Rates of arthritis in the U.S. noninstitutional population are shown in Table 1, based on the National Health Interview Survey (NHIS). In NHIS data, arthritis includes osteoarthritis (mostly) and other arthropathies (small percents of rheumatoid arthritis, traumatic, infectious, and allergic arthritis, chondrocalcinosis, ankylosing spondylitis, and various forms

of spondylosis). Rates of chronic conditions (duration 3+ months) are estimated from respondent reports that are carefully probed by interviewers and later ICD-coded.

From midlife on, arthritis is the foremost chronic condition for women, always ranking number 1. For men, it is near top rank at ages 45-64 and becomes so for ages 65+ (except 1983-85). Prevalence rates rise as fast as most other chronic conditions; vision and cardiopulmonary conditions rise faster (data in ²). Women's rates exceed men's at all ages. In young and middle adulthood, women's rates of arthritis are at least 50% higher. Gender differences (expressed by ratios) narrow a little at older ages. This suggests that men who survive to elderly ages are somewhat similar

to women in lifetime risks for arthritis, more so than men in general. (Expressed as the difference of rates, gender differences (F-M) expand with age. This has also been noted in radiographic data³⁻⁴.)

Arthritis is also highly prevalent in the institutional population. But it is seldom a principal reason for entry into long-term care facilities and is thus often not recorded on facility records. As a result, rates of this seemingly "nonrelevant" condition are hard to find for the institutional population.

Over recent decades, arthritis prevalence has apparently increased in adult age groups (18-44, 45-64, 65+, and men 75+; Table 1). Population aging has occurred in the groups 65+ and 75+ and that alone pushes the arthritis rates upward, but the rises are substantial enough to suggest genuine increases in age-specific disease presence. Trends are smaller for ages 18-44, and not entirely clear for ages 45-64 but still suggestive overall of increase. Gender differences have narrowed at adult ages; this can be viewed both as genuine information (more gender similarity in arthritis presence) and as artifact (in a data series, ratios tend to narrow as rates rise).

Arthritis rates from NHIS are not for specific joints; they indicate if people have the disease in any location. By contrast, data from radiographic and clinical studies are always joint-specific. Several body locations are evaluated for each participant; cost usually prohibits evaluation of all commonly affected locations. Data are analyzed for each joint separately, and it is unfortunately rare to see tables with "any location" rates (among those evaluated).

A few studies have assessed enough locations to compare rates across specific joints. *Radiographic OA* in hands, spine, and feet is extremely common (>50%) by ages 45-50, and somewhat less common in knees and hips⁵⁻⁸. Osteoarthritis rates are often higher among men before ages 45-50, then higher among women from midlife on. Women's higher rates occur in most locations, for both mild and severe degrees of OA. (Higher female rates typically occur for small joints of hands and feet and for knees; and higher male rates for cervical and lumbar spine and hips.) Data from *medical histories* or *exams* regularly show higher rates of OA among women⁷. Physical examinations of numerous locations show highest involvement in the back, then knees⁹. Data on *joint pain* are compatible with this. Pain is most common in the lower back, then knees⁹⁻¹¹. (Surveys usually distinguish between neck/cervical pain and lower back/lumbar pain. Lower back pain is far more frequent than neck pain, so when no distinction is made in a survey, readers can assume the data refer largely to lower back symptoms.) Age-specific rates of musculoskeletal and joint symptoms

(pain or anything else) are usually higher among women¹¹.

Radiographic changes are often asymptomatic and thus have no impacts on people's functioning. Contemporary interest in functioning and wellbeing has pushed clinical and epidemiological researchers to study *symptomatic radiographic OA* or *clinical OA*. (The former is often called "symptomatic OA" in the literature; since this fails to state how the OA was determined, I prefer to include the modifier radiographic. Symptomatic status is usually based on recent pain in the joint. Clinical OA is determined by medical history, symptoms reports, and/or exam; no xrays.) The shift is occurring not only for outcome studies, but also studies of risk factors for arthritis.

To enhance comparability of assessment across studies, diagnostic criteria have been developed for osteoarthritis of hand, knee, and hip¹²⁻¹⁴. The criteria for each site have optional formats, with or without radiographic information. Potential users must recognize that the criteria were developed on samples of symptomatic patients with well-defined rheumatic conditions. Stated exactly, they determine who is highly likely to have OA vs. not have OA among rheumatology patients experiencing pain. Their broader utility for asymptomatic and community-based groups is yet to be determined.

Gender Differences in Arthritis Consequences

Arthritis causes *symptoms* such as pain, *physical limitations* such as trouble walking or opening jars, *social limitations* such as difficulty performing one's job or favorite sport, *therapeutic behaviors* such as taking medical drugs, and use of *medical services* such as physician visits and hospital stays.

Surveys routinely show higher rates of arthritis-related consequences for women than men. Data on activity limitations, visits to physicians, and hospital stays are in Table 2 (for other data, see ¹⁵⁻²⁰). The rates show aggregate effects of arthritis for the U.S. population, and they are very helpful for public health officials and policymakers to see the disease's societal impact. Aggregate rates are a function of both (1) population prevalence of a disease and (2) the chance of an outcome among affected persons. Computationally, an aggregate rate is $\text{Outcomes Per N Population} = \text{Conditions/Population} \times \text{Outcome/Condition} \times \text{N}$.

Prevalence: High arthritis prevalence (details in prior section) pushes upward the aggregate rates for both genders. Still, note how its rank falls as data series move from disability toward medical services (Table

Table 2. Arthritis-Related Disability and Medical Services for Gender-Age Groups, U.S.^a

(Aggregate rates. Ranks shown in brackets.)

Limitation in Major or Secondary Activities ^b (per 1,000 population)									
		Males				Females			
	Ages	18-44	45-69	70-84	85+	18-44	45-69	70-84	85+
1983-85		4.7 [6]	44.6 [1]	72.0 [1]	101.0 [2]	7.3 [3]	83.5 [1]	137.1 [1]	193.4 [1]
1979-80		<45 2.7 [10]	45-64 36.2 [2]	65+ 82.4 [2]		<45 4.5 [5]	45-64 59.0 [1]	65+ 143.1 [1]	

Visits to Office-Based Physicians (principal diagnosis; per 1,000 population)							
		Males			Females		
	Ages	15-44	45-64	65+	15-44	45-64	65+
1985		5.5* [22]	49.9 [8]	110.9 [9]	15.7 [19]	78.3 [8]	190.7 [5]
1979		8.2 [23]	45.6 [9]	76.9 [7]	8.3 [**]	81.2 [9]	159.2 [3]

Hospital Stays (principal diagnosis; discharges per 10,000 population)							
		Males			Females		
	Ages	15-44	45-64	65+	15-44	45-64	65+
1984		0.9* [**]	15.5 [23]	39.2 [18]	3.1 [**]	28.9 [14]	65.3 [13]
1979		2.3 [**]	14.5 [24]	36.4 [19]	2.8 [**]	27.8 [15]	64.6 [15]

SOURCES: For limitations, National Health Interview Survey. For visits, National Ambulatory Medical Care Survey. For hospital stays, National Hospital Discharge Survey. Data for 1979-81 are from tables in ¹¹ and unpublished worktables. Data for 1983-85 are from unpublished worktables; short published versions are in ^{36,38}.

* indicates high sampling error (>30% relative standard error).

** indicates rank >25.

^a Data for children (ages <18 or <15) are not shown because rates are very low.

^b For 1983-85: For ages 18-69, major activity is job of keeping house; limitation is unable to do activity or limited in kind/amount. For ages 70+, major activity refers to independence in personal and household care (ADL and IADL, respectively); limitation is use of personal assistance for ADL/IADL. For all ages shown, secondary activity is anything else besides the major ones. For 1979-80: For all ages, major activity is job or keeping house. For both times, data are pooled across years to achieve stable results; average annual rates are shown.

2). Although arthritis is the top reason for activity limitations from midlife on, its rank drops for ambulatory care, and still lower for hospitalizations. This reflects the concentrated attention on fatal conditions in medical settings, supplanting legitimate needs for care of high-prevalence nonfatal ones.

Chance of Outcome: Among persons with arthritis, how readily does the disease cause symptoms, disability, and medical care? Table 3 shows individual-level impacts (for other data, see ^{10,21-23}). Women with arthritis are a little more likely than men to have associated activity limitations, ambulatory care, and (in some years) hospital stays. Note how small gender differences become in these prevalence-controlled statistics; this means that women and men with arthritis have quite similar propensities to be disabled

by the disease and obtain medical care for it. Looking at ADL and IADL outcomes, Miles and colleagues¹⁰ have some contrasting results: Older women with arthritis have more difficulty performing personal care (ADL) and household management (IADL) activities than men. The difference expands with advancing age, so that women 85+ with arthritis are far more disabled than comparable men. The issue of gender differences in impact (chances of being disabled, institutionalized, etc.) for arthritis merit more descriptive and explanatory work.

Comparing outcome chances for arthritis with other chronic conditions: Of the top-10 prevalence conditions in the U.S. population, just 2 (deformities/orthopedic impairments, heart disease) are more likely than arthritis to cause activity limitations²⁴ (Fig.3 therein).

Table 3. Chances of Disability and Medical Services for Arthritis, U.S.^a

1986-88			
Percent of arthritis conditions causing: ^b			
	Activity limitation	Visit to physician	Hospital stay
Males	17.7%	79.7%	9.6%
Females	20.9	82.8	7.3
1983-85			
Percent of arthritis conditions causing:			
	Activity limitation	Visit to physician	Hospital stay
Ages 18-44			
Males	11.5%	13.5*%	2.2*%
Females	11.5	24.7	4.9
Ages 45-64			
Males	20.9	23.4	7.3
Females	24.6	23.1	8.5
Ages 65+			
Males	19.5	29.0	10.2
Females	26.5	35.0	12.0
1979-81			
Percent of arthritis conditions causing: ^b			
	Activity limitation	Limitation in major activity	Visit to physician
Males	19.7%	16.3%	78.0%
Females	21.4	17.1	82.6

SOURCES: National Health Interview Survey for the years noted. Data are for the noninstitutionalized population. Data are pooled across years to achieve stable results; each percent refers to chance of the outcome in a one-year period. The percents are published as follows: 1979-81²⁵, 1983-85²⁶, 1986-88²⁴.

* indicates high sampling error for a component rate (>30% relative standard error).

^a Activity limitation: any limitation in major or secondary activities. Visit to physician: 1+. Hospital stay: 1+.

^b Age-specific data not available.

The other 7 are less likely to be disabling (high blood pressure, hay fever, hearing impairments, chronic bronchitis, chronic sinusitis, hemorrhoids, asthma).

We make two related points: First, a prevalence control accounts for disease presence, but not its severity. Studies with radiographic or clinical evaluations always score severity, but the information is difficult (maybe impossible) to obtain in interview surveys. This problem is often discussed among contemporary researchers, but it remains unsolved. Second, another aggregate statistic occasionally used is the "percent of all outcomes that are due to condition X". An example is the percent of all limitations due to arthritis = Limitations Due to Arthritis/All Limitations × 100. These percents are affected by both prevalence and chance-of-outcome. Women routinely show higher percents of activity limitations, work limitations, and needs for ADL/IADL assistance due to arthritis than men, in every age group¹⁷ (Tab.6A-B,7A-B,8A-B therein).

In short, the main reason that arthritis-related disability and medical care are more frequent for women is, simply, women's higher rates of arthritis. It is no surprise that the population group with more morbidity has more outcomes associated with the disease. To see if one gender is more likely to be disabled or obtain care, prevalence must be controlled. When we do so, gender differences diminish. Women with arthritis are only slightly more likely than men to have functional problems and to seek health services for the disease (with some evidence that the difference expands at very elderly ages).

Arthritis and Comorbidity

Comorbidity refers to multiple co-occurring conditions in an individual. The topic of comorbidity is now popular in epidemiologic research, signaling long-overdue scientific attention to a person's entire health situation rather than just one target condition (such as arthritis, or ischemic heart disease). Comorbidity can be measured by total number of chronic conditions, by presence of specific clusters (e.g., arthritis + hypertension), and by indexes that combine number and severity. I will show data for the first two measures.

Women are more likely to have multiple chronic conditions than men are²⁵. At ages 60-69, 45% of women and 35% of men have 2 or more conditions (of 9 with public health importance for adults). At ages 80+, the figures are 70% and 53%, respectively. Women's tendency to accumulate chronic conditions is also revealed by pairs of conditions. The kappa statistic measures how often pairs occur at greater-than-chance level. It is typically higher for women than men (for 78 pairs involving conditions with public health importance for adults) (unpublished analyses of the Supplement on Aging for persons ages 55+).

Turning to arthritis comorbidity: Among persons with arthritis, women are slightly more likely than men to have additional chronic conditions (unpublished analyses of the Supplement on Aging; also derived from data in ²⁰ Tab.1). Specific pairs of conditions involving arthritis are shown in Table 4. Prevalence of each pair rises with age and is almost always higher for women than men. Arthritis and high blood pressure co-occur in women more than expected by chance alone, and so do arthritis and hearing impairment in both genders (most ages). Whether shared risks or shared etiology account for this, we cannot say; causes of comorbidity are as researchable an issue as comorbidity's consequences. Comorbidities of musculoskeletal conditions (e.g., osteoarthritis + bursitis) are reported in ¹⁷ (Tab.10). (Due to data set structure, comorbidity can be esti-

mated only for conditions within a body system. This restriction disappears for “limiting conditions” in the same data set. Comorbidities of limiting conditions, within and across body systems, are shown in Tab.11-13 of the reference.)

Does comorbidity propel disability, medical care, depression, and even death? Stated in more operational terms, do probabilities of undesirable outcomes rise sharply with number of conditions, or for particular combinations? We have studied comorbidity’s effect on disability²⁶: In the community-dwelling population, disability first rises swiftly with *number of conditions* but then tapers off. This is probably because ill people who are very disabled are institutionalized, and thus removed from the community-dwelling population. *Pairs of conditions* usually have no special effect on disability (statistically, no interaction effect). The pairs that do commonly show an exacerbating pattern; namely, disability is much greater than expected by an additive model (sum of the conditions’ separate effects). Arthritis has an exacerbating effect when combined with visual impairment/disease; the combination causes pronounced difficulties in walking, personal care (ADLs), and household management (IADLs). Looking at all arthritis pairs that have some special effects on functioning, we find that walking is *most often compromised by arthritis comorbidity*.

(The above statements summarize previously unpublished results from analyses conducted for ²⁶; I provide the details in this paragraph. For arthritis comorbidity, the Significant Pairs Model (Y=f[Age, Gender, Race, 13 solos, *** pairs]) produces these significant effects: Arthritis + Visual Impairment (Walking *, ADL Difficulty *), Arthritis + Vision Disease (Walking **, IADL Difficulty ***), Arthritis + Atherosclerosis (Walking **), Arthritis + Fracture of Hip (Walking *), Arthritis + Ischemic Heart Disease (ADL Difficulty *). Significance levels are * P≤.05, ** P≤.01, *** P≤.001.)

These results join other research showing the great specificity in how arthritis affects functioning. Gucione and colleagues demonstrate that knee OA mainly affects activities involving lower extremities^{22,27}. Over time, musculoskeletal impairment of hands leads to problems in personal care (ADLs), while impairments of lower extremities lead to problems in household management (IADLs)²⁸. Here, I have shown that arthritis comorbidity is also particular. Most combinations have no special effect on disability. But some do (especially arthritis + vision conditions) and they mainly affect walking. In sum, to understand clearly how arthritis leads to physical and social disability, data must ideally be joint-specific, impairment-specific, and task-specific—all three!

Table 4. Arthritis Comorbidity for Women and Men^a

Ages	55-64	65-74	75-84	85+
Percent with pair of conditions: (Bold indicates kappa > .10) ^b				
Arthritis, High blood pressure				
Men	12.1	17.7	15.8	13.5
Women	20.6	28.1	34.8	29.0
Arthritis, Hearing impairment				
Men	10.2	17.3	20.3	24.2
Women	10.2	14.2	22.6	31.2
Arthritis, Vision disease				
Men	1.9	6.6	12.1	15.7
Women	4.0	11.2	22.4	28.6
Arthritis, Visual impairment				
Men ^c	3.8	6.6	8.9	10.5
Women	4.9	5.9	9.9	17.9
Arthritis, Ischemic heart disease				
Men	4.1	8.1	7.7	5.9
Women	4.0	7.2	9.4	10.9
Arthritis, Diabetes				
Men	2.7	4.9	3.4	3.1
Women	5.1	6.2	6.9	5.1

SOURCE: Analyses of the Supplement on Aging, 1984 National Health Interview Survey.

^a Hearing impairment = trouble hearing in one or both ears; includes deaf in one/both ears. Vision disease = cataract, glaucoma, disease of retina. Visual impairment = trouble seeing even when wearing glasses with one or both eyes; includes blind in one/both eyes.

^b The kappa statistic indicates degree of observed co-occurrence beyond that expected by chance; range of positive kappa is 0.0 for chance level to 1.0 for perfect overlap.

^c Prevalence of arthritis + ischemic heart disease does not rise with age for men; this is because IHD prevalence falls slightly with age for them due to high mortality.

New Orientations

Research funds for biomedical and epidemiological research increased rapidly after World War II. They were devoted mainly to fatal diseases -- unveiling their pathogenesis, identifying behavioral and environmental risk factors for disease onset and progression, developing diagnostic techniques, and finding therapies to abate symptoms and slow disease advance. Scientific knowledge grew greatly for cardiovascular and cerebrovascular diseases and some malignant neoplasms, and it widely penetrated clinical care and individuals’ lives. The consequence is longer life on average, but a larger proportion of it spent with significant chronic morbidity and disability.

By contrast, far less attention has gone toward understanding origins and interventions for nonfatal conditions despite the fact they are more numerous and more prevalent than fatal ones. If emphasis on fatal conditions continues in coming decades, with further scientific and clinical successes, then population health will gradually become more and more a matter of nonfatal conditions, those that disable but do not kill. This will come about not by any changes in their incidence, but instead via the declining incidence and severity of fatal conditions. Arthritis already dominates in mid and late life, but it will be even more prominent in individual's health profiles.

I do not advocate quitting research on fatal conditions, but instead adopting a better balance of research attention that is commensurate with the population prevalences of chronic health problems for adults.

Let us assume this happens soon, within the next decade, so that our own energies can be used to learn about an ancient disease and ways to avoid and alleviate it. Biochemists can best define topics for molecular, cellular, and physiological research on osteoarthritis; and rheumatologists, the topics for clinical experiments and observations. Social scientists and epidemiologists can best define topics for understanding how arthritis affects daily symptoms, physical and social functioning, community residence, and wellbeing. There are plenty of fine ideas afoot for arthritis research in social epidemiology, medical sociology, and health psychology, but several themes are missing. I present them here with the hope they might infiltrate research, making it truer to the health and disability experiences of middle-aged and older persons.

1. Arthritis Happens to a Whole Person. Epidemiology of osteoarthritis has concentrated on specific joints. Most studies evaluate disease in one or several body locations, then analyze the data for each location separately. When arthritis in multiple joints is studied at all, it is considered a syndrome ("generalized OA") rather than taken on straightforward empirical terms (OA present in several locations). I propose that more research take a whole-person approach, for example, by discussing hand or knee OA as properties of a person rather than of a joint, and by studying distinctive consequences of multiple-site arthritis for functioning.

2. Chronic Conditions Are Often Plural. Older persons usually have more than one chronic condition. Nonfatal conditions are especially likely to accumulate because they are so numerous and prevalent. Furthermore, ill people seem predisposed toward comorbidity; pairs of conditions often occur at greater-than-chance level (those elevated chances are nor-

mally small but very generally evident). Some researchers will devote their attention to causes of comorbidity, a difficult topic that involves investigating shared risks, secondary conditions, similar etiology, and chance. I am more curious about comorbidity's consequences, namely, to know the special impacts (interactions) that multiplicity has for functioning. Even without any particular substantive interest in comorbidity, researchers should statistically control for presence of comorbidities in order to see arthritis' separate impact (additive) on outcomes.

3. Diseases Don't Disable; Symptoms Do. Having a diagnosis of arthritis or arteriosclerosis does not cause disability or motivate medical care; symptoms of pain, fatigue, malaise, faintness/vertigo, depressed mood, and low energy do. Medical prominence in the 20th century pushed us all to think in terms of diseases and design studies focused on specific pathologies. What would we have learned if we had studied pain and tiredness instead? It is time to bring symptoms in, to give them proper recognition as the main drivers of functional consequences. There is no need to leave disease out. Both experiential and medical perspectives have good scientific value; we are proposing a conscious blend rather than blinders.

4. Pathways From Disease to Disability Are Strong and Faint. There is a basic route of disablement that goes from pathology to impairments in specific body systems, from there to restrictions in physical or mental functions, and onward to difficulties in roles and social functioning²⁹. In the case of arthritis, the principal impairments are pain, stiffness, and limited flexibility; these affect mobility, dexterity, holding and turning objects, stooping and climbing, etc.; and physical dysfunctions ultimately affect abilities to do one's job, hobbies, home and yard chores, sports, personal hygiene, etc. Research has looked at pieces of the pathway; for example, how radiographic findings are related to symptoms, how pain affects physical functioning, and how arthritis is related to labor force participation and ADL/IADL dependency. A more thorough approach is needed, using data with all components (disease, impairment, physical and social functioning), to see how arthritis *does and does not* affect function. Null results are just as important as positive ones. Together they give clinicians and rehabilitation professionals specific information about where to focus preventive attention. The professional's goal is to reduce an individual's chance of experiencing statistically strong pathways.

5. There is More to Life than ADLs and IADLs. Disability research emphasizes health-related difficulties in three domains: personal care, household management, and paid job. These are considered life's

“most important” activities, bearing on a person’s survival, independent living, and social productivity. Individuals do value these activities, but many others are valued too for gaining resources, using skills, producing social goods, maintaining health, and experiencing pleasure³⁰. Chronic conditions can affect any activity depending on its constituent physical and mental requirements; none is inherently spared. There is much to be learned about how arthritis affects discretionary as well as obligatory and committed activities³¹⁻³² and about people’s vigorous use of buffers to maintain activities they value most.

6. Men Have Much to Gain from Research on Arthritis. Because nonfatal conditions are more prevalent among women and because women make up the majority of older persons, research on nonfatal conditions will end up benefiting women especially. One might say the reverse for research on fatal conditions, for which men have notably higher age-specific risks. But such statements are short-sighted. Women do eventually die and from the same causes as men; thus, the benefits of research on heart disease accrue to women even if the pressing need seems to be for men. Men who live long enough acquire arthritis and other bothersome disabling conditions; thus, the benefits of research on arthritis “wait in the wings” for them.

Summing up, we propose a perspective for arthritis research that holds fast to these six themes: (1) Arthritis happens to people as well as joints. (2) Morbidity is more often plural than singular for older persons. (3) Symptoms motivate behavior far more often than diagnoses do. (4) Knowing faint as well as strong routes from disease to disability gives a sound basis for clinical care. (5) Hobbies matter as much as hygiene. (6) The knowledge and applications gained from arthritis research are gender-neutral. We dwell on this last point: Though women stand to benefit “sooner” and “more” from such research, men who manage to defer death awhile will increasingly encounter arthritis. They can then thank women for spending time on arthritis advocacy in local and national political settings and for demanding clinical attention for their aching hands, painful dressing, and trouble raking leaves.

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