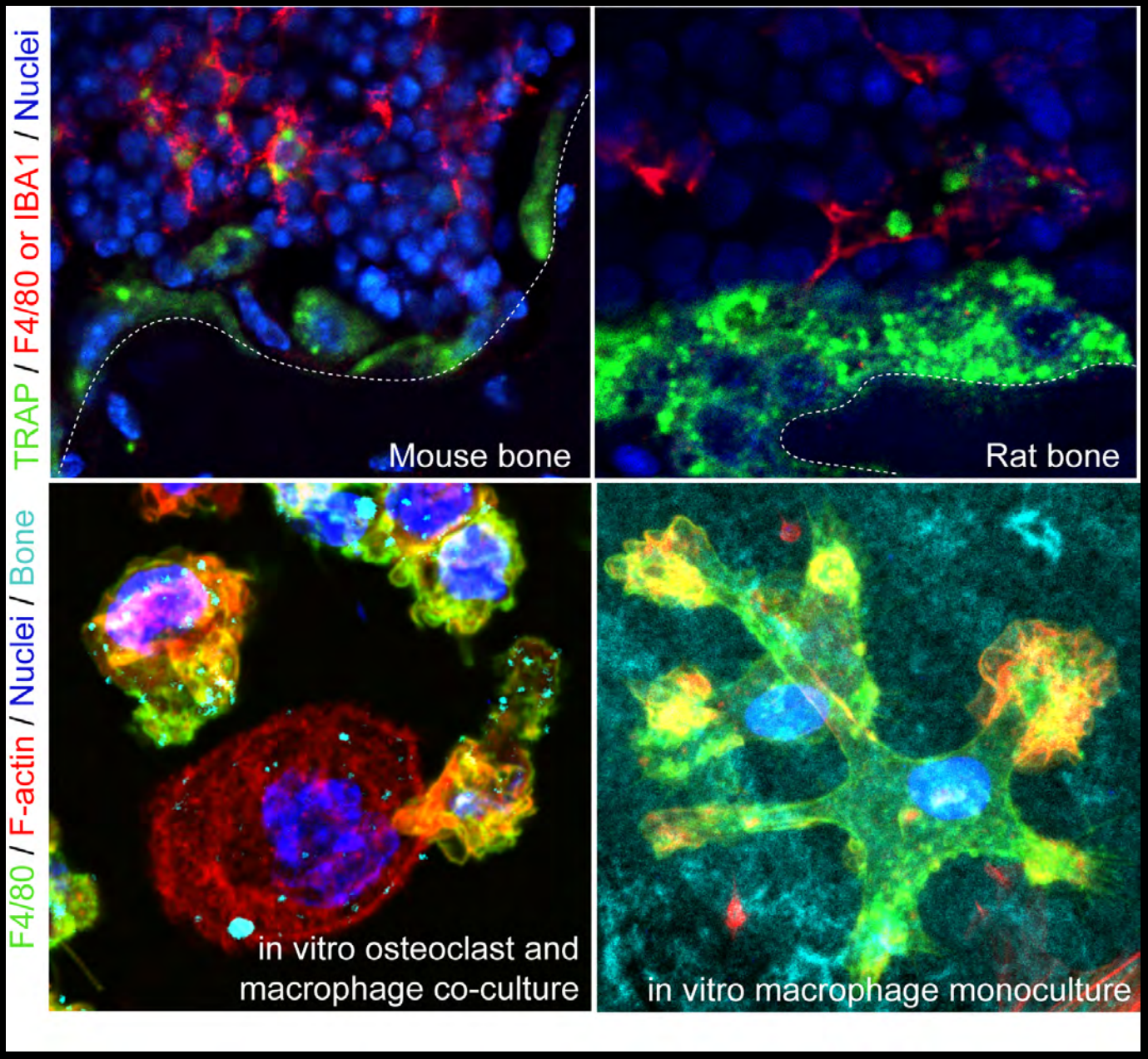
Issue 5, August 2021

ANZBMS Newsletter



ESA-SRB-ANZBMS Annual Scientific Meeting

Committee updates

Member publications

Cover image: Fluorescent confocal imaging of the metaphyseal regions of mouse and rat tibiae (top panel, left and right respectively), of mouse osteoclast and macrophage co-culture (bottom left) and mouse macrophage mono-culture (bottom right). Courtesy of Lena Batoon, Mater Research Institute-UQ

In this issue

ECI Issue: Sept 2021
Next Issue: Nov 2021

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Welcome to ANZBMS newsletter

Welcome to the August Issue of the ANZBMS newsletter!

Hope you are well! We're getting closer to this year's Annual Meeting, and the Program Organising Committee have put together an exciting program. Details about this year's meeting can be found on pg. 3 and 4.

Our publication section continues to highlight the work of ANZBMS members. This edition features a range of articles with content about osteomacs in an overiectomised rodent model, nutritional recommendations for bone health, the Australian Body Composition (ABC) study, management of bone health in ovarian insufficiency and differences between the sexes in terms of risks of cardiovascular disease and osteoporosis in The Gambia.

We also invite you to see what is new with the IFMRS's online learning platform, Huble.

We would like to thank David Musson, Kiranjit Joshi and Feng Pan for their contributions to previous newsletters and now welcome James Smith to the editorial board. We do have two positions available on the editorial board, so please contact us if you are interested in joining. It's a great opportunity to connect and work with other ANZBMS members.

Have news to share? Want to provide us with feedback? Contact us at newsletter@anzbms.org.au

ANZBMS Newsletter Editorial Board

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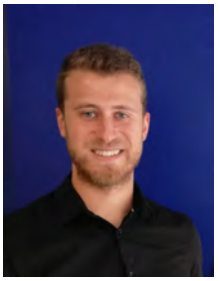

James Smith

Natalie Wee

Emma West

Annual Scientific Meeting Details

The 2021 ANZBMS ASM is being held in conjunction with the ESA and SRB societies, bringing 3 strong and engaging scientific communities together providing a program which unifies key areas of interest. This combined meeting approach facilitates not only increased collaborative potential but also variety in program content. The ANZBMS program includes a number of high profile international and national plenary speakers covering topics such as; skeletal biomechanics, osteocyte and osteoclast biology, precision medicine, osteoarthritis and nutritional impacts on the skeleton. We are also supporting our early career researchers as they emerge as future leaders in their fields, with two ECIC's invited to speak. The program will also include presentation from our top 5 scored outstanding abstracts, proudly supported by Amgen, short talks from plenary posters and our popular Roger Mellick and Margie and Chris Nordin Poster Award sessions, showcasing the work of our young investigators, the future of our society.

In addition to this focused program, we have two sessions combined with ESA covering bone health in the transgender community, and sport and endocrine health. Following the success of our inaugural Therapeutics session in 2019, we will also offer a similar session in the 2021 program, this year highlighting clinical developments in fibrodysplasia ossificans progressiva (FOP), osteo-anabolics and the use of bisphosphonates during bone growth.

Given the logistical challenges we face with COVID-19 outbreaks across New Zealand and Australia, we are working to offer a format which will engage all participants, whether they can attend in person or not, providing interactive Q&A and networking opportunities.

Michelle McDonald, Craig Munns and Christian Girgis

ANZBMS Program Co-Chairs

The 2021 Annual Scientific Meetings of

The Endocrine Society of Australia, The Society for Reproductive Biology & The Australian and New Zealand Bone and Mineral Society

Melbourne Convention & Exhibition Centre

SAVE THE DATE: 21 – 24 NOVEMBER 2021

2021 THEMES

ESA

- Diabetes - 100th anniversary of Banting and Best
- Sport and Endocrine Disorders
- Adrenal
- Neuroendocrine control of behaviour
- COVID Hot Topics
- Endocrine Disrupting Chemicals - 30th anniversary of "endocrine disruption"
- Transgender health
- Award Presentations from selected abstracts

SRB

- Advances in contraception
- Reproductive ageing and sustaining a pregnancy
- Novel technologies in Reproduction
- Endocrine Disrupting Chemicals - 30th anniversary of "endocrine disruption"
- Award Presentations from selected abstracts

ANZBMS

- Cellular mechanisms of bone disease
- Advanced therapeutics in bone
- Transgender health
- Award Presentations from selected abstracts

KEY DATES:

Early bird registration deadline:
FRIDAY 17TH SEPTEMBER

Abstract Submission Deadline:
FRIDAY 13TH AUGUST

Award Submission Deadline:
FRIDAY 13TH AUGUST

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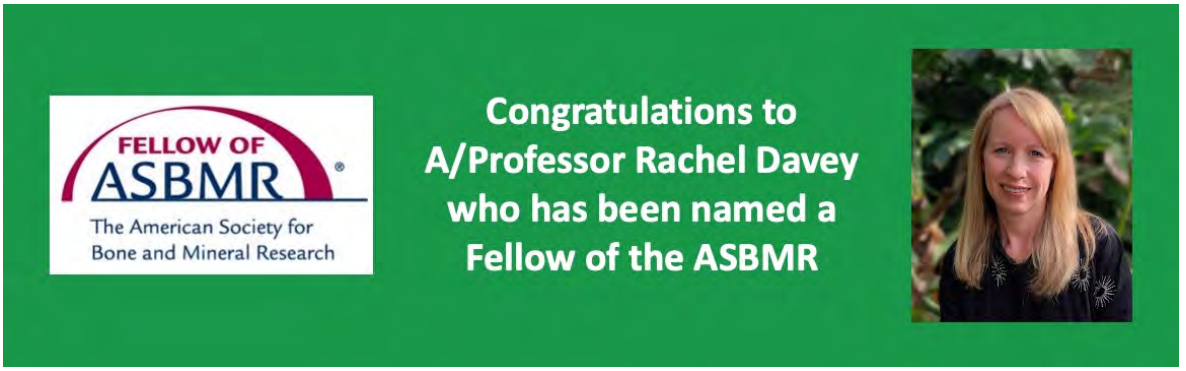
esa endocrine society of australia

Society for Reproductive Biology

ANZBMS

Member achievements



Meet our newest ANZBMS members

Pholpat Durongbhan, PhD candidate

Affiliation: University of Melbourne, Department of Biomedical Engineering

Research category: Basic/Translational

Research interests: My research interest lies in the quantitative morphometric analysis of musculoskeletal tissues using 3D image processing. Specifically, I aim to develop image processing tools to quantify and track structural changes of the bone, cartilage, and joint due to diseases such as osteoarthritis.

What you hope to gain from joining ANZBMS? I hope to be able to connect with fellow researchers and students working in this field, in addition to learning and sharing knowledge within the bone community.

@dpholpat

Updated Version (Second Edition) of 'Clinical Standards For Fracture Liaison Services in New Zealand'

The Clinical Standards document builds on the first version that was published in 2016/2017. The document incorporates core elements of International Osteoporosis Foundation (IOF's) Best Practice Framework and Key Performance Indicators from the IOF, Fragility Fracture Network (FFN), and National Osteoporosis Foundation (NOF)'s 2020 position statement.

This updated document will serve as a detailed 'reference guide' for individual fracture liaison services in New Zealand in their endeavour to improve secondary fracture prevention care provision. It is hoped the majority of FLS's in New Zealand will be able to attain Gold Level of IOF's Best Practice Framework by 2024 by following and implementing the Clinical Standards

Densitometry Committee

Course Date(s):

In a world-first, the ANZBMS densitometry course was delivered through an online format in February in response to COVID-19. The course includes lectures via Zoom and virtual DXA workstations imitating DXA controls, allowing simulated scans and analyses of multiple scans in our library.

The next course also held online, will be on the 18th and 19th of September. For information: https://www.anzbms.org.au/anzbms-bone-densitometry-course.asp

We hope to return to some face to face courses in 2022.

New Publication - Dual Hip DXA Scanning Protocols:

A newly published paper by members of the ANZBMS Densitometry Committee in Journal of Clinical Densitometry has implications for DXA scanning. ANZBMS members are encouraged to view this article: https://pubmed.ncbi.nlm.nih.gov/34391641/.

Item Number - DXA Scanning of people with breast cancer on Aromatase Inhibitors:

Discussions with the Pharmaceutical Benefits Advisory Committee (PBAC) are still ongoing to establish a new medicare item number for DXA scans to evaluate bone health in people with breast cancer being treated with Aromatase Inhibitors; thus still under consideration by the Australian Government. Updates will be provided as they arise.

Member publications

Batoon L, Millard SM, Raggatt LJ, Wu AC, Kaur S, Sun LWH, Williams K, Sandrock C, Ng PY, Irvine KM, Bartnikowski M, Glatt V, Pavlos NJ, Pettit AR. Osteal macrophages support osteoclast-mediated resorption and contribute to bone pathology in a postmenopausal osteoporosis mouse model. J Bone Miner Res. 2021. doi: 10.1002/jbmr.4413.

1. What is the background of the study?

We investigated the contribution of osteal macrophages (osteomacs) to osteoporosis pathophysiology. However, in order to have confidence in any novel discoveries, we first undertook extensive evaluation of a post-menopausal osteoporosis mouse model to comprehensively interrogate whether it replicated the full spatiotemporal complexity of post-menopausal osteoporosis pathophysiology. Review of the literature had somewhat surprisingly revealed that this was a knowledge gap with inconsistencies in how osteoporosis mouse models were performed. This study used a variety of techniques, therefore, we drew on a pool of fantastic collaborators including Associate Professor Nathan Pavlos, Dr Pei Ying Ng, Assistant Professor Vaida Glatt and Dr Michal Bartnikowski to undertake the work.

2. What did you find and what message do you want readers to take away?

Ovariectomy (OVX) in C3H/HeJ mice replicated key features of post-menopausal osteoporosis including presentation of delayed fracture healing which is an important complication of post-menopausal osteoporotic fractures. Using this validated model, we subsequently demonstrated that osteomacs were increased post-OVX and were frequently adjacent to the basolateral membrane of osteoclasts at sites of bone resorption, providing the first evidence of their involvement in osteoporosis bone pathology.

Based on their anatomical position we explored and demonstrated a novel role for osteomacs in supporting osteoclast-mediated bone resorption via clearance of resorption by-products including bone particulate and TRAP. Overall, our study extends on the accumulating evidence that osteomacs, through influence of both catabolic and anabolic bone mechanisms, are important contributors in bone health.

3. What is an application of your finding?

The comprehensive validation of OVX in adult C3H/HeJ mice as a faithful model of post-menopausal osteoporosis will be a valuable technical reference in guiding future studies exploring novel osteoporosis pathological mechanisms and interventional studies including those targeted at correcting delayed fracture healing. The finding that osteomacs support osteoclast-mediated bone resorption opens new avenues for discovery of further research. This includes whether osteomacs may regulate the extracellular molecular contents of the bone microenvironment and hence modulate cell-cell communication outcomes or whether targeting this specific osteomac function has potential to alleviate osteolysis in bone diseases.

4.Did you face any challenges during the study?

The observed increase in osteomacs after OVX was opposite to our hypothesis, which was influenced by our earlier discovery that osteomacs support osteoblast function. We had to think outside the box in order to find a new pathway to explain this observation. We were not able to get publication quality dynamic histomorphometry data from our collected samples that had bone labelling markers. However, while this data would have added further depth of knowledge toward confirming fidelity of our model, its absence does not lessen the value of the presented data which still represents the most comprehensive single study evaluation of OVX-induced bone pathology in a preclinical model.

Member publications

Zengin A, Jarjou LM, Janha R, Prentice A, Cooper C, Ebeling PR and Ward KA. Sex-Specific Associations Between Cardiac Workload, Peripheral Vascular Calcification and Bone Mineral Density: The Gambian Bone and Muscle Aging Study. J Bone Miner Res. 2021. Feb; 36(2):227-235. doi: 10.1002/jbmr.4196.

1. What is the background of this study?
Non-communicable diseases (NCD) are rapidly rising in Africa, with multimorbidity increasing the burden on health and social care. These are commonly overlooked as traditionally organisations have poured efforts into combating infectious diseases in this region. Osteoporosis and cardiovascular disease (CVD) share common risk factors; both often remain undiagnosed until a major life-threatening event occurs. Given there are sex differences in both of these chronic conditions, the aim of this study was to investigate the sex differences in the associations between cardiovascular risk factors and BMD in adults from The Gambia.

2. What did you find and what message do you want readers to take away from your paper?

We showed that there are sex differences in the associations between cardiovascular risk factors and bone health in a rural population of Gambian men and women. Cardiovascular risk factors (rate pressure product, pulse pressure, and peripheral vascular calcification) were negatively associated with aBMD at all sites in women, with no differences in men. Similar negative associations were found in cortical and trabecular bone parameters at the tibia and radius in women but not in men.

Right is an image of our local staff and Prof. Kate Ward, the PI of GamBAS.

3. What is an application of your finding?
Multiple markers of cardiac health are associated with poorer bone health in rural Gambian
women. In the context of epidemiological transition and changing NCD burden, there is a need to identify preventative strategies to slow/prevent rising burden in CVD and osteoporosis.

4. Did you face any challenges during the study?
During a fieldwork visit at the time of data collection, I tried to ascertain menopausal status given the importance of sex hormones for both osteoporosis and CVD. Despite many efforts to restructure the questionnaire, our local fieldworkers were not able to collect this data accurately due to it being culturally taboo.

"I'd like to thank the residents from the Kiang West region in The Gambia for their continuous support and participation over several years, as well as the amazing staff a MRC Keneba!" - Ayse Zengin

Member publications

Kirk B, Hassan EB, Brennan-Olsen S, Vogrin S, Bird S, Zanker J, Phu S, Meerkin JD, Heymsfield SB and Duque G. Body composition reference ranges in community-dwelling adults using dual-energy X-ray absorptiometry: the Australian Body Composition (ABC) Study. J Cachexia Sarcopenia Muscle. 2021 Aug;12(4):880-890. doi: 10.1002/jcsm.12712.

1. What is the background of this study?

Monitoring body composition is vital for both sports science and clinical practice, with DXA the most common imaging method used to evaluate lean (muscle) mass and fat mass. Until now, normative values for body composition in Australian were lacking for Hologic DXA machines. To address this, in the ABC study, we compiled data from 15,479 community-dwelling men and women aged 18-88 years who underwent a standardised Hologic DXA scan. Using the LMS statistical method, we developed normative values (known as the "AIMSS reference ranges") for this population.

2. What did you find and what message you want readers to take away from your paper?

Our normative values for body composition can be used to identify conditions characterised by lean (muscle) mass loss and/or increased fat mass such as obesity, sarcopenia, frailty and cachexia, as well as other acute and chronic diseases (anorexia nervosa, kidney disease, chronic obstructive pulmonary disease, heart failure etc) where body composition abnormalities are typically present.

Our normative values can also be used in sports science settings, where optimising body composition (the ratio of muscle-to-fat mass) is crucial for athletic performance.

3. What is an application of your finding?

The AIMSS reference ranges will assist in clinical research and practice, as well as sports science settings. To ensure translation of our research findings, our article was made open-access and freely available to readers. We also signed a contractual agreement with Hologic Australia for the "AIMSS reference ranges" to be installed into Hologic DXA machine throughout Australia during the next software update. Of course, this is subject to the user's preference.

4. Did you face any challenges during the study?

Fortunately, we did not face any major challenges during this study. However, the data synthesis, analysis and dissemination of findings needed input from multiple researchers and industry specialists, including research assistants, exercise physiologists, imaging/body composition experts, epidemiologist, statisticians and clinicians. We are grateful to all those involved.

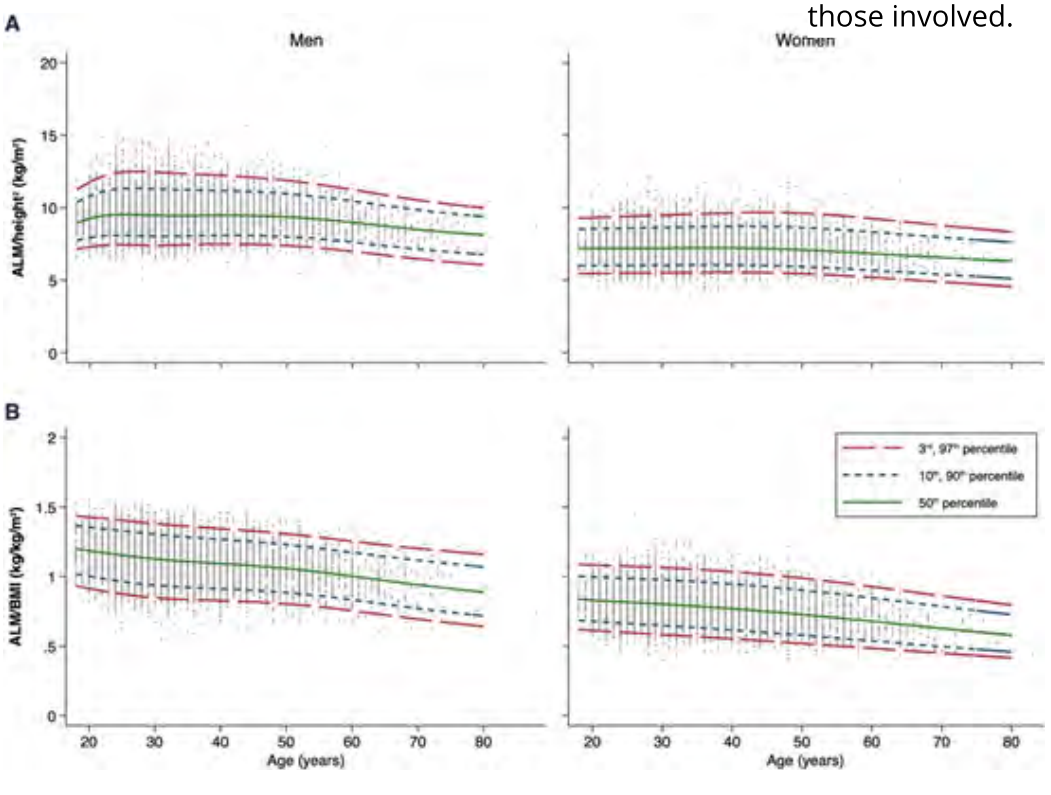


Figure 1. Age-specific and sex-specific percentile curves for (A) appendicular lean mass adjusted for height squared (ALM/height2) and (B) appendicular lean mass adjusted for body mass index (ALM/BMI). Sourced under the Creative Commons Attribution -NonCommercial -NoDerivs License from the Journal of Cachexia, Sarcopenia and Muscle, Volume: 12, Issue: 4, Pages: 880-890, First published: 14 May 2021, DOI: (10.1002/jcsm.12712)

Member publications

Nguyen HH, Milat F and Vincent AJ. New insights into the diagnosis and management of bone health in premature ovarian insufficiency. Climacteric 2021 May 6:1-10. doi: 10.1080/13697137.2021.1917539

1. What is the background of the study?

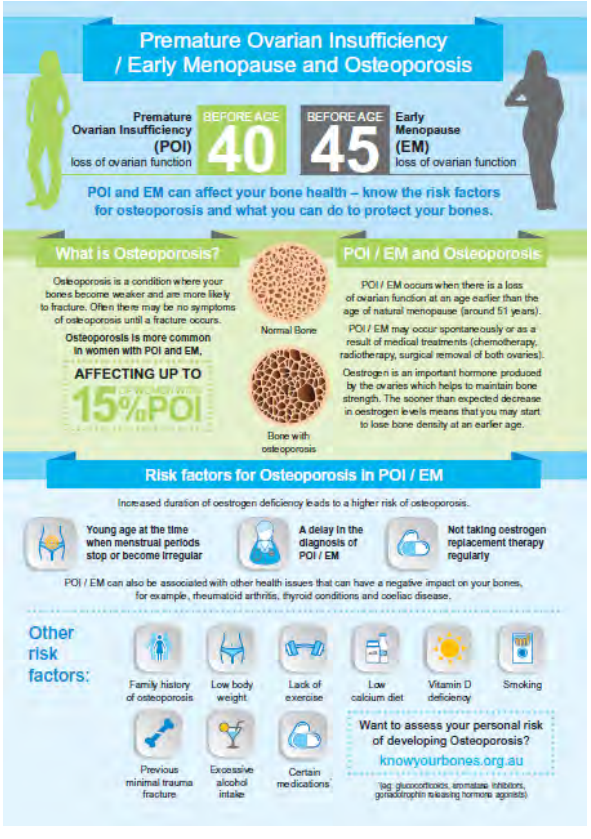
World Menopause Day is on the 18 October each year (two days before World Osteoporosis Day) and the International Menopause Society (IMS) has chosen to highlight osteoporosis as the theme for this year. Premature ovarian insufficiency (POI) is associated with an increased risk of bone loss and fracture and osteoporosis is a key concern of women with POI. Each year, the IMS journal 'Climacteric' produces an issue related to the theme of World Menopause Day. This invited review summarises current and emerging concepts regarding osteoporosis in the setting of POI, including recent work conducted at Monash University. This review comprises one part of our research directed at improving bone health in women with POI. Our research includes investigating underlying pathophysiology, new diagnostic modalities, consumer and clinician knowledge, evidence synthesis of guidelines, RCT of new treatments and translation.

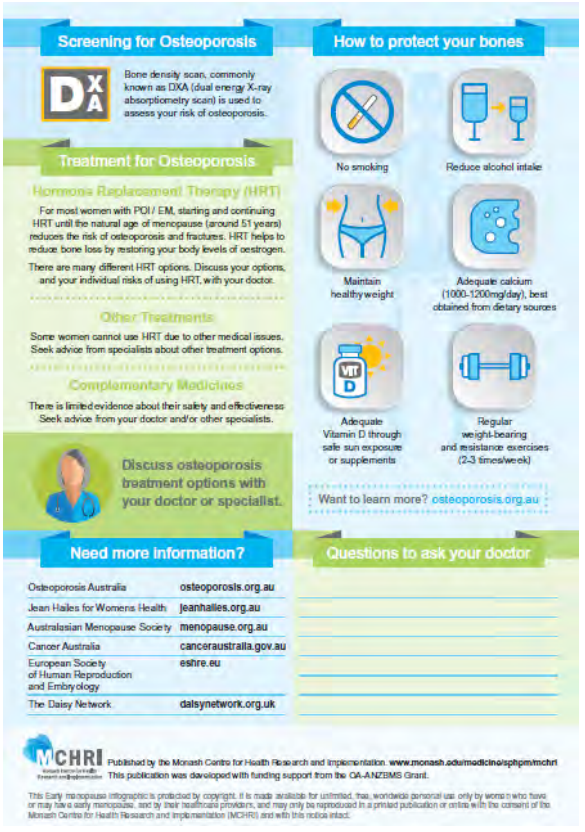
2. What did you find and what message you want readers to take away from your paper?

POI is a risk factor for osteoporosis, and bone health needs to be evaluated at the time of POI diagnosis. DXA-derived BMD remains the gold standard to assess skeletal strength, however there are limitations in its use in POI populations, which may be overcome by more recently available adjunctive tools such as Trabecular bone score, peripheral quantitative computer tomography (pQCT), and high resolution pQCT. Our article highlights the gaps in published literature, particularly the role muscle mass and function plays in fragility fractures in POI women, which are emerging as important aspects to consider in fracture prevention. Oestrogen deficiency is the primary driver for low bone mass in POI women, and early institution and continuation of oestrogen replacement therapy is vital for musculoskeletal health.

3. What is an application of your finding?

This review was written for the non-osteoporosis specialist to increase clinician awareness with the aim of improving bone health management for women with POI.





Member publications

Rizzoli R, Biver E, Brennan-Speranza TC. Nutritional intake and bone health. Lancet Diabetes Endocrinol. 2021. S2213-8587(21)00119-4.

1. What is the background of the study?

General dietary guidelines for optimal bone health are either piecemeal, inconclusive or missing. In this review, we aimed to assess the current literature to assemble and consolidate the best evidence-based data that supports reducing fracture risk and other bone outcomes through the diet. We assessed the effects of specific micro and macro-nutrients, foods as well as overall diet patterns on bone outcomes.

2. What did you find and what message do you want readers to take away?

- A balanced diet including protein (0·8 g/kg body weight per day, up to 1·3 g/kg body weight per day in older individuals (≥75 years), calcium (800–1000 mg per day), and fruits and vegetable (five servings per day) reduces fracture risk.
- Part of the protein and calcium requirements are met with 2–3 servings per day of dairy products.
- A limited sodium intake (≤2·5 g NaCl per day) is recommended.
- Vitamin D, 800–1000 international units per day, or 20–25 µg per day is recommended.
- A dietary pattern shown to be associated with lower fracture risk, such as a Mediterranean diet or prudent/healthy western diet are ideal due to the balanced nature of the various nutrient intakes.
- Total avoidance of a specific food category is likely to be harmful for the skeleton.

3. What is an application of your finding?

The overall goal here was to present a set of guidelines that is easy to access for practitioners and the general public.

4. Did you face any challenges during the study?

Many of the available studies are only observational. For more specific recommendations regarding the benefits and the safety of dietary intake, or omission, of various foods for bone health and fracture risk, further results from larger, quality controlled trials are still needed.

Other member publications:

References: (alphabetical order by first author)

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2. Anderson KB, Tembo MC, Sui SX, Hyde NK, Rufus PG, Pasco JA, Kotowicz MA, Holloway-Kew KL. Normative data for peripheral quantitative computed tomography (pQCT) bone parameters in Australian men. Bone Reports. 2021;15:101107.

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Member publications

Other member publications:

References: (alphabetical order by first author)

11. Mansouri N, Al-Sarawi S, Losic D, Mazumdar J, Clark J, Gronthos S, O'Hare Doig R. Biodegradable and biocompatible graphene-based scaffolds for functional neural tissue engineering: A strategy approach using dental pulp stem cells and biomaterials. Biotechnol Bioeng. 2021.

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Details of members publications are distributed between ANZBMS emails and the quarterly newsletter. Please let us know if you have details to share or would like to nominate another members publication for a 1 page feature by emailing us at newsletter@anzbms.org.au

HubLE News

HubLE is the IFMRS's Online Learning Environment for young investigators in the musculoskeletal (MSK) field.

HubLE supports the next generation of scientists by providing high-quality, accessible knowledge on MSK research, with an emphasis on innovation. Our mission is to shape the future of MSK research, from basic to clinical, by giving young researchers a platform to share, network, and engage in discussion and dialogue with other professionals from across the world.

What's New?

We've made a few changes to ultimately improve how people share their ideas and learn from others. These include:

1. **Search Engine:** You can now search content by its title and keywords! We have added search function to our website to make it easier to navigate. *We are still working to improve this feature, so we are happy to hear your feedback!*

2. **Sharing The Videos On Social Media:** You can now easily share HubLE videos from the website by clicking on the 'share' icon on top right corner of the videos.

3. **Submission:** To submit your EOI for sharing your research or your opinion with HubLE, visit our website www.huble.org or scan this QR code:

Join the HubLE community today!

To share your ideas and learn from our international community, visit our website www.huble.org and view the latest content from the HubLE community including HubLE Opinions from Renee Ormsby (Brigham and Women's Hospital, USA).

Calendar of Events and Webinars

AUSTRALIAN & NEW ZEALAND

RACP-ANZBMS Webinar
Dr Jasna Aleksova - Bone Health in Chronic Kidney Disease
30th August 18:00 AEST
Register here

ANZBMS Virtual Clinical Densitometry Course
18 - 19 September (Virtual)
More information here

Australian and New Zealand Orthopaedic Research Society
6 - 8 October 2021 (Virtual)
More information here

ANZSSFR Annual Scientific Meeting
4 - 6 November 2021
Woolloongabba/Virtual
Abstracts due 26th Sept 2021
More information here

ESA-SRB-ANZBMS Annual Scientific Meeting
21 - 24 November 2021
Melbourne
More information here

Australasian Paediatric Endocrine Group - Annual Scientific Meeting
22-23 November 2021 (Virtual)
More information here

INTERNATIONAL

ASBMR Annual Meeting
1 - 4 October 2021
More information here

Orthopaedic Research Society 2021 Clinician Scholar Career Development Program
More information here

ECTS Digital Masterclass for PhD Students, Trainees and Young Investigators
24 - 27 August 2021
More information here

ECTS Clinical Training Course in Metabolic Bone Disease
2- 3 September 2021 (Virtual)
More information here

10th International Conference on Children's Bone Health
Abstracts due: 15 February 2022
More information here

ASBMR Webinar Series
Monthly webinars
More information here

ECTS Webinar Series
More information here

IO - ASBMR Rare Bone Disease TeleECHO
Delivered virtually the first Thursday of each month 1500 EST
More information here

OI Foundation Osteogenesis Imperfecta TeleECHO clinic series
Delivered virtually the second Wednesday of each month 15:00 hours EST
More information here