Global Coalition on Aging BONE HEALTH INITIATIVE

More Than Just a Fracture:

A Call to Action on Osteoporosis and Bone Health in the Context of Healthy Aging

OCTOBER 2022

Osteoporosis is among the most serious health threats that afflict the aging population. The disease causes bones to become weaker, resulting in fractures from simple falls or even everyday activities like bending over, lifting objects and coughing.

The incidence of osteoporosis grows as we age, and its impact ripples across society as the number of older people on the planet increases. Set in the context of bone health overall, the recently launched Decade of Healthy Ageing provides the framework for the World Health Organization (WHO) to commit the time, attention and resources needed to address the growing present-day and future challenges of osteoporosis and fragility fractures, which are both a common consequence and key indicator of osteoporosis. It is also a moment to consider the impact WHO has on national public policy approaches. In fact, it is time to re-evaluate the quarter-century-old 1994 WHO definition¹ through which osteoporosis and related fragility fractures have been assessed. Through the International Classification of Diseases 11th Revision (ICD 11), the WHO can align its approach to osteoporosis and fragility fractures with 21st-century needs, which can then be scaled across members states.

Given the dramatic advances in osteoporosis prevention, treatment and rehabilitation since 1994—and the additional decades of population aging as one of the most profound and impactful mega-trends of the 21st century—now is an opportunity for the WHO to demonstrate leadership in promoting healthy aging by updating its approach



20th-century image of older people

Image of 21st-century healthy aging

to bone health, including the disease of osteoporosis. Indeed, bone health—and osteoporosis itself—is one of the most powerful symbols of 20th-century aging. Solving for this challenge ought now to become one of the most durable achievements of 21st-century healthy aging.

But first, the following background gives context to the challenge an aging world faces from osteoporosis—and the opportunity created if global leaders and other experts step up to make changes that reflect the current state of medical understanding and the advances in innovation that have the potential to revolutionize our approach to the disease.

A Serious and Growing Health and Economic Challenge

Osteoporosis is a rapidly growing challenge driven by the inevitable demographic fact of the world's aging population. Today, 1 billion people worldwide are over the age of 60, and by 2050, the population will more than double to over 2 billion. For the first time in history, more people will be over the age of 60 than under 14.

In this new demographic landscape, healthy and active aging is a paramount goal, not just for individuals seeking a better quality of life, but for every nation's economic, fiscal and social health.

Osteoporosis already affects more than 200 million people worldwide.² Like other diseases that impact the aging population—such as Alzheimer's disease—the number of cases is projected to escalate in the coming years.

Approximately 33 percent of women and 20 percent of men aged 50 and older will experience a bone fracture related to osteoporosis.³ By 2025, 13.5 million people will suffer osteoporotic fractures, costing health care systems \$400 billion.⁴ According to the International Osteoporosis Foundation (IOF), by 2050 hip fractures will increase by 310 percent among men and 240 percent among women.⁵ Women now spend more days in the hospital due to osteoporosis than diabetes, heart attacks or breast cancer,⁶ highlighting how osteoporosis is under-recognized across society.

Preventing broken bones and fractures among older people can have a major impact in driving down health care costs. The U.S. alone spent \$52 billion treating osteoporotic fractures, which is expected to rise to \$95 billion by 2040.⁷ In the EU27 plus Switzerland and the UK, direct costs in 2019 amounted to \in 56.9 billion for osteoporotic fractures.⁸ These figures don't include costs of informal caregiving, which impose a huge financial burden on families.

The 2019 Global Burden of Disease Study on bone fractures makes the connection between risk of fractures and burden of osteoporosis: "Older people have a particularly high risk of fractures, and more widespread injury-prevention efforts and access to screening and treatment of osteoporosis for older individuals should help to reduce the overall burden."⁹

The Decade of Healthy Ageing: A Call to Action to Address Osteoporosis and Consequent Fragility Fractures

Among the most important goals of the United Nations and WHO Decade of Healthy Ageing (2021-2030) is aligning health care systems worldwide to meet the challenge of caring for the world's rapidly aging population.¹⁰ This entails ensuring people have broad access to the most effective diagnostic and prevention strategies, treatments and care for diseases that disproportionately impact the aging population.

Successfully meeting this goal will accomplish several key priorities: It will help billions of people live healthier, more active, more independent and more fulfilling lives as they age. It will also alleviate the financial burden on over-strained health care systems already struggling to pay for the care today's older people need—much less the care that will be required as the older population doubles over the next few decades. The Decade of Healthy Ageing provides the impetus and a major global platform to make necessary change.

But in one key area—bone health—there are avoidable barriers to success that the WHO should address urgently. Specifically, the WHO needs to update the way it codes osteoporosis and related fractures (e.g., fragility fractures) in order to make relevant how tens of millions of people are diagnosed and treated—or, more accurately, not diagnosed and not treated. Aging and fragility fractures must be central to this new approach.

These fractures or breaks can have permanent debilitating side effects, including lingering pain; loss of mobility and independence; isolation from friends and family leading to depression and anxiety; and muscle loss that can lead to further falls and fractures. One-third of people over 50 who suffer a hip fracture–commonly associated with osteoporosis–die within a year¹¹–and 50 percent have reduced mobility and independence.

In recent years, medical science and biopharmaceutical innovation have generated significant and cost-effective advances in the area of bone health: osteoporosis detection, prevention, treatment, and rehabilitation. Yet, the WHO's approach to defining osteoporosis has not kept pace. The way it frames and therefore ultimately recommends the diagnosis of osteoporosis is limiting access to these advances and causing unnecessary suffering among older people, imposing higher costs for health care systems and creating avoidable barriers to the goals of the WHO's Decade of Healthy Ageing. Too often this reality is reflected in poor access and reimbursement decisions for prevention, treatment and rehabilitation, including not spending on innovative biomedical therapies.

Aligning the WHO Approach to Bone Health with 21st Century Longevity and Innovation: Key to Accelerating Prevention, Treatment and Care of Osteoporosis

In 1994, the WHO established what has become the dominant technical definition of osteoporosis.

Current WHOOsteoporosis is defined as a bone mineral density (BMD)Definition ofthat lies 2.5 standard deviations or more below the averageOsteoporosis:value for young healthy women (a T-score of <-2.5 SD).</th>

While this definition—based exclusively on bone mineral density—reflected the best knowledge of the previous century, it does not account for the dramatic growth in understanding and the rapid medical innovation that have created additional effective ways to prevent, diagnose and treat the disease—and the very important point that fragility fractures are so central to recognizing osteoporosis and communicating on bone health.

As medical knowledge has advanced and experience with the disease has grown, the 1994 WHO definition now suffers from several prominent shortcomings because of its sole focus on BMD:

Relying on a Single Test.	A bone density scan (DEXA Scan or DXA), which measures bone mass, predicts just 44 percent of women and 21 percent of men who will break a bone. ¹² The WHO's narrow scope does not recognize other radiologic testing methods, multiple other risk factors that predict osteoporosis and resulting bone fractures, including the initial fracture itself.
Blocking Effective	Because the 1994 WHO definition became the de facto standard adopted
Prevention,	by health care systems worldwide, it has often served as a gatekeeper for
Treatment,	access to treatments, rehabilitation and prevention services. Unfortu-
Rehabilitation	nately, it fails to recognize a fragility fracture as a symptom of underlying
and Care.	osteoporosis, and so restrictive national reimbursement guidance based
	on this approach limits the scope of the care doctors can provide and the
	treatments that patients can receive. ¹³

Not Taking Account of Real-World Changes.

The number of older people, a principal risk factor for the increase in fragility fractures and consequent osteoporosis, has, since the early 1990s grown dramatically and with it therefore the emergence of age as a population health indicator for risk of fragility fracture outcomes from osteoporosis. As such, the 1994 definition does not identify bone health—or fragility fractures themselves—as a key prerequisite to healthy and active aging. In parallel, the medical and health technology advances offer profound differences not just in type but in kind of how to assess risk. The WHO itself should account for both these developments in its approach to osteoporosis and expected impact on fragility fractures.

As a result of these and other factors, osteoporosis is massively under-diagnosed and undertreated in patients who suffer a fragility fracture while having a bone density measurement above the WHO-identified threshold for osteoporosis. It is also therefore under-recognized in reimbursement policy.

Today, a staggering 80 percent of people with osteoporosis-related fractures are not adequately treated to reduce the risk of future fracture.¹⁴ This leaves them highly vulnerable since people with a previous fracture face an 86 percent higher risk of suffering an additional fracture.¹⁵ It also certainly leads to significantly more spending following the second fracture, compounding the serious and often deadly health effects on the patient. Diagnosis as early as possible is essential, but diagnosis must also be followed by appropriate treatment and monitoring to mitigate the future potential detrimental consequences.

Moving Past the WHO's 1994 Definition: Many Countries Already Taking Action to Meet National Clinical Realities

In recent decades, there have been major advances in the area of bone health and therefore in osteoporosis prevention strategies, disease diagnosis and cost-effective treatments. Widespread use of these advances would have a tremendous impact on improving patient health and quality of life, as well as reducing health care expenditures that will continue to soar as more people are impacted by this disease.

Yet for tens of millions of people around the world, these advances remain unavailable because the WHO's 1994 definition still guides clinicians in the diagnosis and treatment of osteoporosis and policymakers in the reimbursement for this care.

Today, the growing incidence of osteoporosis and the failure to embrace new strategies for preventing, diagnosing and treating the disease represent a major barrier to achieving the WHO's goals for the Decade of Healthy Ageing. But, it could be transformed into a major opportunity.

An updated globally recognized standard definition would kick off a virtuous cycle—building awareness, promoting early detection and diagnosis, ensuring access to high-quality, cost-effective treatments and improving bone health among the aging population.

In the absence of global action, many individual countries are already modifying their clinical approaches to osteoporosis to unlock these potential advances:

- The United Kingdom,¹⁶ United States,¹⁷ Argentina¹⁸ and countries across the EU including France,¹⁹ Belgium,²⁰ Spain,²¹ Portugal²² and Poland,²³ have adopted new clinical practice guidelines to focus on groups at a higher risk for osteoporosis, especially post-menopausal women.
- In Japan and the U.S., experts on bone health and aging are collaborating to roll out demonstration projects that focus on prevention of osteoporosis-related fractures.^{24, 25}
- China has created new guidelines for diagnosing and assessing osteoporosis that go



National/Regional Medical Societies Across the Globe Fill WHO Gaps

beyond bone mineral density, including CT scans and other imaging assessments and risk calculators.²⁶

- S. Korea concluded the current WHO definition "may be insufficient to reflect the diverse spectrum of osteoporosis" and adopted new assessment measures and treatment guidelines for physicians.²⁷
- Egypt developed a new expert consensus regarding the management of osteoporosis, along with new guidelines for health care professionals to assess and treat the disease.²⁸

- The UK adopted new quality standards for patient care that includes assessment of fracture risk and drug treatments to reduce fracture risk and improve bone density.²⁹
- In the U.S., the Bone Health and Osteoporosis Foundation (BHOF) issued an updated Clinician's Guide to Prevention and Treatment of Osteoporosis aimed specifically at preventing, diagnosis and treating osteoporosis before fractures occur and stated that a fragility fracture despite a T-score better than -2.5 constitutes the clinical definition of osteoporosis.³⁰

These are welcome developments that point the way toward better prevention, diagnosis and treatment of osteoporosis. The burdens of osteoporosis are significant: poor quality of life and suffering for older people, financial and time burdens on family caregivers, and ballooning expenditures on health care systems. Without changes in policy and practice, the toll will continue to rise with the aging of the population.^{31, 32}

Yet for much of the world, even including the countries where new approaches have emerged, the WHO's 1994 definition still often guides clinical care and therefore restricts access to the latest advances in fighting osteoporosis and the consequent fragility fractures. The world needs a global strategy to fight a global challenge. And the first step is creating a 21st century WHO approach to osteoporosis that takes into account the best available medical knowledge of how to prevent, diagnose and treat osteoporosis.

To guide discussions about updating the WHO's definition of osteoporosis, the Global Coalition on Aging Bone Health Initiative offers the following principles that would facilitate more effective prevention strategies and care pathways for those at risk.

Guiding Principles: Moving Toward a 21st-Century Approach to Osteoporosis

Rather than viewing osteoporosis as a disease to be diagnosed **Reframe Osteoporosis** and treated only after a fracture occurs (if then), new WHO Prevention as Essential guidelines should emphasize prevention of osteoporosis as to Healthy Aging an essential strategy in promoting healthy aging. As a recent report led by Dr. Mary Bussell and published by the Economist Intelligence Unit suggests, "prevention is the most important action that can be taken to reduce the future burden of osteoporosis and osteoporosis fractures."33 Take Advantage There are many measures beyond DXA-based bone mineral density-the cornerstone of the WHO's 1994 definition-that of the Latest can help identify people with higher bone fragility. Many **Diagnostic Tools** countries are already incorporating CT scans, QCT (quantitative computed tomography), BCT (biomechanical computed tomography) ultrasounds, FRAX[®] (fracture risk assessment) and other tools to detect osteoporosis in its early stages before the critical first break occurs. The current osteoporosis definition excludes patients that Reflect the Real

Impacts of Osteoporosis The current osteoporosis definition excludes patients that experience low trauma or fragility fracture of the hip, spine and other major sites and do not have a BMD result that meets the definition. In fact, these are patients that need treatment and services to prevent further negative impacts that fractures can have on their health. Further, the definition centers on BMD in women, virtually excluding men, who are also at risk of fracture and osteoporosis, especially with age. A new approach could model the American Association of Clinical Endocrinologists (AACE) clinical practice guidelines (see below).

American Association of Clinical Endocrinologists (AACE) Model for Diagnosing Osteoporosis

- Low trauma spine or hip fracture
- T-score 2.5 or below in the lumbar spine, femoral neck, total proximal femur or distal radius
- T-score between -1 and 2.5 **and** a fragility fracture of proximal humerus, pelvis or distal forearm
- T-score between -1 and 2.5 and high fracture probability based on a nationally or internationally accepted fracture risk assessment tool, i.e., FRAX[®]

Establish Bone Health as a Lifetime Health Goal	Diagnosis and intervention for osteoporosis should be based on the risk of fracture, not bone mineral density alone. Bone health should be incorporated into routine care to identify people at risk and put them on a prevention path before the first fracture occurs. This would create an opportunity to leverage digital technologies to comprehensively address the prevention and treatment of fragility fractures across the care continuum—from primary to specialized care.
Leverage the Decade of Healthy Ageing as a Call to Action on Bone Health	Building on the quarter-century of information, insights, data and real-life experiences, the WHO implementation of the recently launched UN Decade of Healthy Ageing could create a WHO Decade of Healthy Ageing Action Plan on Bone Health that would reflect the day-to-day needs of patients and care- givers to ensure best solutions are applied to early signs of osteoporosis as well as the consequent impact on fragility fractures, including the particular results of inadequate atten- tion to and treatment of the first fracture.

Time to Establish New Coding for Bone Health to Guide National Approaches

During the Decade of Healthy Ageing, the WHO has a major opportunity to provide leadership on a disease that currently represents one of the most formidable barriers to healthy and active aging. One major barrier to giving osteoporosis the attention it deserves is the recent shift from ICD 10 to ICD 11, which may make it much less likely that osteoporosis is identified as a cause of morbidity or mortality. This would lead to underestimations of the global burden of this condition.

In ICD 10 there was differentiation between osteoporosis with and without fracture, which has been lost in ICD 11. Therefore, without an update in ICD 11, there is a significant risk that clinicians and coders will consider the ICD 11 pathological fractures code as referring to malignancies resulting in a failure to fully identify the major cause of fractures in older adults—osteoporosis. Therefore, the moment is now to update the coding for osteoporosis in ICD 11 to:

- Use the current code for pathological fractures to describe fractures due to underlying neoplastic/malignant disease such as primary bone cancer, cancer metastasis, multiple myeloma, or infection/inflammation and
- Create a new code for osteoporosis-related fragility fractures describing fractures related to low bone mass, osteoporosis or deteriorated microarchitecture. This code should be at the same level in ICD as pathological fractures.

Combining this updated ICD 11 coding with the ongoing national approaches to the framing of bone health as described above will lead to a reframed policy approach to bone health that will enable access and reimbursement for more effective prevention, treatment and rehabilitation of the consequent fragility fractures. This white paper serves as a call to action for a new approach to osteoporosis diagnosis and for the WHO to drive efforts to update this definition globally. In doing so, WHO—with partners in the bone health and aging spaces—has the potential to dramatically improve the quality of life for tens of millions of people worldwide as they age and reduce the soaring costs to health care systems as they struggle to care for people impacted by this most dramatic and expansive disease of aging.

Endnotes

 WHO technical report series, 1994 "Assessment of fracture risk and its application to screening for post menopausal osteoporosis" a report of WHO study group

2. The Economist Intelligent Unit Healthcare. (2021). Integrated care pathways for bone health: An overview of global policies. The Economist. https://impact.econ-asia.com/ per-spectives/sites/default/files/eiu_am-gen_bone_health_global_policy_overview_ fi-nal_2021_3_5.pdf

3. The Economist Intelligent Unit Healthcare. (2021). Integrated care pathways for bone health: An overview of global policies. The Economist. https://impact.econ-asia.com/ per-spectives/sites/default/files/eiu_am-gen_bone_health_global_policy_overview_ fi-nal_2021_3_5.pdf

4. International Osteoporosis Foundation, Capture the Fracture. (2022). Policy makers. Capture the Fracture. https://www.capturethefracture.org/policymakers

5. International Osteoporosis Foundation. (2022). Epidemiology of osteoporosis and fragility fractures. International Osteoporosis Foundation. https://www.osteoporosis.foundation/ facts-statistics/epidemiology-of-osteoporo-sis-and-fragility-fractures

6. The Economist Intelligent Unit Healthcare. (2021). Integrated care pathways for bone health: An overview of global policies. The Economist. https://impact.econ-asia.com/ per-spectives/sites/default/files/eiu_am-gen_bone_health_global_policy_overview_ fi-nal_2021_3_5.pdf

7. The Economist Intelligent Unit Healthcare. (2021). Integrated care pathways for bone health: An overview of global policies. The Economist. https://impact.econ-asia.com/ per-spectives/sites/default/files/eiu_am-gen_bone_health_global_policy_overview_ fi-nal_2021_3_5.pdf

8. International Osteoporosis Foundation. (2022). Key statistics for Europe. International Osteoporosis Foundation. https://www. osteoporosis.foundation/ facts-statistics/ key-statistic-for-europe 9. Wu, A. M., Bisignano, C., James, S. L., Abady, G. G., Abedi, A., Abu-Gharbieh, E., ... & Vos, T. (2021). Global, regional, and national burden of bone fractures in 204 countries and territories, 1990–2019: a systematic analysis from the Global Burden of Disease Study 2019. The Lancet Healthy Longevity, 2(9), 580–592. DOI: https://doi.org/10.1016/S2666-7568(21)00172-0

10. The World Health Organization. (2020). UN decade of healthy aging 2021 – 2030. The World Health Organization. https://www.who. int/initiatives/decade-of-healthy-ageing

11. Hendrie, D. (10 Feb 2021). Fractures can be deadly. Why is preventive action rare? News GP. https://www1.racgp.org.au/newsgp/ clini-cal/fractures-are-linked-to-deaths-inolder-people-why

12. Neustadt, J. (11 May 2021). Osteoporosis: A global health crisis. NBI Health. https:// www.nbihealth.com/osteoporo-sis-global-health-crisis/

13. Health Policy Partnership. (May 2022). Osteoporosis and fragility fractures: A policy toolkit. Health Policy Partnership. https:// www.healthpolicypartnership.com/ app/ uploads/Osteoporosis-and-fragility-frac-tures-a-policy-toolkit.pdf

14. Hendrie, D. (10 Feb 2021). Fractures can be deadly. Why is preventive action rare? News GP. https://www1.racgp.org.au/newsgp/ clini¬cal/fractures-are-linked-to-deaths-inolder-people-why

15. The Economist Intelligent Unit Healthcare. (2021). Integrated care pathways for bone health: An overview of global policies. The Economist. https://impact.econ-asia.com/ per-spectives/sites/default/files/eiu_am¬gen_bone_health_global_policy_overview_ fi¬nal_2021_3_5.pdf

 Gregson, C. L., Armstrong, D. J., Bowden, J., Cooper, C., Edwards, J., Gittoes, N., Harvey, N., Kanis, J., Leyland, S., Low, R., McCloskey, E., Moss, K., Parker, J., Paskins, Z., Poole, K., Reid, D. M., Stone, M., Thomson, J., Vine, N., & Compston, J. (2022). UK clinical guideline for the prevention and treatment of osteoporosis. Archives of osteoporosis, 17(1), 58. DOI: 10.1007/s11657-022-01061-5 17. American College of Obstetricians and Gynecologists. (2021). Osteoporosis Prevention, Screening, and Diagnosis: ACOG Clinical Practice Guideline No. 1. Obstetrics and gynecology, 138(3), 494–506. DOI: 10.1097/ AOG.00000000004514

 Schurman, L., Galich, A. M., González,
González, D., Messina, O. D., Sedlinsky,
Uñas, C. R., & Sánchez, A. (2017). Guías argentinas para el diagnóstico, la prevención y el tratamiento de la osteoporosis 2015 [Argentine guidelines for the diagnosis, prevention and treatment of osteoporosis, 2015]. Medicina, 77(1), 46–60. https://pubmed.ncbi.nlm.nih. gov/28140312/

 Briot, K., Roux, C., Thomas, T., Blain, H., Buchon, D., Chapurlat, R., Debiais, F., Feron, J. M., Gauvain, J. B., Guggenbuhl, P., Legrand, E., Lehr-Drylewicz, A. M., Lespessailles, E., Tremollieres, F., Weryha, G., & Cortet, B. (2018).
2018 update of French recommendations on the management of postmenopausal osteoporosis. Joint bone spine, 85(5), 519–530. DOI: 10.1016/j.jbspin.2018.02.009

20. Sanchez-Rodriguez, D., Bergmann, P., Body, J. J., Cavalier, E., Gielen, E., Goemaere, S., Lapauw, B., Laurent, M. R., Rozenberg, S., Honvo, G., Beaudart, C., & Bruyère, O. (2020). The Belgian Bone Club 2020 guidelines for the management of osteoporosis in postmenopausal women. Maturitas, 139, 69–89. https:// doi.org/10.1016/j.maturitas.2020.05.006

21. González-Macías, J., Del Pino-Montes, J., Olmos, J. M., & Nogues, X. (2015). Clinical practice guidelines for postmenopausal, glucocorticoid-induced and male osteoporosis. Spanish Society for Research on Bone and Mineral Metabolism (2022 update). Revista Clínica Española (English Edition), 215(9), 515-526. DOI: 10.4321/S1889-836X2022000100003

22. Rodrigues, A. M., Canhão, H., Marques, A., Ambrósio, C., Borges, J., Coelho, P., Costa, L., Fernandes, S., Gonçalves, I., Gonçalves, M., Guerra, M., Marques, M. L., Pimenta, S., Pinto, P., Sequeira, G., Simões, E., Teixeira, L., Vaz, C., Vieira-Sousa, E., Vieira, R., da Silva, J. (2018). Portuguese recommendations for the prevention, diagnosis and management of primary osteoporosis - 2018 update. Acta reumatologica portuguesa, 43(1), 10–31. https:// pubmed.ncbi.nlm.nih.gov/29602163/ 23. Lorenc, R., Głuszko, P., Franek, E., Jabłoński, M., Jaworski, M., Kalinka-Warzocha, E., Karczmarewicz, E., Kostka, T., Księzopolska-Orłowska, K., Marcinowska-Suchowierska, E., Misiorowski, W., & Więcek, A. (2017). Guidelines for the diagnosis and management of osteoporosis in Poland: Update 2017. Endokrynologia Polska, 68(5), 604-609. DOI: 10.5603/EP.2017.0062

24. Bone Health and Osteoporosis Foundation. (5 Oct 2021). New Pilot Program Aims to Improve Quality of Post-Fracture Care in Patients with Osteoporosis. Bone Health and Osteoporosis Foundation. https://www.bonehealthandoste-oporosis.org/news/new-pilotprogram-aims-to-improve-quality-of-postfracture-care-in-patients-with-osteoporosis/

25.Fragility Fracture Network Japan. (8 Dec 2020). About the Clinical Standard and Practice Manual. Fragility Fracture Network Japan. https://ffn.or.jp/archives/news_top/fl s%e-3%82%af%e3%83%aa%e3%83%8b%e -3%82%ab%e3%83%ab%e3%82%b9%e3%8 2%bf%e3%83%b3%e3%83%80%e3%83%b9 c%e3%83%89%e3%81%8a%e3%82%88%e3 81%b3%e5%ae%9f%e8%b7%b5%e3%83% 9e%e3%83%8b%e3%83%a5%e3%82%a2% e3%83%ab/

26. Cheng, X., Yuan, H., Cheng, J., Weng, X., Xu, H., Gao, J., ... & Tian, W. (2020). Chinese expert consensus on the diagnosis of osteoporosis by imaging and bone mineral density. Quantitative Imaging in Medicine and Surgery, 10(10), 2066. https://qims.amegroups.com/ article/view/49244/html

27. Choi, H. S., Park, S. Y., Kim, Y. M., Kim, S. H., Kim, K. M., & Chung, Y. S. (2016). Medical treatment of severe osteoporosis including new concept of advanced severe osteoporosis. Osteoporosis and Sarcopenia, 2(1), 13-19. D0I: 10.1016/j.afos.2016.02.003

28. El Miedany, Y., Abu-Zaid, M. H., El Gaafary, M., El Naby, M. M. H., Fathi, N., Saber, H. G., ... & Gadallah, N. (2021). Egyptian consensus on treat-to-target approach for osteoporosis: a clinical practice guideline from the Egyptian Academy of bone health and metabolic bone diseases. Egyptian Rheumatology and Rehabilitation, 48(1), 1-16. DOI: 10.1186/s43166-020-00056-9 29. National Institute for Health and Care Excellence (Great Britain). (2017). Osteoporosis: assessing the risk of fragility fracture. National Institute for Health and Care Excellence (NICE). https://www.guidelines.co.uk/ musculoskeletal-and-joints-/nice-osteoporosis-guideline/236056.article

30. LeBoff, M. S., Greenspan, S. L., Insogna, K. L., Lewiecki, E. M., Saag, K. G., Singer, A. J., & Siris, E. S. (2022). The clinician's guide to prevention and treatment of osteoporosis. Osteoporosis International, 1-54. DOI: 10.1007/ s00198-021-05900-y

31. Soen, S., Usuba, K., Crawford, B., & Adachi, K. (2021). Family caregiver burden of patients with osteoporotic fracture in Japan. Journal of Bone and Mineral Metabolism, 39(4), 612– 622. DOI: 10.1007/s00774-020-01197-9

32. Dane Hansen, F. S. A., Pelizzari, P., & Bruce Pyenson, F. S. A. (2021). Medicare cost of osteoporotic fractures-2021 updated report. https://static1.squarespace.com/ static/5c0860aff793924efe2230f3/t/6061fb-83f79e4f7ca2f8a530/1617034116331/Medicare+Cost+of+0steoporotic+Fractures.pdf

33. The Economist Intelligent Unit Healthcare. (2021). Integrated care pathways for bone health: An overview of global policies. The Economist. https://impact.econ-asia.com/ per-spectives/sites/default/files/eiu_am-gen_bone_health_global_policy_overview_ fi-nal_2021_3_5.pdf



About Global Coalition on Aging Bone Health Initiative

The Global Coalition on Aging (GCOA) convened its Bone Health Initiative (BHI) in 2022 with the goal of elevating bone health on the global public health agenda. By bringing together a partnership of leading scientists, clinicians, policy experts, advocates and business leaders with expertise from across osteoporosis, aging and public health, the BHI aims to leverage the UN/WHO Decade of Healthy Ageing as a unique moment to emphasize the importance of bone health through the healthy aging lens, with a focus on the prevention, treatment and rehabilitation of fragility fractures. Through communications, education, advocacy and cross-discipline collaboration, the BHI is focused on aligning policy change and healthcare practice with 21st-century healthy aging realities to thereby ensure the highest quality of life possible for those with or at risk of osteoporosis and to reduce the costly impact of osteoporosis and fragility fractures on health systems.

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