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BRIEF REPORT

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Limited physician knowledge of sarcopenia: A survey

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Abstract

Background: Sarcopenia, a reduction in skeletal muscle mass and function, is a condition that contributes to functional decline and disability in older adults. Although research on this geriatric condition has developed rapidly in recent years, little work has been done to document whether practicing physicians are incorporating sarcopenia into their clinical practice.

Methods: An online survey of 253 practicing U.S. physicians assessed knowledge of sarcopenia, use of the term in practice, motivation for screening patients, and diagnostic and treatment approaches. They were board certified in four practice areas: internal medicine ($n = 69$), family medicine ($n = 69$), geriatrics ($n = 40$), or physical medicine and rehabilitation (PM&R) ($n = 75$).

Results: Less than 20% of internists and family medicine physicians reported being very familiar with the term sarcopenia, with substantially higher familiarity at this level reported among geriatricians (70%) and among PM&R specialists (41%). Two additional findings pointed to deficiencies in sarcopenia knowledge and practice: participants substantially overestimated the prevalence of sarcopenia in older adults (44% of participants reported an expected prevalence of >25%) compared to findings from published studies (indicating 10% of older adults experience sarcopenia); over 75% reported not typically using specific diagnostic criteria or being unsure if their approach utilized any specific criteria. When asked what terminology they use in a medical chart for a patient presenting with significant loss of muscle mass and strength, only 8% said sarcopenia.

Conclusions: Sarcopenia, a condition that can have a major impact on older adults as they age, has not been fully incorporated into the knowledge base and practices of active physicians. The survey data suggest that improving physician familiarity with sarcopenia and having universal agreement on criteria for diagnosis may increase the screening for and treatment of sarcopenia.

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muscle mass, physical function, sarcopenia, strength

INTRODUCTION

Sarcopenia is a condition that is defined as an accelerated loss of skeletal muscle in conjunction with decreased functional capacity.[1] Although many practitioners consider muscle loss to be part of "normal aging"—a process that is notably subjective and lacks a universal definition—the loss of muscle and strength undoubtedly increases the risk of adverse outcomes such as falls, fractures, functional decline, frailty, reduced quality of life, increased health care costs, hospitalization, nursing home admission, and mortality.[2–6]

Sarcopenia was initially operationalized as simply low muscle mass, estimated from lean mass obtained by dual x-ray absorptiometry (DXA). The definition was later expanded to also include decreased function as measured by strength and/or physical performance because these functional measures showed a stronger association with clinically relevant outcomes than lean mass.[3] Multiple definitions utilizing different cutpoints for specific aspects of lean mass, strength, and physical functioning have been developed in Europe, Asia, and the U.S. since 2010[3] and in 2021 the international Sarcopenia Definitions and Outcomes Consortium (SDOC) came to an agreement that available measures used to estimate muscle mass were so poorly related to important outcomes that only grip strength and gait speed should be used as sarcopenia criteria.[7] The lack of consensus on a single definition of sarcopenia that can be easily implemented in the clinical setting has likely slowed its incorporation into medical practice. Another factor that may inhibit widespread clinical acceptance and knowledge of sarcopenia is the lack of specific, effective, and reimbursable treatment.

While sarcopenia has received increasing attention from researchers and has been the subject of much high-quality research, its penetration into clinical practice has been slow. An important advancement in the recognition of sarcopenia as a disease entity came in 2016 when an International Classification of Disease Clinical Modification code (ICD-10-CM) of M62.84 was assigned.[8] However, there is some evidence that clinicians are not knowledgeable enough to utilize the diagnosis in their practice. Prior to an educational program on sarcopenia for practitioners in Australia and New Zealand, only 15% identified sarcopenia as a disease and 6 months after the training only 14% made sarcopenia diagnoses a part of their practice.[9] In the Netherlands, a survey of healthcare professionals revealed that while two-thirds knew the concept of sarcopenia, only one in five knew how to diagnose it.[10] A survey in the U.K. of National Health Service organizations showed that less than half identified sarcopenia in their organization, even among geriatrician respondents.[11] Very few of these organizations made the diagnosis using a specific algorithm and the authors suggest that the label of sarcopenia was being applied without an accurate diagnostic workup. In this paper, we present the results of a survey of U.S. physicians that evaluated their familiarity with sarcopenia and its use in their practices.

Key points

- Although research on sarcopenia—a reduction in skeletal muscle mass and function, has developed rapidly in recent years, little work has been done to document whether practicing physicians are incorporating sarcopenia into their clinical practice.
- A survey of 253 practicing U.S. physicians found modest familiarity with sarcopenia and little use of diagnostic criteria.
- Physicians seem to have good motivations to screen for sarcopenia, with the majority reporting a concern for fall prevention and loss of independence and mobility.

Why does this paper matter?

This survey advances the understanding of awareness and use of sarcopenia screening and diagnostic tools, and suggests that sarcopenia has not been fully incorporated into the knowledge base and practices of active physicians, and that universal agreement on criteria for diagnosis and improved dissemination of sarcopenia information are needed.

METHODS

This project used qualitative and quantitative research methods in a two-phased approach, consisting of a set of

interviews that informed the strategy for a large online survey. The first phase employed 30-minute phone interviews with nine physicians from seven cities across the United States who were board-certified in either internal medicine, family practice, geriatrics, or physical medicine and rehabilitation (PM&R). Participants were recruited through a mix of professional contacts and cold calls and were asked questions about their approach to diagnosing, monitoring, and treating age-related muscle decline among adults aged 65 and older in community settings, as well as their familiarity with the term "sarcopenia" specifically. Interviewers probed more deeply into areas that seemed to, particularly interest participants or spark a unique perspective, which helped uncover potential blind spots in the design of the online survey used in the second phase. Participants were offered a $25 cash card for their time.

A 15-minute online survey was then administered to 253 physicians in the U.S. in four practice areas using Medscape, the market research arm of the global medical news organization WebMD and among the country's leading sources of medical information for providers.[12] Medscape continually recruits and manages an opt-in panel of approximately 95,000 physicians out of its global readership base of 600,000 physicians. All 25,171 eligible U.S. physicians in the four specialty areas were emailed an invitation to complete the survey anonymously. Only respondents who passed the initial screener questions about their patient population (majority age 65+ and in outpatient care) were able to proceed to the substantive questions. Respondents received a one-time payment of $25–$35, depending on the difficulty of recruiting respondents for their specialty.

While the opt-in nature of the panel precludes its status as a fully random sample, the sheer size and breadth of Medscape's reach into the physician population—among the largest available in the U.S. and with ample representation across regions, genders, and ages[13] —support best practices in data collection for the notoriously hard-to-reach physician audience. Moreover, because Medscape is first and foremost a website for healthcare providers to access credible medical information, its research participants have lower risk of self-selection bias than they would if recruited by strictly market research firms.

This research was sponsored by the Aging in Motion Coalition (AIM), a project of the Alliance for Aging Research, which worked closely with Reingold, a social impact communications firm, to develop the research plans and instruments. The Alliance supported the project with funding from the AIM sponsors. The Sterling IRB ruled that the study was exempt from institutional review board (IRB) review pursuant to 45 C.F.R. §46.104 (d), Category 2 Exemption (DHHS).

Participants

The online survey, conducted in the U.S., used quotas to target a well-rounded distribution of between 40 and 75 respondents in each of four medical practice areas that would be likely to encounter older patients with reduced strength and functioning in general community settings. Screener questions were programmed into the start of the survey, requiring respondents to meet all of the following criteria: status as a full-time practitioner licensed as a medical doctor; board certified in either internal medicine, family medicine, geriatrics, or PM&R; at least 51% of patients are aged 65 and older; and at least 76% of cases are outpatient. Given the comparatively small population of 7123 certified geriatricians in the U.S. overall (less than 1% of all physicians today),[14] this audience, in particular, was inherently hard to reach. The survey recruitment approach, therefore, focused more on a provider's experience with age 65+ patients in outpatient settings than on their personal demographics (e.g., age, gender, race, location). By adopting an identical approach to recruitment across all medical specialties and by leveraging Medscape's extensive reach, the research team strove to mitigate potential recruitment bias between specialties. Researchers did not apply weighting techniques to the data, however, and therefore exercised caution when comparing results between specialties.

Statistical analysis

The margin of error for the overall survey is estimated at +/−6% at a 95% confidence level. This margin was calculated by comparing the total sample size of 253 to the estimated population of 350,794 U.S. physicians in the four practice areas, with the Z score of 1.96 for a 95% confidence level. The population figure was sourced from a 2020 report of the American Board of Medical Specialties,[14] summing the count of physicians practicing in each specialty area, with geriatric medicine as a subspecialty of internal and family medicine. Given the branching logic in the survey, some questions had fewer responses and will therefore have larger margins of error. Additional imprecision is likely given the non-probabilistic (non-random) sample derived from a quota-based recruitment method. Survey data are presented for the full survey population unless otherwise specified.

RESULTS

The interviews and surveys were conducted between August and October, 2021. The survey generated the

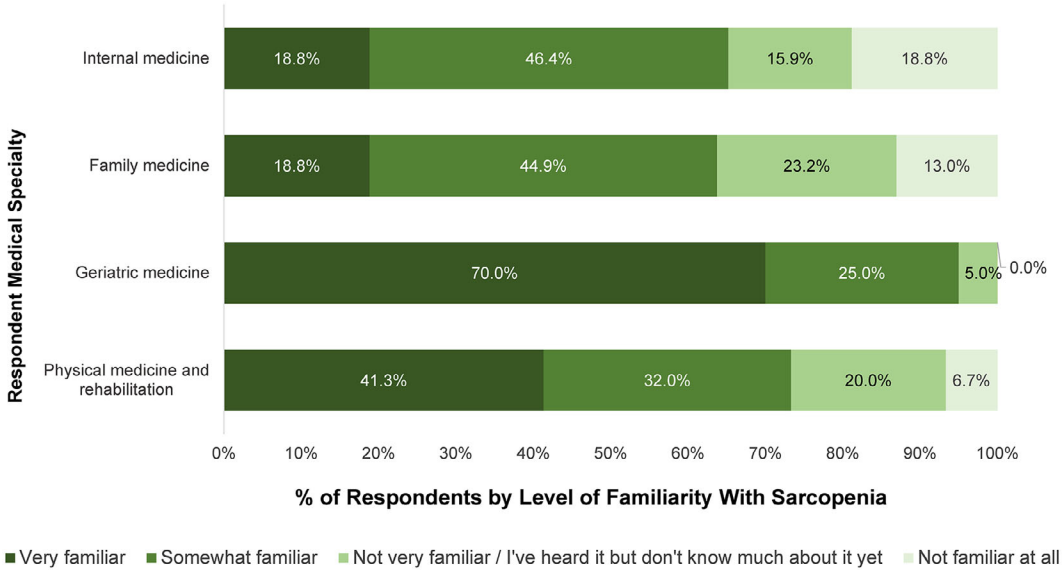

FIGURE 1 Physician familiarity with the term sarcopenia, by specialty. Q2: What is your primary area of medical practice? ($n = 253$). Q5: How familiar are you with the term "sarcopenia"? ($n = 253$).

following breakdown of respondents: 69 in internal medicine (27%), 69 in family practice (27%), 40 in geriatrics (16%), and 75 in PM&R (30%). Among the 213 non-geriatrician respondents, only 8% said they had completed advanced training in geriatric medicine. The full survey instrument and results are included in the Data S4.

Figure 1 shows the level of familiarity with the term sarcopenia by specialty. Geriatricians had the most familiarity, followed by specialists in PM&R, with less than 20% of internists and family medicine physicians reporting they were very familiar with the term. When asked what terminology they would use in a medical chart for a patient presenting with a significant loss of muscle mass and strength, 25% would use muscle loss and weakness and 24% would use deconditioning, only 8% said they would use sarcopenia.

Physicians were asked to "estimate the percentage of older Americans with sarcopenia, a muscle condition that results in significant loss of muscle mass and strength over time." Figure S1 shows the distribution of these estimates stratified by the level of familiarity with sarcopenia reported by the respondent. There was a wide distribution of estimates, with the most common estimate being that prevalence is more than 25%, and, among those reporting they are very familiar with sarcopenia, over 60% thought the prevalence of sarcopenia is greater than 25%.

Table 1 displays diagnostic techniques and criteria used to identify sarcopenia. Manual muscle testing and gait speed and grip strength measurement were the most common tests employed, while 21% of respondents said they do not use specific measurements to confirm a diagnosis. When asked about diagnostic criteria or guidelines for diagnosis, 50% said they do not typically use specific diagnostic criteria and an additional 27% said they were unsure if their approach utilized any specific criteria. A

TABLE 1 Physicians' diagnostic techniques and diagnostic criteria for sarcopenia

Measurements used in diagnosis (select all that apply; $n = 248$)	**Percent**
Manual muscle testing strength scale	40%
Gait speed test results	39%
Grip strength test results (e.g., from a dynamometer)	35%
None-I do not use specific measurements to confirm a diagnosis.	21%
DEXA scan results	19%
Electrodiagnostic results	14%
CT/MRI results	10%
Ultrasound results	5%
Other	7%
N/A-I always defer to a specialist for diagnosis	1%
Diagnostic criteria (select one; $n = 246$)	
N/A-I do not typically use specific diagnostic criteria.	50%
Unsure which one applies to my criteria	27%
FNIH (Foundation for the National Institutes of Health)	14%
SSCWD (Society of Sarcopenia, Cachexia, and Wasting Disorders)	6%
EWGSOP (European Working Group on Sarcopenia in Older People)	4%
Other	0%

TABLE 2 Physician motivations for screening for sarcopenia

Physician reasons for screening (select up to two; $n = 234$)	**Percent**
Fall/injury prevention	60%
Concern for their ability to remain independent/mobile	53%
Concern for their decreased strength during ADLs (activities of daily living)	26%
Concern for their higher risk of mortality	23%
Concern for potential worsening of their comorbidities	15%
Patient or caregiver satisfaction/peace of mind	8%
Compliance with Medicare regulations	4%
Other	0%
Diagnoses that would prompt screening (select all that apply; $n = 234$)	
Malnutrition or poor nutrition	82%
Frailty	77%
Limited mobility	76%
Cachexia	74%
Dementia or cognitive decline	62%
Neurological disorder	55%
Cancer	49%
Osteoporosis	49%
Respiratory issues (e.g., COPD, tobacco usage)	29%
Metabolic disorder	27%
Chronic inflammation	26%
Diabetes	22%
Cardiovascular disease	21%
Obesity	17%
Other condition	2%
No specific condition would prompt me to screen	2%
N/A-I only see patients by referral	1%
Screening after patient life events (select all that apply; $n = 234$)	
Recent hospitalization or extended bed rest	82%
Experienced an acute injury/fall	75%
Transitioned to/from long-term care	56%
Recent surgery	41%
Loss of a spouse, significant other, or caregiver	27%
Became eligible for Medicare	12%
Turned a specific age	11%
No specific life event prompts me to screen.	4%
Other life event	3%

smaller proportion of participants (24%) cited actual published criteria. Table 2 lists respondents' general concerns, specific diagnoses, and patient life events that would prompt screening for significant loss of muscle mass and strength. A majority of physicians would be motivated to screen for sarcopenia out of concerns for fall and injury prevention (60%) and for the loss of ability to remain independent and mobile (53%).

Figure S2 illustrates that there were only small differences in the approach to treatment by medical specialty. Physical therapy was recommended by nearly 90% of physicians, followed by at-home exercise, protein supplementation, dietary changes, and vitamin supplements. Appetite stimulants and hormone therapy were recommended by small proportions of the four medical specialties. When asked to roughly estimate how many of their patients would suffice with diet and exercise as the only interventions to address sarcopenia, responses centered around the middle: 35% saying "about half" and 38% saying "a few or some." Respondents were also asked for the most common reasons their patients failed to address loss of muscle mass and strength. The most common responses were the belief that sarcopenia is a natural part of aging (56%), the lack of desire/ability to change habits with diet or exercise (41%), and the lack of understanding that sarcopenia is treatable (38%). Instructive examples of some of the observations that interviewees made about sarcopenia and its interventions are summarized in the Data S3.

DISCUSSION

This survey evaluated a large group of physicians in four specialties who are likely to care for older patients with sarcopenia. Familiarity with the term sarcopenia varied considerably across medical specialties (Figure 1), with less than 20% of internists and family practitioners saying they were very familiar with this term compared to 41% of PM&R specialists and 70% of geriatricians. This is of concern because of the large number of older patients cared for by physicians in internal medicine and family practice. The multiple definitions of sarcopenia currently in use, and a lack of universal diagnostic criteria or reimbursable diagnostic method, might also contribute to physicians' weaker familiarity with the term. Even among those who reported being very familiar with the term sarcopenia, it is unclear how knowledgeable they are. In this subgroup, over 60% estimated that the overall prevalence of sarcopenia in older Americans was over 25% (Figure S1), substantially higher than results from a meta-analysis of 35 studies of general populations of older adults around the world, which found a prevalence of 10% in both men and women.[15] It is possible that our participants are making their estimates based on their patient populations, as it has been demonstrated that the prevalence of sarcopenia is substantially higher in hospitalized older adults.[16]

While a large proportion of physicians reported familiarity with sarcopenia, a much smaller proportion

actually used the term in their practice (8%), utilized one or more of the standardized definitions (24%), or depended on objective measures such as grip strength (35%) or gait speed (39%) to make the diagnosis. Although weakness is a common complaint of older patients many clinicians continue to consider it a normal part of aging and the state of medical practice at this time does not appear geared to identifying the cause of this symptom and labelling it as sarcopenia. The use of standardized functional assessment tools, such as the Short Physical Performance Battery (SPPB), during routine physical examinations could help identify patients experiencing even small decreases in functional capacity. Reimbursement for such an assessment could go very far toward more universal use and acceptance of such tools.

The lack of a unifying consensus definition and diagnostic criteria for sarcopenia is likely to have slowed the incorporation of this condition into clinical practice. However, this survey revealed that physicians had appropriate concerns that would motivate them to screen for muscle loss, including fall and injury prevention, loss of mobility and independence, and hospitalization. They also had appropriate recommendations for treating loss of muscle and strength, with over 50% of all respondents citing physical therapy, at-home exercise, protein supplementation, and dietary changes (Figure S2), although the survey did not ascertain how often they actually used these interventions in practice. They had what is likely an overly optimistic view of the benefits of their interventions, with over half of physicians surveyed saying that the proportion of their patients for which diet and exercise alone would be sufficient to address sarcopenia was half or more.

Although research in sarcopenia has increased in recent years, little has been written about the incorporation of this condition into clinical practice. Studies of health care providers in Australia/New Zealand and the Netherlands showed results similar to our study, with modest familiarity with sarcopenia but many providers having no clear knowledge of how to diagnose it.[9,10] Both of these studies found that after attending courses in sarcopenia the knowledge of health professionals improved substantially immediately after the course but reduced several months later. A limitation of our study is that it only surveyed physicians. Attention to sarcopenia varies among diverse healthcare providers and in different settings. In a study of multiple types of professionals in Japan, for example, physical therapists were significantly more likely than dieticians to utilize grip strength and physical performance in evaluating muscle loss, and rehabilitation settings were much more likely to use these evaluations than acute care hospitals or nursing homes.[17] In a survey of multiple types of healthcare providers for cancer patients in Australia, 88% were aware of accepted definitions of sarcopenia.[18]

The large impact of sarcopenia on functional decline and reduced quality of life in the older population is an important reason to improve the recognition, diagnosis and control of this condition. As demonstrated in this survey, there is reasonable familiarity with the concept of sarcopenia but further knowledge is necessary for the broad application of sarcopenia in clinical practice. Some of this knowledge is available and must be transmitted to practitioners while additional knowledge from ongoing and future research will be necessary to bring this condition into routine medical care. Current efforts to educate consumers and clinicians are ongoing, led by groups like the Alliance for Aging Research's AIM Coalition and its educational film to raise awareness of sarcopenia.[19] It is also necessary to introduce sarcopenia into medical school curricula and continue to emphasize its importance in specialty training programs, especially geriatrics. Active practitioners can also be supported through continuing education offerings, as an analysis of the present data set showed no correlation between respondents' years of experience practicing medicine and their familiarity with the term sarcopenia, use of official diagnostic criteria, or accurate estimation of the prevalence of the condition among older Americans today. It is of concern that not all geriatricians who participated in this survey were very familiar with sarcopenia, a condition of critical importance to geriatric medicine, and consideration of increased training in this area is warranted. The option for trainees to reduce their geriatric specialty training from 2 years to 1 year[20] may be having a negative impact on awareness and familiarity with this condition.

There is poor correspondence between currently utilized sarcopenia criteria,[21] and a universally agreed upon definition would reduce much of the confusion on how to correctly diagnose sarcopenia. Development of a valid and reliable approach to screening and diagnosis that is feasible in the clinical setting is much needed. While a perfect screening tool for sarcopenia is not yet available, the Strength, Assistance with Walking, Rising from a Chair, Climbing Stairs, and Falls (SARC-F) questionnaire, a five-item questionaire, may be a useful starting place.[22] Despite this tool's low sensitivity, it does offer high specificity.[23] In fact, the 2018 convening of the European Working Group on Sarcopenia in Older People proposed a diagnostic strategy that begins with the SARC-F and progresses to functional and strength assessments and measurement of muscle mass.[24]

Currently, in the U.S., diagnostic tools used to identify sarcopenia, such as grip strength and gait speed, are not reimbursed by insurance. The fact that lean body mass as measured by DXA is a poor way of estimating

muscle mass and does not predict functional decline[25] has led to the most recent international consensus effort excluding DXA as a means of diagnosing sarcopenia.[7] An alternative to DXA, the D_3-creatine dilution method, has been shown to be a valid measure of muscle mass[26] and a strong predictor of functional outcomes[27,28] but is not yet available for clinical use. Finally, more research must be completed and shared with clinicians on the best interventions to prevent and treat sarcopenia. There is reasonably good evidence for the benefit of resistance training and protein supplementation, but new studies are underway to evaluate their joint effect.[29] Advances in sarcopenia research can lead to its incorporation into the World Health Organization project on Integrated Care for Older People (ICOPE) (https://www.who.int/publications/i/item/WHO-FWC-ALC-19.1).

AUTHOR CONTRIBUTIONS

All of the authors (Jack M. Guralnik, Peggy M. Cawthon, Shalender Bhasin, Roger Fielding, Jay Magaziner, Alfonso J. Cruz-Jentoft, Bruno Vellas, Lindsay Clarke, Laura Lattimer, and William Evans) reviewed or contributed to the study design, analysis and interpretation of the data, and preparation of the manuscript. Everyone who contributed significantly to the article has been included as an author, and given written consent to be included as such.

CONFLICT OF INTEREST

Jack M. Guralnik, MD, PhD, serves as a paid consultant to the Alliance for Aging Research's Aging in Motion Coalition. Lindsay Clarke, JD is an employee of the Alliance for Aging Research, serving as the Senior Vice President of Health Education and Advocacy. Laura Lattimer is an employee of Reingold, Inc., the communications firm that conducted the interviews and survey work and assisted with analysis. Roger Fielding reports stock options from Inside Tracker and Axcella Health and consultancy from Nestlé, Biophytis, Pfizer, Rejuvenate Biomed, and Chugai. Roger Fielding is partially supported by the US Department of Agriculture (USDA), under agreement No. 58-8050-9-004, by NIH Boston Claude D. Pepper Center (OAIC; 1P30AG031679). Bruno Vellas is the Chair of Gerontopole, which is working on a government grant application with industrial partners BioAge, Roche, and Pfizer. Alfonso Cruz-Jentoft has received fees for performing educational activities from Abbott Nutrition, Nutricia/Danone, Nestlé Medical Nutrition and Fresenius Kabi (nutrition companies that market products for sarcopenia) and consulting fees from Rejuvenate Biomed, Reneo Pharmaceuticals and Akros Pharma on the development of drugs to treat sarcopenia. William Evans is a paid consultant for BioAge Labs, Longeveron, Inc., and Biophytis. He is partially funded by NIH grants R01AG05941, R01CA246695, R01CA240394, R44 DK125151, R01AG065265, U54AG07593, R01AG074956, U01CA271277, U01CA271278, and R37CA258761-01A1. He also receives support from Muscular Dystrophy Association, Parent Project Muscular Dystrophy, and Duchenne UK. Dr. Shalender Bhasin reports receiving research grants from NIA, NINR, NICHD-NCMRR, AbbVie, and Metro International Biotechnology; consultation fees from OPKO; and equity interest in FPT and Xyone Therapeutics. These grants and conflicts are managed by the Brigham and Women's Hospital according to the rules and regulations of the Mass General Brigham Healthcare System.

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The supporters of the Alliance for Aging Research and the AIM Coalition had no role in the subject recruitment, data collection, data analysis, and preparation of the article. The authors retained editorial control over all research and analysis.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Data S1. Physician Estimates of the Prevalence of Sarcopenia Among Older Americans, by Level of Familiarity With the Term.

Data S2. Physicians' Recommended Treatment Approaches for Sarcopenia, by Specialty.

Data S3. Physician Interviewees' Observations About Sarcopenia Terminology, Screenings, Diagnosis, and Treatment.

Data S4. Survey Questionnaire and Responses *n* (%).

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