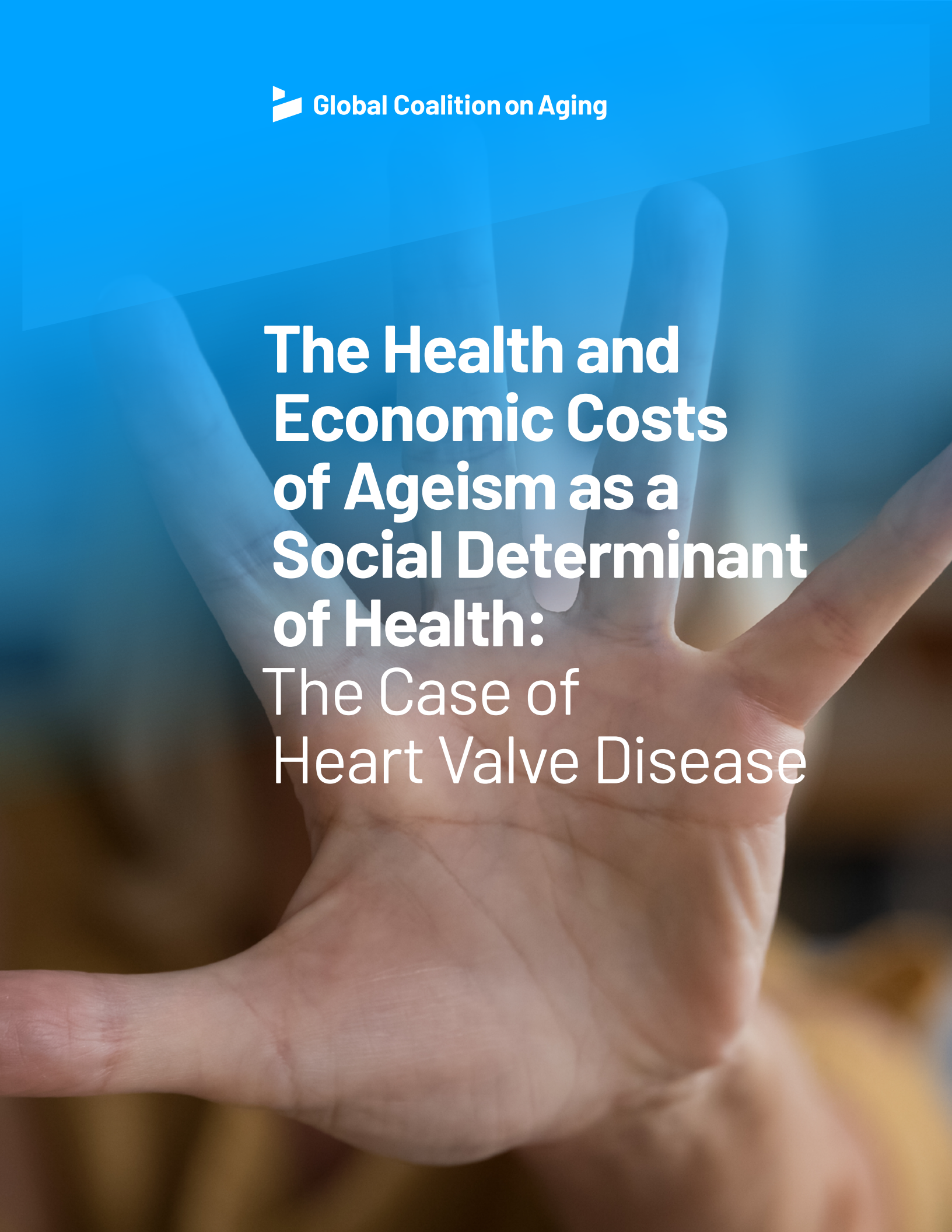
Global Coalition on Aging



The Health and Economic Costs of Ageism as a Social Determinant of Health:

The Case of Heart Valve Disease

Introduction

People around the world are living far longer than ever in history, as medical advances have enabled newfound longevity and significantly increased the average lifespan.[1] This dramatic demographic shift is reshaping the 21st century, with the number of people 60 or older soaring to 2 billion by 2050, making up 20 percent of the world's population.[2] The 80+ demographic is the fastest growing of all,[3] increasing the number of older adults at risk of disease and illness. Coupled with the trend of declining birthrates in all societies as they modernize, the number of old are now outpacing young by considerable margins.

Amid this context, growing evidence of widespread ageism is particularly alarming as its negative impacts stretch across society at large. Although older people constitute a significant proportion of the population, ageism is pervasive: 1 in 2 people globally hold ageist beliefs, with even higher numbers in lower-income countries.[4] Nor is it uncommon for older adults themselves to have outdated views on their own age and how they fit in society at large.

So significant is the challenge of ageism in society that the United Nations' (UN) 194 Member States called upon the Director-General of the World Health Organization (WHO) to take action on ageism. As a result, the WHO launched the Global Campaign to Combat Ageism in 2021, and the UN designated "Combatting Ageism" as one of the four pillars of its Decade of Healthy Ageing (2021-2030). Also in 2021, the WHO, the Office of the High Commissioner for Human Rights, the United Nations Department of Economic and Social Affairs (UNDESA), and the United Nations Population Fund published the *Global report on ageism*, which drew a direct link between the goal of combatting ageism and the UN Sustainable Development Goals.[5,6]

This paper was created by the Global Coalition on Aging with funding from Edwards Lifesciences.

"To achieve the long-lasting, vastly better development prospects that lie at the heart of the Sustainable Development Goals, we must change the narrative around age and ageing. We must raise visibility of and pay closer attention to ageist attitudes and behaviors, adopt strategies to counter them, and create comprehensive policy responses that support every stage of life."[7]

Global report on ageism, 2021, World Health Organization.

Stakeholders and decisionmakers, in particular, must better understand the direct impact of ageism on health as older adults themselves, healthcare professionals, and society at large make decisions every day founded in ageist assumptions.

As established in the report and subsequent research, ageism, or harmful stereotypes, prejudice, and discrimination based on age, has a significant impact on people's lives, worsening older adults' mental and physical health, limiting their ability to get the care they need, and collectively, shortening their lifespans.[8] Self-directed ageism—internalized negative beliefs about age which may present as self-doubt or negative self-perception—can negatively impact an individual's health,[9] and ageism in the healthcare system itself adversely affects older people's ability to receive care and their health outcomes.

Ageism is insidious and far-reaching, warranting the powerful and collaborative engagement of the UN Decade of Healthy Ageing and other global institutions. The guiding principles were two-fold: that substantive policy change on aging is needed and that behaviors and cultural attitudes about aging will follow policy change. Without these, the gains that have enabled healthy longevity to develop will falter; people may gain years, but not the health that one hopes for and strives to accompany those years.

Two years later, in 2023, with an equally groundbreaking paper in *The Lancet*, the World Health Organization took this commitment one step further, explicitly identifying ageism as a social determinant of health: a societal, non-medical factor that influences health outcomes.[10] Ageism—along with previously unrecognized determinants of health, from where one lives, one's race or ethnicity, or one's education—is now officially a part of the social determinant of health narrative.

While ageism has only recently been recognized as a social determinant of health, the WHO notes its impact is profound.[11] Ageism, however, lacks the level of attention that other social determinants of health receive, despite its prevalent and significant consequences, including poorer physical health, impediment to recovery from disability, and earlier death.[12,13] The likelihood of negative health outcomes rises as experience with everyday ageism increases, affecting both physical and mental health and cognitive ability.[14,15]

Ageism is particularly connected to the increased prevalence of cardiovascular disease, chronic respiratory disease, diabetes, and musculoskeletal disorders, and poorer outcomes in countless other conditions, from macular degeneration to heart valve disease, stemming from both direct health effects and the impacts of under-diagnosis and undertreatment.[16] These chronic consequences of ageism decrease quality of life, life expectancy, and are costly.[17,18] The impact of ageism is therefore not only on healthy longevity but also carries significant fiscal consequences.

The example of heart valve disease is both a dramatic and critical illustration of ageism as a social determinant of health as it is so profoundly under-recognized. As importantly, it is essential to understand how the two are linked: older adults often do not receive timely diagnoses or treatment because symptoms are too often dismissed as normal signs of aging. They are dismissed by older adults themselves, by their health-care providers, and by their families and friends who love them dearly. This tendency is even more concerning, given the great innovations in diagnosing and treating heart valve disease leading to vast improvement in quality of life. The great innovation and technological advancement in heart valve disease provides a clear demonstration of what healthy longevity can look like through new technologies and a willingness to utilize them, unimpeded by ageism.

Ageism and Heart Valve Disease: A Case Study

The global burden of heart valve disease is increasing as populations age: the risk of heart valve disease increases significantly after age 65, reaching 12.4 percent after age 75.[19] Rates are increasing around the world, with national estimates projecting rates to double in Europe by 2040 and triple by 2060 and similar increases in Asia.[20] In the U.S., the prevalence has already more than doubled from 2000 to 2018, and is likely to continue to grow exponentially as the population ages, doubling again by 2050.[21,22]

In addition to the cost in both lives and reduced quality of life, this increase in disease burden has a significant price tag: in the U.S. alone, heart valve disease costs $23.5 billion each year in direct health expenditures, and without timely access to treatment, over ten years, an estimated $10 billion will be lost from unpaid contributions like volunteering and family caregiving.[23,24]

Heart valve disease is treatable, and new technology has reduced the risks and recovery time required for treatment. In addition to traditional surgical aortic valve replacement (SAVR), minimally invasive surgical options and transcatheter options including transcatheter aortic valve implantation (TAVI) and transcatheter edge-to-edge repair (TEER) have been shown to improve quality of life and survival.[25,26,27]

"In critical care, age doesn't matter—when you're 90 and you have a heart attack or a cardiac event related to heart valve disease, you're on my table in the ER. Doctors have been watching, but not doing anything until they're on my table, because they're 90. They don't realize how much older people have, how much they can contribute. Screening and getting people upfront saves our public healthcare system money."

Janine Eckstein, MD, Interventional Cardiologist; Assistant Professor, University of Saskatchewan

Despite the availability of these life-saving innovations, many older adults do not receive a diagnosis. Even with a diagnosis of severe aortic stenosis with indication for treatment: one study found that 49 percent of patients were not referred to the heart team, while another found that 81 percent of patients who went untreated had not even been referred. Older age, gender, ethnicity, and socioeconomic status all impact the likelihood of receiving appropriate treatment.[28,29,30]

Ageism among healthcare providers and even older adults and their families themselves can impede detection of heart valve disease. Common early symptoms such as shortness of breath, fatigue, dizziness, and chest pain are often dismissed as "a normal part of getting old." Yet, ignoring these symptoms has serious consequences: left untreated, severe, symptomatic aortic stenosis, which is the most common type of heart valve disease, has a mortality rate of between 25 and 50 percent per year—and new data suggests that even mild and moderate cases of aortic stenosis are associated with a higher mortality risk than previously suspected.[31,32,33]

Despite experiencing higher rates of cardiovascular disease overall, older people globally receive interventions at a lower rate than younger people—with older women in particular being less likely to receive appropriate cardiological investigations.[34] Lack of data is a contributing factor. People age 65 and older, and especially women, have largely been excluded from clinical trials, leading to less evidence in the literature confirming the safety and effectiveness of treatments in older patients. This lack of data can, in turn, skew perceptions among providers, making them less inclined to intervene.[35] Aortic valve replacement is frequently denied to older adults based solely on age as an exclusion criterion—despite being the optimal, or even only, therapeutic choice—with 46 percent of patients under age 65 undergoing valve replacement compared with only 20.5 percent of patients aged 85 years.[36,37]

Age Exclusion in Clinical Trials: Perpetuating Ageism

Even when older adults are overrepresented in a patient population, they remain underrepresented in clinical trials.

Older adults are significantly underrepresented in clinical trials, leading to hesitation among clinicians to treat those in whom there is less of an evidence base for care (older people, and older women in particular).[38] While international guidelines have not included recommendations for age's use as an exclusion criterion since 1993, age has nevertheless been extensively used as one until only recently.[39] Mean age in clinical studies has largely not increased, resulting in a dearth of clinical data directly applicable to older people.[40] Major medical bodies that fund research have now specified that age is not an acceptable exclusion criterion without justification, but other exclusion criteria, such as comorbidities, level of function, and other prescription drug use, may decrease the level of participation of older people in clinical trials. This results in less data on a treatments' efficacy in older adults. Even when older adults are overrepresented in a patient population, they remain underrepresented in clinical trials: while two-thirds of cancer patients in the U.S. are over 65, they represent only 25 percent of clinical trial participants.[41] Data in older adults is especially necessary, however, as adverse drug reactions are more common in older this population, and older adults consume a substantial percentage of all prescription drugs.[42]

Yet treatment for heart valve disease does exist, and with appropriate, timely treatment, older adults can return to their daily activities, returning to work, volunteering, family, and hobbies—benefiting both the older adults themselves, through increased quality of life, and providing positive economic benefits. A recent analysis of TAVI for older American patients with severe aortic stenosis found treatment provided monetary benefits of more than $200,000 per patient from a payer perspective and more than $50,000 per patient from a societal perspective.[43]

"Now is the time to act against heart valve disease. A sense of urgency can speed proven, evidence-based care that mitigates long-term costs, improves outcomes, and better serves patients and their families."

Neil Johnson, Executive Director, Global Heart Hub; Chief Executive, Croí, the West of Ireland Cardiac & Stroke Foundation & National Institute for Prevention and Cardiovascular Health

Ensuring appropriate screening, follow-ups, and treatment can save lives. Increasing awareness among the general public and general practitioners to ensure that early symptoms like shortness of breath, fatigue, and faintness are not dismissed as "normal" signs of aging can help ensure older adults receive appropriate screenings. Auscultation is an inexpensive and non-invasive detection tool, yet fewer than one-quarter of general practitioners regularly provide this basic screening to people over the age of 60.[44] More than 40 percent of heart murmurs detectable on a physical exam are missed by primary care providers.[45] New technologies can help support these screenings, with AI enabling earlier diagnosis, referral, and optimal treatment and digital stethoscopes decreasing the amount of clinical training and experience required to detect abnormal heart sounds.[46,47] Digital stethoscopes also enable remote auscultation, which increases access to care in remote areas.[48]

Even with a diagnosis, patients do not always receive a referral to treatment, and the complexity and lack of integration of health systems can create conflicting recommendations from providers, leading to confusion, uncertainty, and a reluctance to seek care. A "watchful waiting" approach is also common among providers. However earlier diagnosis and treatment can prevent the cost of emergency and acute care—even mild and moderate aortic stenosis are associated with increased mortality risk if untreated.[49]

Ageism in Healthcare: Who Receives Care?

Healthcare providers are not immune to ageism, and in fact may actually hold more negative age-based biases than the general population.[50] In a prospective cohort study, healthcare providers were more likely to withhold life-sustaining treatments from older adults than from younger people, even when controlling for prognosis and patient preference.[51] Meanwhile, almost half of students in medicine and nursing report witnessing overt age discrimination in healthcare.[52]

Almost half of students in medicine and nursing report witnessing overt age discrimination in healthcare.

Even global health targets may deprioritize older people: the UN's Sustainable Development Goals (SDG) for 2030 includes SDG 3.4, "reduce by one-third premature mortality from non-communicable diseases through prevention and treatment…."[53] The indicator for this goal is the "probability of dying between age 30 and exact age 70" from "cardiovascular disease, cancer, diabetes, or chronic respiratory disease." Reduction of deaths over age 70 are conspicuously excluded from this goal.

"Premature mortality" is, by WHO definition, deaths occurring between the ages of 15 and 70, implying that deaths past 70 are expected. Health resource allocation follows this logic, with resources overwhelmingly prioritized for preventing mortality in those age 15 to 70.[54]

Even further, common health metrics used to evaluate resource allocation and cost-effectiveness, including disability-adjusted life years (DALYs) (the primary tool used by the WHO, World Bank, and national health agencies), undervalue years lived by older adults: until it was revised in 2010, the DALY allocated a lower value to years lived beyond age 69 as compared to those lived as a younger adult—justified by an unsubstantiated belief that older adults "depend on the rest of society for physical, emotional, and financial support."[55] While the DALY has since been reformed, this ageist understanding of older adults' economic role continues to underpin approaches to public health, as the stated rationale for the SDG 3.4 is the loss of productivity and impact on the economy of premature deaths in those ages 15 to 70.[56]

The COVID-19 pandemic laid bare ageist attitudes about the expendability of older adults, antagonized by the economic and social costs of measures enacted to protect vulnerable people.[57] Care rationing in an emergency pandemic scenario prompted discussions about the valuation of lives—who was "worth" saving—and underscored existing inequities in who receives care.[58] These arguments often center around productivity and contributions to the economy, devaluing the contributions of older adults because they are assumed not to be working, and their unpaid contributions to their communities as caregivers, as volunteers, and as leaders in their communities are undervalued.[59] While the immediate crisis of the COVID-19 pandemic has subsided, the ageism it exposed in healthcare systems and society at large continues to have an insidious, underrecognized effect on who receives care.

Conclusion

As our global population ages, the imperative to expose, understand, and then dismantle ageist beliefs becomes ever more urgent. In healthcare, ageism results in underdiagnosis and undertreatment of conditions like heart valve disease, where timely intervention can dramatically improve outcomes and lead to significant cost savings for health systems and society. Heart valve disease offers one of the clearest examples of how ageism operates as a social determinant of health, with real implications for quality of life and life expectancy, demonstrating why both the UN and the WHO view overcoming ageism as a central tenet of the Decade of Healthy Ageing.

Despite tremendous scientific innovation and the availability of advanced treatments, ageist systems, attitudes, and beliefs continue to place countless lives at unnecessary risk by preventing timely access to care and treatment. Quite literally, individuals with heart valve disease are dying from ageism. All stakeholders, therefore, have important actions they must take to tackle ageism and address its detrimental impacts on health.

These actions include to:

1. Raise ageism to the top of the WHO agenda
2. Embed ageism and its impact on health into core discussions on aging policy
3. Establish ageism as a social determinant of health as a central tenet of public health practice
4. Develop a communications strategy to promote ageism awareness and education among both healthcare providers and the public
5. Commit to exploring and availing new technologies to circumvent ageism's impacts in diagnosis, treatment, and care

Promoting awareness and education among global health decisionmakers, healthcare providers, and the public, along with integrating technologies like AI-supported diagnostics, can simultaneously begin to dismantle ageism and circumvent its worst effects in healthcare. Overcoming ageism and its impacts is a critical first step in achieving health equity and unlocking the full benefit of innovation for individuals and their families, healthcare systems, and society at large.

Endnotes

1. World Health Organization. GHE: Life expectancy and health life expectancy. https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/ghe-life-expectancy-and-healthy-life-expectancy

2. United Nations Department of Economic and Social Affairs. (2019). World population prospects 2019, Revision. https://population.un.org/wpp/publications/files/wpp2019_highlights.pdf

3. World Health Organization: WHO. (2022, October 1). Ageing and health. https://www.who.int/news-room/fact-sheets/detail/ageing-and-health

4. World Health Organization. (2021). Ageism is a global challenge: UN. https://www.who.int/news/item/18-03-2021-ageism-is-a-global-challenge-un

5. World Health Organization. (2021, March 18). Ageism is a global challenge: UN [Press release]. https://www.who.int/news/item/18-03-2021-ageism-is-a-global-challenge-un

6. Global report on ageism. (2021). World Health Organization. https://iris.who.int/bitstream/handle/10665/340208/9789240016866-eng.pdf?sequence=1

7. World Health Organization. (2021). Ageism is a global challenge: UN. https://www.who.int/news/item/18-03-2021-ageism-is-a-global-challenge-un

8. Mikton, C., Fuente-Núñez, V., Officer, A., & Kung, E. (2021). Ageism: a social determinant of health that has come of age. The Lancet, 397(10282), 1333-1334. https://doi.org/10.1016/S0140-6736(21)00524-9

9. Henry, J., Coundouris, S., & Nangle, M. (2024). Breaking the links between ageism and health: An integrated perspective. Ageing Research Reviews, 95(102212). https://doi.org/10.1016/j.arr.2024.102212

10. Mikton, C., Fuente-Núñez, V., Officer, A., & Kung, E. (2021). Ageism: a social determinant of health that has come of age. The Lancet, 397(10282), 1333-1334. https://doi.org/10.1016/S0140-6736(21)00524-9

11. Global report on ageism. (2021). World Health Organization. https://iris.who.int/bitstream/handle/10665/340208/9789240016866-eng.pdf?sequence=1

12. Allen, J., Solway, E., Kirch, M., Singer, D., Kullgren, J., Moise, V., & Malani, P. (2022). Experiences of everyday ageism and the health of older US Adults. Jama Network Open, 5(6), e2217240. https://doi.org/10.1001/jamanetworkopen.2022.17240

13. Global report on ageism. (2021). World Health Organization. https://iris.who.int/bitstream/handle/10665/340208/9789240016866-eng.pdf?sequence=1f

14. Allen, J., Solway, E., Kirch, M., Singer, D., Kullgren, J., Moise, V., & Malani, P. (2022). Experiences of everyday ageism and the health of older US Adults. Jama Network Open, 5(6), e2217240. https://doi.org/10.1001/jamanetworkopen.2022.17240

15. Chang, E., Kannoth, S., Levy, S., Wang, S., Lee, J., & Levy, B. (2020). Global reach of ageism on older persons' health: A systematic review. PLoS One, 15(1), e0220867. https://doi.org/10.1371/journal.pone.0220857

16. Levy, B., Slade, M., Chang, E., Kannoth, S., & Wang, S. (2020). Ageism amplifies cost and prevalence of health conditions. The Gerontologist, 60(1), 174-181. https://doi.org/ 10.1093/geront/gny131

17. Chang, E., Kannoth, S., Levy, S., Wang, S., Lee, J., & Levy, B. (2020). Global reach of ageism on older persons' health: A systematic review. PLoS One, 15(1), e0220867. https://doi.org/10.1371/journal.pone.0220857

18. Levy, B., Slade, M., Chang, E., Kannoth, S., & Wang, S. (2020). Ageism amplifies cost and prevalence of health conditions. The Gerontologist, 60(1), 174-181. https://doi.org/ 10.1093/geront/gny131

19. Ancona, R., & Pinto, S. (2020). Epidemiology of aortic valve stenosis (AS) and of aortic valve incompetence (AI): is the prevalence of AS/AI similar in different parts of the world?. e-Journal of Cardiology Practice, 18(10-22). https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-18/epidemiology-of-aortic-valve-stenosis-as-and-of-aortic-valve-incompetence-ai

20. Danielsen, R., Aspelund,T., Harris, T., & Gudnason, V. (2014). The prevalence of aortic stenosis in the elderly in Iceland and predictions for the coming decades: The AGES-Reykjavík study. International Journal of Cardiology, 176(3), 916-922. https://doi.org/10.1016/j.ijcard.2014.08.053

21. Alliance for Aging Research. (2018). The Silver Book: Valve Disease. Valve Disease: Chronic Disease and Medical Innovation in an Aging Nation. https://www.agingresearch.org/wp-content/uploads/2018/06/Silver-Book-Valve-Disease-VOLUME-Final.pdf

22. Bernard, S., & Elmariah, S. (2021). Treating moderate aortic stenosis: Too early or too late? Current Treatment Options in Cardiovascular Medicine, 23(1). https://doi.org/10.1007/s11936-020-00884-0

23. Alliance for Aging Research. (2018). The Silver Book: Valve Disease. Valve Disease: Chronic Disease and Medical Innovation in an Aging Nation. https://www.agingresearch.org/wp-content/uploads/2018/06/Silver-Book-Valve-Disease-VOLUME-Final.pdf

24. Sevilla, J., Klusty, J., Song, Y., Russo, M., Thompson, C., Jiao, X., Clancy S., & Bloom, D. (2022). Cost-utility and cost-benefit analysis of TAVR availability in the US severe symptomatic aortic stenosis patient population. Journal of Medical Economics, 25(1), 1051-1060. https://doi.org/10.1080/13696998.2022.2112442

25. Duffy, M., Lynch, A., Reddin, C., Judge, C., O'Donnell, M., & Murphy, R. (2023). Comparing functional and quality of life outcomes in transcatheter aortic valve implantation and surgical aortic valve replacement for aortic stenosis: a systematic review and meta-analysis. BMC Cardiovascular Disorders, 23(519). https://doi.org/10.1186/s12872-023-03445-y

26. Biasco, L., Klersy, C., Benfari, G., Biaggi, P., Corti, R., Curti, M., Gaemperli, O., Jeger, R., Maisano, F., Muelle, O., Naegeli, B., Noble, S., Praz, F., Tersalvi, G., Toggweiler, S., Valgimigli, M., Enriquez-Sarano, M., & Pedrazzini, G. (2023). Restoration of life expectancy after transcatheter edge-to-edge mitral valve repair. JACC: Cardiology Interventions, 16(18), 2231-2241. https://doi.org/10.1016/j.jcin.2023.06.014

27. Kerolos, M., Chiang, C., Eid, J., Ritz, E., Derbas, L., Suboc, T., Collado, F., Kavinsky, C., & Suradi, H. (2022). Quality of life impact of transcatheter edge to edge repair of mitral valve with the mitraclip system in patients with mitral regurgitation and cardiogenic shock. Circulation, 146(1). https://doi.org/10.1161/circ.146.suppl_1.13672

28. Galper, B., Kim, S., Heliste, J., Whitacre, M., Basra, S., Eberhart, L., & Berry, N. (2023). TCT-347 Mapping Out the Journey to TAVR in a Large Integrated Health System: Rates and Clinical Consequences of Delays in Referral of Severe Symptomatic Aortic Stenosis Patients to the Structural Heart Team Stratified by Gender, Ethnicity, and Socioeconomic Status, Journal of the American College of Cardiology, Volume 82, Issue 17, Supplement, Page B139, ISSN 0735-1097, https://doi.org/10.1016/j.jacc.2023.09.355.

29. Li, S.X., Patel, N.K., Flannery, L.D., Selberg, A., Kandanelly, R.R., Morrison, F.J., Kim, J., Tanguturi, V.K., Crousillat, D.R., Shaqdan, A.W., Inglessis, I., Shah, P.B., Passeri, J.J., Kaneko, T., Jassar, A.S., Langer, N.B., Turchin, A., & Elmariah, S. (2022). Trends in Utilization of Aortic Valve Replacement for Severe Aortic Stenosis. J Am Coll Cardiol., 79(9):864-877. doi: 10.1016/j.jacc.2021.11.060.

30. Iung, B., Delgado, V., Rosenhek, R., Price, S., Prendergast, B., Wendler, O., De Bonis, M., Tribouilloy, C., Evangelista, A., Bogachev-Prokophiev, A., Apor, A., Ince, H., Laroche, C., Popescu, B., Piérard, L., Haude, M., Hindricks, G., Ruschitzka, F., Windecker, S., Bax, J., Maggioni, A., & Vahanian, A. (2019). Contemporary presentation and management of valvular heart disease: The EURObservational Research Programme Valvular Heart Disease II Survey. Circulation, 140(14), 1156-1169. https://doi.org/10.1161/CIRCULATIONAHA.119.04108

31. Lange, R., Beckmann, A., Neumann, T., Krane, M., Deutsch, M., Landwehr, S., Kötting, J., Welz, A., Zahn, R., Cremer, J., Figulla, H., Schuler, G., Holzhey, D., Funkat, A., Heusch, G., Sack, S., Pasic, M., Meinertz, T., Walther, T., Kuck, K., Beyersdorf, F., Böhm, M., Möllmann, H., Hamm, C., & Mohr, F. (2016). Quality of life after transcatheter aortic valve replacement: Prospective data from GARY (Geran Aortic Valve Registry). JACC: Cardiovascular Interventions, 9(24), 2541-2554. https://doi.org/ 10.1016/j.jcin.2016.09.050

32. Leon, M., Smith, C., Mack, M., Miller, D., Moses, J., Svensson, L., Tuzcu, E., Webb, J., Fontana, G., Makkar, R., Brown, D., Block, P., Guyton, R., Pichard, A., Bavaria, J., Herrmann, H., Douglas, P., Petersen, J., Akin, J., Anderson, W., Wang, D., & Pocock, S. (2010). Transcatheter aortic-valve implantation for aortic stenosis in patients who cannot undergo surgery. New England Journal of Medicine, 363(17), 1597-1607. https://doi.org/10.1056/NEJMoa1008232

33. Cath Lab Digest. (2023). ACC.23: Edwards highlights new data related to lifetime management of aortic stenosis. Cardiovascular Learning Network. https://www.hmpgloballearningnetwork.com/site/cathlab/news/acc23-edwards-highlights-new-data-related-lifetime-management-aortic-stenosis

34. Bowling, A. (1999). Ageism in cardiology. The BMJ, 319(7221), 1353-1355. https://doi.org/10.1136/bmj.319.7221.1353

35. Bowling, A. (1999). Ageism in cardiology. The BMJ, 319(7221), 1353-1355. https://doi.org/10.1136/bmj.319.7221.1353

36. Bramstedt, K. (2003). Aortic valve replacement in the elderly: Frequently indicated yet frequently denied. Gerontology, 49(1), 46-49. https://doi.org/10.1159/000066502

37. Vora, A., Batchelor, W., Boudoulas, K., Daggubati, R., Elmariah, S., Hermiller, J., Khalique, O., Kliger, C., Mahoney P., Skelding, K., Smith, T., Szerlip, M., & Goldsweig, A. (2024). Breaking down barriers to transcatheter aortic valve replacement. Society for Cardiovascular Angiography & Interventions Think Tank Proceedings, 3(3). https://doi.org/10.1016/j.jscai.2023.101257

38. Bowling, A. (1999). Ageism in cardiology. The BMJ, 319(7221), 1353-1355. https://doi.org/10.1136/bmj.319.7221.1353

39. Florisson ,S., Aagesen, E., Bertelsen, S., Nielsen, L., & Rosholm, J. (2020). Are older adults insufficiently included in clinical trials?—An umbrella review. Basic & Clinical Pharmacology & Toxicology, 128(2), 213-223. https://doi.org/10.1111/bcpt.13536

40. Florisson ,S., Aagesen, E., Bertelsen, S., Nielsen, L., & Rosholm, J. (2020). Are older adults insufficiently included in clinical trials?—An umbrella review. Basic & Clinical Pharmacology & Toxicology, 128(2), 213-223. https://doi.org/10.1111/bcpt.13536

41. Herrera, A., Snipes, S., King, D., Torres-Vigil, I., Goldberg, D., & Weinberg, A. (2010). Disparate inclusion of older adults in clinical trials: Priorities and opportunities for policy and practice change. American Journal of Public Health, 100(1), 105-112. https://doi.org/10.2105/AJPH.2009.162982

42. Herrera, A., Snipes, S., King, D., Torres-Vigil, I., Goldberg, D., & Weinberg, A. (2010). Disparate inclusion of older adults in clinical trials: Priorities and opportunities for policy and practice change. American Journal of Public Health, 100(1), 105-112. https://doi.org/10.2105/AJPH.2009.162982

43. Bloom, David. "Healthy Ageing for a Healthy Economy." CEPR, 15 Nov. 2022, https://cepr.org/voxeu/columns/healthy-ageing-healthy-economy.

44. Gaede, Luise et al. "Heart Valve Disease Awareness Survey 2017: what did we achieve since 2015?." Clinical Research in Cardiology: Official Journal of the German Cardiac Society vol. 108,1 (2019): 61-67. https://doi.org/10.1007/s00392-018-1312-5.

45. Brennan, Matthew J et al. "Bridging gaps in heart valve disease care: Opportunities for quality improvement." Catheterization and Cardiovascular Interventions: Official Journal of the Society for Cardiac Angiography & Interventions vol. 94,2 (2019): 289-293. https://www.doi.org/10.1002/ccd.28371.

46. Thoenes, Martin, et al. "Narrative Review of the Role of Artificial Intelligence to Improve Aortic Valve Disease Management." Journal of Thoracic Disease, vol. 13, no. 1, AME Publishing Company, Jan. 2021, pp. 396–404. https://doi.org/10.21037/jtd-20-1837.

47. Lee, Sung Hoon, et al. "Advances in Microsensors and Wearable Bioelectronics for Digital Stethoscopes in Health Monitoring and Disease Diagnosis." Advanced Healthcare Materials, vol. 10, no. 22, Wiley, Sept. 2021, p. 2101400. https://doi.org/10.1002/adhm.202101400.

48. Hirosawa, Takanobu, et al. "The Utility of Real-Time Remote Auscultation Using a Bluetooth-Connected Electronic Stethoscope: Open-Label Randomized Controlled Pilot Trial." JMIR mHealth and uHealth, vol. 9, no. 7, JMIR Publications Inc., July 2021, p. e23109. https://doi.org/10.2196/23109.

49. "ACC.23: Edwards Highlights New Data Related to Lifetime Management of Aortic Stenosis." CathLabDigest, Cardiovascular Learning Network, 6 Mar. 2023, www.hmpgloballearningnetwork.com/site/cathlab/news/acc23-edwards-highlights-new-data-related-lifetime-management-aortic-stenosis

50. MacIntyre, C., Menzies, R., Kpozehouen, E., Chapman M., Travaglia, J., Woodward, M., Pulver, L., Poulos, C., Gronow, D., & Adair, T. (2016). Equity in disease prevention: Vaccines for the older adults—a national workshop, Australia 2014. Vaccine, 34(46), 5463-5469. https://doi.org/10.1016/j.vaccine.2016.09.039

51. Henry, J., Coundouris, S., & Nangle, M. (2024). Breaking the links between ageism and health: An integrated perspective. Ageing Research Reviews, 95. https://doi.org/10.1016/j.arr.2024.102212

52. Henry, J., Coundouris, S., & Nangle, M. (2024). Breaking the links between ageism and health: An integrated perspective. Ageing Research Reviews, 95. https://doi.org/10.1016/j.arr.2024.102212

53. World Health Organization. SDG Target 3.4 | Noncommunicable diseases and mental health: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being. https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/sdg-target-3.4-noncommunicable-diseases-and-mental-health

54. Lloyd-Sherlock, P., Guntupalli, A., & Sempé, L. (2022). Age discrimination, the right to life, and COVID-19 vaccination in countries with limited resources. Journal of Social Issues, 78(4), 883-889. https://doi.org/10.1111/josi.12561

55. Lloyd-Sherlock, P., Guntupalli, A., & Sempé, L. (2022). Age discrimination, the right to life, and COVID-19 vaccination in countries with limited resources. Journal of Social Issues, 78(4), 883-889. https://doi.org/10.1111/josi.12561

56. World Health Organization. Premature mortality from noncommunicable disease. https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3411

57. Henry, J., Coundouris, S., & Nangle, M. (2024). Breaking the links between ageism and health: An integrated perspective. Ageing Research Reviews, 95. https://doi.org/10.1016/j.arr.2024.102212

58. Henry, J., Coundouris, S., & Nangle, M. (2024). Breaking the links between ageism and health: An integrated perspective. Ageing Research Reviews, 95. https://doi.org/10.1016/j.arr.2024.102212

59. Lloyd-Sherlock, P., Guntupalli, A., & Sempé, L. (2022). Age discrimination, the right to life, and COVID-19 vaccination in countries with limited resources. Journal of Social Issues, 78(4), 883-889. https://doi.org/10.1111/josi.12561

Global Coalition on Aging

The Global Coalition on Aging aims to reshape how global leaders approach and prepare for the 21st century's profound shift in population aging. GCOA uniquely brings together global corporations across industry sectors with common strategic interests in aging populations, a comprehensive and systemic understanding of aging, and an optimistic view of its impact. Through research, public policy analysis, advocacy, and strategic communications, GCOA is advancing innovative solutions and working to ensure global aging is a path for fiscally sustainable economic growth, social value creation and wealth enhancement.

For more information, visit
www.globalcoalitiononaging.com

and contact
Susan Wile Schwarz
sschwarz@globalcoalitiononaging.com