Australian and New Zealand Society for Sarcopenia and Frailty Research

2019 ANNUAL MEETING • SYDNEY, AUS • 22–23 NOVEMBER

Meeting Handbook & Program
PBS Information: Authority required (STREAMLINED) as treatment for osteoporosis. Criteria apply. Refer to PBS Schedule for full information.

Before prescribing please review the full Product Information available from www.amgen.com.au/Prolia.PI

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PROLIA MINIMUM PRODUCT INFORMATION.

INDICATIONS: Treatment of osteoporosis in postmenopausal women (PMO) to reduce risk of vertebral, non-vertebral and hip fractures. Treatment to increase bone mass in men with osteoporosis at increased risk of fracture. Treatment to increase bone mass in women and men at increased risk of fracture due to long-term systemic glucocorticoid therapy.

CONTRAINDICATIONS: Hypocalcaemia. Hypersensitivity to denosumab, CHO-derived proteins or any component. Pregnancy and in women trying to get pregnant.

PRECAUTIONS: Correct hypocalcaemia prior to initiating therapy. Monitor calcium in patients predisposed to hypocalcaemia. Adequate intake of calcium and vitamin D is important. Severe renal impairment. Skin infections. Evaluate patients for risk factors for osteonecrosis of the jaw (ONJ); use with caution in these patients. Very rare reports of atypical femoral fractures. Multiple vertebral fractures may occur following discontinuation. In glucocorticoid-induced osteoporosis, fractures occur at higher BMD than PMO.

ADVERSE EFFECTS:

Common: hypercholesterolaemia, eczema, fracture, back pain, arthralgia, nasopharyngitis, pain in extremity, osteoarthritis, bronchitis, hypertension, headache, dyspepsia, urinary tract infection, upper abdominal pain, bone pain and alopecia.

Dosage and Administration:

Single subcutaneous injection of 60 mg, once every 6 months. Ensure adequate intake of calcium and vitamin D. No dose adjustment required in the elderly or in renal impairment.


References:


Join us for the latest information on managing patients at risk of fragility fracture, and to hear practical advice from Clinical Professor Charles Inderjeeth.

**OSTEOPOROTIC HIP FRACTURES: how to minimise the risk**

Join us for the latest information on managing patients at risk of fragility fracture, and to hear practical advice from Clinical Professor Charles Inderjeeth.

**Topics covered:**

- Identifying who is at risk, including clinical assessments of sarcopenia
- What can be done to minimise the risk of hip fractures:
  - Lifestyle interventions and falls prevention strategies
  - Anti-osteoporosis treatments – a clinical assessment of the safety and efficacy data for treatments, including long-term risk:benefit profiles
- Case study discussion

**Clinical Professor Charles Inderjeeth**

Clinical Professor Charles Inderjeeth is a Clinical Epidemiologist and Consultant Physician in Rheumatology and Geriatric Medicine in Western Australia. He has been involved in education and research in the field of rheumatology, osteoporosis, vitamin D, dementia and geriatric syndromes.

Charles is an actively practicing clinical academic with strong education links to General Practice, Specialist Practice and Hospital services. He has numerous advisory/executive roles to the Department of Health (WA), the Arthritis Foundation of WA, Osteoporosis Australia, Australian Rheumatology Association, Australian and New Zealand Society of Bone Mineral Research and Australia and New Zealand Society for Geriatric Medicine.

This symposium is sponsored and organised by Amgen. Lunch will be provided.

This is a medical education event for healthcare professionals to attend only.
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Welcome

It is my pleasure to welcome you to the Annual Meeting of the Australian and New Zealand Society for Sarcopenia and Frailty Research. Following the successful third conference in Dunedin, the 2018 conference will be held at Hilton Sydney.

Both sarcopenia and frailty affect many older people, and are becoming more prevalent with our ageing populations. Identifying, preventing and treating these conditions will better support older people in ageing well. This meeting will provide ample opportunity to hear from and interact with internationally renowned scientists and clinicians and to improve our knowledge and skills in these important health areas.

The conference will showcase international speakers, new research, emerging researchers, and will provide time to network with colleagues to share ideas and explore collaborations.

This national conference is multi-disciplinary in nature and will be attractive to scientists and clinicians from multiple disciplines including medicine, epidemiology, exercise physiology, nutrition, basic sciences and body composition measurement and methodologies.

On behalf of our Scientific/Steering Committee, I would like to welcome you to Sydney.

Professor Sue Kurrle
Convenor
Australian and New Zealand Society for Sarcopenia and Frailty Research 2019 Annual Meeting
Curran Professor in Health Care of Older People
Faculty of Medicine, University of Sydney
Director, NHMRC Cognitive Decline Partnership Centre
Clinical Director, Northern Sydney LHD Aged Care and Rehabilitation Network
Senior Staff Specialist Geriatrician
Hornsby Ku-ring-gai Health Service

Local Organising Committee
Professor Sue Kurrle, Convenor
Prof Rob Daly
Prof Ian Cameron

Scientific Committee
Professor Gordon Lynch (Chair)
Professor Robin Daly
Associate Professor Philip Sheard
Professor Andrea Maier
Dr René Koopman
Professor Sue Kurrle
Professor Charles Inderjeeth
Professor Gustavo Duque
Dr David Scott
Associate Professor Ruth Hubbard

ANZSSFR Council
President: Professor Robin Daly, VIC
President Elect: Professor Andrea Maier, VIC
Immediate Past President: Professor Gustavo Duque, VIC
Secretary: A/Professor Debra Waters, NZ
Treasurer: A/Prof Sharon Brennan-Olsen, VIC
Regional Councillors:
Vacant – Victoria and Tasmania
Professor Susan Kurrle – NSW and ACT
A/Professor Ruth Hubbard - Queensland
Professor Charles Inderjeeth – Western Australia
A/Professor Solomon Yu – South Australia
A/Professor Philip Sheard – New Zealand

Meeting Secretariat
Lara Malcolm, Meeting Managers
The Meeting People Pty Ltd
PO Box 764 MITCHAM South Australia 5062
Tel: +61 8 8177 2215 Email: laras@themeetingpeople.com.au
https://www.anzssfr.org
https://www.anzssfrmeeting.com.au
President’s Welcome

It is my pleasure to welcome you to the 2019 Annual Meeting of the Australian and New Zealand Society for Sarcopenia and Frailty Research (ANZSSFR) in Sydney. This is my first year as President of ANZSSFR and it has been a pleasure to work closely with the local organising and scientific committee, led by Prof. Sue Kurrle and Prof. Gordon Lynch, who have put together an exciting programme. We have an outstanding mix of leading international and national speakers covering basic, clinical and translational research, as well as a diverse range of symposia, oral and poster presentations from our emerging researchers. It is truly an international meeting with speakers and delegates from 10 different countries. I am also very pleased this year to see the introduction of a dedicated early-mid career lunchtime symposium session on Saturday. I invite and encourage you to attend this session and actively participate in our entire meeting, ask questions and network with colleagues, share ideas and explore collaborations.

Beyond the annual meeting, this year has seen a number of important new activities and initiatives within our Society and the broader field. In July, sarcopenia was officially recognised as a disease with an ICD-10 code in Australia. This is an important step forward for our field (and society) but further work is still needed to raise awareness and educate both health professionals and the wide community about this disease. Several important initiatives led by members of our society that coincided with the ICD-10 announcement and sarcopenia day included: 1) a press release led by Prof. Gustavo Duque; 2) an article in the Conversation to highlight sarcopenia as a disease which received widespread reach (>32,000 reads to date); and 3) our ANZSSFR Taskforce on the Diagnostic Criteria for Sarcopenia, chaired by Dr David Scott, formulating a statement which clearly articulated our stance on which definition and diagnostic criteria should be adopted in Australia.

There have been a number of other noteworthy initiatives that I would like to highlight. This year saw the launch of our new ANZSSFR website as well as the formation of the early-mid career researcher subcommittee led by Dr Esmee Reijnierse (Chair), Dr Jesse Zanker, Dr David Scott, Lara Vlietstra and Dr Marc Sim. We also introduced a number of new prizes/awards for our EMCRs, including the Rising Star and Bright Star Best Publication awards, and the Allied Health Award to attract and support practicing allied health professionals to the annual meeting. We established an ANZSSFR membership database and online payment system to more closely monitor and track our members. I would like to thank Prof. Alan Hayes for leading this initiative. Our society was also invited to be part of a joint muscle and bone symposium at the Australian and New Zealand Bone and Mineral Society (ANZBMS) meeting in Darwin. This session was extremely well received and I would like to thank Prof. Gordon Lynch, Prof. Sue Kurrle and A/Prof. Debra Waters for showcasing some of the tremendous work undertaken by members of our society.

The future for our society is very promising with some exciting times ahead but there also some challenges that we will need to collectively address. This year saw the departure of our executive manager, Gwen McMaster-Fay, who worked diligently to manage the society. Thank you Gwen for you valuable contribution. I also wish to acknowledge our treasurer, A/Prof. Sharon Brennan-Olsen, who has worked tirelessly behind the scenes in what has been a challenging year to ensure that our society remains financially viable moving forward. Finally, I would like to thank our symposium and abstract reviewers (Phil Sheard, Andrea Maier, Rene Koopman, Sue Kurrle, Charles Inderjeeth, Gustavo Duque, David Scott and Ruth Hubbard) and our event organiser, Lara Malcolm from the Meeting People, who has done a fantastic job overseeing the entire meeting. A special thank you also to our sponsors, including Amgen (Platinum), NSW Government (Northern Sydney Local District Health) (Silver), Hologic and Sanofi (Bronze) along with our exhibitors, without whom this conference would not be possible.

I welcome you to Sydney and hope that you enjoy the 4th Annual ANZSSFR meeting.

Professor Robin Daly, PhD, FSMF
President - ANZSSFR
CHAIR OF EXERCISE AND AGEING
INSTITUTE FOR PHYSICAL ACTIVITY AND NUTRITION
DEAKIN UNIVERSITY
The Australian and New Zealand Society for Sarcopenia and Frailty Research 2019 Annual Meeting gratefully acknowledges the support of the following companies and organisations:

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General Information

Venue
Hilton Sydney
48 George Street
SYDNEY NSW 2000

Telephone: +61-2-9266-2000
https://www.hiltonsydney.com.au

All sessions will be located on Level 2 of the Hilton Sydney. The plenary sessions will be held in the State Room and the concurrent session held also in Room 2. The exhibition, catering and posters will be located in Room 3-6.

Registration Desk
The registration desk will be open at the following times:
Friday 22nd November 07:45 - 19:00
Saturday 23rd November 07:30 - 17:00

Name Badges
Each conference delegate will receive a name badge on registration. The badge will be your official pass and must be worn to gain entry to all sessions, lunch and refreshment breaks. If a name badge for a partner attending a social function is required, please ask at the registration desk.

Speaker Preparation
All speakers must report to the Audio Visual Technician located in the back of the State Room. Please load your talk with the technician during the breaks prior to your session. It is preferable to load at least two sessions prior to your session.

Poster Presenters
All Posters are up for the duration of the meeting. Posters should be portrait and no more than 1 metre wide x 1.2 metres long. Posters can go up from Friday morning from 8 am and should be removed by the end of afternoon tea at 4 pm on Saturday 23rd November. Poster authors should stand by their posters during morning tea on both days to answer queries in relation to your research. Velcro will be provided to affix your poster to the boards.

Abstract Book
All abstracts are available online for downloading prior to the start of the Meeting. Please refer to the link Meeting Handbook to obtain a copy to save to your device. No printed abstract books or programs will be provided during the meeting.

WIFI
WIFI will be available at the Hilton Sydney. A code will be given to you at the time of the Meeting.

Catering Breaks and Special Diets
All catering breaks will be located on Level 2 with the exhibitions. We are very grateful for the support of our sponsors and encourage you to take the time to visit them during the breaks. The waiting staff have been advised of any special diets to date. Please see the staff at the Registration Desk or the wait staff to locate your requirements.

Mobile Phones
Please ensure that all mobile phones are switched to silent mode during scientific sessions.
Conference and Social Events

Welcome Reception

Date: Friday 22 November 2019  
Time: 5.30pm – 7.30pm  
Venue: Exhibition Area (with the posters), Level 2, Hilton Sydney

A great networking opportunity that will allow you to catch up with colleagues and mingle with delegates attending the meeting and viewing the posters. Included in full and in-training registration fees.

All delegates must indicate on the registration site whether they will be attending this function.

Cost: Included with full registration. Extra tickets: $65 per ticket.

Meet the Professor Breakfast Sessions

Date: Saturday 23rd November 2019  
Time: 7.30am – 8.30am

Please arrive 10 minutes prior to the start of the session.

Venues:

Breakfast 1: Professor Luc van Loon - LEVEL 1, ROOMS 5 & 6  
Title: Strategies to prevent disuse atrophy  
Sponsored by Nestle

Breakfast 2: Professor Sue Kurrle - LEVEL 1, ROOMS 3 & 4  
Putting frailty into practice in hospital and community
Invited Speakers

**Professor Luc van Loon (The Netherlands)**
Luc is the Professor of Physiology of Exercise at the Department of Human Biology at Maastricht University Medical Centre, The Netherlands. His research focuses on the skeletal muscle adaptive response to exercise, and the impact of nutritional and pharmacological interventions to modulate muscle metabolism in health and disease.

**Professor Sean X. Leng (USA)**
Sean is a geriatrician and Professor of Medicine in the Division of Geriatric Medicine and Gerontology, Department of Medicine, Johns Hopkins University School of Medicine, USA. He is also an immunogerontologist and his frailty research focuses on the role of chronic inflammation, impact on aging immunity, as well as stem cell therapy as potential intervention.

**Professor Cathie Sherrington (Australia)**
Cathie is a Professorial Research Fellow and NHMRC Senior Research Fellowship at the School of Public Health and Institute for Musculoskeletal Health, University of Sydney. She leads the Physical Activity, Ageing and Disability Research Stream, and her research focuses on the design and evaluation of falls prevention and exercise interventions for older people and those with disabilities.

**Professor Andrea Maier (Australia)**
Andrea is Professor of Gerontology at the VU University Amsterdam, The Netherlands, Divisional Director of Medicine and Community Care, Royal Melbourne Hospital and Professor of Medicine and Aged Care at the University of Melbourne. Her research is driven by her passion to unravel ageing mechanisms and the interaction of ageing and age-related diseases, with a particular focus on sarcopenia.

**Emeritus Professor Miranda Grounds (Australia)**
Miranda is an Emeritus Professor in the School of Anatomy and Human Biology at University of Western Australia. She is as a cell biologist who has focussed on skeletal muscle, using *in vivomouse models to investigate factors controlling the post-natal growth, maintenance, hypertrophy/atrophy, damage and regeneration of normal, diseased (muscular dystrophies) and ageing muscles.
Exhibition

Please take the time to visit our conference supporters in the exhibition area.

<table>
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<tr>
<th>Booth</th>
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## Day 1 – Friday 22nd November 2019

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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>07:45 - 17:00</td>
<td>Registration Desk Open</td>
<td>LEVEL 2, FOYER</td>
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<tr>
<td>08:30 - 08:45</td>
<td>Welcome and Opening:</td>
<td>LEVEL 2, STATE ROOM</td>
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<tr>
<td></td>
<td><strong>Professor Robin Daly</strong> (President ANZSSFR)</td>
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<td></td>
<td>Chair of Exercise and Ageing, Institute for Physical Activity and Nutrition, Deakin University</td>
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<td><strong>Professor Susan Kurrle</strong> (Convenor)</td>
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<td>Curran Professor in Health Care of Older People, Faculty of Medicine, University of Sydney</td>
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<td></td>
<td>Welcome to Country</td>
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<tr>
<td>08:45 - 09:45</td>
<td>Plenary Session #1</td>
<td>LEVEL 2, STATE ROOM</td>
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<tr>
<td></td>
<td><strong>Professor Luc van Loon</strong> - Professor of Physiology of Exercise, Department of Human Biology, Maastricht</td>
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<td>University Medical Centre</td>
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<tr>
<td></td>
<td><strong>Title:</strong> Anabolic Resistance of Aging</td>
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<tr>
<td>09:50 - 10:50</td>
<td>Symposium 1 – Exercise and nutrition to combat sarcopenia.</td>
<td>LEVEL 2, ROOM 2</td>
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<td><strong>Chair:</strong> Dr Andrew Phil</td>
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<td></td>
<td>Synthesising Skeletal Muscle with Resistance Exercise: One Protein at a Time. Donny Camera</td>
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<td>09:50 - 10:10</td>
<td>The importance of physical activity for maintaining mitochondrial function across healthspan.</td>
<td>LEVEL 2, ROOM 2</td>
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<td></td>
<td>Andrew Phil</td>
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<tr>
<td>10:10 - 10:30</td>
<td>Nutritional approaches to combat sarcopenia.</td>
<td>LEVEL 2, ROOM 2</td>
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<td>Lee Hamilton</td>
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<tr>
<td>10:30 - 10:50</td>
<td>Interactive Discussion: What is Needed to Establish a Consensus Operational Definition of Sarcopenia in Australia and New Zealand. David Scott</td>
<td>LEVEL 2, ROOM 2</td>
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<tr>
<td>11:20 - 12:20</td>
<td>Plenary Session #2</td>
<td>LEVEL 2, STATE ROOM</td>
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<td><strong>Professor Sean Leng</strong> - Professor of Medicine in the Division of Geriatric Medicine and Gerontology, Department of Medicine, Johns Hopkins University School of Medicine.</td>
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<td></td>
<td><strong>Title:</strong> Understanding Frailty, Aging, and Inflammation</td>
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*Draft Program as at 19 November 19 - Subject to change.*
### Day 1 – Friday 22nd November 2019

**12:20 - 13:30**  
*Lunch, Exhibition and Posters*  
*LEVEL 2, ROOMS 3-6*

**13:30 - 14:30**  
*Lunchtime Symposium – Sponsored by Amgen*  
*LEVEL 2, STATE ROOM*  
*Chair: Dr Brenton Martin*

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<tr>
<th>Time</th>
<th>Session</th>
<th>Level</th>
<th>Room</th>
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| 14:30 - 15:30 | Symposium 3 – Sarcopenia over the course of hospitalisation: predictive value of muscle measures  
*Chair: Prof Andrea Maier* | LEVEL 2, ROOM 2 |                          |
| 14:30 - 14:50 | Predictive value of muscle measures during acute hospitalization of older adults: The EMPOWER study.  
*Carel Meskers* | LEVEL 2, ROOM 2 |                          |
| 14:50 - 15:10 | Longitudinal changes of muscle mass, muscle strength and physical performance in acutely admitted older adults up to three months post-discharge: The Hospital-ADL study.  
*Esme Reijnierse* | LEVEL 2, ROOM 2 |                          |
| 15:10 - 15:30 | Muscle measures and its clinical determinants in subacute geriatric rehabilitation patients: The EMPOWER-GR study.  
*Andrea Maier* | LEVEL 2, ROOM 2 |                          |

**15:30 - 16:00**  
*Afternoon tea and Exhibition*  
*LEVEL 2, ROOMS 3-6*

**16:00 - 17:00**  
*Outstanding Abstract Presentations*  
*Chair: Dr Anthony Villani and A/Prof Sharon Brennan-Olsen*  
*LEVEL 2, STATE ROOM*

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<tr>
<th>Time</th>
<th>Abstract</th>
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<th>Room</th>
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| 16:00 - 16:12 | Chronic leucine-enriched whey protein reduces insulin concentrations in older women: Liverpool Hope University - Sarcopenia Ageing Trial (LHU-SAT).  
*Ben Kirk* | LEVEL 2, ROOM 2 |                          |
| 16:12 - 16:24 | Muscle viral delivery of IGF-1 in mice promotes muscle and bone growth in response to suspension and reloading.  
*Hui Jean Kok* | LEVEL 2, ROOM 2 |                          |
| 16:24 - 16:36 | Associations of objectively-determined sedentary behaviour and physical activity with sarcopenia and incident falls over 12-months in community-dwelling Swedish older adults.  
*David Scott* | LEVEL 2, ROOM 2 |                          |
| 16:36 - 16:48 | The role of individual components of sarcopenia and their rate of decline in fracture risk in elderly women and men.  
*Dima Alajlouni* | LEVEL 2, ROOM 2 |                          |
| 16:48 - 17:00 | Effects of a Multicomponent Exercise Program Combined with a Multi-nutrient Supplement on Musculoskeletal Health in Men with Prostate Cancer Receiving Androgen Deprivation Therapy: A 12-Month Randomised Controlled Trial.  
*Jack Dalla Via* | LEVEL 2, ROOM 2 |                          |

**17:00 - 18:00**  
*Interactive Poster Session*  
*LEVEL 2, ROOMS 3-6*

**17:30 - 19:30**  
*Welcome Reception*  
*LEVEL 2, ROOMS 3-6*

**20:00 - Late**  
*GoSARC Drinks*  
*LEVEL 2, ROOMS 3-6*

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*Draft Program as at 19 November 19 – Subject to change.*
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
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<tbody>
<tr>
<td>07:30 - 17:00</td>
<td>Registration Desk Open</td>
<td>LEVEL 2, FOYER</td>
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<tr>
<td>07:30 - 08:30</td>
<td><strong>LEVEL 1, ROOMS 5 &amp; 6</strong>&lt;br&gt;Meet the Professor Breakfast 1 – Strategies to prevent disuse atrophy&lt;br&gt;Speaker: Prof Luc van Loon&lt;br&gt;Sponsored by Nestle</td>
<td>LEVEL 1, ROOMS 3 &amp; 4&lt;br&gt;Meet the Professor Breakfast 2 – Putting frailty into practice in hospital and community&lt;br&gt;Speaker: Prof Sue Kurrle</td>
</tr>
<tr>
<td>08:45 - 09:45</td>
<td><strong>Plenary Session #3</strong>&lt;br&gt;Professor Cathie Sherrington - Professorial Research Fellow and NHMRC Senior Research Fellow, School of Public Health and Institute for Musculoskeletal Health, University of Sydney&lt;br&gt;Title: Preventing disuse atrophy</td>
<td>LEVEL 2, STATE ROOM&lt;br&gt;Chair: Prof Vasi Naganathan</td>
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<tr>
<td>09:00 - 10:00</td>
<td><strong>LEVEL 2, STATE ROOM</strong>&lt;br&gt;Symposium 5 – SPRINTT: moving toward function-centred geriatric medicine&lt;br&gt;Chair: Dr Matteo Tosato</td>
<td>LEVEL 2, ROOM 2&lt;br&gt;Symposium 6 – Impact of exercise on cellular changes during neuromuscular ageing&lt;br&gt;Chair: Dr Philip Sheard</td>
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<tr>
<td>09:00 - 10:30</td>
<td>New Strategies for Biomarker Discovery in the Field of Physical Frailty and Sarcopenia.&lt;br&gt;Emanuele Marzetti</td>
<td>Structural alterations at the myotendinous junction in elderly and exercised mouse skeletal muscles Philip Sheard&lt;br&gt;Proteomic differences between young, elderly, and exercised-elderly murine soleus muscles and their correlations with deficits in force production. Navneet Lal</td>
</tr>
<tr>
<td>10:00 - 11:20</td>
<td>Morning tea, Exhibition and Posters</td>
<td>LEVEL 2, ROOMS 3-6</td>
</tr>
<tr>
<td>11:00 - 12:00</td>
<td><strong>Plenary Session #4</strong>&lt;br&gt;Professor Miranda Grounds - Emeritus Professor, School of Anatomy and Human Biology, University of Western Australia&lt;br&gt;Title: Preventing disuse atrophy</td>
<td>LEVEL 2, STATE ROOM&lt;br&gt;Chair: Dr Philip Sheard</td>
</tr>
<tr>
<td>12:00 - 13:30</td>
<td>Lunch, Exhibition and Posters</td>
<td>LEVEL 2, ROOMS 3-6</td>
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<tr>
<td>13:00 - 14:25</td>
<td><strong>Lunchtime Early- to Mid-Career Symposium</strong>&lt;br&gt;Chair: Dr Esme Reijnierse and Anna Rojer&lt;br&gt;Pitch your research: 3 minutes + 2 minutes questions</td>
<td>LEVEL 2, STATE ROOM</td>
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<tr>
<td>13:30 - 13:35</td>
<td>Definition-specific prevalence estimates for sarcopenia in an Australian population: the Geelong Osteoporosis Study. Sophia Sui</td>
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<tr>
<td>13:40 - 13:45</td>
<td>Change in frailty index following a 12-month weight loss intervention in Australian breast cancer survivors. Natasha Reid</td>
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### ANZSSFR 2019 Annual Meeting Program

**Day 2 – Saturday 23\(^{rd}\) November 2019 continued...**

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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>13:45 - 13:50</td>
<td>Protective and Harmful Factors Associated with pro-dormal Sarcopenia in an Early Middle-aged Birth Cohort. Lara Vlietstra</td>
</tr>
<tr>
<td>13:55 - 14:00</td>
<td>Optimal resistance training for older adults to increase muscle mass: A systematic review and meta-analyses. Anthony Kamleh</td>
</tr>
</tbody>
</table>
| 14:00 - 14:20 | Interactive Panel Discussion "Don’t take us for granted!" The EMCR compass for navigating the funding jungles and the path to success. *Chair: Lara Vlietstra and Dr Anthony Villani*
|               | *Panel Members: Prof Sean X Leng, A/Prof Debra Waters and Dr David Scott*                  |
| 14:20 - 14:25 | MOVE TO SESSIONS                                                                            |
| 14:30 - 15:30 | **LEVEL 2, STATE ROOM** Panel Sessions                                                     |
| 14:30 - 14:42 | Oral Communications A                                                                      |
|               | *Chair: Dr Ben Kirk and Dr Marc Sim*                                                        |
| 14:30 – 14:42 | Effects of whey-protein and vitamin D supplementation combined with progressive resistance training on muscle mass, size and strength, glycaemic control and inflammation in older adults with type 2 diabetes: A 6-month randomised controlled trial. Robin Daly |
| 14:42 – 14:54 | Distinct trajectories of individual physical performance measures across 9 years in 60- to 70-year-old adults. Anna Rojer |
| 14:54 - 15:06 | Enhancing protein intake to achieve national nutrient reference values may be insufficient to improve muscle mass and function in institutionalised older adults. Sandra Iuliano |
| 15:06 - 15:18 | The impact of osteosarcopenia on mortality, aerobic capacity, balance, muscle strength and chronic inflammation in older people: 9-year follow up study. Walter Sepúlveda |
| 15:18 - 15:30 | The association of sarcopenia as a comorbid disease with institutionalisation and mortality in geriatric rehabilitation patients. Jacob Pacifico |
| 15:30 - 16:00 | Afternoon tea and Exhibition                                                                |
| 16:00 - 17:00 | **LEVEL 2, STATE ROOM** Plenary Session #5                                                  |
|               | *Professor Andrea Maier - Professor, General Medicine and Aged Care, The University of Melbourne; Divisional Director of Medicine and Community Care, The Royal Melbourne Hospital; Professor of Ageing, Vrije Universiteit, Amsterdam, The Netherlands* |
|               | *Title: Identifying, evaluating and managing sarcopenia and frailty during hospitalisation and beyond* |
| 17:00 - 17:15 | **LEVEL 2, STATE ROOM** Awards and Closure                                                 |
| 17:15 - 18:00 | **LEVEL 2, STATE ROOM** Annual Meeting of the Australian and New Zealand Society for Sarcopenia and Frailty Research |
Early- to Mid-Career Research Pitch Poster Presentations

P1  Definition-specific prevalence estimates for sarcopenia in an Australian population: the Geelong Osteoporosis Study  
Sophia Sui, Kara Holloway-Kew, Natalie Hyde, Lana Williams, Sarah Leach, Julie Pasco

P2  Clinical implications of osteosarcopenia and its components in community-dwelling older adults  
Steven Phu, Walter Sepulveda-Loyola, Ebrahim Bani Hassan, Sharon Brennan-Olsen, Jesse Zanker, Sara Vogrin, Romy Conzade, Vanessa Probst, Gustavo Duque

P3  Change in frailty index following a 12-month weight loss intervention in Australian breast cancer survivors  
Natasha Reid, Ruth Hubbard, Nancye Peel, Marina Reeves

P4  Protective and Harmful Factors Associated with Pro-dromal Sarcopenia in an Early Middle-aged Birth Cohort  
Lara Vlietstra, Debra L. Waters, Kim Meredith-Jones

P5  Supplementation improves protein deficiencies in community-dwelling (pre)sarcopenic older people  
Lenore Dedeyne, Jolan Dupont, Jos Tournoy, Katrien Koppo, Sabine Verschueren, Evelien Gielen

P6  Optimal resistance training for older adults to increase muscle mass: A systematic review and meta-analyses  
Anthony A Kamleh, Esmee R Reijnierse, Jesse J Aarden, Robin M Daly, Andrea B Maier

Poster Presentations

P7  Clinical determinants of resting metabolic rate in geriatric outpatients  
Suey Yeung, Esmee M. Reijnierse, Marijke C. Trappenburg, Carel G.M. Meskers, Andrea B. Maier

P8  Midthigh bone, muscle and fat mass vs conventional tissue mass indices: Associations with strength, performance and balance in older patients  
Ebrahim Bani Hassan, Steven Phu, Sara Vogrin, Gustavo Duque

P9  The increased risk of falls in sarcopenic older adults is associated with impairments in several components of postural balance: A cross-sectional study  
Ben Kirk, Steven Phu, Sharon L Brennan-Olsen, Sara Vorgin, Ebrahim Bani Hassan, Ahmed Al Saedi, Gustavo Duque

P10  Greater adherence to a Mediterranean diet is associated with better gait speed in older adults with type 2 diabetes mellitus  
Anthony Villani, Rebecca McClure

P11  Diagnostic differences and agreement between the original and revised European Working Group on Sarcopenia in Older People operational definitions  
Anthony Villani, Rebecca McClure

P12  Adiposity is inversely associated with strength in older adults with type 2 diabetes mellitus  
Michelle Barrett, Rebecca McClure, Anthony Villani

P13  Influence of the new EWGSOP2 consensus on research with presarcopenic and sarcopenic older persons  
Jolan Dupont, Lenore Dedeyne, Katrien Koppo, Sabine Verschueren, Jos Tournoy, Evelien Gielen
Poster Presentations

**P14** Prevalence of sarcopenia, sarcopenic obesity and their associations with metabolic syndrome in older people in Vietnam  
*Tu Nguyen*, Ngoc-Tam Nguyen, Nguyen Trung-Anh, Thang Pham, Huyen Vu

**P15** Effects of five different community interventions on clinical measurements of sarcopenia in older adults: what is the best strategy?  

**P16** Diagnosis, prevalence and clinical impact of sarcopenia in COPD: a systematic review and meta-analysis  
*Walter Sepulveda-Loyola*, Christian Osadnik, Steven Phu, Andrea Akemi Morita, Gustavo Duque, Vanessa Suziaine Probst

**P17** Timing and methods of frailty assessments in geriatric trauma patients: A Systematic Review  
*Mya Cubitt*, Emma Downie, Rose Shakerian, Peter Lange, Elaine Cole

**P19** Otago Exercise Program at home: Development of methodology to measure compliance  
*Lenore Dedeyne*, Jorgen Wullems, Jolan Dupont, Jos Tournay, Evelien Gielen, Sabine Verschueren

**P20** Sarcopenia in inpatient rehabilitation: prevalence in younger and older patients and association with acute length of stay  
*Irina Churilov*, Leonid Churilov, Kim Brock, Navina Curtin, David Murphy, Kavitha Muthukrishnan, Richard J Macisaac, Elif I Ekinci

**P21** Incidence and cost of hospitalisations due to pelvic fracture in Australia  
*Harry Wu*, Lisa Kouladjian O’Donnell, Sarah Hilmer

**P22** Increasing burden of osteoporosis in Australia over a 24-year period  
*Harry Wu*, Lisa Kouladjian O’Donnell, Sarah Hilmer

**P23** Frailty is a dynamic condition where repeated measurement is important for mortality prediction: findings from the North West Adelaide Health Study  
*Mark Q Thompson*, Olga Theou, Graham R Tucker, Robert J Adams, Renuka Visvanathan

**P25** Anticholinergic Burden as a Predictor of Frailty in Geriatric Patients Undergoing Inpatient Rehabilitation  
*Phu Sabei Shwe*, Paul Thein, Parul Marwaha, Karina Teage, Ramini Shankumar, Ralph Junckerstorff

**P26** Developing an electro-mechano-biological model for prediction of bone loss in consequence of physical frailty in older adults  

**P27** Diet quality and muscle health: protocol for a systematic review and meta-analysis of observational and intervention data  
*Jessica Davis*, Wolfgang Marx, Amelia McGuinness, Meghan Hockey, Madeline West, Brendon Stubbs, Joseph Firth, Julie A. Pasco, Mohammadreza Mohebbi, Fiona Collier, Amy Loughman, Dr Simon Rosenbaum, Felice Jacka

**P29** Severely Decreased Bone Formation and Muscle quality in the Winnie Mouse Model of Inflammatory Bowel Disease (IBD)  
*Ahmed Al Saedi*, Shilpa Sharma, Lulu Chen, Ebrahim Bani Hassan, Kulmira Nurgali, Gustavo Duque
Poster Presentations

P30  Effect of denosumab on falls, muscle strength and function in community dwelling older adults  
Steven Phu, Ebrahim Bani Hassan, Sara Vogrin, Ben Kirk, Gustavo Duque

P31  Physical performance tests as diagnostic tools for sarcopenia  
Steven Phu, Ebrahim Bani Hassan, Sara Vogrin, Jesse Zanker, Ahmed Al Saedi, Solange Bernardo, Gustavo Duque

P34  Evaluation of combining castration and hind-limb immobilisation to induce sarcopenia in mice  
Danielle Debruijn, Alan Hayes

P35  Exploring frailty in Indo-Fijian older adults in a New Zealand setting: A mixed methods study  
Nazreen Hussain

P36  Frailty is a useful concept in people with intellectual disability  
Clive Sun, Seeta Durvasula, Rebecca Stack, Ian Cameron

P37  High-sucrose diet induces ageing-like chronic inflammation and neuromuscular deterioration in young C57BL/6J mice  
Yen-Hui Chiu, Yu-Ning Liu, Hung-Yu Chien, Wan-Chun Li

P38  Association between serum interleukin-6 and frailty in older men  
Monica Tembo, Kara Holloway-Kew, Chiara Bortolosci, Sharon Brennan-Olsen, Lana Williams, Mark Kotowicz, Julie Pasco

P39  Instrumented measures of sedentary behaviour and physical activity are associated with mortality in community-dwelling older adults: a systematic review, meta-analysis and meta-regression  
Anna Rojer, Keenan Ramsey, Natascha van Rijssen, Marijke Trappenburg, René Otten, Martijn Heymans, Mirjam Pijnappels, Carel Meskers, Andrea Maier

P40  LIFT-UP: Feasibility and efficacy of a progressive resistance exercise training program in non-ambulating geriatric rehabilitation patients  
Anthony A Kamleh, Esme M Reijnierse, Jesse J Aarden, Patricia Maggs, Alana Jacob, Andrea B Maier

P41  Leg muscle mass, strength and quality in relation to high falls risk: Geelong Osteoporosis Study  
Julie Pasco, Monica Tembo, Natalie Hyde, Kara Anderson, Lana Williams, Mark Kotowicz, Sophia Sui, Kara Holloway-Kew

P42  Malnutrition according to the GLIM criteria, ESPEN definition and MST malnutrition risk and its associations with physical and functional performance in geriatric rehabilitation patients – the RESORT cohort  
Jeewanadee Hettiarachchi, Esme Reijnierse, Andrea Maier

P44  The association between sleep quality and frailty status in older people in Vietnam  
Thu Thi Hoai Nguyen, Huyen Thi Thanh Vu, Huong Thi Thu Nguyen, Tam Ngoc Nguyen, Tu N Nguyen

P46  Higher concentrations of parathyroid hormone (PTH) are associated with reduced gait velocity in adults: A systematic review  
Lavanya Srinivasa Murthy, Natasha A. Grande de França, Guillaume T. Duval, Sara Vogrin, Cedric Annweiler, Gustavo Duque

P47  Osteocalcin and its forms across the lifespan in adult men  
Cassandra Smith, Sarah Voisin, Ahmed Al Saedi, Steven Phu, Tara Brennan-Speranza, Lewan Parker, Nir Eynon, Danielle Hiam, Xu Yan, David Scott, Lauren C. Blekkenhorst, Joshua R. Lewis, Ego Seeman, Elizabeth Byrne, Leon Flicker, Gustavo Duque, Bu B. Yeap, Itamar Levinger
Poster Presentations

P48  Morbidity measures predicting mortality in older inpatients: a systematic review
    Cheng Hwee Soh, Syed Wajih Ul Hassan, Julian Sacre, Andrea Maier

P49  Pilot study of Frailty Initiative in Northern Sydney Local Health District
    Linda Xu, Susan Kurile

P50  Leg length as a surrogate to height for the measurement of skeletal muscle mass index
    Ming Li Yee, Boyd Strauss, Christopher Gilfillan

P51  Inpatient post-fall assessments: Are they good enough to minimise harm, prevent reoccurrence and provide data for improvement
    Anton Peiris

P52  Associations of sarcopenia and its components with self-reported health-related quality of life, physical activity, and nutrition in older adults performing exercise training
    Ewelina Akehurst, David Scott, Juan Peña Rodriguez, Carol Alonso Gonzalez, Jasmaine Murphy, Sandor Dorgo, Alan Hayes

P53  Cigarette smoking causes glucose intolerance with involvement of the wasting and insulin resistance in muscle
    Anwar Khan, Sherouk Fouda, Ali Mahzari, Stanley Chan, Ross Vlahos, Jiming Ye

P54  Comparing SARC-F and SARC-CalF for sarcopenia screening in older men and women in Vietnam
    Ngoc-Tam Nguyen, Tu N Nguyen, Thu Thi Hoai Nguyen, Thanh Xuan Nguyen, A/Prof Huyen Thi Thanh Vu, Thang Pham

P55  Meteorin-like (Metrnl), as a myokine, is a therapeutic candidate for aging skeletal muscle
    Jung Ok Lee, Naomi X.Y. Ling, Bruce E. Kemp, Hyeon Soo Kim

P56  Nocturnal hypoxemia is associated with reduced hand grip strength in males
    David Stevens, Sarah Appleton, Andrew Vincent, Yohannes Melaku, Sean Martin, Tiffany Gill, Catherine Hill, Gary Wittert, Robert Adams

P57  Nocturnal hypoxemia is associated with increased appendicular skeletal muscle mass index in middle aged, but not elderly, males
    David Stevens, Ronaldo Piovezan, Yohannes Melaku, Sarah Appleton, Gary Wittert, Robert Adams

P58  Prevalence of sarcopenia as a comorbid disease: A systematic review and meta-analysis
    Jacob Pacifico, Milou Geerlings, Esme Reijnierse, Christina Phassouliotis, Wen Kwang Lim, Andrea Maier
Invited Speaker Abstracts

Muscle wasting and Sarcopenia: pre-clinical research to clinical treatments
Miranda D Grounds
School of Human Sciences, the University of Western Australia, Australia 6009

Classic sarcopenia refers to loss of skeletal muscle mass and function during normal healthy ageing, although this term now includes cachexia, muscle wasting related to increased inflammation in diseases like cancers. The precise reasons for the onset and progression of muscle wasting varies between different situations; this talk will focus mainly on normal ageing.

Over the last 20 years we have investigated muscles and other tissues of normal ageing C57Bl/6J mice at the cell and molecular level, with detailed time course studies of mice sampled at 8 ages (from 3 to 29 months) identifying changes in muscles initiated after about 12 months, with the transition to ageing for many factors evident by 18 months. The 2 main features of old muscles are striking changes in metabolism, plus altered neuromuscular junctions indicating denervation. We subsequently showed progressive alterations of sciatic nerves indicating neurodegeneration, plus altered neuronal connectivity in the spinal cord: the primary cause of these linked neuromuscular changes remains unclear. Mention will be made of oxidative stress, non-coding RNAs, plus cancer and cachexia in old mice with clinical implications. We apply this basic information to human tissues with UK colleague studying the ageing Hertfordshire cohort, to help advise on the best biomarkers for analyses of old muscle biopsies and biofluids.

The complexity of interacting systemic factors (from vascular biology to the microbiome) is attracting increasing attention for extending the span of normal healthy ageing to reduce disease burden and disability. In this context, exercise is universally acclaimed as beneficial: in mice we can investigate the benefits of exercise that prevents sarcopenia at the molecular level, in many tissues from the same individual mice to address such systemic effects. I will also discuss the impact of immunoageing that presents the opportunity for clinical interventions to ‘rejuvenate the system’.
Symposium 1 – Exercise and nutrition to combat sarcopenia

Synthesising Skeletal Muscle with Resistance Exercise: One Protein at a Time.
Dr Donny Camera
Department of Health and Medical Sciences, Swinburne University

Human skeletal muscle is a highly malleable tissue that can alter its phenotype in response to repeated bouts of contractile activity (i.e. exercise) and altered nutrient availability, particularly protein. The net balance between the continuous and simultaneous processes of muscle protein synthesis (MPS) and muscle protein breakdown (MPB) determines whether skeletal muscle tissue is increasing (hypertrophy) or decreasing (atrophy) total protein content, which is a key regulator of overall skeletal muscle mass. Muscle hypertrophy can only occur when there is an accumulation of muscle proteins during repeated periods of anabolism, such as that induced by performance of resistance exercise and protein ingestion, that exceeds the loss of muscle proteins during intervening periods of catabolism. When assessing muscle protein synthesis, commonly utilised acute measurements of protein synthesis using labelled amino acid tracers are limited by the timing of the assessment. In particular, the brief duration of tracer administration in a laboratory setting under sterile conditions fails to integrate all aspects of habitual ('free-living') behaviour such as sleeping, feeding, and/or other physical activity and physiological stresses. The use of longer-term labelling using deuterium oxide (D₂O) provides an alternative method to investigating rates of muscle protein synthesis and breakdown as it can be administered via drinking water and under real world conditions. This presentation focuses on the evolving use of D₂O as a metabolic tracer to measure both fractional and individual rates of muscle protein synthesis following resistance exercise to provide novel mechanistic insight to changes in the muscle proteome with advancing age.

The importance of physical activity for maintaining mitochondrial function across healthspan.
Dr Andy Philp
Garvan Institute of Medical Research, UNSW Medicine, UNSW Sydney

Mitochondrial content and function decline during ageing, leading to alterations in glucose and lipid utilisation, reduced insulin sensitivity, increased adiposity and loss of functional ability. Thus, strategies aimed at maintaining or boosting mitochondrial function hold tremendous therapeutic potential for mitigating chronic diseases of ageing. The best countermeasure currently identified to increase mitochondrial content in skeletal muscle is exercise; however how this adaptation occurs at the cellular level is poorly understood. Research has identified that exercise transiently activates a number of cellular stress responses that initiate mitochondrial remodeling, providing therapeutic and ergogenic targets to explore. This talk will highlight exercise approaches to manipulate mitochondrial function in skeletal muscle and discuss the therapeutic implications of these strategies for healthy ageing.

Nutritional approaches to combat sarcopenia
Dr. D. Lee Hamilton
Institute for Physical Activity and Nutrition (IPAN), School of Exercise and Nutrition Sciences, Deakin University, Geelong, VIC.

The exact mechanisms that lead to sarcopenia are still unknown. However, evidence supports the concept that resistance to feeding induced stimuli is one of the key causes. More specifically, old muscle is less able than young muscle at increasing the synthesis of new proteins after a feeding stimulus. This metabolic defect, termed anabolic resistance, results in a net loss of muscle protein and subsequently a loss of muscle mass. If sarcopenia’s origin is partly related to nutrition responses is there a nutritional solution? This talk will explore the potential mechanisms of sarcopenia in addition to addressing some of the potential nutrient related solutions including protein nutrition and fish-oil.
The ANZSSFR Task Force on Diagnostic Criteria for Sarcopenia recommended the use of the original European Working Group on Sarcopenia in Older People (EWGSOP) operational definition of sarcopenia in 2018. EWGSOP recommended sarcopenia be defined by the presence of low muscle mass in conjunction with weak muscle strength and/or poor physical function. In January 2019, EWGSOP published revised guidelines (EWGSOP2) for the definition and treatment of sarcopenia. EWGSOP2 defines sarcopenia using low muscle strength as the primary parameter, with diagnosis confirmed by the presence of low muscle quantity or quality. Physical performance measures now only categorise the severity of sarcopenia in EWGSOP2. A key aim of EWGSOP2 was to provide clear cut-points for these measurements in order to increase harmonisation of sarcopenia studies and clinical utility. However, the methods by which EWGSOP2 have derived these cut-points are problematic, with numerous inconsistencies highlighted by researchers since its publication. In March 2019, recommendations from the Sarcopenia Definition and Outcomes Consortium Conference (SDOC; an extension of the 2014 US FNIH Sarcopenia Project) were released. Preliminary findings suggest grip strength is an important discriminator of mobility disability (walking speed <0.8 m/s) and other adverse outcomes (e.g. falls), while lean mass, measured by dual-energy X-ray absorptiometry, is a poor discriminator of mobility disability. Notably, EWGSOP2 cut-points are generally based on estimates of -2 standard deviations below mean reference population values from previous analyses (without any specific sarcopenia outcome), whereas SDOC is adopting new classification and regression tree analyses with mobility disability as the outcome. This presentation will discuss the rationale and processes for the development of current sarcopenia definitions, while also covering their potential limitations. In light of multiple current sarcopenia definitions, initiatives are clearly required to reduce ambiguity among researchers and health care professionals on appropriate methods for the diagnosis of sarcopenia.

The ANZSSFR Task Force on Diagnostic Criteria for Sarcopenia: Initial Process and Outcomes, and Future Possibilities

The ANZSSFR Task Force on Diagnostic Criteria for Sarcopenia was established in 2017 to adopt and promote an operational definition of sarcopenia for use by clinicians and researchers in Australia and New Zealand. The Task Force was initiated due to the absence of international consensus regarding the diagnostic criteria for sarcopenia, and the recognition that there was a lack of understanding about sarcopenia amongst clinicians, researchers and members of the public in Australia and New Zealand. The Task Force adopted a modified Delphi method to achieve consensus. The Delphi method is an iterative process of consultation and exploration of disagreement amongst participants. The Task Force, comprised of 24 clinicians and researchers with an interest in sarcopenia, achieved consensus with 94% of members supporting adoption and promotion of the European Working Group on Sarcopenia in Older People (EWGSOP) definition, and the need for future validation of existing cut-points developed from international cohorts using Australian and New Zealand data. However, the EWGSOP subsequently released a revised sarcopenia definition, and an additional definition from the Sarcopenia Diagnostic and Outcomes Consortium (SDOC) is in preparation. These new definitions are likely to increase confusion for Australian and New Zealand clinicians and researchers with an interest in sarcopenia, highlighting the need for a clear and consistent message regarding the preferred operational definition. A modified Delphi consensus may be a path towards improving both the understanding of sarcopenia and the credibility of the field in the eyes of the wider community. To ensure representation by all stakeholders and to best promote the consensus outcomes, widespread participation should be sought. A diverse participation group could include researchers, clinicians, policy makers, members of the public and those living with sarcopenia. This presentation will summarise potential methods for expanding the original ANZSSFR Task Force on Diagnostic Criteria for Sarcopenia.
Symposium 2 – The operational definition of sarcopenia: Do we need to establish a consensus in Australian and New Zealand (again)? continued...

Interactive Discussion: What is Needed to Establish a Consensus Operational Definition of Sarcopenia in Australia and New Zealand

D Scott
Monash University Victoria

Consensus definitions of sarcopenia with a focus on clinical relevance were published almost a decade ago, and the provision of a code for sarcopenia in the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10-CM) in 2016 was another step towards increasing clinical recognition of sarcopenia. Despite these achievements, there is little evidence that assessment and treatment of sarcopenia is systematically performed by clinicians in Australia and New Zealand, and public awareness of sarcopenia appears exceedingly low. The ANZSSFR Task Force on Diagnostic Criteria for Sarcopenia was formed in 2017 to address poor awareness and knowledge of sarcopenia, and particularly, to establish a consensus on an operational definition of sarcopenia in Australia and New Zealand. The Task Force published the findings of its first expert-led Delphi process in 2018, and recommended the European Working Group on Sarcopenia in Older People (EWGSOP) original definition should be the preferred operational definition for use by clinicians and researchers. However, a subsequent revision to the EWGSOP definition in 2018 has led to calls for further work by the Task Force to clarify its consensus definition, and this may also present an opportunity to expand the process to include a wider range of stakeholders including clinicians, patients, funding bodies and community groups. This interactive discussion session led by Dr. Scott will invite audience members to comment on key topics highlighted in the earlier presentations by Dr Sim and Dr Zanker, and also to provide their own input into potential priorities for the Task Force, including developing consultation strategies, determining patient-relevant sarcopenia outcomes, and establishing local cut-points for components of sarcopenia. These discussions will be transcribed and subsequently reported to the Task Force to inform initiatives aimed at harmonising and promoting recommendations for sarcopenia case-finding in Australia and New Zealand.
Symposium 3 – Sarcopenia over the course of hospitalisation: Predictive value of muscle measures

**Predictive value of muscle measures during acute hospitalization of older adults: The EMPOWER study**
Meskers CGM, Reijnierse EM, Numans ST, Plerik VO, van Anicum JM, Scheerman K, Verlaan S, Maier AB.

**Background:** Approximately 10% of older adults is annually admitted to a hospital. Hospitalized older adults are at risk for detrimental outcomes, such as falls and loss of self-dependency. Muscle measures may be used for identification for adults at risk, timing and targets for intervention.

**Methods:** The EMPOWER study is an observational, prospective, longitudinal inception cohort of 378 patients aged 70 years and older who were subsequently admitted to four wards of the VU University Medical Center (The Netherlands) between April and December 2015. Patients were assessed for demographic and clinical characteristics, measurements of muscle mass (by bioelectrical impedance analysis), handgrip strength (by dynamometry) both at admission and at discharge. Three months post-discharge, mortality, falls and ADL/IADL by the Katz and Lawton and Brody score were assessed by a follow-up telephone interview. Long-term mortality up to four years post-discharge was obtained from hospital registries.

**Results:** The mean age was 79.7 years (SD 6.39), 49% were female and the median length of stay was 5 days (IQR 3-8). The majority of patients were living independently at the time of hospitalization (90%) and three months post-discharge (83%). The prevalence of sarcopenia was 40% with a higher proportion of males (76%) compared to females (5%). Mortality was 14% and 49% respectively at three months and four years follow-up. Muscle measures showed no significant decline during the hospital stay but were significantly associated with falls, loss of ADL/IADL and short- and long-term mortality.

**Conclusion:** Muscle measures in older hospitalized older patients relate to both short- and long-term detrimental outcomes while the change of muscle measures during hospitalization is inconclusive. Muscle measures are suited to identify patients at risk and for the planning of dedicated pre- and post-hospital interventions. Future prospective studies and trials are required to address the protective value of the aforementioned interventions.

**Longitudinal changes of muscle mass, muscle strength and physical performance in acutely admitted older adults up to three months post-discharge: The Hospital-ADL study**
Aarden JJ, Reijnierse EM, van der Schaaf M, van der Esch M, Reichardt LA, van Seben R, Bosch JA, Twisk JWR, Maier AB, Buurman BM, Engelbert RHH on behalf of the Hospital-ADL study group.

**Background:** Over 30% of acutely hospitalized adults aged 70 and older experience decline in their activities of daily living, such as standing up from a chair or walking. The decline in activities of daily living is associated with low muscle mass and muscle strength. Information on the course of muscle mass, muscle strength and physical performance over time may provide specific starting points for timing and targets for intervention.

**Methods:** The Hospital-ADL study is a multicentre, observational, prospective cohort study of 401 patients aged 70 years and older who were acutely admitted to six hospitals in The Netherlands between September 2015 and June 2017. Patients were assessed for demographic, psychosocial and physical measurements including muscle mass (by bioelectrical impedance analysis), handgrip strength (by dynamometry), chair stand time and gait speed (by Short Physical Performance Battery) at admission, discharge and one- and three months post-discharge.

**Results:** The mean age of the patients was 79.3 years (SD 6.6) and 49% were female. Muscle mass and muscle strength did not change during the acute hospital stay but showed a significant decline after discharge from the hospital. Chair stand time and gait speed improved significantly from acute hospitalization up to three months post-discharge. Fear of falling showed an interaction effect with the course of muscle strength over time.

**Conclusion:** Muscle mass and muscle strength did not change during acute hospitalization. At post-discharge, a significant decline was found in muscle mass and muscle strength. Future studies should focus on improving muscle mass and muscle strength including psychological aspects such as fear of falling directly after discharge from hospital.
Symposium 3 – Sarcopenia over the course of hospitalisation: Predictive value of muscle measures

Muscle measures and its clinical determinants in subacute geriatric rehabilitation patients: The EMPOWER-GR study
Reijnierse EM, Lim WK, Tuttle CSL, Maddison C, Maier AB.

Background: Geriatric patients admitted to subacute rehabilitation are at high-risk of sarcopenia due to muscle atrophy arising from their acute hospital admission and extended periods of bed rest during hospitalisation, in combination with older age and multimorbidity. In this context, sarcopenia may be a key determinant of functional rehabilitation outcomes.

Methods: The EMPOWER-GR study is an ongoing multicentre, observational, prospective longitudinal cohort of patients admitted to subacute geriatric rehabilitation wards. Our first wave of data included 693 patients. A Comprehensive Geriatric Assessment was performed assessing various health domains at admission and discharge, including muscle mass (by bioelectrical impedance analysis), handgrip strength (by dynamometry) and physical performance (by Short Physical Performance Battery; SPPB). A follow-up telephone interview was conducted three months post-discharge.

Results: The mean age was 82.2 years (SD 7.9), 57% were female and the median length of stay was 20 days (IQR 14-30). Before hospitalization, 97% was living independently. At admission, 63% was moderately-severely frail, 52% malnourished, 96% ADL dependent and the median SPPB score was 2 points (IQR 0-4). The prevalence of sarcopenia was 40% and the in-hospital incidence 7%. Skeletal muscle mass declined by −0.1±2.4kg. Handgrip strength, gait speed and SPPB score demonstrated improvements; handgrip strength by +0.7±4.4 kg, gait speed by +0.13±0.21 m/s and SPPB by +2±2 points. Muscle measures were significantly associated with inflammation, risk of malnutrition, functional dependency during admission, and with institutionalization and mortality at three months post-discharge.

Conclusion: The high proportion with sarcopenia supports the importance of diagnosing sarcopenia in this setting and the need for further investigation of therapeutic strategies. Despite the minimal changes in muscle measures, there was substantive individual variation and a high incidence of sarcopenia. Collectively, these data support subacute care as an important setting for the implementation of sarcopenia diagnostics as well as preventive and therapeutic strategies.
Symposium 5 – SPRINTT: moving toward function-centred geriatric medicine

The “function vs. disease dilemma” in contemporary medicine: Physical frailty & sarcopenia as a prototypic condition of new-generation geriatric medicine. The message of the SPRINTT project
Tosato M, Calvani R, Marzetti E, Landi F
Fondazione Policlinico Agostino Gemelli - Catholic University of Sacred Heart

Due to the worldwide demographic transition, healthcare systems are facing new demands. Health services—with their approach of mostly single acute conditions—are indeed confronted with an expanding older population characterized by specific medical needs related to multimorbidity and functional impairment. The European research project “Sarcopenia and Physical Frailty IN older people: multicomponent Treatment strategies” (SPRINTT) project is specifically designed to overcome existing barriers for efficient public health interventions against frailty, and promote the implementation of successful aging strategies across Europe. The SPRINTT randomized clinical trial (RCT) will compare the efficacy of a multicomponent intervention (based on long-term structured physical activity, nutritional counselling, and an information and communication technology intervention) versus a Healthy Aging Lifestyle Education program for preventing incident mobility disability in community-dwelling older persons with physical frailty and sarcopenia. For the RCT, 1,500 community-dwellers, aged 70 years and older (750 per treatment arm) will be enrolled. The study population will be comprised of “real life”, non-disabled older persons exposed to increased vulnerability to stressors. The identification of such population will rely on three key elements: low muscle mass, measured by DXA; clinical signs of physical frailty (i.e., weakness, slow walking speed, and poor balance); absence of major mobility disability. The primary outcome will be the incidence of mobility disability (i.e., incident inability to walk 400 meters). Secondary outcomes will include, among others, changes in physical performance and function; ability of selected biomarkers to predict the rate of change in muscle mass; incidence of falls. The SPRINTT RCT will be conducted in 15 study sites located in nine European countries. The inclusion of a population with special needs will open pathways for future direction in the prevention of physical disability.

In this symposium, the background, rationale, design, and data from the baseline visit of the SPRINTT trial will be described.

New Strategies for Biomarker Discovery in the Field of Physical Frailty and Sarcopenia
Marzetti E, Tosato M, Calvani R, Landi F
Fondazione Policlinico Agostino Gemelli - Catholic University of Sacred Heart

Physical frailty (PF) and sarcopenia are two common geriatric conditions upstream of the disabling cascade. The lack of a unique operational definition for PF and sarcopenia and their complex pathophysiology make the development of biomarkers for these conditions extremely challenging. Presently available biomarkers for PF and sarcopenia are typically related to specific pathogenic mechanisms and/or phenotypes. As such, they only describe single aspects of the conditions and are weakly associated with clinically relevant outcomes. This scenario suggests that there might not be one single biological marker that reliably tracks the multitude of different contributors and phenotypes of PF and sarcopenia. A shift of paradigm is therefore needed, moving from the quest for a single biomarker to the development of multivariate/multidimensional modeling of a panel of complementary biomarkers (likely within multiple classes: imaging, serum biomarkers, and functional tests). This approach may promote: (1) the early detection of otherwise subclinical conditions, (2) the diagnostic assessment of clinically-manifested PF and sarcopenia, (3) the risk stratification of subjects with a suspected or confirmed diagnosis, (4) the tracking of the conditions over time, (5) the selection of an appropriate therapeutic intervention, and (6) the monitoring of the response to treatment. As opposed to conventional monodimensional approaches, the simultaneous evaluation of multiple parameters belonging to different domains may be better suited to cope with the heterogeneity of complex age-related phenomena, such as PF and sarcopenia.
Nutritional status is of course a major determinant of the person's wellbeing. Evidence suggests that nutrition represents an important and modifiable factor potentially affecting the frailty status of the older person. Nutrition is not only involved in the direct assessment of frailty, but may also play a role in the definition of the interventions aimed at restoring robustness and contrasting sarcopenia. Given its capacity to provide beneficial effects on multiple systems and at biological, clinical, and social levels, nutrition may be considered as a multicomponent intervention per se. Notably, the combination of nutritional interventions and physical exercise appears to be the most effective strategy presently available for the management of sarcopenia.

For a nutritional intervention to be effective against frailty and sarcopenia, it should: a) provide an adequate caloric intake; b) ensure the provision of appropriate nutrients, taking into account age, sex, health status, PA level, and comorbidities; c) provide the adequate quality and quantity of nutrients at the right time, that is, when physiologically needed. We will detail existing evidence on the efficacy of different combinations of macronutrient, micronutrient, and “nutraceutical” compounds alone and in combination with exercise in relation to skeletal muscle mass, metabolism (protein and fuel), and performance (i.e., strength and function).
Symposium 6 – Impact of exercise on cellular changes during neuromuscular ageing

Age-related neurodegeneration may be caused by defects at the nuclear envelope, and attenuated by exercise
Gillon A P1, Cornwall J C2 & Sheard P W1

1Department of Physiology, School of Biomedical Sciences, University of Otago2,1 Centre for Early Learning in Medicine, Otago Medical School, University of Otago, New Zealand

Extensions to lifespan have resulted in widespread frailty caused by loss of skeletal muscle mass. Many studies have shown that age-related loss of skeletal muscle is driven at least partly by denervation arising from death of motoneurons. Recent evidence indicates that degradation of the nucleocytoplasmic barrier and transport process are likely contributors to motoneuron death in normal ageing. It is well established that exercise protects muscle mass in old age, so we asked whether this outcome might be due to prevention of age-related degenerative changes in motoneurons. Mice were given access to a running wheel for four months (or were retained as sedentary controls), and we then used immunohistochemistry to examine nuclear envelope and nucleocytoplasmic transport proteins in their motoneurons. We found that loss of lumbar motoneurons in old age was accompanied by reductions in immunodetectable levels of key nucleocytoplasmic transport proteins in surviving neurons, but these changes were attenuated in elderly animals that had undergone wheel running. Our results show that exercise reduces some of the emergent defects at the nuclear envelope that contribute to age-related motoneuron death, and by reducing motoneuron death it potentially helps preserve muscle mass by reducing denervation atrophy.

Structural alterations at the myotendinous junction in elderly and exercised mouse skeletal muscles
Sheard, P1, K. Nielsen1, N. Lal1, J. Cornwall1

1Department of Physiology, School of Biomedical Sciences, University of Otago, 2Centre for Early Learning in Medicine, Otago Medical School, University of Otago, New Zealand

Progressive loss of muscle mass accompanied by decline in muscle function are cardinal features of sarcopenia. The myotendinous junction is a crucial interface between tendons and contractile elements, and alteration in the properties of this structure has the potential to impact significantly on muscle function. Therefore, we sought to investigate whether changes at the myotendinous junction might contribute to the age-related decline in muscle function, and whether regular exercise might reduce the severity of any change. We visualised the myotendinous junctions of soleus muscle fibres from young (n=5, 6 months), elderly sedentary (n=5, 24 months), and elderly exercised (n=5, 24 months) mice using wholmount and transverse section immunohistochemistry. Length of the myotendinous region of muscle fibres increased by 95% between 6 and 24 months of age (p<0.0001) with no significant change in total fibre length or muscle pennation angle, resulting in a 6.4% decline in the contractile length of fibres. Extension to the myotendinous region was accompanied by a doubling (from 3% to 6% of section area) in collagen deposition in sections containing myotendinous profiles. Old mice that exercised regularly between 20-24 months reversed these changes. Therefore, prevention or reversal of changes to the connective tissue framework with regular exercise has the potential to maintain or improve muscle function during normal ageing.
Symposium 6 – Impact of exercise on cellular changes during neuromuscular ageing continued...

Proteomic differences between young, elderly, and exercised-elderly murine soleus muscles and their correlations with deficits in force production

Navneet Lal1, Jon Cornwall1,2, Tania Slatter3, Torsten Kleffmann4, Phil Sheard1
1Department of Physiology, School of Biomedical Sciences, University of Otago; 2Centre for Early Learning in Medicine, Otago Medical School, University of Otago; 3Department of Pathology, Dunedin School of Medicine, University of Otago; 4Centre for Protein Research, Department of Biochemistry, University of Otago

Skeletal muscles deteriorate with age and this manifests as weakness and disability amongst the elderly. To date, the most effective intervention against sarcopenia is exercise, but its mechanism of action at the cellular and molecular level has not been elucidated. Therefore, we sought to deepen our understanding of age-related changes in the C57Bl6 mouse soleus proteome and the potential impact these changes have on muscle force production. Moreover, we investigated how voluntary aerobic exercise acts to protect muscle function in sarcopenia and the concomitant impact it has on the soleus proteome.

We collected and measured the maximum absolute and specific force produced, muscle length vs tension relationships, stimulation frequency vs force, and nerve vs direct muscle stimulation of 29 soleus muscles (13 young, 10 elderly and 6 exercised elderly). A subset of this sample (3 young, 3 elderly and 3 exercised elderly) was subjected to proteomic analysis using SWATH-MS (sequential window acquisition of all theoretical fragment ion spectra mass spectrometry) to identify and quantify relative differences between the proteomes of young, elderly and exercised-elderly muscles, and whether they correlated with differences in force production characteristics. Furthermore, the subcellular location of proteins of interest was identified on tissue sections using fluorescence immunohistochemistry. The results of this investigation are currently pending and will be presented at this forum.
Outstanding Abstracts

**Chronic leucine-enriched whey protein reduces insulin concentrations in older women: Liverpool Hope University - Sarcopenia Ageing Trial (LHU-SAT)**

**Dr Ben Kirk**¹, Dr Kate Mooney¹, Dr Farzad Amirabdollahian³, Dr Omid Khaiyat¹

¹Liverpool Hope University, Liverpool, United Kingdom, ²The University of Melbourne, Melbourne, Australia

**Aim:** Increasing protein intake alone, or in combination with exercise, is suggested as a promising strategy to enhance musculoskeletal and cardiometabolic health. However, randomized controlled trials are needed to confirm this.

**Method:** 100 community-dwelling, older adults [52% women; age: 69 ± 6 years (mean ± SD), BMI: 27.2 ± 5.2 kg/m², SMI: 8.9 ± 1.0 kg/m²] were randomized to one of four [Control (C), Exercise (E), Exercise+Protein (EP), Protein (P)] independent arms. E and EP completed 16 weeks of exercise [resistance (2 times/week) and functional (1 time/week)]. EP and P were also administered a leucine-enriched whey protein supplement (3 times/day) based on individual body-weight (1.5g/kg/day). Muscle mass, strength and function, and fasting metabolic markers [plasma glucose, glycated haemoglobin (HbA1c), insulin, c-reactive protein (CRP), interleukin-6 (IL-6) and tumour necrosis factor (TNF-α)] were measured pre- and post-intervention.

**Result:** At post-intervention, leg extension (E: +103n; EP: +93n) and flexion (E: +48n; EP: +41n) strength, and scores on the short physical performance battery (E:+0.6 points; EP: +0.6 points) and six-minute walk test (E: +48m; EP: +55m) improved in E and EP respectively (p <0.05 vs C), with no further differences between-arms. In women only, post-intervention insulin levels declined in EP (-1.98 ± 0.51μIU/mL, p = 0.009) and P (-1.51 ± 1.58μIU/mL, p = 0.007) vs C, and remained significant after adjusting for baseline insulin, age, plasma glucose and fat mass (EP: β = -3.25, 95% CI: -5.58 to -1.02; P: β = -2.78, 95% CI: -5.09 to -0.47, p <0.05 vs C). Muscle mass, handgrip strength and inflammatory markers displayed no between-arm changes (p >0.05).

**Conclusion:** Chronic leucine-enriched whey protein treatment, positively induced sex-specific changes in insulin concentrations without further influencing muscle performance.

**Muscle viral delivery of IGF-I in mice promotes muscle and bone growth in response to suspension and reloading**

**Ms. Hui Jean Kok**¹, Ms. Lauren Lautenslager¹, Mr. Raymond Duong⁴, Dr. Joshua Yarrow¹, Dr. Elisabeth Barton¹,²,⁴

¹Department of Applied Physiology and Kinesiology, University Of Florida, Gainesville, United States, ²Department of Pharmacology and Therapeutics, University Of Florida, Gainesville, United States, ³Division of Diabetes, Endocrinology, and Metabolism, University Of Florida, Gainesville, United States, ⁴Anatomy and Cell Biology, School of Dental Medicine, University of Pennsylvania, Philadelphia, United States, ⁵Research Service Malcom Randall VA Medical Center, North Florida-Sorida Veterans Health System North Ge, Gainesville, United States

**AIMS:** Aging results in skeletal muscle (sarcopenia) and loss of bone (osteopenia) in a continuous and coexisting fashion ultimately disrupting quality of life in the geriatric population. Insulin-like Growth Factor I (IGF-I) is a major factor that modulates muscle and bone growth. We sought to investigate if increased IGF-I in muscle contributes to both muscle and bone remodeling during disuse and reloaded conditions.

**METHODS:** Unilateral intramuscular injection of self-complementary adeno-associated virus harboring the murine proIgf1 cDNA was performed in adult female C57BL6 mice 3 days prior to hindlimb suspension. Hindlimb muscles were unloaded for 7 days and then reloaded for 3, 7, and 14 days. Soleus muscles were harvested for morphological and functional assays.

**RESULTS:** Loss of soleus mass and force following suspension was not prevented by IGF-I, however there was 30% increase in muscle fiber cross-sectional area (CSA) due to IGF-I treatment. In addition, IGF-I rescued soleus mass and specific force loss following day 7 of reloading. Furthermore, there was a 17% increase in soleus mass and 30% increase in soleus specific force of IGF-I treated hindlimbs that were reloaded for 14 days. We also observed that there were 2-3 fold increase in centrally nucleated muscle fibers in IGF-I treated soleus across all groups (control, suspension, reloaded day 3, 7 and 14), an indication of increased satellite cell activity in the muscle. Trabecular bone density decreased by 35% in response to suspension, then rescued in IGF-I treated limbs across all groups by 10-35%. Minimal cortical bone thickness were observed.

**CONCLUSION:** This study extends evidence that IGF-I is a potent anabolic factor for both muscle and bone during disuse atrophy and is important once physical activity is resumed. Future work will be performed to delineate if our current finding is due to mechanical or chemical coupling between muscle, bone and IGF-I.
Outstanding Abstracts

**Associations of objectively-determined sedentary behaviour and physical activity with sarcopenia and incident falls over 12-months in community-dwelling Swedish older adults**

**Dr David Scott**1, Dr Jonas Johansson2, Ms Anooyha Gandham1, Professor Peter Ebeling1, Professor Peter Nordstrom2, Professor Anna Nordstrom2

1Monash University, Clayton, Australia, 2Umeå University, Umeå, Sweden

**Aim:** To explore associations of sedentary behaviour, light-intensity physical activity (PA) and moderate and vigorous intensity PA (MVPA) with sarcopenia (updated European Working Group on Sarcopenia in Older People definition; EWGSOP2) and its components, and also incidence of falls.

**Method:** 3,334 community-dwelling 70-year-olds residing in Umeå, Sweden, were included. Appendicular lean mass (ALM; dual-energy X-ray absorptiometry), hand grip strength (HGS) and timed up-and-go (TUG) were assessed. Sarcopenia was defined according to EWGSOP2 classifications; “probable” (low HGS only), “confirmed” (low HGS and low ALM), or “severe” (low HGS, low ALM and slow TUG). Participants were an accelerometer for seven days. Total time in, and number of bouts of, sedentary behaviour, light-intensity PA and MVPA were quantified using established algorithms. Incident falls were self-reported at 6 and 12 months after baseline.

**Result:** Only 1.8% of participants had probable or confirmed sarcopenia; none had severe sarcopenia. After adjustment for covariates including other levels of activity, only MVPA was associated with reduced likelihood of low ALM (odds ratio: 0.89; 95% CI: 0.85-0.93 per 1 hr increase in MVPA), low HGS (0.22; 0.10-0.48), slow TUG (0.34; 0.17-0.69) and probable or confirmed sarcopenia (0.80; 0.71-0.91). The number of MVPA bouts (10-19, 20-29, 30-39, 40-49, 50-59 minute bout durations) was also associated with lower likelihood for probable or confirmed sarcopenia in a dose-response fashion (odds ratio: 0.92; 95% CI: 0.88-0.97, 0.87; 0.80-0.96, 0.78; 0.66-0.93, 0.72; 0.56-0.94, and 0.66; 0.43-0.99, respectively, per additional bout). Total time and bouts of activity were not associated with 12-month incident falls (all P>0.05).

**Conclusions:** Greater time spent performing MVPA is associated with lower likelihood of sarcopenia independently of sedentary behaviour and light-intensity PA. Increasing participation in MVPA bouts of longer durations may be an important target for reducing sarcopenia prevalence in community-dwelling older adults.

**The role of individual components of sarcopenia and their rate of decline in fracture risk in elderly women and men**

**Mrs Dima Alajlouni**1, Dr Dana Bluc1,2, Dr Thach Tran1,2, Prof John A. Eisman1,2,3, Prof Tuan V. Nguyen1,2,4,5, Prof Jacqueline R. Center1,2,3

1Osteoporosis and Bone Biology Program - Garvan Institute of Medical Research, Sydney, Australia, 2Faculty of Medicine, UNSW Sydney, Sydney, Australia, 3Clinical School, St Vincent’s Hospital, Sydney, Australia, 4Clinical Translation and Advanced Education - Garvan Institute of Medical Research, Sydney, Australia, 5School of Medicine Sydney - University of Notre Dame Australia, Sydney, Australia

**Aim:** The relationship between sarcopenia and fracture is controversial. We assessed the independent contribution of individual components of sarcopenia (muscle mass, strength and performance) and their rate of decline to fracture risk in elderly women and men.

**Methods:** The study involved 914 women and 505 men aged 60+ years from the Dubbo Osteoporosis Epidemiology Study. Frailty fractures were ascertained by X-ray report (2000-2018). Clinical data, lean muscle mass (MM), BMD, quadriceps strength (QS), gait speed (GS), sit-to-stand (5xSTS), and get-up-and-go (TUG) were measured biannually. Multivariable adjusted Cox regression was used to determine the contribution of individual components of sarcopenia (baseline and rate of decline), operationally defined as the worst quartile, to fracture risk, accounting for age, BMD, prior fracture, and falls.

**Results:** There were 271 incident fractures over 9,436 person-years of follow-up in women, and 86 fractures over 5,150 person-years in men, yielding incidence rates of 29/1,000 person-years (95% CI: 25-32) in women, and 17/1,000 person-years (13-21) in men. MM and its rate of decline were not associated with higher fracture risk in either gender. Baseline strength and performance did not contribute to fracture risk in women. However, in men, baseline QS, GUG, STS, and GS were associated with a 2- to 3-fold increased fracture risk. Importantly, after accounting for their baseline level, greater rate of decline in strength and performance was associated with 1.61- to 2.69-fold increased fracture risk in women. In men, the rate of decline only contributed to fracture risk in addition to baseline measure for GS.

**Conclusion:** Baseline muscle strength and performance in men and their rate of decline in women, but not DXA-derived muscle mass, were associated with fracture risk. Easy to perform in primary care, they may be useful additions for fracture risk prediction and potential targets for therapeutic intervention.
Outstanding Abstracts

Effects of a Multicomponent Exercise Program Combined with a Multi-nutrient Supplement on Musculoskeletal Health in Men with Prostate Cancer Receiving Androgen Deprivation Therapy: A 12-Month Randomised Controlled Trial

Mr Jack Dalla Via1, Dr Patrick J Owen1, Professor Robin M Daly1, Ms Niamh L Mundell1, Professor Patricia L Livingston2, Dr Timo Rantalainen1,3, Professor Jeremy L Millar4, Professor Declan G Murphy3, Associate Professor Steve F Fraser1

1Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Geelong, Australia, 2Faculty of Health, Deakin University, Geelong, Australia, 3Gerontology Research Centre and Faculty of Sport and Health Sciences, University of Jyväskylä, Jyväskylä, Finland, 4Radiation Oncology, Alfred Health, Melbourne, Australia, 5Division of Cancer Surgery, Peter MacCallum Cancer Centre, Melbourne, Australia

AIM: Androgen deprivation therapy (ADT) improves survival in men with advanced prostate cancer (PCa), but is associated with multiple adverse effects including accelerated bone and muscle loss. No studies have examined the combined effects of exercise and nutritional supplementation on musculoskeletal health in this population. This 12-month randomised controlled trial (RCT) aimed to investigate whether multimodal exercise combined with protein, calcium and vitamin D supplementation could optimize musculoskeletal health in ADT-treated men.

METHODS: Seventy ADT-treated men (mean age: 71.3 ± 6.2 years) were randomised to exercise+supplementation (ExSuppl, n=34) or usual care (CON, n=36). The exercise program (3 d/week) included moderate-high intensity progressive resistance training (2 sets, 8-12 reps) and weight-bearing impact exercises (3 sets, 10-20 reps). The daily nutritional supplement included 25g whey protein (with 2.4g leucine), 1200mg calcium carbonate and 1000IU vitamin D. Key outcomes included: DXA areal hip and spine bone mineral density (aBMD) and total body lean mass and fat mass; pQCT cortical and/or trabecular volumetric BMD, bone structure and strength at the distal (4%) and proximal (66%) tibia and radius; and muscle strength (leg press, chest press and seated row).

RESULTS: Sixty men (86%) completed the study. ExSuppl resulted in an 11% greater increase in leg press muscle strength compared to CON (p<0.05), but had no effect on lean or fat mass, DXA aBMD or any pQCT bone outcomes. At 12 months, both groups experienced similar and significant losses of total hip and femoral neck aBMD (1.1-2.0%), distal radius trabecular vBMD (2.7-2.9%) and proximal tibia and radius cortical bone area (1.4-2.3%) and strength (2.1-3.5%).

CONCLUSION: In ADT-treated men, a 12-month multicomponent exercise program with daily consumption of a protein, calcium and vitamin D enriched drink was effective for improving muscle strength, but did not ameliorate bone and muscle loss.
Distinct trajectories of individual physical performance measures across 9 years in 60- to 70-year-old adults

Dr Anna Rojer1, Dr Trynke Hoekstra2, Dr Natasja van Schoor3, Prof Andrea Maier4,5, Prof Mirjam Pijnappels1
1Department of Human Movement Sciences, @AgeAmsterdam, Amsterdam Movement Sciences, VU University, Amsterdam, Netherlands, 
2Department of Health Sciences and the Amsterdam Public Health Research Institute, Faculty of Science, VU University Amsterdam, 
, Netherlands, 3Amsterdam UMC, VU University Amsterdam, Department of Epidemiology and Biostatistics, Amsterdam Public Health, 
Amsterdam, Netherlands, 4Department of Medicine and Aged Care, @AgeMelbourne, The Royal Melbourne Hospital, The University of 
Melbourne, Melbourne, Australia

AIMS: Physical performance is an important factor for successful ageing. This study aimed to describe distinct trajectories of four individual physical performance measures over 9 years of follow-up in individuals aged 60-70 years and to evaluate the characteristics of individuals and overlap between measures.

METHODS: Physical performance was measured in 440 participants of the Longitudinal Aging Study Amsterdam by tandem stand, gait speed, chair stand and handgrip strength. Gender-specific latent class models were conducted to obtain distinct trajectories. The degree of overlap between measures for the most (un)favourable trajectories was calculated.

RESULTS: Mean age at baseline was 67.9 (SD 1.7) years for males and 68.0 (SD 1.7) year for females. The optimal number of trajectories differed across measures. For tandem stand one trajectory (179 males, 198 females) was optimal. Three trajectories for gait speed were identified dependent on baseline speed: fast with no decline (47 males, 27 females), intermediate with no decline (132 males, 130 females) and slow with decline (6 males, 48 females). Two trajectories were identified for the chair stand: a stable (168 males, 150 females) and declining trajectory (10 males, 38 females). For handgrip strength three declining trajectories were identified differing in baseline performance: high (55 males, 75 females), intermediate (111 males, 118 females), and low (17 males, 10 females). The overlap between similar trajectories of all measures was minimal: 6.3%.

CONCLUSION: Trajectories of physical performance were heterogeneous, but showed similar trajectories for males and females. Little overlap between the measures was shown, suggesting different mechanisms for decline. This study emphasizes the use of multiple measurement methods to assess physical performance.
Oral Communications A

Enhancing protein intake to achieve national nutrient reference values may be insufficient to improve muscle mass and function in institutionalised older adults.

Dr Sandra Iuliano1, Mrs Shirley Poon1, Mrs Judy Robbins1, Dr Xiaofang Wang1, Professor Ego Seeman1,2
1University of Melbourne / Austin Health, Heidelberg, Australia, 2Australian Catholic University, Melbourne, Australia

Aim: Inadequate protein intake contributes to loss of muscle mass and function in older adults. As protein supplementation stimulates muscle protein synthesis, we hypothesised that dairy supplementation will improve muscle mass and function in older adults.

Methods: Sixty aged-care facilities (n=3600 residents, mean age 87.7±8.0yrs, 70% female), were randomly assigned to enhanced dairy menu (n=30 facilities) or usual menu (n=30) for 2 years. In 157 residents, body composition was measured using bone densitometry. Maximal ankle, knee, hip and hand-grip strength, and 5m gait speed were measured in 204 residents at baseline and 12 months. Compliance with intervention and dietary intake was determined using valid visual estimation of plate waste. Group differences were determined using a mixed effects model adjusting for age, sex and facility (cluster).

Results: Protein intake was augmented by 13g/day (95%CI: 9.1, 18, p=0.001) achieving a relative protein intake of 1.0±0.4g/kg body weight (BW) (p<0.001), a value greater than controls (0.8±0.3g/kg BW). Relative to sarcopenic definition guidelines, 27% of residents were classified as sarcopenic. 90% had hand-grip strength below the cut-off of 30kg for men and 20kg for women and 48% had gait speed slower than 0.8m/sec. At 12 months a group x time effect was observed for hip strength (p=0.037), in that hip strength declined less in supplemented (-23.0kg, 95%CI:-30.7, -15.3) than non-supplements residents (-35.7kg, 95%CI:-44.9, -26.6). No group differences were observed for changes in lean mass (1.7kg, 95%CI:-4.8, 0.4), relative appendicular skeletal mass (0.4kg/m2, 95%CI:-0.8, 0.1), hand grip strength (0.3kg, 95%CI:-1.4, 2.0), gait speed (0.3sec, 95%CI:-1.2, 0.6) or measures of ankle or knee strength.

Conclusion: Provided compliance and persistence were satisfactory, the limited benefit to hip strength and the remaining null observations suggest that enhanced protein intake to international standards (1.5g/kg BW) may be needed to improve muscle mass and function in older adults.

The impact of osteosarcopenia on mortality, aerobic capacity, balance, muscle strength and chronic inflammation in older people: 9-year follow up study.

Walter Sepúlveda Loyola1, Mario Molar1,2, Gustavo Duque1,2, Denilson Teixeira2, Regina Célia Poli-Frederico1, Vanessa Suziane Probst1,3
1Program of Masters and Doctoral degree in Rehabilitation Sciences, Londrina State University (UEL) and University of Northern Parana (UNOPAR), Londrina, Brazil, 2Program of Masters and Doctoral degree in Physical Education, Londrina State University (UEL) and University of Maringá (UEM, Maringá, Brazil, Londrina PR, Brazil, Londrina, Brazil, 3Grupo de estudo de envelhecimento (GEE), Londrina State University, Londrina, Brazil, 4Department of Medicine - Western Health, Melbourne Medical School, The University of Melbourne, St Albans, Victoria, Australia, Melbourne, Australia, 5Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne and Western Health, St. Albans, Victoria, Australia, Melbourne, Australia

Aim: This study aimed to determine the impact of osteosarcopenia on mortality and important functional outcomes in older persons.

METHOD: 242 community-dwelling older adults (77% female) aged 68-86 years old from Londrina, Brazil, participants from the study on aging and longevity (ELLO data from 2009 to 2018). Subjects underwent body composition analysis by dual energy X-ray absorptiometry and bioelectrical impedance, and assessments for aerobic capacity and muscle strength including the incremental shuttle walking test (ISWT), six minutes walking test (6MWT), handgrip force (HGF) and sit-and-stand test (STS). Static balance was assessed by the one-legged stance test (OLST) and chronic inflammation by IL-6 and tumor necrosis factor alpha (TNF-α). Osteosarcopenia was defined as low bone mineral density (BMD) (T-score<−1) combined with low phase angle (PhA). Comparison were run with Students T test and Man-Whitney test. Survival probabilities were estimated using the Kaplan-Meier method. Receiver operating characteristic curve was used to analyze the association of PhA with mortality and to find the best cut point.

RESULT: The proportion of individuals who died in a 9-year follow up was higher in the osteosarcopenic group (25%) compared to without osteosarcopenia (9%) (p=0.015). Osteosarcopenia was highly associated with mortality (OR= 2.64, 95%CI= 1.19-5.9, p= 0.017). Individuals with osteosarcopenia compared to those without it presented worse performance in the ISWT (514±19 m vs. 621±16 m), 6MWT (515±7 m vs. 538 ± 6 m), OLST (13.5±10.2 s vs.16.7 ±8.3 s) and HGF (25±7 Kg vs. 28±9 Kg), p< 0.05 for all. The cut-point used to PhA was ≤ 6.07º for both male and female (AUC: 0.687; Sensitivity: 64% and Specificity: 61% for mortality).

CONCLUSIONS: Osteosarcopenia diagnosed with low phase angle combined with low BMD is highly associated with mortality. Additionally, subjects with osteosarcopenia presented worse aerobic capacity, balance and muscle strength in older people.
Oral Communications A

The association of sarcopenia as a comorbid disease with institutionalisation and mortality in geriatric rehabilitation patients

Mr Jacob Pacifico1, Esmee M. Reijnierse1, Wen Kwang Lim1, Andrea B. Maier1,2
1 Department of Medicine and Aged Care, @AgeMelbourne, The Royal Melbourne Hospital, The University of Melbourne, Australia.
2 Department of Human Movement Sciences, @AgeAmsterdam, Faculty of Behavioural and Movement Sciences, Amsterdam Movement Sciences, Vrije Universiteit, Amsterdam, The Netherlands

AIM: Sarcopenia is associated with poor health outcomes such as falls, loss of independence and mortality and is more prevalent at higher age and in patients with age-related diseases. This study aimed to determine whether sarcopenia as a comorbid disease of cardiovascular disease (CVD), dementia, diabetes mellitus (DM) and respiratory disease, is associated with new institutionalisation and mortality post-discharge from geriatric rehabilitation.

METHOD: Geriatric rehabilitation patients were recruited from the Restoring Health of Acutely Unwell Adults (RESORT) cohort. Muscle mass (bio-electrical impedance analysis), handgrip strength and 4-meter gait speed were measured at admission. Sarcopenia was defined using the European Working Group on Sarcopenia in Older People (EWGSOP 2010). New institutionalisation was defined as not living in a nursing home before hospital admission and admitted to a nursing home post-discharge, ascertained via three-month follow-up phone call. Logistic regression analyses were performed adjusted for age and sex.

RESULT: 413 patients were included (56.4% female, mean age 82.5±7.87 years, median follow-up 108 days). The overall prevalence of sarcopenia was 41.6%; prevalence of sarcopenia was 42.4% in CVD patients, 48.1% in dementia patients, 35.7% in DM patients and 51.7% in respiratory disease patients. Sarcopenia as a comorbid disease of dementia was associated with new institutionalisation (OR=6.0, 95% CI: 2.1-17.7) compared to non-sarcopenic patients without dementia, but not in patients with CVD (OR=1.5, 95% CI: 0.5-4.4), DM (OR=2.7, 95% CI: 0.6-5.1) and respiratory disease (OR=1.7, 95% CI: 0.6-7.3) and respiratory disease (OR=1.7, 95% CI: 0.6-7.3). Sarcopenia as a comorbid disease of CVD and respiratory disease was associated with mortality (OR=4.0, 95% CI: 1.3-12.5; OR=3.0, 95% CI: 1.0-8.8, respectively), but not in patients with dementia (OR=2.2, 95% CI: 0.7-7.2) and DM (OR=1.0, 95% CI: 0.3-3.7).

CONCLUSIONS: Sarcopenia, comorbid of dementia, places patients at greater risk of institutionalisation, and sarcopenia, comorbid of CVD and respiratory diseases, places patients at greater risk of mortality post-discharge.
Muscle Fibre Morphometry in Winnie Mice Model of Inflammatory Bowel Disease

Shilpa Sharma1,2, Kulmira Nurgali1,2-3, Danielle Debruin1,3, Alan Hayes1,2,3, Gustavo Duque1,2
1Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health, Melbourne, Australia., Australia; 2Department of Medicine-Western Health, The University of Melbourne, Melbourne, Australia., Australia; 3Institute of Health and Sport, Victoria University., Australia

AIMS: Musculoskeletal dysfunctions are the most common peripheral manifestation in inflammatory bowel disease (IBD). The high incidence of sarcopenia (weakened and atrophied muscles) in IBD patients can lead to adverse outcomes. In Winnie mice, intestinal inflammation results from intestinal epithelial defect conferred by a mutation in the Muc2 mucin gene. We hypothesise that this mouse model of spontaneous chronic colitis is sarcopenic. To test our hypothesis, we characterised the muscle phenotype of Winnie mice compared to age matched control C57BL/6.

METHODS: As mild spontaneous inflammation in the colon is developed in Winnie mice by 6-weeks of age and results in severe colitis by the age of 12-16 weeks, we analysed the muscle micro-architecture, muscle mass and oxidative capacity of soleus muscle type in 6- and 15-week-old Winnie mice versus controls. Soleus muscles were dissected, weighed and frozen in isopentane cooled in liquid nitrogen (n=4/group). Transverse sections from the belly of the muscle were cut at a thickness of 12μm with a cryotome at −20°C. The muscle samples were then subjected to hematoxylin and eosin and succinate dehydrogenase staining procedures.

RESULTS: Winnie mice had similar number of fibres, fibre-size and inter-fibre space at 6-week of age compared to C57BL6. By 15-weeks, higher inter-fibre space and smaller muscle size was observed in Winnies compared to C57BL6 (p<0.05). Additionally, Winnie mice demonstrated lower oxidative capacity at 15weeks compared to controls, a difference also not seen at 6weeks.

CONCLUSION: Mild spontaneous inflammation at 6weeks of age in Winnie mice does not affect soleus muscle micro-structure and muscle mass. However, as this progresses to severe colitis, altered soleus muscle micro-structure and lower muscle mass is observed. Therefore, we conclude that muscle demonstrates signs of sarcopenia at later stages of inflammatory disease. However, additional experiments aiming to complete their muscle phenotype (i.e. strength) are still required.

Unmet needs in sarcopenia and osteoporosis prevention and early intervention for socially disadvantaged populations

Dr Esther Alonso1,2, Dr Sonia Cortado1,2, Professor Gustavo Duque1,2,3, Associate Professor Sharon Brennan-Olsen1,3
1University Of Melbourne, St Albans, Australia; 2Hospital Clinico San Carlos, Madrid, Spain; 3Australian Institute for Musculoskeletal Science (AIMSS), St Albans, Australia

Aims: With few exceptions, a social gradient exists for many chronic diseases: sarcopenia and osteoporosis appear to be no exception. Yet, whilst socially disadvantaged individuals may be most likely to benefit from prevention and early intervention programs, they are often the least likely to have access. This scoping study mapped sarcopenia and osteoporosis prevention/early intervention programs available to residents of the Brimbank Local Government Area (LGA); the third most populous area in metropolitan (western) Melbourne, yet with three times lower English proficiency, and one of the most socially disadvantaged Victorian LGAs.

Methods: We identified sarcopenia and osteoporosis prevention/early intervention programs that were available (at December 2017), for adults aged ≥65 years, and which did not require a referral from a healthcare practitioner. Grey literature and electronic resources were searched, encompassing local council, community groups, and government funded programs on offer in the LGA, amongst others.

Results: In the study region, 61 prevention/early intervention programs were identified that did not require a referral from a healthcare practitioner; only 50% of these programs were targeted at adults aged ≥65 years, and the remainder were open to adults of any age. There was limited availability of no-cost prevention programs (18% of total had no cost). Primary objectives of available programs were to improve mobility (27.9%), increase general fitness (21.3%), prevent falls (14.7%), improve gait and balance (9.8%), and functional rehabilitation (5%), whilst the remaining programs were ambiguous in their objectives (21.3%).

Conclusion: Despite Brimbank being one of the most socially disadvantaged Victorian LGAs, most of the prevention/early intervention programs involved a cost to participate. This information provides impetus for regional policy influencers to consider equity in their efforts to achieve healthier communities, and for musculoskeletal disease to be included in the biannual health-related characterization of this region by the Australian Health Policy Collaboration.
Sarcopenic obesity as a potential risk factor for obstructive sleep apnea: a population-based study

Ronaldo Delmonte Piovezan1, David Stevens2, Robert Adams2, Helton de Sá Souza1, Vania D’Almeida1, Sergio Tufik1, Dalva Poyares1
1Federal University Of Sao Paulo, Sao Paulo, Brazil; 2Adelaide Institute for Sleep Health (AISH), Flinders University, Adelaide, Australia

AIM: Evidence suggests that increased BMI is associated with changes in sleep parameters, as well as a higher risk of obstructive sleep apnea (OSA). However, the increase in the prevalence of OSA in older adults is not explained by weight changes. We aimed to evaluate the associations of sarcopenia, obesity and sarcopenic obesity with OSA in a mid-to old aged sample from the general population.

METHODS: Data came from the population-based cohort study EPISONO, which included a representative sample from the city of São Paulo in 2007. Questionnaires, actigraphy, and full polysomnography assessed sleep; bioelectrical impedance analysis evaluated body composition. Appendicular skeletal muscle mass adjusted for body mass index defined sarcopenia (men=0.79; women=0.512); total body fat defined obesity (men=30%, women=40%); and the overlap between both conditions defined sarcopenic obesity (SO). Final results were obtained by multiple multinomial logistic regression analysis.

RESULTS: 359 adults (median [range] age, 59 [50-88] years; 212 [59.1] female) were enrolled in the study. Obesity was detected in 22.6% of the sample, sarcopenia in 5.6%, and SO in 16.2%. After controlling for covariates, no poor sleep indicator or sleep disorder was associated with obesity or sarcopenia. However, SO was independently associated with OSA (OR=3.14, 95%CI=1.49-6.61). Additionally, nocturnal hypoxemia was associated with both obesity (aOR=2.59, 95% CI=1.49-4.49), and SO (OR=2.92, 95% CI=1.39-6.13).

CONCLUSION: Only participants with SO were more likely to have OSA. Those with obesity and SO were more likely to have nocturnal hypoxemia. These findings suggest both fat deposition and muscle decline play a synergistic role in the mechanisms leading to OSA in individuals close to or over old age, which may explain the higher age-related frequencies of sleep breathing disorders. Future research appraising prospective evaluations and therapeutic strategies to reduce the consequences of OSA in older adults should simultaneously target adipose and muscle tissues.

Effect of structured strength and balance training interventions on functional status, fall risk and neuropathy symptoms in patients with DPN: a randomized controlled trial

Dr Kavita Venkataraman1, Ms Tessa Riandini1
1Saw Swee Hock School of Public Health, National University Of Singapore, Singapore, Singapore

This study aimed to test the effectiveness of a structured strength and balance training intervention in improving functional status, fall risk and neuropathy symptoms in patients with diabetic peripheral neuropathy (DPN).

The study was a single-blind parallel group randomized controlled trial of 2 months of once weekly home-based strength and balance training with 143 DPN patients. Outcomes were assessed at baseline, 2 months and 6 months. Outcomes of interest were functional status (timed up and go (TUG), five times sit-to-stand (FTSTS), functional reach, static balance, ankle muscle strength and knee range of motion), balance confidence, fall risk, and neuropathy symptoms over 6 months. Mean differences in scores between groups were compared using mixed models.

Sixty-seven participants were included on each arm for the final intention-to-treat analysis. The two groups were similar, except in terms of gender. There were no significant differences between groups on the outcomes of interest at baseline. There were significant improvements in TUG (mean difference (MD) -1.14, 95%CI -2.18:-0.1; p 0.032), FTSTS (MD) -1.31, 95%CI -2.12:-0.51; p 0.001), ankle muscle strength (MD 0.94, 95%CI 0.09:1.78; p 0.031), knee range of motion (MD 6.82, 95%CI 2.8:10.78; p 0.001), balance confidence (MD 6.17, 95%CI 1.89:10.44; p 0.005), neuropathy symptom score (MD -0.57, 95%CI -0.93:-0.22; p 0.002). Although there was no significant intervention effect on fall risk, we observed 3% reduction in fall risk among intervention group.

Short-term strength and balance training produced sustained improvements in functional status, balance confidence, fall risk and neuropathy symptoms at 6 months. An intervention of this nature can potentially reduce the risk of falls and injuries in DPN patients and may be a useful treatment option for patients with DPN in clinical practice.
An interdisciplinary approach to nutrition management on an orthogeriatrics ward in South Auckland

Sandra van Lill, Dietitian and Melissa Birdling, Geriatrician.
Adult Rehabilitation and Health of Older People, Counties Manukau Health, South Auckland

Background: Middlemore Hospital is a tertiary teaching hospital in South Auckland, with a specialist orthopaedics service and a dedicated orthogeriatrics rehabilitation ward. The interdisciplinary team is comprised of the medical, nursing, allied health staff and rehabilitation assistants.

It is well documented that weight loss and malnutrition are associated with higher risk of hip fracture, and subsequent fractures. In 2012-2013 an audit of hip fracture patients (n=70) admitted to the orthogeriatrics ward at Middlemore Hospital, over a six-month period, found that 52% were at moderate-to-high risk of malnutrition. Patients with high nutrition risk had 1.5 times (95% C.I. 1.1-1.9) longer length of stay (LOS) than low risk patients. Prior to admission 90% of people were living in their own home, and only 57% were discharged home. Malnourished patients were more likely to be discharged to a residential aged care facility.

These results emphasised the importance of secondary prevention, through proactive nutrition management and to support people on their rehab journey.

An interdisciplinary team approach
An integrated, interdisciplinary approach has been implemented to manage nutrition on the orthogeriatrics ward at Middlemore Hospital. This includes:

- Rehab assistants screen all patients on admission to identify nutrition risk.
- All hip fracture patients are routinely prescribed oral nutrition supplements for the duration of their admission.
- Nutrition status is closely monitored by the team during admission e.g. twice weekly weights and regular review of oral intake.
- High and most moderate risk patients are referred for specialist Dietitian nutrition assessment and intervention.
- A Protected Meal Time policy operates – hence no assessments or interventions during meal times.
- A Red Tray system is in place for patients requiring assistance or encouragement with meals.
- Therapists run a Breakfast Group to assess patients’ functional status. This also provides opportunity for mobilisation, encourages socialisation and improves oral intake.
- Adding malnutrition as a diagnosis on the discharge summary alerts the primary care physician to the need for ongoing nutrition management and monitoring.
- Discharge planning to provide ongoing nutrition care to high risk patients post discharge.
- Weekly multidisciplinary meetings to discuss progress towards goals.
- Regular nutrition in-services to nursing staff and students.

Future initiatives include:

- Repeat audits of nutrition status of patients with fractures.
- Lunch Group – encouraging patients to eat lunch in the ward dining room.
- Adding grip strength as an assessment and outcome measure of frailty and sarcopenia.

Take home messages

- Malnutrition is common in hip fracture patients and is associated with poorer outcomes e.g. failed rehabilitation, increased LOS and increased health care costs.
- Nutrition is everyone’s concern, and an integrated, interdisciplinary team approach is essential to target malnutrition on the rehabilitation ward.

The dietitian is a key member of the orthogeriatrics team, and should provide tailored nutrition interventions to patients identified as increased nutrition risk.
Aim: Reported prevalence estimates for sarcopenia vary depending on criteria. We examined sarcopenia prevalence using different definitions and assessed agreement between them in an Australian sample.

Methods: Women (n=364) and men (n=342) aged 60-96 years from the Geelong Osteoporosis Study were included. Handgrip strength (HGS) was measured by dynamometer (Jamar) and appendicular lean mass (ALM) by whole-body DXA (Lunar). Sarcopenia definitions included the European Working Group on Sarcopenia in Older People (EWGSOP1, EWGSOP2) and the Foundation for the National Institutes of Health (FNHI). Sarcopenia was determined according to low HGS (EWGSOP1 <20kg, EWGSOP2 <16kg, women; <30kg, <27kg, men) and low ALM/height^2 (<5.67kg/m^2, <5.5kg/m^2, women; <7.23kg/m^2, <7.0kg/m^2, men); and low HGS (FNHI <16kg, women; <26 kg, men) and low ALM/BMI (<0.512m^2, women; <0.789m^2, men). Prevalence estimates were standardised to the Australian population (2011) and agreement between definitions assessed using the Cohen’s kappa statistic (κ).

Results: Between 13.7-29.9% women and 2.1-14.1% men were identified with low HGS. Low ALM/height^2 was identified in 7.1-11.8% women and 6.0-8.4% men, and 21.7% of women and 21.1% of men had low ALM/BMI. Age-standardised prevalence estimates for sarcopenia were 5.9% (95%CI 3.4-8.4) for women and 2.9% (1.9-4.0) for men (EWGSOP1), 2.3% (1.3-3.4) for women and 0.5% (0.2-0.9) for men (EWGSOP2), and 4.0% (2.1-5.8) for women and 1.1% (0.6-1.5) for men (FNHI). There was moderate agreement between EWGSOP1 and EWGSOP2 for women (κ=0.58) and men (κ=0.30). There was poor agreement between FNHI and EWGSOP1 (κ=0.16 women, 0.12 men) and EWGSOP2 (κ=0.19 women, 0 men).

Conclusions: Sarcopenia prevalence differed according to definition applied. Point estimates for sarcopenia prevalence according to EWGSOP2 identified fewer individuals than EWGSOP1, with FNHI estimates between the two; however, the 95%CIs overlapped. Further work is needed to harmonise the criteria and decide if cut-points should be population-specific.

P2 Clinical implications of osteosarcopenia and its components in community-dwelling older adults

Mr Steven Phu1,2,3, Mr Walter Sepúlveda-Loyola1,2,3, Dr Ebrahim Bani Hassan1,2, Assoc Prof Sharon Brennan-Olsen1,2, Dr Jesse Zanker1,2, Dr Sara Vogrin1,2, Ms Romy Conzade1,2, Dr Vanessa Probst1, Prof Gustavo Duque1,2
1Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne and Western Health, St Albans, Australia, 2Department of Medicine - Western Health, Melbourne Medical School, The University of Melbourne, St Albans, Australia, 3Masters and PhD Programme in Rehabilitation Sciences, Londrina State University (UEL) and University North of Paraná (UNOPAR), Londrina, Brazil, 4Heinrich Zentrum München - German Research Center for Environmental Health (GmbH), Institute of Epidemiology, Neuherberg, Germany

Aims: This study aimed to determine the associations of osteosarcopenia with physical performance, balance and falls and fractures in community-dwelling older adults. Additionally, we aimed to determine whether the impact on clinical outcomes is dependent on specific components of osteosarcopenia.

Methods: Cross-sectional data were extracted for 253 community-dwelling older adults (77% women) aged 77.9±0.42 years old who presented for a falls and fractures risk assessment in Melbourne, Australia. Participants were mobile, community-dwelling older adults aged 65 years or older without cognitive impairment. Participants underwent body composition analysis by dual energy X-ray absorptiometry, and assessments for physical performance including the Timed Up and Go (TUG) and Short Physical Performance Battery (SPPB). Static balance was assessed by posturography and dynamic balance by the four-square step test (FSS). Falls in the past year and fractures in the past 5 years were self-reported. Osteosarcopenia was defined as (i) low bone mineral density (BMD) (T-score ≤−1 SD) combined with sarcopenia, and (ii) osteoporosis (BMD T-score ≤−2.5 SD) combined with severe sarcopenia. To define sarcopenia, we employed the European Working Group on Sarcopenia in Older People (EWGSOP1), the revised criteria (EWGSOP2), and the Foundation for the National Institutes for Health (FNHI). Kruskal-Wallis and logistic regression were used for statistical analysis.

Results: Osteosarcopenia was associated with worse SPPB, TUG, FSS, limit of stability, falls and fractures history. Additionally, osteosarcopenia with severe sarcopenia component was related to an increased rate of falls (OR from 2.83 to 3.63; p< 0.05 for all) when using the EWGSOP2 definition and fractures when using the FNHI definition (OR from 3.86 to 4.38; p< 0.05 for all).

Conclusion: Osteosarcopenia was associated with overall worse physical performance and balance. Use of the EWGSOP2 and FNHI criteria resulted in the strongest associations with physical performance, falls and fracture rates.
P3
Change in frailty index following a 12-month weight loss intervention in Australian breast cancer survivors

Dr Natasha Reid1, Professor Ruth Hubbard1, Dr Nancye Peel1, Associate Professor Marina Reeves1
1The University of Queensland, Runcorn, Australia

AIM: To investigate change in the frailty index (FI) following a 12-month intervention targeting diet and physical activity in Australian breast cancer survivors diagnosed with stage I-III breast cancer.

METHODS: The Living Well after Breast Cancer study was a two-arm pragmatically-designed randomised controlled trial of a 12-month telephone-delivered weight loss intervention versus usual care in women (aged 18-75 years; body mass index [BMI] 25-45 kg/m2) following treatment for early-stage (I-III) breast cancer. Intervention targets included: modest weight loss (5-10%), 500kcal/day reduction in energy intake and increasing diet quality, and increasing physical activity to 210 minutes/week and resistance exercise to 2-3 times/week. Regression analyses, adjusted for baseline FI, age, smoking status, marital status and time since diagnosis were used to assess the intervention effects on change in FI.

RESULTS: Data for participants with complete data (n=127) were analysed (age [mean±SD]: 56.4±9.0 years; BMI: 31.5±5.1 kg/m2). Mean weight loss was significantly higher (p<0.001) in the intervention group (-4.2±5.4 kg) compared to the usual care group (-0.01±4.2 kg). Mean FI at baseline was 0.19±0.09. Mean FI improved significantly in both groups (intervention: -0.018 [95%CI: -0.027, -0.009]; usual care: -0.010 [95%CI: -0.019, -0.000]), although the between-group difference was not statistically significant (intervention minus usual care: -0.008 [95%CI: -0.021, 0.005]).

CONCLUSION: Intervention participants experienced a larger mean reduction in their FI compared to the usual care group, although this was not statistically significant. This is one of the first studies to investigate the impact of a weight loss intervention on the FI. In addition to the intervention targets in this study, future interventions should aim to target more health factors that contribute to the FI, such as social, cognitive and mental health, and medication use. Factors associated with the improvement of the FI in the usual care group also warrant further exploration.

P4
Protective and Harmful Factors Associated with Pro-dromal Sarcopenia in an Early Middle-aged Birth Cohort

Lara Vlietstra1, Dr Debra L. Waters1, Dr Kim Meredith-Jones1
1Department of Medicine, University of Otago, Dunedin, New Zealand; 2School of Physiotherapy, University of Otago, Dunedin, New Zealand

AIM: Sarcopenia is well described in older adults, but early onset sarcopenia (pro-dromal sarcopenia) may present before the age of 50. Factors attributable to early onset sarcopenia in middle-aged adults are largely unknown and identifying these factors was the aim of this study.

METHODS: The Dunedin Multidisciplinary Health and Development Study is a birth-cohort study that began in Dunedin, New Zealand in 1972. The current study used data from ages 38 and 45 years (n=904). The primary outcome was pro-dromal sarcopenia at age 45, defined by low appendicular lean muscle mass (ALM) measured by DXA. Relationships between low ALM at age 45 and biomarkers, lifestyle, physical function and physical activity at age 38 were analysed using univariate logistic regression adjusted for sex and BMI.

RESULTS: Using Prado’s age-specific median cut-scores, participants were classified as having low ALM or normal/high ALM. Thus, 50.1% (n=451) of the cohort had low relative ALM. Mean BMI was 28.44 and 52.0% of the cohort were female. Significant protective factors for low ALM at age 45 were: creatinine (OR=0.976, CI=0.960-0.992), BMI (OR=0.581, CI=0.540-0.625), weight (OR=0.959, CI=0.938-0.982), year of the first pregnancy in women (OR=0.945, CI=0.897-0.996), weekly hours spent on sport/leisure activities (hard; OR=0.820, CI=0.747-0.901, very hard; OR=0.711, CI=0.561-0.900), VO2max (OR=0.943, CI=0.899-0.988), grip strength (OR=0.914, CI=0.889-0.939), one-leg balance (OR=0.969, CI=0.949-0.989), perceived physical functioning (OR=0.979, CI=0.963-0.996) and perceived overall fitness (OR=0.219, CI=0.050-0.964). The only significantly associated harmful factor was smoking, both the amount of cigarettes a day (OR=1.035, CI=1.005-1.065) and package years (OR=1.024, CI=1.000-1.047).

CONCLUSION: Pro-dromal sarcopenia is present in early middle aged but a number of factors appear protective. Only smoking history was the strongest harmful factor. If confirmed in other studies, intervention trials focused on modifiable factors could be undertaken.
Poster Abstracts – Early- to Mid-Career Research Pitch Posters

P5
SUPPLEMENTATION IMPROVES PROTEIN DEFICIENCIES IN COMMUNITY-DWELLING (PRE)SARCOPENIC OLDER PEOPLE

Lenore Dedeyn1, Jolien Dupont1, Jos Tournay2, Katrien Koppo3, Sabine Verschueren3, Evelien Gielen1,2
1Division of Gerontology & Geriatrics, Department of Chronic Diseases, Metabolism and Ageing (CHROMETA), KU Leuven, Leuven, Belgium; 2Department of Geriatric Medicine, UZ Leuven, Leuven, Belgium; 3Exercise Physiology Research Group, Department of Movement Sciences, KU Leuven, Leuven, Belgium; 4Department of Rehabilitation Sciences, KU Leuven, Leuven, Belgium

Aim: The protein Recommended Dietary Allowance (RDA) for healthy adults is 0.8g protein/kg bodyweight (BW)/day (d). Expert groups, such as the PROT-AGE study group, recommend a higher protein intake (up to 1.5g protein/kg BW/d) for older people with chronic diseases. In addition, at least 25-30g protein (whereof at least 2.5g leucine) is recommended per meal. To our knowledge, daily protein intake has not been described in a (pre)sarcopenic older population. Also, we wanted to investigate whether protein supplementation influences dietary protein intake.

Methods: Community-dwelling individuals (≥ 65 years) with (pre)sarcopenia were included in the ENHANCe study (NCT 03649688). Dietary protein intake was calculated by four day estimated dietary records. Participants received an individualized protein supplement (Nestlé Instant Protein), to achieve a total (dietary + supplemental) intake of 1.5g protein/kg BW/d for twelve weeks.

Results: Twenty-four (pre)sarcopenic adults (75.21 ±5.76 years, 33% female) had an average dietary protein intake (1.02 ±0.22 g/kg BW/d) that was higher than the RDA, but lower than the 1.5g/kg BW/d recommended by experts. Supplementation improved total protein intake to 1.53 ±0.22 g/kg BW/d and did not affect dietary protein intake. More than 60% of dietary protein intake was of animal origin. At baseline, protein intake reached the threshold of 25g per meal at lunch and dinner. Supplementation increased the protein intake of all three main meals to levels of at least 30g. Leucine intake at baseline was insufficient at breakfast (mean 0.82g ±0.56), lunch (median 2.25g (1.80-2.71)) and dinner (median 2.00g (1.26-2.66)). Supplementation increased leucine levels to target levels at lunch, but not at breakfast and dinner.

Conclusions: Community-dwelling (pre)sarcopenic older people do not reach the recommended protein intake for older people proposed by expert groups. With individualized protein supplementation, adequate intake of protein can be obtained without substantial change in dietary intake.

P6
Optimal resistance training for older adults to increase muscle mass: A systematic review and meta-analyses

Mr Anthony A Kamleh1, Dr Esmee R Reijnierse2, Mr. Jesse J Jarden3, Professor Robin M Daly2, Professor Andrea B Maier1,4
1Department of Medicine and Aged Care, @AgeMelbourne, The Royal Melbourne Hospital, The University of Melbourne, Parkville, Australia; 2Amsterdam UMC, University of Amsterdam, Department of Rehabilitation, Amsterdam Movement Sciences, Amsterdam, Netherlands; 3Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Geelong, Australia; 4Department of Human Movement Sciences, @AgeAmsterdam, Faculty of Behavioural and Movement Sciences, Amsterdam Movement Sciences, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

Aim: Resistance exercise training (RET) can increase muscle mass and strength in older adults, but evidence regarding the most effective protocol is lacking. The objectives of this systematic review and meta-analysis were: (1) to determine the optimal variance of RET factors (equipment, total training dose, number of exercises, volume (sets and repetitions), frequency, length of intervention, progression, intensity, session duration, training structure, adherence, and attrition) to increase muscle mass (primary outcome) and muscle strength (secondary outcome); and (2) to compare these results with international RET guidelines.

Methods: A systematic search was conducted using five databases (MEDLINE, CINAHL, Cochrane, Embase, and SPORTDiscus) from inception until 30th August 2018. Included studies were randomised controlled trials, with a mean/median age of participants ≥65 years, comparing RET to a comparison group and reporting muscle mass pre- and post-intervention.

Results: Ninety-nine articles (139 interventions) were included in the systematic review and 61 in the meta-analyses (82 interventions). There was considerable heterogeneity in the number for interventions that detected significant increases in muscle mass (60/139, 43%) and muscle strength (61/98, 68%). RET factors associated with the greatest gains in muscle mass and muscle strength were: use of combination of equipment, seven to eight exercises per session with three lower body exercises, a volume of three to four sets and 12 to 15 repetitions per exercise, a frequency of two-three days per week, intervention length of greater than six weeks, progressive intensity, intervention duration of 15-45 minutes, and in a supervised individually training structure. These results align with current guidelines provided by American, Australian, Japanese, British, Canadian and Japanese societies.

Conclusion: Not all RET interventions are effective for improving muscle mass and strength, but our meta-analysis suggests that adhering to the current RET guidelines for older adults are likely to be most effective.
CONCLUSION: Accurate estimation of the energy requirements including the resting metabolic rate (RMR) is important for optimal nutritional care, yet its clinical determinants are unknown. This study examined the associations between clinical determinants of the Comprehensive Geriatric Assessment (CGA) domains with RMR among geriatric outpatients.

Aims: Accurate estimation of the energy requirements including the resting metabolic rate (RMR) is important for optimal nutritional care, yet its clinical determinants are unknown. This study examined the associations between clinical determinants of the Comprehensive Geriatric Assessment (CGA) domains with RMR among geriatric outpatients.

Methods: This study included community-dwelling older adults (n=84, 54 females) referred to geriatric outpatient mobility clinics recruited in Amsterdam (The Netherlands) and Melbourne (Australia). Determinants within domains of the CGA included diseases (number, type and severity of diseases, polypharmacy), nutrition (body weight, body mass index (BMI), absolute and relative skeletal muscle mass (SMM), fat-free mass (FFM), fat mass (FM), risk of malnutrition), physical function (handgrip strength, Short Physical Performance Battery. Timed Up & Go), cognition (Mini-Mental State Examination), psychological wellbeing (Geriatric Depression Scale) and blood pressure (systolic, diastolic, heart rate). RMR was objectively measured using indirect calorimetry with a canopy hood. Associations between the clinical determinants with standardized RMR (country and sex-specific z-scores) were analysed with linear regression adjusted for age, sex and body weight. A Bonferroni correction (p<0.0015) was applied to account for multiple testing.

Results: Determinants within the nutritional domain were associated with RMR. Absolute measures (i.e. body weight, BMI, SMM, FFM and FM in kg) had higher effect estimates (β) than relative measures (i.e. SMM, FFM and FM in %). Within the absolute measures, body weight showed the strongest association with RMR (β=0.58, p<0.0015). Significant associations between determinants within the nutritional domain with RMR disappeared after further adjustment for body weight. None of the other domains were associated with RMR.

Conclusion: Body weight is the strongest clinical determinant of RMR and should be taken into account when estimating RMR in geriatric care.

P8
Mid-thigh bone, muscle and fat mass vs conventional tissue mass indices: Associations with strength, performance and balance in older patients

Deep Bani Hassan, Steven Phu, Sara Voogin, Gustavo Duque
Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne and Western Health, St. Albans, Australia
Department of Medicine-Western Health, The University of Melbourne, St. Albans, Australia

Aims: Mid-thigh has been suggested for quick and low radiation assessment of bone, muscle and fat mass. We hypothesised that mid-thigh tissue masses are as good or better than conventional indices in predicting outcomes.

Methods: Data from 260 patients with a history or risk of falls and fractures and examined at the Falls and Fracture Clinic were included. Cross-sectional assessments included: a comprehensive clinical exam, DXA scan (at conventional regions and at mid-thigh), grip strength, posturography, gait speed (GAIT Rite®), timed up and go (TUG) and four-square step (FSST) tests. Pearson’s correlations and linear regression analyses were applied.

Results: Mean age of participants was 78 years ±6.7 (range 65-96). Bone mass in the mid-thigh region was moderately to highly correlated to conventional measures of bone mass (r=0.491-0.756, p<0.001). Mid-thigh lean mass was strongly correlated to appendicular lean mass (ALM) (r=0.718-0.770, p<0.001) and mid-thigh fat mass was strongly correlated to gynoid or total fat (r=0.643-0.815, p<0.001). When corrected for BMI, appendicular and mid-thigh muscle lean masses produced better associations with strength (p<0.001), gait speed (0.001), and balance compared to correction for height. Dynamic indicators of balance: gait speed (0.002), FSST (0.006), heel-to-toe distance (0.046) and TUG (0.020) were all associated with muscle masses corrected for BMI, age and gender. Conversely, static balance indicators (e.g. limits of stability, eyes-open, eyes-closed and saccadic ellipse areas) were not associated with muscle mass. Horizontal visuo-vestibular interaction sway (0.037) and vertical visuo-vestibular interaction sway (0.003) showed significant associations with mid-thigh and/or appendicular lean mass. Only ALM/BMI was negatively associated with fear of falling (FES-I, p<0.013), and despite the negative associations between number of falls with lean masses corrected for BMI, the associations did not reach significance.

Conclusion: Mid-thigh is a potential surrogate to study bone, muscle and fat mass with strong associations with alterations in strength, performance and balance.
Poster Abstracts

P9
The increased risk of falls in sarcopenic older adults is associated with impairments in several components of postural balance: a cross-sectional study

Dr Ben Kirk1,2, Mr Steven Phu1,2, Dr Sharon L Brennan-Olsen1,2, Dr Sara Vorgin1,2, Dr Ebrahim Bani Hassan1,2, Dr Ahmed Al Saedi1,2, Dr Gustavo Duque1,2
1University of Melbourne, Melbourne, Australia, 2Australian Institute for Musculoskeletal Science, St Albans, Australia

Aims: Sarcopenia increases falls, which associates with impaired balance. However, the specific components of balance affected by sarcopenia remain unclear.

Methods: In 265 community-dwelling older adults [72.8% women, aged: 65 - 96 years] the revised EWGSOP2 algorithm was used to classify participants as non-sarcopenic, pre-sarcopenic or sarcopenic. Appendicular lean mass (dual energy x-ray absorptiometry), handgrip strength (hydraulic dynamometer) and gait speed (over 4-metres) were used to determine sarcopenia, while balance domains were evaluated by a 3D virtual reality system, and the number of self-reported falls (over previous 12 months) were categorized as ≥2.

Results: Prevalence of sarcopenia was 21.5% (17.2% women). Of those, 26 (9.8%) were classified as pre-sarcopenic, and 31 (11.7%) as sarcopenic: of the older adults classified as sarcopenic, 83.9% were defined as severe-sarcopenic. Comparisons of balance domains revealed a greater proportion of sarcopenic older adults had poorer limits of stability (LOS) compared to their non-sarcopenic counterparts (+21.2%, p= 0.038). Compared to the non-sarcopenic group, a higher proportion of pre-sarcopenic (+39.4%, p <0.001) and sarcopenic (+57.3%, p <0.001) older adults were unable to complete the stand on foam with eyes closed (FECA) assessment. We also observed a higher proportion of participants with a history of ≥2 falls in pre-sarcopenic (+34.2%, p <0.001) and sarcopenic (+28.8%, p= 0.002) older adults versus the non-sarcopenic group. After adjustment for age and sex, clinically relevant associations were seen for those scoring above the LOS cut-points [odds ratio (OR) 0.53, 95%CI 0.17-0.65] and being able to complete the FECA assessment [OR 0.44, 95%CI 0.26-0.75] with a lower likelihood of reporting ≥2 falls; results were sustained after further adjustment for parathyroid hormone.

Conclusion: Specific components of balance are more affected by sarcopenia in older adults. Future rehabilitation programs should focus on improving those components; to decrease falls risk in sarcopenic older adults.

P10
Greater adherence to a Mediterranean diet is associated with better gait speed in older adults with type 2 diabetes mellitus.

Dr Anthony Villani1, Ms Rebecca McClure1
1University of the Sunshine Coast, School of Health and Sport Sciences, Australia

Background & Aims: Adherence to a Mediterranean Diet (MedDiet) is emerging as a potential dietary strategy to attenuate physical disability with age. This cross-sectional analysis aimed to explore the association between adherence to a MedDiet and characteristics of the physical frailty phenotype in older adults with type 2 diabetes mellitus (T2DM).

Methods: Adherence to a MedDiet was assessed using two dietary adherence tools: 1) alternate Mediterranean Food Score (MED); 2) Mediterranean Diet Adherence Screener (MEDAS). The short physical performance battery (SPPB) and gait speed was used to evaluate lower extremity physical function. Frailty was defined as having three of the following: exhaustion, low muscle strength, low physical activity, slow gait speed, and weight loss. Multiple regression analysis was used to summarise associations between dietary adherence, SPPB score, gait speed and muscle strength adjusted for age, physical activity and time since T2DM diagnosis.

Results: A total of n = 87 participants (71.2 ± 8.2 years) were included. A total of n = 6 (~7%) and n = 32 (~37%) participants were identified as frail and pre-frail respectively. After adjustment for age, physical activity and time since T2DM diagnosis, greater adherence to a MedDiet, using both adherence tools, was significantly associated with better gait speed (MED: β = 0.365; P = 0.002; MEDAS: β = 0.313; P = 0.007). When assessing the individual dietary elements included in the MED score, fish and seafood consumption was the single significant contributor to better gait speed (β = 0.229; P = 0.05). Nil associations were observed when assessing adherence against muscle strength.

Conclusions: Greater adherence to a MedDiet was associated with better lower extremity physical performance in older adults with T2DM. Future studies should investigate the efficacy of a MedDiet intervention for attenuation of physical frailty characteristics in older adults with T2DM.
P11
Diagnostic differences and agreement between the original and revised European Working Group on Sarcopenia in Older People operational definitions.

Dr Anthony Villani1, Ms Rebecca McClure1
1University of the Sunshine Coast; School of Health and Sport Sciences, Australia

Aims: This cross-sectional study aimed to compare diagnostic differences for identification of sarcopenia between the original EWGSOP1 and the most recently revised EWGSOP2 definitions, in older adults with type 2 diabetes.

Methods: Appendicular skeletal muscle (ASM) corrected for height (ASM/m2) was assessed by dual energy X-ray absorptiometry. For confirmation of sarcopenia using the EWGSOP1 definition, low ASM index (males, ≤7.26kg/m2; females, ≤5.5kg/m2) accompanied low hand-grip strength (HGS) (males, ≤30kg; females, ≤20kg) or low physical performance (SPPB score: ≤8; or gait speed: ≤0.8m/sec). In contrast, for confirmation of sarcopenia using the EWGSOP2 definition, low muscle strength (HGS: males, ≤27kg; females, ≤16kg or chair stands: ≥15sec for 5 rises) accompanied low ASM index (males, ≤7.0kg/m2; females, ≤5.5kg/m2). Cohen’s kappa (κ) statistic was applied to determine the degree of agreement between the two definitions. Chi-square (with post-hoc analysis by Bonferroni correction) was applied to determine differences in the prevalence of non-sarcopenia, pre/probable sarcopenia and sarcopenia between the two definitions.

Results: A total of n = 87 older adults were included. Agreement between the two definitions was low and non-significant (κ value = 0.118, P = 0.144). Significantly more cases of sarcopenia were identified when applying the EWGSOP1 definition (EWGSOP1: n = 6 (7%); EWGSOP2: n = 2 (2%), P <0.001). No gender differences were reported. No significant differences were observed for identification of non-sarcopenia (EWGSOP1: n = 69 (79%); EWGSOP2: n = 72 (83%); P = 0.184) and pre/probable sarcopenia (EWGSOP1: n = 10 (11%); EWGSOP2: n = 12 (14%); P = 0.180).

Conclusions: We report a lack of agreement for identification of sarcopenia using the two operational definitions proposed by the EWGSOP. Specificity and sensitivity analysis using larger heterogenous cohorts, which captures all diagnostic criteria from both operational definitions would be of benefit.

P12
Adiposity is inversely associated with strength in older adults with type 2 diabetes mellitus

Ms Michelle Barrett1, Ms Rebecca McClure1, Dr Anthony Villani1
1University of the Sunshine Coast; School of Health and Sport Sciences, Australia

Aims: A decline in muscle mass coupled with excessive adiposity has been proposed as potential mediators contributing to mobility disability and poor muscle quality with age. This cross-sectional analysis aimed to explore the associations between measures of adiposity, muscle strength and physical performance in community-dwelling older adults with type 2 diabetes mellitus (T2DM).

Methods: Adiposity was measured by waist circumference (WC) or body fat percentage (BF %) derived from dual energy X-ray absorptiometry (DXA). The short physical performance battery (SPPB) and gait speed were used to evaluate lower extremity physical function. Muscle strength was assessed using hand-grip strength (HGS) or chair stands. Multiple regression analysis was used to summarise the association between measures of adiposity, SPPB score, gait speed, HGS and chair stands adjusted for age, gender and total appendicular skeletal muscle (ASM).

Results: A total of n = 87 community-dwelling older adults with T2DM (71.2 ± 8.2 years; BMI: 29.5 ± 5.9kg/m2) were included in the final analyses. WC was positively associated with total ASM (r = 0.626; P <0.001). However, WC was negatively associated with HGS (β = -0.373; P = 0.03) even after adjustment for age, gender and total ASM. When assessed as BF %, adiposity was also negatively associated with HGS (β = -0.392; P <0.001). However, this association was no longer significant in the fully adjusted model (β = -0.342; P = 0.070). In contrast, both WC and BF % were positively associated with greater length of time for completion for chair stands (WC: β = 0.265; P = 0.02, BF %: β = 0.430; P = 0.001). Nil associations were observed between adiposity and physical performance.

Conclusion: Overall, adiposity is associated with poor strength in older adults with T2DM. Assessment of muscle function and quality should be considered for older adults with T2DM.
Poster Abstracts

P13 Influence of the new EWGSOP2 consensus on research with presarcopenic and sarcopenic older persons

Dr Jolan Dupont1,2, Lenore Dedeyne1, Prof Katrien Koppo1, Prof Sabine Verschueren1, Prof Dr Jos Tournay1,2, Prof Dr Evelien Gielen1,2
1Gerontology & Geriatrics, Department of Chronic Diseases, Metabolism and Ageing (CHROMETA), KU Leuven, Leuven, Belgium;
2Department of Geriatric Medicine, UZ Leuven, Leuven, Belgium;3Exercise Physiology Research Group, Department of Movement Sciences, KU Leuven, Leuven, Belgium;4Research Group for Musculoskeletal Rehabilitation, Department of Movement Sciences, KU Leuven, Leuven, Belgium

Background: In 2010, the European Working Group on Sarcopenia in Older People (EWGSOP) published a consensus on definition and diagnosis of sarcopenia, defining conceptual stages of sarcopenia: ‘presarcopenia’, ‘sarcopenia’ and ‘severe sarcopenia’ (EWGSOP1). Recently a revised consensus was published, focusing on muscle strength as key characteristic of sarcopenia (EWGSOP2). Persons with only low muscle strength have ‘probable sarcopenia’, while those with both low muscle strength plus low muscle quantity/quality have ‘confirmed sarcopenia’. Persons with also low physical performance have ‘severe sarcopenia’.

Aim: To determine the effect of the revised EWGSOP2 criteria on sarcopenia classification of participants in the Exercise and Nutrition for Healthy Ageing Randomized Controlled Trial (RCT).

Methods: ENHANCE is an ongoing 5-armed RCT (ClinicalTrials.gov: NCT03649698) that examines the effect of an individualized nutritional intervention (protein supplementation and/or omega-3 supplementation) combined with a physical exercise program in community-dwelling (pre)sarcopenic elderly aged ≥ 65 years. EWGSOP1 (pre)sarcopenic elderly are eligible for inclusion. EWGSOP2 criteria were applied to evaluate whether the new definition influences the classification in sarcopenia stage.

Results: As on July 1, 2019, 40 subjects (mean age 75±) are randomized in ENHANCE. Of these, 34 are presarcopenic, four sarcopenic and two severe sarcopenic according to EWGSOP1. According to EWGSOP2, 26 persons have no sarcopenia, none probable, 11 confirmed and three severe sarcopenia. Nine presarcopenic EWGSOP1 subjects became EWGSOP2 sarcopenic. Two EWGSOP1 sarcopenic persons were considered severe sarcopenic in EWGSOP2. One EWGSOP1 severe sarcopenic subject was no longer classified in EWGSOP2.

Conclusion: Most EWGSOP1 sarcopenic and severe sarcopenic subjects are still classified in EWGSOP2. However, most presarcopenic subjects are no longer classified in EWGSOP2. Although EWGSOP2 facilitates diagnosis of sarcopenia in clinical practice, a consensus definition of preclinical or early stages of sarcopenia would be welcomed to address the needs of these elderly and to align future research in this area.

P14 Prevalence of sarcopenia, sarcopenic obesity and their associations with metabolic syndrome in older people in Vietnam

Dr Tu Nguyen1,2,3, Dr Ngoc-Tam Nguyen1,2,3, Dr Nguyen Trung-Anh1,2, Professor Thang Pham1,2, Associate Professor Huyen Vu1,2,3
1Westmead Applied Research Centre, Faculty of Medicine and Health, The University Of Sydney, Sydney, Australia; 2Scientific Research Department, National Geriatric Hospital, Hanoi, Vietnam; 3Department of Geriatrics, Hanoi Medical University, Hanoi, Vietnam

Aims. To investigate the prevalence of sarcopenia, sarcopenic obesity and their associations with metabolic syndrome in older people in Vietnam.

Method. Participants aged ≥60 were recruited from outpatient clinics of the National Geriatric Hospital in Hanoi, Vietnam from 1/2018 to 10/2018. Sarcopenia was defined by the criteria proposed by the Asian Working Group for Sarcopenia (AWGS) and by the Foundation for the National Institutes of Health (FNIH) Sarcopenia Project. Sarcopenic obesity was defined as having sarcopenia and a body mass index (BMI) ≥25. Metabolic syndrome was defined by having at least 3/5 criteria according to the definition of the National Cholesterol Education Program (NCEP) Adults Treatment Panel (ATP) III.

Results. There were 535 participants, mean age 70.1±8.0, 59.8% female, 61.1% had metabolic syndrome. Using AWGS definition, the prevalence of sarcopenia and sarcopenic obesity was 56.1% and 6.7%, respectively. With the FNIH definition, the prevalence of sarcopenia and sarcopenic obesity was 41.3% and 6.3%, respectively. Sarcopenia defined by FNIH was significantly associated with increased risk of metabolic syndrome (adjusted OR 1.74, 95%CI 1.09-2.79), while the association was not statistically significant with sarcopenia defined by AWGS (adjusted OR 1.44, 95%CI 0.95-2.19). Sarcopenic obesity was associated with increased risk of metabolic syndrome (adjusted OR 2.73, 95%CI 1.07-6.93 with sarcopenic obesity identified by FNIH-defined sarcopenia plus BMI≥25, and adjusted OR 2.83, 95%CI 1.12-7.11 with sarcopenic obesity identified by AWGS-defined sarcopenia plus BMI≥25). All models were adjusted for age and gender.

Conclusions. There was a high prevalence of sarcopenia in older outpatients at the National Geriatric Hospital in Vietnam. Sarcopenia and sarcopenic obesity were associated with increased risk of metabolic syndrome in this population.
Poster Abstracts

P15
Effects of five different community interventions on clinical measurements of sarcopenia in older adults: what is the best strategy?

Walter Aquiles Sepúlveda Loyola1,2, Renata Pires Tricanico Macie1,3, Fabiana Christina Scherer2, Camila Pereira2, Anderson da Silva Honorato2, Bruna Prado Gomes2, Denilson Teixeira2, Vanessa Suziane Probst1,3

1 Program of Masters and Doctoral degree in Rehabilitation Sciences, Londrina State University (UEL) and University of Northern Parana (UNOPAR), Londrina, Brazil, Londrina, Brazil. 2 Program of Masters and Doctoral degree in Physical Education, Londrina State University (UEL) and University of Maringá (UEM, Maringá, Brazil, Londrina, Brazil. 3 Grupo de estudio de envejecimiento (GEE), Londrina State University, Londrina, Brazil, Londrina, Brazil

AIM: This study aimed to determine the effects of five different interventions on clinical measurements of sarcopenia.

METHOD: 169 community-dwelling older adults (81% female, age: 70±7 years, BMI: 28 kg/m2) from Londrina, Brazil were allocated into one of the five different intervention groups: functional exercise circuit (FEC, n=31), pilates (PI, n=28), dance (DA, n=33), treadmill exercise (TE, n=28) and health education (HED, n=49). The interventions lasted 3 months, twice (FEC, PI, DA and TE) and once a week (HED). Measurements of sarcopenia were muscle mass (MM), muscle strength (MS) and physical performance (PP). MM was measured by bioimpedance using fat-free mass index (FFMI) and percentage of body fat-free (BF%). MS was assessed by handgrip force (HGF) and sit-to stand test (STS) and PP by 4-meter gait speed (4MGS) and six-minute walking test (6MWT). Intragroup comparison (pre and post) were analyzed with Student t test and Mann-Whitney test. Intergroup delta analysis (post-pre) among the five interventions was run with ANOVA.

RESULT: After 3 months of intervention MM increased in individuals from FEC, PI and HED (p< 0.05 for all). MS improved in subjects from FEC, PI, DA, TE and HED (p< 0.05 for all). PP augmented in individuals from FEC, PI, DA and TE (p< 0.05 for all). The increase in FFMI was 1-2 kg/m2 higher in FEC, DA and HED compared to TE (p< 0.05 for all). The increase in HGF was 1kg greater in PI compared to FEC and 20Kg compared to HED (p< 0.05 for all). The increase in 6MWT was 63m higher in FEC compared to PI and 56m compared to HED (p< 0.05 for all).

CONCLUSIONS: Although all five interventions resulted in benefits on clinical measurements of sarcopenia, FEC and PI promoted the best effects on muscle mass, strength and physical performance in older people.

P16
Diagnosis, prevalence and clinical impact of sarcopenia in COPD: a systematic review and meta-analysis.

Walter Sepúlveda Loyola1,4, Christian Osadnik2, Steven Phu3,4, Andrea Akemi Morita1, Gustavo Duque1,2,4, Vanessa Suziane Probst1

1 Departament of Physiotherapy, Londrina State University, Brazil, Londrina, Brazil, 2 Department of Physiotherapy, Monash University, Australia, Melbourne, Australia. 3 Department of Medicine – Western Health, Melbourne Medical School, The University of Melbourne, St Albans, Victoria. Australia. Melbourne, Australia. 4 Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health, St Albans, Victoria, Australia, Melbourne, Australia

AIM: This systematic review with meta-analysis was designed to identify the current criteria used to diagnose sarcopenia, its prevalence and impact on health outcomes in individuals with chronic obstructive pulmonary disease (COPD).

METHOD: Five biomedical electronic databases including PubMed, LILACS, EMBASE, Cochrane Library and Scielo, were searched between database inception and August 31st, 2018 to identify studies relating to sarcopenia in individuals with COPD. Studies that classified sarcopenia according to any criteria (provided it was stated in the methodology) were included. Health-related quality of life, muscle strength, exercise capacity, gait speed, physical activity levels, pulmonary function, inflammatory/oxidative stress biomarkers and mortality were assessed in studies with comparisons between individuals with and without sarcopenia. This review was registered in PROSPERO (University of York) (CRD42018092576).

RESULT: 23 studies were selected for analysis. The prevalence of sarcopenia varied from 33% to 14% when using only muscle mass versus when it is combined with physical function (p< 0.0001). Sarcopenia is associated with worse pulmonary function (FEV1%pred. MD=-7.06, 95% CI= -9, -5.11; I2= 83%), GOLD stage ≥ 3 (OR= 2.91, 95% CI= 1.93, 4.38; I2= 100%), poor aerobic capacity (Std. MD= -0.35, 95% CI= -0.44, -0.26; I2= 96%) and worse quality of life (Std. MD= -0.26, 95% CI= 0.16, 0.35; I2= 85%) in individuals with COPD.

CONCLUSIONS: Although sarcopenia prevalence in patients with COPD depends on the criteria utilized, it has a negative impact on health outcomes related to physical and pulmonary function, quality of life, severity and mortality in this disease.
P17
Timing and methods of frailty assessments in geriatric trauma patients: A Systematic Review

Dr Mya Cubitt1, Dr Emma Downnie2, Dr Rose Shakerian1, Dr Peter Lange1,2, Dr Elaine Cole2
1University Of Melbourne, Melbourne, Australia; 2The Royal Melbourne Hospital, Melbourne, Australia; 3Centre for Trauma Sciences, Blizard Institute, Queen Mary University of London, London, England

AIM: The trauma population is aging and better prognostic measures for geriatric trauma patients are required. Frailty rather than age appears to be associated with poor outcomes. This systematic review aimed to identify the optimum frailty assessment instrument and timing of assessment in patients aged over 65 years admitted to hospital after traumatic injury. The secondary aim was to evaluate outcomes associated with frailty in elderly trauma populations.

METHOD: This systematic review was registered with the PROSPERO International Prospective Register of Systematic Reviews (CRD42018090620). A MEDLINE and EMBASE literature search was conducted from inception to January 2018 combining the concepts of injury, geriatric, frailty, assessment and prognosis. Included studies were in patients 65 years or older hospitalised after injury and exposed to an instrument meeting consensus definition for frailty assessment. Study quality was assessed using criteria for review of prognostic studies combined with a GRADE approach.

RESULT: Thirteen papers met inclusion criteria. Twenty-three frailty instruments were reported and assessments were made up to 72hrs post admission. Preinjury frailty prevalence varied from 14.2% (37/260) to 94% (17/18), with in-hospital mortality rates from 2% (5/250) to 33% (6/18). Four studies found an association between frailty and mortality. Eight papers reported an association between frailty and a composite outcome of mortality and adverse discharge destination. Generalisability and assessment of strength of associations was limited by single centre studies with inconsistent findings and overlapping cohorts.

CONCLUSIONS: Associations between frailty and adverse outcome were demonstrated despite a range of instruments, administering clinician, time of assessment and data sources. Although evidence gaps remain, incorporating frailty assessment into trauma systems is likely to identify geriatric patients at risk of adverse outcomes. Consistency in frailty instruments and geriatric specific outcome measures will improve research relevance.

P19
Otago Exercise Program at home: Development of methodology to measure compliance

Lenore Dedeyne1, Jorgen Wullems2, Jolan Dupont1, Jos Tournoy1,3, Evelien Gielen1,3, Sabine Verschueren4
1Division of Gerontology & Geriatrics, Department of Chronic Diseases, Metabolism and Ageing (CHROMETA), KU Leuven, Leuven, Belgium; 2Division of Electrical Engineering (ESAT) TC, Group T Leuven, Leuven, Belgium; 3Department of Geriatric Medicine, UZ Leuven, Leuven, Belgium; 4Department of Rehabilitation Sciences, KU Leuven, Leuven, Belgium

AIMs: Wireless sensors with accelerometers and gyroscopes can be used to monitor physical exercises and daytime activities. In this study, we aimed to assess the possibility to objectively classify exercises and activities during a day by an inertial measurement unit (IMU) in (pre)sarcopenic adults.

Methods: Twenty-five community-dwelling (pre)sarcopenic older people performed the Otago exercise program (“OEP”) and daytime activities (“Daytime, non-OEP” such as sitting, standing, walking). Participants wore an IMU with a 3D accelerometer and gyroscope (Dynaport MoveMonitor+, MobiRobots, The Netherlands). Two classification methods were developed and compared. First, one comprehensive algorithm was used to assess accuracy for all classifications together (types of OEP and types of daytime activities). Second, a layered hybrid model was developed, containing a heuristic algorithm (classifying moments not wearing the monitor as “No wear”) and three machine-learning algorithms, one general (“Daytime, non-OEP” – “OEP”) and two detailed (what type of “Daytime, non-OEP” activity? and what type of “OEP” exercise?). Classification accuracies were assessed by comparing algorithm output with video recordings.

Results: The layered hybrid model showed higher accuracy compared to the comprehensive algorithm. The heuristic algorithm classified “No wear” with 96% accuracy. The general machine-learning algorithm classified the data into “Daytime, non-OEP” (68% accurate) and “OEP” (78% accurate). One detailed machine-learning algorithms classified strength and dynamic balance exercises of the OEP with 75% and 79% accuracy respectively, while the second algorithm classified daytime activities: standing (83% accuracy), cycling (69% accuracy), walking (86% accuracy) and sitting/lying (96% accuracy).

Conclusion: The layered hybrid model and algorithms to objectively classify OEP and daytime activities showed moderate to good accuracies. This suggests they can be used in clinical or research practice to monitor training compliance of (pre)sarcopenic older people. Monitoring daytime activities might give insight in overall physical activity and its change thanks to exercise (eg, decreased sedentary time).
Poster Abstracts

P20
Sarcopenia in inpatient rehabilitation: prevalence in younger and older patients and association with acute length of stay.

Dr Irina Churilov1,2, Prof Leonid Churilov2, Dr Kim Brock1, Dr Navina Curtain1, Dr David Murphy1, Dr Kavitha Muthukrishnan1, Prof Richard J MacIsaac1,2, A/Prof Elif Ekinci1,2
1 St Vincent’s Hospital Melbourne, Fitzroy, Australia, 2 The University of Melbourne, Heidelberg, Australia

Aims:
- To estimate the prevalence of sarcopenia in general inpatient rehabilitation population;
- To compare the prevalence of sarcopenia in patients above and below 65 years of age;
- To investigate the association between sarcopenia status and the length of stay in acute hospital preceding admission to rehabilitation.

Methods: This cross sectional observational study recruited adult patients admitted to a general post-acute inpatient rehabilitation unit at a metropolitan tertiary referral hospital. Participants’ sarcopenia status was determined using the European Working Group on Sarcopenia in Older People 2 algorithm based on muscle mass, measured by Bio Impedance Analysis, and grip strength.

Results: Between November 2016 to January 2019, 203 participants were recruited. The overall prevalence of sarcopenia was 18% (95% CI 13% to 24%). The prevalence of sarcopenia in patients younger than 65 years was 14% (95% CI 8% to 22%), and the prevalence in patients 65 years and older was 23% (95% CI 15% to 32%), risk difference of 9% (95% CI: -1.2% to 20%; p=0.1). With incorporation of these results into the most recent meta-analysis of sarcopenia in inpatient rehabilitation, the mean pooled prevalence was 47% (95% CI 23% to 71%). Adjusted for age, patients with sarcopenia had a significantly longer length of stay in the acute hospital than patients without sarcopenia (p=0.015).

Conclusions: The prevalence of sarcopenia in general inpatient rehabilitation for patients older than 65 years found in our study was more similar to the prevalence reported in studies of community dwellers than to that found in diagnostic stream specific inpatient geriatric rehabilitation studies. The prevalence of sarcopenia in patients younger than 65 years was greater than the prevalence in the community. Patients with sarcopenia had a longer length of stay in the acute hospital.

P21
Incidence and cost of hospitalisations due to pelvic fracture in Australia

Dr Harry Wu1, Dr Lisa Kouladjia1, Professor Sarah Hilmer1
1 Kolling Institute of Medical Research, University of Sydney and Royal North Shore Hospital, St Leonards, Australia

Background: Pelvic fracture is strongly associated with frailty and sarcopenia. There is a lack of contemporary Australian data on the incidence and economic cost of pelvic fracture hospitalisations. We aimed to quantify Australian nationwide trends of pelvic fracture hospitalisations over a 24-year period (July 1993 – June 2017). We characterised the impact of age on rates of hospitalisations. Annual hospitalisation costs due to pelvic fracture were calculated from July 2011-June 2017.

Methods: Hospitalisations with a principal diagnosis of pelvic fracture were extracted from Australian Institute of Health and Welfare National Hospital Morbidity Database. Australian population estimates were obtained from Australian Bureau of Statistics. Age-specific incidence rate ratios (IRR) were assessed using negative binomial regression models. Hospital treatment costs from 2011-2017 were estimated using the Australian Refined-Diagnosis Related Groups (AR-DRGs). Cost estimates for relevant AR-DRGs were derived from the Independent Hospital Pricing Authority for the years 2011-2017.

Results: Over the 24-years, hospitalisations due to pelvic fracture increased from 3724/year (July 1993 – June 1994) to 17028/year (July 2016 – June 2017). Population-adjusted hospitalisation rates for pelvic fracture increased by 230.9% during this period. For every 10-year increase in age, the rate of hospitalisation due to pelvic fracture increased by 79.2% ([IRR]=1.792; 95% CI=1.750-1.835; p<0.001). The total estimated annual costs of hospitalisations for pelvic fracture increased from $61,925,514 in 2011-2012 to $65,149,426 in 2016-2017 (5.2% increase). The estimated overall cost of hospitalisations for pelvic fracture over a 6-year period (2011 - 2017) was $376,062,918.

Conclusions: Pelvic fracture is increasingly common in Australia and is associated with significant economic cost to the hospital system. Age is an important risk factor for pelvic fracture hospitalisations. There is a need for more research on the underlying factors such as frailty and ageing mechanisms to reduce the burden of pelvic fracture on the health system and the individual.
P22
Increasing burden of osteoporosis in Australia over a 24-year period

Dr Harry Wu1, Dr Lisa Kouladjian O’Donnell1, Professor Sarah Hilmer1
1Kolling Institute of Medical Research, University of Sydney and Royal North Shore Hospital, St Leonards, Australia

Background: There is emerging evidence that osteoporosis and sarcopenia are closely linked, and often lead to the development of frailty. We aimed to quantify Australian nationwide trends of prescription and hospitalisation rates for osteoporosis over a 24-year period (July 1993–June 2017). We characterised the impact of age on rates of hospitalisations.

Methods: Prescription data were obtained from a publicly available Pharmaceutical Benefit Scheme database. Hospitalisations with principal diagnosis of osteoporosis were extracted from Australian Institute of Health and Welfare National Hospital Morbidity Database. Australian population estimates were obtained from Australian Bureau of Statistics. Age-specific incidence rate ratios (IRR) were assessed using negative binomial regression models.

Results: Over the 24-years, hospitalisations due to osteoporosis increased from 1321/year to 8115/year. Population-adjusted hospitalisation rates for osteoporosis increased by 344.6%. For every 10-year increase in age, the rate of hospitalisation due to osteoporosis increased by 92.0% ([IRR]=1.920; 95%CI=1.872-1.970;p<0.001). Between July 2000 and June 2017, prescriptions for osteoporosis treatment increased >60-fold from 26,237 to 1,611,397. Alendronate containing medications were the commonest prescribed osteoporosis drugs with 24,662,815 scripts (65.4%). These included alendronate 15,986,515(42.45%), alendronate with cholecalciferol and calcium 1,953,750(5.2%). This was followed by risedronate 8,632,674(22.9%), risedronate with calcium 2,886,773(7.7%), denosumab 1,315,683(3.5%), zoledronic acid 190,455(0.5%) and teriparatide 9,763(0.03%). Annual expenditure for these medications increased >115 million from $1.35million to $156.25million between July 2000 and June 2017. The total cost of drug therapy for treating osteoporosis was $2.01 billion over the 17-year period.

Conclusions: Age is a strong risk factor for hospitalisation due to osteoporosis. Despite a significant increase in the prescription of antiresorptive medications in recent years, hospitalisation rates due to osteoporosis continue to rise and represent a growing healthcare burden. Non-pharmacological and pharmacological therapies that target the fundamental ageing process are needed to reduce osteoporosis and prevent the development of frailty.

P23
Frailty is a dynamic condition where repeated measurement is important for mortality prediction: findings from the North West Adelaide Health Study.

Mr Mark Q Thompson1, Assoc Prof Olga Theou2,3, Dr Graham R Tucker1,3, Prof Robert J Adams1, Prof Renuka Viswanathan1,3
1NHMRC CRE Frailty and Healthy Ageing, Adelaide, Australia; 2Dalhousie University, Halifax, Canada; 3University Of Adelaide, Adelaide, Australia

Frailty is a state of decreased physiological reserve and vulnerability to stressors. Frailty places individuals at greater risk of adverse health outcomes, however, it is a dynamic condition and may not always lead to decline.

Aims: The aim of this study was to measure frailty state transitions, and to determine the relationship between frailty status (at baseline and follow-up) and mortality using both the Frailty Phenotype (FP) and Frailty Index (FI) in the North West Adelaide Health Study.

Methods: Analysis of a population-based cohort of community dwelling older adults (n = 909, mean age 74 ± 6.2) years, 55% female). There was a mean 4.5 years between baseline and follow-up. Mortality was matched to official death records with a minimum of 10 years follow-up.

Results: Improvement in frailty state was common for both tools (FP 15.5%; FI 7.9%). The majority remained stable (FP 44.4%; FI 52.6%), and many transitioned to a worse level of frailty (FP 40.1%; FI 39.5%). For both measures, baseline frailty was a significant predictor of mortality up to 10 years, with initially good predictive ability (AUC 0.8-0.9) decreasing over time. Repeated measurement at follow-up resulted in good prediction compared to lower (AUC: 0.6-0.7) discrimination of equivalent baseline frailty status. In a multivariable model, frailty measurement at follow-up was a stronger predictor of mortality compared to baseline. Frailty change for the Continuous FI was a significant predictor of decreased or increased mortality risk based on corresponding improvement or worsening of score (HR = 1.04, 95%CI = 1.02-1.07, p = .001).

Conclusions: Frailty was a dynamic process where improvement was possible. Frailty measurement is a good predictor of mortality up to 10 years, however, recency of frailty measurement is important for improved prediction. A regular review of frailty status is required in older adults.
**Poster Abstracts**

**P25**  
*Anticholinergic Burden as a Predictor of Frailty in Geriatric Patients Undergoing Inpatient Rehabilitation*  
Dr Phu Sabei Shwe1, Dr Paul Thein2, Dr Parul Marwah3, Ms Karina Teage4, Dr Ramini Shankumar1, Dr Ralph Junckerstoff1  
1Monash Ageing Research Centre (MONARC), Melbourne, Australia, 2Department of Medicine, Monash Health, Melbourne, Australia,  
3Department of Dental Services, Monash Health, Melbourne, Australia, 4Department of Pharmacy, Monash Health, Melbourne, Australia

**Aim:** Poor oral health is associated with frailty in elderly. Anticholinergic medications are a risk factor for poor oral health. Anticholinergics can cause functional and cognitive decline, increase the risk of falls and are a risk factor for frailty in elderly.  
**Methods:** A cross-sectional study of 186 geriatric inpatients >65 years old was performed over 3 months from October to December 2017. Frailty and oral health were assessed using previously validated tools, namely Reported Edmonton Frailty Scale (REFS) and oral health assessment test (OHAT). Exposure to anticholinergic medications was assessed using Anticholinergic Burden Score (ACB). Other data collected included demographics, comorbidities and history of smoking and alcohol.  
**Results:** Mean age was 80±8 and 58% were female. Only 44 patients were not exposed to any anticholinergic medication. 95 out of 186 patients scored 1-3 in ACB score whereas 47 patients had high anticholinergic burden (ACB ≥4). 46 patients fell into the severely frail group, of which 38% were exposed to high anticholinergic burden (ACB ≥4). Patients who scored 4 or more in the ACB were more than two times as likely to have severe frailty. (OR 2.21, P= 0.035, 95% confidence interval 1.05-4.6). Among patients with severe frailty, 38% had ACB ≥4. (P= 0.02). The median score for OHAT was 4. Oral health was found to be a significant predictor for all levels of frailty. (OR 1.24, P= 0.024, 95% CI 1.02-1.49)  
**Conclusion:** High anticholinergic drug exposure is a predictor for severe frailty. Poor oral health has a correlation to all levels of frailty. This study highlights the need to perform a review of medications with anticholinergic properties and deprescribing them in elderly patients. Further research should be directed at whether interventions such as deprescribing could prevent poor oral health or slow the progression of frailty.

**P26**  
*Developing an electro-mechano-biological model for prediction of bone loss in consequence of physical frailty in older adults*  
Mehdi Hassanzadeh1,2, Dr Mojtaba Haghighi-Yazdi1, Dr Morad Karimpour1, Dr Ali Ghasem-Zadeh1,2, Dr Gustavo Duque3,4  
1School of Mechanical Engineering, College of Engineering, University of Tehran, , Iran, 2Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne, Melbourne, Australia, 3Departments of Endocrinology and Medicine, Austin Health, University of Melbourne, Melbourne, Australia, 4Department of Medicine-Western Health, Melbourne Medical School, University of Melbourne, Melbourne, Australia

**Aim:** The most widely accepted clinical definition of frailty includes low physical activity, exhaustion, slowness, muscle strength, and weight loss. The mechanical environment of bones is directly affected by muscle strength and physical activity. Based on the conception of functional adaptation, which bone adapts to its mechanical environment, it can be proposed that frailty could potentially cause bone loss and increase the risk of falls and fractures. Theoretically assessing bone loss in older adults by considering frailty could contribute to identify a person at the risk of fracture. The main objective of this research is to introduce a novel theoretical model of bone (re)modeling by incorporating the effects of disuse, microdamage, cellular accommodation and electro-mechano-biological stimuli in frail older persons.  
**Method:** The (re)modeling formulations proposed by Huiskes et al.’s (2000) and Diego et al.’s (2012) were used as the basis of this model research. A 2D finite element (FE) model of bone was developed using MATLAB software to verify the proposed formula, and investigate the effects of mobility limitation, caused by frailty, on the bone (re)modeling process. In this FE model, bone has been considered as a piezoelectric object with linear elastic material behavior.  
**Results:** Preliminary results of the simulation showed i) trabeculae adaptation with the external mechanical loadings, which follows the Wolff’s law; ii) a significant reduction in the density of bone due to low physical activity; iii) reduced bone loss rate and increased bone density after applying the electric field in patients with low physical activity.  
**Conclusion:** This model could be used as a framework for further research concerning bone loss due to physical frailty and electrical effects in the maintenance of bone. Animal experiments are still needed to validate the outcomes of the model.
**Poster Abstracts**

**P27**

**Diet quality and muscle health: protocol for a systematic review and meta-analysis of observational and intervention data**

Jessica Davis1, Dr Wolfgang Marx1,1, Amelia McGuinness1, Meghan Hockey1, Madeline West1, Dr Brendon Stubbs1,2, Dr Joseph Firth4, Prof Julie A. Pasco1,5,6, Dr Mohammadreza Mohabbi1, Dr Fiona Collie8,9, Dr Amy Loughman1, Dr Simon Rosenbaum10,11, Prof Felice Jacka1,2,3,13

1 Deakin University, School of Medicine, IMPACT Strategic Research Centre, Geelong, Australia, 2 Department of Psychological Medicine, Institute of Psychiatry, King’s College London, , 3 Physiotherapy Department, South London and Maudsley NHS Foundation Trust, , UK, 4 NICM Health Research Institute, Western Sydney University, , Australia, 5 Department of Clinical Epidemiology, Monash University, Prahran, Australia, 6 Department of Medicine - Western Campus, The University of Melbourne, Melbourne, Australia, 7 Deakin University, Faculty of Health, Biostatistics Unit, Geelong, Australia, 8 Deakin University, Geelong, Australia, 9 Barwon Health, Geelong, Australia, 10 School of Psychology, University of New South Wales, Sydney, Australia, 11 Ingham Institute for Applied Medical Research, Liverpool, Australia, 12 Centre for Adolescent Health, Murdoch Children’s Research Institute, , Australia, 13 Black Dog Institute, , Australia

**Aim:** Up to 33% of the global population experience significant musculoskeletal conditions, and while all ages are affected, prevalence increases with age. This loss of muscle function can contribute to the development of type 2 diabetes mellitus, cardiovascular disease, cognitive decline, and premature mortality. Nutritional components have been associated with muscle health; these include protein, dietary energy, and dietary fat type. However, the examination of overall diet quality in relation to muscle health is a comparatively new focus of research.

This systematic literature review and meta-analysis aims to investigate the association between habitual diet quality, indicated by dietary patterns and indices, and muscle health.

**Methods:** This protocol was prospectively registered with PROSPERO and PRISMA guidelines utilised. PubMed, EMBASE, CINAHL, Cochrane CENTRAL, and reference list of past systematic reviews were searched from database inception to 30 March 2019, based on a pre-defined search strategy which has been published elsewhere (PROSPERO number CRD42019124320). Participants included all adults aged over 18 years, exposure terms related to dietary patterns and quality, and outcome terms related to muscle health. Study types included longitudinal and cross-sectional cohort studies, RCTs, uncontrolled intervention and pilot studies. Articles were divided between two groups consisting of two independent reviewers to determine their eligibility. Risk of bias will be assessed through Newcastle-Ottawa Scale and Cochrane Risk of Bias Tool. Data will be extracted, and exposure and outcome variables assessed to determine whether a meta-analysis is viable, and subgroup analyses stratified by age will also be considered.

**Results:** To date, 10,390 articles have been identified for review, with n=39 observational and n=2 intervention studies included for data extraction following secondary screening. Further results will be presented.

**Conclusions:** To our knowledge, this will be the first systematic review to report observational and intervention data including the association of diet quality with muscle health.

**P29**

**Severely Decreased Bone Formation and Muscle quality in the Winnie Mouse Model of Inflammatory Bowel Disease (IBD)**

Dr Ahmed Al Saedi2, Ms Shilpa Sharma1,2, Ms Lulu Chen3,4, Mr Ebrahim Bani Hassan1,2, Prof Kulmira Nurgal1,2, Prof Gustavo Duque1,2

1 Department of Medicine – Western Health, The University of Melbourne, St Albans, Australia, 2 Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne and Western Health, St Albans, Australia, 3 Institute for Health and Sport, Victoria University, Melbourne, Australia, 4 Department of Anatomy, Histology and Embryology, Nanjing Medical University, Nanjing, People’s Republic of China

Although osteoporosis and sarcopenia commonly afflict patients with inflammatory bowel disease, the mechanisms of bone/muscle loss in these subjects remain poorly understood. A major limitation is the lack of an appropriate animal model for IBD. In this study, we characterized the bone phenotype and muscle mass analysis of the Winnie, which closely replicate pathophysiology of IBD. 6, 14 and 21-week-old Winnie mice were compared to age and sex matched control C57BL/6 mice(WT). Despite similar body weight, bone formation in Winnie mice was severely decreased in trabecular surfaces at 14 and 21-weeks respectively compared to WT (bone formation rate -20%, -25%), and mineral apposition rate (44% at 14 w, 46% at 21w, µm/day). Osteoblast numbers was significantly lower in Winnie mice compared to WT (-42% at 14w, -54% at 21w). Similarly, total-collagen BV/TV (-17% at 14w, -19% at 21w) and collagen I (9% at 14w, -7% at 21w) were significantly reduced in the Winnie group. In contrast, osteoclast N. was significantly higher compared to WT mice (+59.9% at 14w, +38% at 21w). Osteoid volume was significantly lower in Winnie mice compared to WT (28% at 14w, 23% at 21w). Furthermore, 3-point bending showed lower mean failure force (MN) in Winnie mice (-20% at 14w, -49% at 21w). No differences in Winnie vs WT at 6w. microCT analysis of the distal femoral showed that Winnie had significantly lower bone content (23%), total bone density, cortical and trabecular bone content, periosteal and endocortical cirumferences compared with WT at 14w and 21w. Skeletal muscle phenotyping showed the total proportion of oxidative fibers in the muscle was greater in WT compared to winnies (18% at 14w, 27.5 at 21w). In summary, this is the first study performing a full bone phenotyping and muscle analysis in a mouse model of IBD, which could open avenues for understanding the mechanisms involved in IBD-related bone/muscle loss.
**P30**

**Effect of denosumab on falls, muscle strength and function in community dwelling older adults**

**Mr Steven Phu**, Dr Ebrahim Bani Hassan, Dr Sara Vogrin, Dr Ben Kirk, Prof Gustavo Duque

1. Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne and Western Health, St Albans, Australia
2. Department of Medicine – Western Health, The University of Melbourne, St Albans, Australia

**Aims:** This study aimed to determine the effects of Dmab on muscle strength, function and balance in community-dwelling older adults.

**Methods:** 79 community-dwelling older adults (≥65 years) presenting with a high risk of falls and/or fractures from western Melbourne, Australia participated in this study. Falls and fracture history was recorded, and the following assessments performed: handgrip strength, gait speed, Short Physical Performance Battery (SPPB), timed up and go (TUG), four square step test (FSST) and posturography. Fear of falling was subjectively assessed using the Falls Efficacy Scale International (FES-I) and Activities-specific Balance Confidence scale (ABC). Participants were prescribed either Dmab (N=51) or zoledronic acid (ZOL) (N=28) following local Australian guidelines, with a 6-month follow-up where assessments were repeated.

**Results:** A greater number of females were present in Dmab (86%) compared to ZOL (64%) with similar median age of 80 years (71,84) in Dmab and 77.5 years (74,81) in ZOL. Groups were balanced on other baseline characteristics. At the 6-month follow up, the Dmab group improved gait speed by 0.06m/s (0, 0.1 p=0.041). Time to complete the TUG and FSST improved by 1.7 sec (-3.4, -0.1 p=0.041) and 1.7 sec (-2.7, -0.6 p=-0.003) respectively. Fear of falling declined in FES-I by 3.1 points (-5.5, -0.8 p=0.01) and improved in ABC by 7.8% (1.0, 14.6 p=0.025). A trend towards significant improvements was found for SPPB score of 1.1 points (-0.04, 2.3 p=0.058) and limits of stability 11.9 cm² (-0.4, 24.3 p=0.58).

**Conclusion:** Dmab displayed a positive effect in improving balance, function and fear of falling, which may explain its anti-fall efficacy. Further studies should be conducted in larger trials to clarify these effects and potential mechanisms.

**P31**

**Physical Performance Tests as Diagnostic Tools for Sarcopenia**

**Steven Phu**, Ebrahim Bani Hassan, Sara Vogrin, Jesse Zanker, Ahmed Al Saedi, Solange Bernardo, Gustavo Duque

1. Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne and Western Health, St. Albans, VIC, Australia
2. Department of Medicine-Western Health, The University of Melbourne, St. Albans, VIC, Australia
3. Subacute and Aged Care Services, Western Health, St. Albans, VIC, Australia

**Background:** Physical performance measures have been used in a range of ways to detail an individual’s risk for adverse events including falls, fractures, morbidity and mortality. Sarcopenia, defined as the presence of low muscle mass, strength and function has been shown to increase an individual’s risk for falls by up to 3-fold. The aim of this study was to determine whether 2 measures of physical performance (timed up and go – TUG, and the Short Physical Performance Battery – SPPB) can be used to diagnose severe sarcopenia using the EWGSOP1 and EWGSOP2 criteria.

**Methods:** This was a cross-sectional study of 318 community-dwelling older adults from western Melbourne VIC, Australia. Participants were aged over 65 years old, could mobilise independently, were not cognitively impaired and reported a risk/history of falls and/or fractures. Appendicular lean mass corrected for height squared (ALM/h²), handgrip strength and gait speed were assessed for diagnosis of sarcopenia, in addition to TUG and SPPB. Diagnostic ability of the TUG and SPPB tests independently and combined with ALM/h² was determined using area under the ROC curve (AUC) and potential cut-points assessed.

**Results:** Prevalence of severe sarcopenia was 11.8% using EWGSOP1 and 7.3% using EWGSOP2. Participants presented with a median age of 78 years (IQR 73, 83) and 75% were female. AUC for TUG in diagnosing all sarcopenia definitions was poor, ranging between 0.666-0.672. Similar AUC was found for SPPB at 0.644-0.680. Highly sensitive and specific cut-points for each physical performance could not be found.

**Conclusions:** Physical performance measures alone cannot be used to accurately diagnose sarcopenia according to current EWGSOP definitions. This may be attributed to the currently recommended methods to assess ALM which have shown a disconnect between performance and muscle mass. Additionally, sensitive and specific cut-points could not be determined.
P34 Evaluation of combining castration and hind-limb immobilisation to induce sarcopenia in mice

Danielle Debruin1,2, Professor Alan Hayes1,2,3
1Institute for Health and Sport, Victoria University, Footscray, Australia, 2Australian Institute for Musculoskeletal Science (AIMSS), St Albans, Australia, 3Department of Medicine - Western Health, Melbourne Medical School, The University of Melbourne, Melbourne, Australia

INTRODUCTION: Sarcopenia (the loss of muscle mass and function) is becoming increasingly prevalent in the ageing population. However, little is known about the effectiveness of models that physiologically mimic the ageing condition, such as castration-dependent androgen-depletion (to mimic age-reduced testosterone levels in males) and limb immobilisation (to mimic inactivity). Here, we aimed to evaluate the effectiveness of our mouse model of sarcopenia by comparing results to young and old mice.

METHODS: C57BL/6J mice (n=18; 12 weeks old) were obtained from the Animal Resources Centre (WA, Australia). After one-week acclimatisation, mice were castrated and one week later, the right hind limbs were casted for two weeks (immobilisation), after which the slow twitch soleus and fast-twitch extensor digitorum longus (EDL) muscles were removed and analysed for contractile properties. All results were then compared to control 16-week-old (n=8) and 12-14-month-old (n=17) animals.

RESULTS: Muscle mass to body mass ratios decreased after immobilisation (p<0.0001) and were comparative to changes seen in the aged mice. Contractile force in the soleus was severely impacted by immobilisation (p<0.0001) with no effect observed in the EDL. However, in both the aged EDL and soleus muscles, specific force production was significantly lower than the 16-week-old muscles (p<0.001).

CONCLUSIONS: The degree of muscle atrophy (>20%) achieved by immobilisation was comparative to the aged mice when corrected for body weight. However, force production in the EDL differed between models with only the soleus displaying similar decreases. This is likely due to both the postural role of the soleus, and also the position of the muscles during the immobilisation phase, in which the EDL

P35 Exploring frailty in Indo-Fijian older adults in a New Zealand setting: A mixed methods study

Mrs Nazreen Hussain1
1Auckland University of Technology, Auckland, New Zealand

AIM: The first aim of the proposed study is to explore what frailty means for community-dwelling frail Indo-Fijian older adults in New Zealand. The other aim is to develop or amend a suitable screening tool to identify pre-frailty in community-dwelling Indo-Fijian older adults in New Zealand.

METHOD: A mixed methods study will be conducted in two phases. Phase 1, will be a qualitative study consisting of face to face, semi-structured interviews. The question of Phase 1 is: What does frailty mean for community-dwelling frail Indo-Fijian older adults in New Zealand? Thematic analysis will be done to analyse data from Phase 1. The results of Phase 1 will be used to structure Phase 2, which will be the quantitative aspect. The question for Phase 2 is: What is a suitable screening tool to identify pre-frailty in community-dwelling Indo-Fijian older adults in New Zealand? In Phase 2, a questionnaire / tool will be developed or amended to measure pre-frailty in Indo-Fijian older adults. Validity and reliability will be tested in Phase 2 to ensure that there is rigour in the research. The study will provide an in-depth understanding of what frailty means to Indo-Fijian older adults in New Zealand and a tool to measure pre-frailty in this vulnerable population.

RESULT: The proposed study will be completed in November 2021.

CONCLUSIONS: The proposed study will be completed in November 2021.
Poster Abstracts

P36
Frailty is a useful concept in people with intellectual disability

Clive Sun1, Seeta Durvasula2, Rebecca Stack2, Prof Ian Cameron3
1St Vincents Hospital, Sydney, Australia, 2Centre for Disability Studies, Faculty of Medicine and Health, University of Sydney, Sydney, Australia, 3John Walsh Centre for Rehabilitation Research, Faculty of Medicine and Health, University of Sydney, Sydney, Australia

Background: People with intellectual disability (PWID) have multiple impairments and co-morbidities. This places them at risk of developing frailty at an earlier age than other populations. Due to pre-existing impairments, the standard assessments for frailty, such as grip strength and walking speed in this group are not reliable. Instead, an accumulation of deficits approach has been used. A Frailty Index (Fi) was developed and has been used to describe PWID who attend this specialized PWID health clinic.

Method: The frailty index was developed using routinely collected clinical data and the items were based on other frailty studies in PWID. After a pilot study in 30 people, the Fi was refined to 44 items and was used in all adults attending the clinic over a 9 month period.

Results: Preliminary analysis showed a higher proportion of frailty (48.3% with mean age of frailty 40.6 years) than the general population (21% over 65 years). However 51.7% of clinic patients are not frail. Frailty appears to be more prevalent in people with severe intellectual disability (79% vs 62% with mild ID).

Discussion: Of the PWID who were not frail 13% live independently, 60% live with family and 26.7% live in group homes. However 51.7% of clinic patients are not frail. Frailty appears to be more prevalent in people with severe intellectual disability (79% vs 62% with mild ID).

P37
High-sucrose diet induces ageing-like chronic inflammation and neuromuscular deterioration in young C57BL/6J mice

Yen-Hui Chiu1, Yu-Ning Liu1, Hung-Yu Chien2, Wan-Chun Li3
1Department of Education and Research, Taipei City Hospital, Taipei, Taiwan, 2Department of Endocrinology & Metabolism, Taipei City Hospital, Taipei, Taiwan, 3Institute of Oral Biology, School of Dentistry, National Yang-Ming University, Taipei, Taiwan

AIMS: Multiple studies have revealed that high-sucrose diet can lead to obesity and chronic low-grade inflammation in liver and adipose tissues. However, very little is known on the effect of that in skeletal muscles. Besides, the causal relationship between chronic inflammation and muscle loss is also equivocal. Here, we evaluated the correlation among high-sucrose diet, chronic inflammation and muscle loss in mice fed with sucrose-sweetened water.

METHODS: The male C57BL/6J mice were either received standard chow with RO water (ND group) or 8% sucrose-sweetened water (HS group). Both the chow and drinking water were given ad libitum. After 20-25 weeks of feeding, right calf muscles were harvested. The neuromuscular junction integrity and inflammatory were evaluated by neuromuscular junction morphology and RT-qPCR analysis.

RESULTS: Mice fed with sucrose-sweetened water represented increasing body weight and reducing lean composition without significant difference in blood glucose levels. Compared to ND group, genes related to pro-inflammatory, including Il1b, ccl2 and Adgre1, were elevated in mice fed with sucrose-sweetened water reflecting the chronic inflammation in muscles. Furthermore, high-sucrose diet resulted in a significant increase in the proportion of fragmented neuron muscular junctions (from 4.7% to 16.9%) and a decrease in the proportion of innervated junctions (from 95 to 76%).

CONCLUSIONS: Our data showed that muscles in mice fed with high-sucrose diet experienced ageing-like phenotypes with chronic inflammation and motoneuron deterioration at relative young age. We hypothesized that the chronic inflammation caused by high-sucrose diet would affect the viability of the motoneurons and accelerate ageing-like neuromuscular deterioration, leading to significant muscle loss later in life.
Poster Abstracts

P38
Association between serum interleukin-6 and frailty in older men

Miss Monica Tembo1, Dr Kara Holloway-Kew1, Dr Chiara Bortolasci2, Associate Professor Sharon Brennan-Olsen2,3, Associate Professor Lana Williams1, Professor Mark Kotowicz2,3, Professor Julie Pasco2,4,5
1Deakin University, Geelong, Australia, 2Department of Medicine-Western Health, The University of Melbourne, St Albans, Australia, 3Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne, St Albans, Australia, 4Barwon Health, Geelong, Australia, 5Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia

Aim: Ageing has been associated with increased serum inflammatory biomarkers. Inflammation has been postulated to play a role in the pathophysiology of frailty. We investigated the association between interleukin-6 (IL-6) and frailty in older men.

Method: This cross sectional study utilised data from 581 men aged 60-90 years (median 75, IQR 68-82) participating in the Geelong Osteoporosis Study. Frailty comprised at least three of the following: unintentional weight loss, exhaustion, low physical activity, slowness and weakness. Medications known to affect inflammatory processes (including nonsteroidal anti-inflammatory drugs, aspirin, oral glucocorticoids, statins, anti-depressants and anti-rheumatoid agents) and smoking were self-reported. Weight and height were measured and body mass index (BMI) calculated (kg/m2). Serum IL-6 was measured following an overnight fast using enzyme-linked immunosorbent assay (ELISA, R&D Systems). IL-6 values were natural log transformed (ln IL-6) and associations between ln IL-6 and frailty were tested using multivariable logistic regression. Use of medications that affect inflammation, smoking and BMI were tested as potential confounders and/or effect modifiers.

Result: Forty-nine (8.4%) men were frail. Frail men were older and more likely to use medications known to affect inflammation than non-frail men, otherwise the groups were similar in regard to BMI and smoking. A relationship was evident between ln IL-6 and frailty before adjustment for age (OR 1.48 95%CI 1.05-2.08, p=0.026) and after (adjusted OR 1.37 95%CI 0.97-1.94, p=0.082). The relationship was sustained following adjustments for BMI and smoking, however, medications known to affect inflammation attenuated the association (OR 1.28 95%CI 0.89-1.82, p=0.181).

Conclusion: This study reports that IL-6 is positively associated with frailty; however, this association appears to be explained by medications known to affect inflammation. The challenge in characterising frailty is still on-going, thus further work into clinically relevant biomarkers of frailty is warranted.

P39
Instrumented measures of sedentary behaviour and physical activity are associated with mortality in community-dwelling older adults: a systematic review, meta-analysis and meta-regression

Anna Rojer1, Keenan Ramsey2, Nataly van Rijssen3, Marijke Trappenburg4, René Otten5, Martijn Heymans6, Mirjam Pijnappels1, Carel Meskers2, Andrea Maer1,8
1Department of Human Movement Sciences, @AgeAmsterdam, Amsterdam Movement Sciences, VU University, Amsterdam, Netherlands, 2Department of Endocrinology and Metabolism, Amsterdam University Medical Center, Amsterdam, Netherlands, 3Department of Internal Medicine, Amstelland Hospital, Amstelveen, Netherlands, 4Department of Internal Medicine, Amsterdam University Medical Center, VU University Medical Center, Amsterdam, Netherlands, 5Medical Library, VU University, Amsterdam, Netherlands, 6Department of Epidemiology and Biostatistics, VU University Medical Center, Amsterdam, Netherlands, 7Department of Rehabilitation Medicine, Amsterdam University Medical Center, VU University Medical Center, Amsterdam Movement Sciences, Amsterdam, Netherlands, 8Department of Medicine and Aged Care, @AgeMelbourne, The University of Melbourne, Melbourne, Australia

AIMS: Sedentary behaviour (SB) and physical activity (PA) are two constructs to describe bodily movements and patterns change during ageing. SB increases and PA decreases. Both are associated with detrimental health outcomes. This study aimed to systematically review and quantify the association between instrumented measures of SB (i-SB) and PA (i-PA) and mortality in community-dwelling older adults.

METHODS: A literature search in PubMed, Embase.com, Cochrane Library, CINAHL, PsycINFO and SPORTdiscus was conducted from inception to the 27th of June 2019. Studies that examined the association between instrumented measures of sedentary behaviour, by either accelerometry or pedometry, and mortality in older adults were included and quantitatively summarised by use of a meta-analysis.

RESULTS: Thirteen prospective cohort studies reporting data of 39,038 participants were included in the systematic review. In total 2502 (6.4%) participants died during a mean or median follow-up ranging from 2.0 to 9.8 years. Overall, comparing the relatively most sedentary with the relatively least sedentary group of participants resulted in a pooled HR of 2.58 (95% CI 1.93-3.40), which was attenuated to HR 1.74 (95% CI 1.01-3.09) after additional adjustments for higher i-PA levels (N=4 articles). For steps per day, light, moderate-to-vigorous- and total PA comparing the relatively least active with the most active resulted in a pooled HR of 3.16 (95% CI 2.23-4.49); 2.33 (95% CI 1.49-3.70); 3.03 (95% CI 2.38-3.85) and 4.17 (95% CI 1.92-9.09), respectively.

CONCLUSION: Instrumented measures of SB and PA are significantly associated with mortality in community-dwelling older adults. For i-SB this was independent of time spent in higher levels of i-PA. Both SB and PA should be considered key-factors in lifestyle-related risk management.
**P40**

LIFT-UP: Feasibility and efficacy of a progressive resistance exercise training program in non-ambulating geriatric rehabilitation patients

Mr Anthony A Kamleh1, Dr Esme M Reijnierse1, Mr Jesse J Aarden2, Ms Patricia Maggs3, Ms Alana Jacob1, Professor Andrea B Maier1,4

1Department of Medicine and Aged Care, @AgeMelbourne, The Royal Melbourne Hospital, The University of Melbourne, Parkville, Australia, 2Amsterdam UMC, University of Amsterdam, Department of Rehabilitation, Amsterdam Movement Sciences; Amsterdam, Netherlands, 3Department of Allied Health, Physiotherapy, The Royal Melbourne Hospital, Melbourne Health, Parkville, Australia, 4Department of Human Movement Sciences, @AgeAmsterdam, Faculty of Behavioural and Movement Sciences, Amsterdam Movement Sciences, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

**Aims:** Little is known about the incidence of non-ambulation in patients post-acute hospitalisation, the primary reason for non-ambulation, and the feasibility and efficacy of progressive resistance exercise training (PRET) in non-ambulatory geriatric rehabilitation patients admitted to subacute wards. The aim of LIFT-UP is 1) to determine the point-prevalence and primary reason for non-ambulation, and 2) to assess the feasibility and efficacy of PRET in non-ambulating geriatric rehabilitation patients.

**Methods:** A point-prevalence study was conducted on the 14th of May 2019 at the Royal Melbourne Hospital, Australia, using a questionnaire completed by both the patients’ and their treating physiotherapists to determine the prevalence and primary reason for non-ambulation. Patients were eligible for the point-prevalence study and the PRET program if they had a functional ambulation category score of two or less, were pre-morbidly ambulant, and were not terminally ill. LIFT-UP is part of the Restoring Health of Acutely Unwell Adults study (RESORT), introducing PRET on the 15th of May 2019 in two wards, and comparing to the current exercise program of two control wards. The feasibility was assessed by adherence, (serious) adverse events and a motivation questionnaire. Efficacy of PRET is assessed using clinical outcomes including muscle mass, handgrip strength, knee extension strength, physical performance and length of stay.

**Results:** The point-prevalence of non-ambulatory patients who fit the LIFT-UP eligibility criteria was 16/72 patients (22%). Low muscle strength was identified as the primary reason for non-ambulation by both patients and physiotherapists (n=6), with lower body factor(s) being identified by patients (n=5) and pain by physiotherapists (n=5). The PRET program is ongoing, with seven patients who completed the program. There have been no adverse events.

**Conclusion:** Incidence of non-ambulation is prevalent in geriatric rehabilitation patients. PRET is feasible for non-ambulatory geriatric patients and has to be proven to be effective.

**P41**

Leg muscle mass, strength and quality in relation to high falls risk: Geelong Osteoporosis Study

Prof Julie Pasco1,2,3, Ms Monica Tembo1, Dr Natalie Hyde1, Ms Kara Anderson1, Assoc Prof Lana Williams1, Prof Mark Kotowicz1,2,3, Ms Sophia Sui1, Dr Kara Holloway-Kew1

1Deakin University, Geelong, Australia, 2Department of Medicine-Western Campus, University of Melbourne, St Albans, Australia, 3Barwon Health, Geelong, Australia

**Aims:** Age-related declines in muscle mass and/or strength are likely to contribute to a higher falls risk among people with sarcopenia. The aim of this study was to investigate muscle mass and strength in association with falls risk.

**Method:** This cross-sectional study involved 296 women (ages 60-90yr) from the Geelong Osteoporosis Study. Maximum hip-flexor and hip-abductor strength was measured using a hand-held dynamometer (Nicholas Manual Muscle Tester). Appendicular and leg lean mass values were determined from whole body DXA (Lunar DPX-L); appendicular lean mass was expressed relative to height (rALM, kg/m2) and leg muscle quality as muscle strength relative to lean mass (kg/kg). A high falls risk score was identified as an Elderly Falls Screening Test (EFST) score ≥2 (Cwikel, 1998). Logistic regression determined the likelihood of high falls risk in association with rALM, muscle strength and muscle quality. Potential confounders included age, weight, physical activity, smoking and alcohol consumption.

**Results:** 105 (35.5%) women had a high falls risk; compared to those with lower EFST scores, these women were older (74.6±8.4 yr vs 70.3±7.0 yr), had lower muscle strength (hip-flexor 13.4±4.7 vs 14.9±4.8 kg; hip-abductor 10.7±4.2 vs 12.6±4.2 kg) and muscle quality (hip-flexor 1.6±0.5 vs 1.8±0.6 kg; hip-abductor 1.3±0.5 vs 1.5±0.5 kg); all p<0.008. After adjusting for age and weight, rALM (OR 0.60 95%CI 0.38-0.95) and hip-abductor strength (OR 0.93, 95%CI 0.93-0.87) were independently protective against a high falls risk score. Similarly, hip-abductor muscle quality was also protective (OR 0.58, 95%CI 0.33-1.00). However, physical activity was an effect modifier, for inactive women, hip-abductor strength, but not rALM, was negatively associated with falls risk and no association was detected for active women. Furthermore, no association was observed for hip-flexor strength.

**Conclusion:** These results suggest that preservation of hip-abductor strength seems important for women who are habitually inactive, in order to minimise falls risk.
**Poster Abstracts**

**P42**
Malnutrition according to the GLIM criteria, ESPEN definition and MST malnutrition risk and its associations with physical and functional performance in geriatric rehabilitation patients - the RESORT cohort

Ms Jeewanadee Hettiarachchi1, Dr Esmee Reijniers2, Prof Andrea Maier1,2
1Department of Medicine and Aged Care, @AgeMelbourne, The Royal Melbourne Hospital, The University of Melbourne, Parkville, Australia, 2Department of Human Movement Sciences, @AgeAmsterdam, Faculty of Behavioural and Movement Sciences, Amsterdam Movement Sciences, Vrije Universiteit, Amsterdam, The Netherlands

**AIM:** Malnutrition is common in older adults and associated with adverse outcomes. Various screening and diagnostic tools have been suggested for clinical implementation. This study aimed to determine the association between malnutrition using the Global Leadership Initiative on Malnutrition (GLIM), European Society for Clinical Nutrition and Metabolism (ESPEN) and Malnutrition Screening Tool (MST) criteria with physical and functional performance at admission and their changes during hospitalisation in geriatric rehabilitation patients.

**METHODS:** The Restoring Health of Acutely Unwell Adults (RESORT) observational, longitudinal cohort includes geriatric rehabilitation patients. Malnutrition was defined using the GLIM, ESPEN and MST criteria. Physical performance was determined using handgrip strength (HGS) (kg) and gait speed (GS) (m/s); functional performance by dependency in Activities of Daily Living (ADL) (Katz score: median) and Instrumental ADL (IADL) (Lawton and Brody score: median), measured at admission and discharge. Logistic and linear regression analyses were used with adjustments for sex for HGS.

**RESULTS:** The sample included 444 patients (56.8% females, mean age 82.4±8.0 years, median length of stay 19 [IQR: 14-29] days). The prevalence of malnutrition according to GLIM, ESPEN and MST criteria was 52.0%, 12.6% and 44.4% respectively. Malnutrition according to the ESPEN definition was associated with lower HGS in males (β: -4.17 kg, SE 1.83, p=0.024). Malnutrition according to the GLIM and ESPEN criteria was associated with higher GS (β 0.05 m/s, SE 0.02, p=0.023; β 0.08 m/s, SE 0.04, p=0.041 respectively). Malnutrition by the GLIM criteria was associated with ADL dependency (OR 1.62, 95%CI 1.03-2.53, p=0.036). Malnutrition was not associated with changes in physical and functional performance during hospitalisation.

**CONCLUSION:** Malnutrition was associated with lower HGS, higher GS and ADL dependency at admission, depending on the applied definition, but not with changes in physical and functional performance.

**P44**
The association between sleep quality and frailty status in older people in Vietnam

Thu Thi Hoai Nguyen1,2, Dr Huey Thi Thanh Vu1,2, Dr Huong Thi Thu Nguyen1,2, Dr Tam Ngoc Nguyen1,2, Dr Tu N Nguyen1,4
1Scientific Research Department, National Geriatric Hospital, Hanoi, Viet Nam, 2Department of Gerontology, Hanoi Medical University, Hanoi, Viet Nam, 3Dinh Tien Hoang Institute of Medicine, Hanoi, Viet Nam, 4Westmead Applied Research Centre, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

**AIM:** Sleep disturbances are common in older people. Some study suggested that sleep disorders are associated with greater evidence of frailty. This study aims to examine the association between sleep quality and frailty status in older people in Vietnam. We hypothesized that older people with poor sleep quality will have higher risk of frailty.

**METHODS:** This study is a secondary analysis from the baseline data of a study designed to investigate the prevalence of sarcopenia in older patients at the National Geriatric Hospital in Hanoi, Vietnam from 1/2018 to 10/2018. Frailty status was defined by Fried’s frailty criteria. The Pittsburg Sleep Quality Index (PSQI) was applied to assess sleep quality, with a total PSQI score >5 indicating poor sleep quality. Charlson comorbidity index was used to evaluate comorbidity.

**RESULTS:** There were 925 participants (mean age 71.2 ± 8.4, 60% were women, mean Charlson comorbidity index 1.5 ± 1.2). The percentage of participants with poor sleep quality was 85.7%. The prevalence of frailty was 16.4% in all participants, 18.4% in participants with poor sleep quality and 4.6% in participants with normal sleep quality (p=0.001). On univariate logistic regression, poor sleep quality was associated with increased risk of frailty (unadjusted OR 4.7, 95%CI 2.0-11.0). The association between poor sleep quality and frailty was still significant after adjusting to age, gender, body mass index and Charlson comorbidity index (adjusted OR 4.7, 95%CI 1.6-14.0).

**CONCLUSION:** In this study in older people in Vietnam, poor sleep quality may be a risk factor for developing frailty. This finding suggests further longitudinal studies to confirm this association.
**P46**

**Higher Concentrations of Parathyroid Hormone (PTH) are Associated with Reduced Gait Velocity in Adults: A Systematic Review**

Lavanya Srinivasan Murthy1,2, Natasha A. Grande de França3, Guillaume T. Duval4, Sara Vogrën1,2, Cedric Annweiler1,5, Gustavo Duque1,2

1Australian Institute for Musculoskeletal Science (AIMSS), The University of Melbourne and Western Health, St Albans, Australia, 2Department of Medicine – Western Health, Melbourne Medical School, The University of Melbourne, St Albans, Australia, 3Department of Medicine – Western Health, Melbourne Medical School, The University of Melbourne, Sao Paulo, Brazil, 4Department of Neuroscience and Aging, Division of Geriatric Medicine and Memory Clinic, Research Centre on Autonomy and Longevity; Angers University Hospital; University of Angers, Angers, France, 5Robarts Research Institute, Department of Medical Biophysics, Schulich School of Medicine and Dentistry, the University of Western Ontario, London, Canada

**Introduction/Objectives:** High serum concentrations of parathyroid hormone (PTH) have been associated with osteosarcopenia. Gait velocity is a predictor of adverse outcomes in osteosarcopenic subjects. This systematic review aimed to assess evidence for the effect of high PTH levels on gait velocity in adults.

**Methods:** We searched PubMed, Embase (Ovid interface) and Cochrane (CENTRAL) for published studies evaluating circulating PTH in human adults aged >20 years, without date or language restriction. We excluded studies with patients on dialysis and if PTH was measured following any intervention having potential effect on its concentrations. Primary outcome was gait velocity defined as the time needed to walk a predetermined distance, or distance walked during a fixed period at usual pace or fast pace. Two independent researchers conducted data extraction and evaluated the risk of bias. Disagreements were resolved by a third reviewer. Risk of bias assessment was done using the National Heart, Lung and Blood Institute quality assessment tool.

**Results:** A total of 681 articles were retrieved from the systematic search. Following full text review and risk of bias assessment, 8 studies were included for final analysis. Of the included studies, half (n=4) demonstrated a significant inverse association between high PTH concentrations and gait velocity, one study showed a nonsignificant association of increasing PTH levels with declining gait speed, and the remainder showed no relation. In addition, three studies also highlighted a negative correlation between PTH levels and muscle strength.

**Conclusion:** Our review of published studies suggests higher concentrations of PTH are associated with reduced gait velocity in adults. This relationship deserves further exploration with RCTs designed to assess the effects of correcting abnormal circulating PTH levels on physical performance in adults.

**P47**

**Osteocalcin and its forms across the lifespan in adult men**

Miss Cassandra Smith1,2, Dr Sarah Voisin1, Dr Ahmed Al Saedi2, Mr Steven Phu2, Dr Tara Brennan-Speranza2, Dr Lewan Parker3, A/Prof Nir Eynon1, Dr Danielle Hiam1, Dr Xu Yan1, Dr David Scott1, Dr Lauren C. Blekkenhorst4, Dr Joshua R. Lewis5, Prof Ego Seeman6, Dr Elizabeth Byrnes7, Prof Leon Ficker1, Prof Gustavo Duque1, Prof Bu B. Yeap1, A/Prof Itamar Levinger1,2,3

1Institute for Health and Sport (IHeS), Victoria University, Footscray, Australia, 2Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health, St Albans, Australia, 3School of Physiotherapy and Exercise Science, University of Western Australia, 4School of Clinical Sciences at Monash Health, Monash University, Clayton, Australia, 5School of Medical and Health Sciences, Edith Cowan University, Australia, 6Medical School, University of Western Australia, Australia, 7University of Melbourne and the Department of Endocrinology, Australia, 8Department of Biochemistry, PathWest Laboratory Medicine, Queen Elizabeth II Medical Centre., Australia

**Aim:** Osteocalcin (OC), an osteoblast-specific secreted protein expressed by mature osteoblasts is used in clinical practice and in research as a marker of bone turnover. OC has two major forms carboxylated (cOC) and undercarboxylated (ucOC) and each form has a different biological function including bone remodelling and glucose metabolism. Reference ranges for cOC and ucOC across the adult lifespan are not clear and current reference intervals for ucOC are limited to older men. Given the different physiological roles of cOC and ucOC, development of reference ranges of the total OC (tOC) and different forms may help to identify people who are at risk for future bone or metabolic conditions.

**Method:** Blood was collected in the morning after an overnight fast from 236 community dwelling men (18 to 92 years old). Participants did not have a history of diabetes, antiresorptive, warfarin or glucocorticoid use. Serum was analysed for tOC and the ucOC fraction using the hydroxyapatite binding method. cOC, ucOC/OC and cOC/ucOC ratios were calculated. Reference intervals were established by polynomial quantile regression analysis.

**Result:** The normal range for our reference population of young men (≤30 years), was: tOC 17.9-56.8 ng/mL, ucOC 7.1- 22.0 ng/mL, cOC 8.51-40.3 ng/mL (mean and 95% CI). Aging had a significant effect on tOC, ucOC and cOC which reflected a “U” shape pattern. The ucOC/OC ratio increases with increasing age while cOC/ucOC ratio decreases with age. Body mass index (BMI) explained 4% of the variance in the ratios, while age explained 31% of the variance.

**Conclusions:** We have defined reference ranges for the OC forms across the adult male lifespan and demonstrated OC-ratios better reflect the effects of aging on OC-forms.
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P48
Morbidity measures predicting mortality in older inpatients: a systematic review

Mr Cheng Hwee Soh1, Mr Syed Wajih Ul Hassan1, Dr Julian Sacre1, Dr Andrea Maier1
1@AgeMelbourne, Royal Melbourne Hospital, Parkville, Australia

Aim: Morbidity is an important risk factor for mortality and a variety of morbidity measures have been developed in order to classify and weigh each morbidity regarding their impact in patients’ health outcomes. The objective of this systematic review was to compare the capacity of morbidity measures in predicting mortality among older inpatients admitted to internal medicine wards, geriatric wards or cohorts including all hospital wards.

Method: A systematic literature search was conducted from inception to 6th March 2019 using 4 databases: Medline, Embase, Cochrane and CINAHL. Articles were included if morbidity measures and mortality were assessed in inpatients admitted to internal medicine wards, geriatric wards or all hospital wards. The Charlson Comorbidity Index was reported most frequently and a higher morbidity score was associated with greater mortality risk, primarily at longer follow-up periods. Articles comparing the association between morbidity measures and mortality showed that the Geriatric Index of Comorbidity is better than the Charlson Comorbidity Index, Cumulative Illness Rating Scale, Index of Coexistent Disease and disease count.

Conclusions: The Charlson Comorbidity Index is most frequently described and predictive for mortality at higher scores and longer follow-up period. In older inpatients, the Geriatric Index of Comorbidity has better predictive capacity than Charlson Comorbidity Index, Cumulative Illness Rating Scale, Index of Coexistent Disease and it should be used more often as a prognostic tool to reflect high-risk patients and assist in clinical decision making.

P49
Pilot study of Frailty Initiative in Northern Sydney Local Health District

Dr Linda Xu1, Dr Susan Kurrle1
1Hornsby Kuring-gai Hospital, Sydney, Australia

Aims:
1. To measure current clinical practice against the Asia Pacific Clinical Practice Guidelines for Management of Frailty in patients 75 years and over admitted to a medical ward in a metropolitan hospital.
2. To introduce a dedicated physiotherapist, pharmacist and dietician intervention following using FRAIL scale for screening.

Methods: Retrospective audit of 50 consecutive admissions one year prior to intervention and comparison with 50 consecutive admissions post-implementation. In pre-implementation group, frailty was identified using search term “frail” through electronic medical records (EMR). In implementation group patients were screened for frailty using FRAIL Scale and appropriate interventions commenced. Patients on stroke pathway and those with cognitive impairment and/or Mini-Mental State Examination (MMSE) of less than 18 were excluded from the intervention. An allied health discharge plan is sent to GP for continuation in community.

Results: The pre- and post-implementation group were similar in age (mean: 85 years vs 87 years, p=0.12) and aged adjusted Charlson Comorbidity Index (5.98 vs 6.56, p=0.14). There was improved identification of frailty post implementation (100% vs 30% pre). Post-implementation, more patients received physiotherapy reviews (96% vs 76%, p=0.004), although this was not associated with maintained or improved mobility on discharge (p=0.31). Similarly, more patients received pharmacy intervention (84% vs 64%, p=0.023) but this was not associated with deprescribing (p=0.86). Fatigue was identified in more cases post-implementation (91% vs 24%), although pathology screening for reversible causes of fatigue was similar (60% post vs 64% pre). More patients received dietician reviews post implementation (91% vs 58%), and recording of weight was markedly improved (92% vs 64%). Vitamin D screening was similar in both groups (48% pre vs 42% post).

Conclusion: The Frailty Initiative improved identification of frailty and patient access to allied health interventions. Ongoing data are being collected to assess outcome measures including length of stay.
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P50

**Leg length as a surrogate to height for the measurement of skeletal muscle mass index**

Dr Ming Li Yee1,2, Professor Boyd Strauss3, Professor Christopher Gilfillan1,2

1Department of Endocrinology, Eastern Health, Melbourne, Australia, 2Monash University, Clayton, Australia

Sarcopenia is associated with adverse outcomes. Assessment of skeletal muscle mass in sarcopenia includes the use of dual energy absorptiometry (DEXA) to quantify appendicular skeletal muscle mass, adjusted by height (m²) to derive a skeletal muscle mass index (SMI). SMI reading 2 standard deviation below the mean of a young reference age group was associated with increased physical disability. Height declines with age and therefore the SMI may underestimate sarcopenia in the older age group.

**Aims:** To determine if leg length is a better surrogate marker to height as a denominator in the skeletal muscle index.

**Method:** Analysis was performed on 2 separate groups of women; 161 women with height and leg length measurements, and a separate cohort of 49 women who had height, leg length, grip strength and muscle area data from computed tomography (CT) analysis. 35/49 women in this group had DEXA data.

A scatter plot of height and leg length against age was performed in both groups. Linear regression analysis using SMI adjusted for leg length was explored against muscle area and grip strength as a measure of muscle mass and function in the second group.

**Results:** Scatter plot shows reduction in height in the older age group, whilst leg length remains largely unchanged. SMI adjusted for height obscures the lower skeletal muscle mass seen in older subjects whereas SMI adjusted for leg length does not. Univariate regression analysis using SMI adjusted for leg length [(appendicular skeletal muscle mass (kg)/leg length m²)] shows a stronger association with grip strength (p value 0.013), whilst SMI using height was not significant (p value 0.320).

**Conclusion:** Whilst height was noted to be lower in the older age group, leg length remains unchanged. Skeletal muscle index adjusted for leg length may be another alternative to measurement of sarcopenia.

P51

**Inpatient post-fall assessments: are they good enough to minimise harm, prevent reoccurrence and provide data for improvement**

Dr Anton Peiris1

1ADHB, Auckland, New Zealand

Inpatient post-fall assessments; are they good enough to minimise harm, prevent reoccurrence and provide data for improvement.

**Aims:** Inpatient falls account for half of the in-hospital serious adverse events. A thorough post-fall assessment is the key to minimise harm and recurrence, while, inadequate assessments may lead to suboptimal patient outcomes. The objective was to find the adequacy of current assessments to gather important clinical findings.

The aim was to use this information to standardise the assessment process to achieve the goals.

**Method:** The current practice of post-fall assessment in general medical wards at a tertiary hospital was assessed against a standard (the seven domains and the key indicators) prepared using multiple local and international guidelines including the New Zealand Health Quality and Safety Commission recommendations.

Forty random cases out of 161 falls in general medical wards over seven months were studied. The falls on other locations and as secondary events were excluded.

**Results:** The descriptively analysed sample of forty had 60 % males and 75% were above 65. Sixty-five per cent of the falls occurred after hours and house officers assessed 82.5%. Thirty out of forty (75%) had a medical review and all had a description of the fall (100%). However, a considerable percentage was suboptimal in regard to the domains and the key indicators. For example, witness status or anticoagulation status was not recorded in 80% each, postural drop (97.5 %), head injury (72.5%) and neck injury (80%).

**Conclusion:** An evidence-based pro forma is proposed as a tool to improve the assessment process.
Poster Abstracts

PS2
Associations of sarcopenia and its components with self-reported health-related quality of life, physical activity, and nutrition in older adults performing exercise training

Ms Ewelina Akehurst\textsuperscript{1,2}, Dr David Scott\textsuperscript{1,2}, Dr Juan Peña Rodriguez\textsuperscript{4}, Dr Carol Alonso Gonzalez\textsuperscript{4}, Ms Jasmaine Murphy\textsuperscript{1,2}, Professor Sandor Dorgo\textsuperscript{5}, Professor Alan Hayes\textsuperscript{1,2,4}

\textsuperscript{1}Institute of Health and Sport, Victoria University, Footscray, Australia; \textsuperscript{2}Australian Institute for Musculoskeletal Sciences (AIMSS), St Albans, Australia; \textsuperscript{3}Department of Medicine, School of Clinical Sciences at Monash Health, Monash University, Clayton, Australia; \textsuperscript{4}Faculty of Physiotherapy, The National University of Colombia, Bogota, Colombia; \textsuperscript{5}College of Health Sciences, The University of Texas at El Paso, El Paso, USA; \textsuperscript{6}Department of Medicine - Western Health, Melbourne Medical School, St Albans, Australia

\textbf{Aim:} Sarcopenia can be prevented and treated with exercise, particularly resistance training. The purpose of this study was to explore prevalence of sarcopenia and its associations with health-related quality of life (HRQoL), physical activity, and nutrition in Australian older adults participating in exercise programs at four residential care gyms of Uniting AgeWell.

\textbf{Method:} A total of 105 older adults (mean±SD 76.9±6.2 years) who were already undergoing or had recently commenced resistance training were assessed for sarcopenia components. These included appendicular lean mass (ALM, assessed with dual energy X-ray absorptiometry), muscle strength (assessed by handgrip strength and chair stands), and physical performance (assessed by gait speed over a 4-metre distance, short physical performance battery (SPPB) timed up and go (TUG) test, and 400-metre walk test). Spearman correlations explored associations for sarcopenia components with self-reported HRQoL (via Assessment of QoL, AQoL-4D), physical activity (via Physical Activity Scale for Elderly, PASE), and nutrition (via Australian Eating Survey, AES).

\textbf{Results:} Sarcopenia prevalence was 3.8% according to Foundation for the National Institutes of Health (FNHI) sarcopenia project and the revised European Working Group on Sarcopenia in Older People (EWGSOP2), and 10.5% according to EWGSOP1. Chair stand was negatively associated with HRQoL (p=0.043), as were TUG and 400-metre walk test (p<0.01). TUG and 400-metre walk were also negatively associated with PASE (p<0.018 and p=0.035, respectively). Conversely, positive associations were observed in gait speed with HRQoL (p=0.001) and PASE (p=0.048), handgrip with PASE (p=0.032), ALM/BMI with PASE (p=0.030), and ALM (p=0.05) and ALM/BMI (p=0.01) with protein and energy intake. Australian Recommended Food Score (ARFS) was not associated with any of the sarcopenia components.

\textbf{Conclusion:} Sarcopenia is associated with poorer HRQoL, inadequate physical activity and nutrition, even in older adults participating in exercise programs.

PS3
Cigarette smoking causes glucose intolerance with involvement of the wasting and insulin resistance in muscle

Mrs Anwar Khan, Mrs Sherouk Fouda, Dr Ali Mahzari, Dr Stanley Chan, Prof Ross Vlahos, Prof Jiming Ye

\textsuperscript{1,2}Health and Biomedical Sciences, RMIT University, Australia; \textsuperscript{3,4}Health and Biomedical Sciences, RMIT University, Australia; \textsuperscript{5}Health and Biomedical Sciences, RMIT University, Australia

Skeletal muscle is a major site of determining glucose-tolerance because it constitutes around 40% of body weight and stores 80% of insulin-stimulated glucose. This study investigated how chronic cigarette smoking (CS) may affect glucose tolerance in relation to its effects on skeletal muscle.

Male mice (C57BL/6J) fed a chow diet exposed to CS twice daily, 5 days for 14 weeks. The effects on glucose tolerance and associated metabolism were monitored during CS.

CS significantly increased plasma levels of insulin, triglycerides and leptin despite moderate reductions in body weight and fasting blood glucose. Compared to the mice exposed to air under the same conditions, mice with CS developed glucose intolerance. Interestingly, muscle mass with CS was significantly reduced and was associated with a significant decrease in the content of myosin heavy chain, indicating a muscle wasting. Consistent with increased levels of triglycerides in the circulation, the content triglycerides in muscle was also significantly increased. As lipid accumulation can lead to insulin resistance in muscle by disrupting insulin signalling, we examined the key molecules in the insulin signalling pathway. We found that phosphorylation of Akt under the basal level of plasma insulin was reduced in the muscle of mice exposed to SC. We further explore the mechanism for the increased triglycerides in plasma and muscle by examining adipose tissue. The results showed significant reductions in adiposity mass and size which were accompanied by increased hormone sensitive lipase and inflammation, suggesting an increase in lipolysis in adipose tissue by CS.

Chronic CS can cause glucose intolerance by suppressing the role of skeletal muscle in whole-body glucose homeostasis. The mechanisms include both reduced muscle capacity and its diminished response to insulin action. Our study provides the scientific evidence against the perception that CS may help maintain normal glucose tolerance by controlling body weight gain.
Poster Abstracts

P54
Comparing SARC-F and SARC-CalF for sarcopenia screening in older men and women in Vietnam

Dr Ngoc-Tam Nguyen, Tu N Nguyen, Ms Thu Thi Hoai Nguyen, Dr Thanh Xuan Nguyen, A/Prof Huyen Thi Thanh Vu, Prof Thang Pham
1 Department of Geriatrics, Hanoi Medical University, Hanoi, Viet Nam, 2 Scientific Research Department, National Geriatric Hospital, Hanoi, Viet Nam, 3 Westmead Applied Research Centre, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia, 4 Dinh Tien Hoang Institute of Medicine, Hanoi, Viet Nam

Aims. To compare the diagnostic accuracy of SARC-F and SARC-CalF combined with calf circumference (SARC-CalF) in older community-dwellers in Vietnam and to explore its difference by gender.

Methods. Community-dwelling older people who visited the outpatient clinics of the National Geriatric Hospital in Hanoi, Vietnam were recruited from 1/2018 to 10/2018. The FNIH (the Foundation for the National Institutes of Health) criteria for sarcopenia were used as the “gold standard”. The sensitivity/specificity analyses of the SARC-F and SARC-CalF were calculated. To compare the overall diagnostic accuracy, receiver operating characteristic (ROC) curves and area under the ROC curves (AUC) were performed.

Results. There were 523 participants (mean age 70.1 ± 8 years, 60.2% female). Overall, the specificity of SARC-F and SARC-CalF was 76.4% and 62.9%, respectively, whereas the sensitivity was 59.2% and 66.0%, respectively. The AUCs of SARC-F and SARC-CalF were 0.73 (95%CI 0.69-0.77), and 0.72 (95%CI 0.68-0.77) for SARC-CalF. Among male participants, the specificity of SARC-F and SARC-CalF was 93.0% and 74.6%, respectively, whereas the sensitivity was 57.7% and 65.7%, respectively. The AUC of the two screening tools were almost similar (SARC-F: 0.81, 95%CI 0.75-0.86, SARC-CalF: 0.79, 95%CI 0.73-0.85). Among female participants, the specificity of SARC-F and SARC-CalF was 62.9% and 49.8%, respectively, whereas the sensitivity was 71.8% and 66.7%, respectively. SARC-F had larger AUC than SARC-CalF (0.74, 95%CI 0.68-0.81 and 0.66, 95%CI 0.58-0.73).

Conclusions. In this study in older people in Vietnam, the specificity and the overall diagnostic accuracy of SARC-F and SARC-CalF were better in men compared to women.

P55
Meteorin-like (Metrnl), as a myokine, is a therapeutic candidate for aging skeletal muscle

Jung Ok Lee, Naomi X.Y. Ling, Bruce E. Kemp, and Hyeon Soo Kim
1 Department of Anatomy, Korea University College of Medicine, Seoul, Republic of Korea
2 Protein Chemistry and Metabolism, and Metabolic Signaling Laboratory, St Vincent’s Institute of Medical Research, University of Melbourne, Fitzroy, Victoria 3065, Australia

A substantial loss of muscle mass and strength (sarcopenia), a decreased regenerative capacity, and a compromised physical performance are hallmarks of aging skeletal muscle. These changes are typically accompanied by impaired muscle metabolism, including mitochondrial dysfunction and diabetes. Remarkably, physical activity and exercise are well-established countermeasures against muscle aging, and have been shown to attenuate age-related decreases in muscle mass, strength, and regenerative capacity, and slow or prevent impairments in muscle metabolism. Meteorin-like (metrnl) is a myokine that was secreted from muscle after exercise and has beneficial effects on glucose metabolism; however, its underlying mechanism of action is not completely understood. We found that metrnl increases glucose uptake via the calcium-dependent AMPK pathway in skeletal muscle C2C12 cells. The intraperitoneal injection of recombinant metrnl improves glucose tolerance in mice with high-fat diet-induced obesity or type 2 diabetes (db/db) by decreasing the levels of insulin and glucose in the blood, but not in AMPK-dependent AMPK pathway in skeletal muscle C2C12 cells. The intraperitoneal injection of recombinant metrnl improves glucose tolerance in mice with high-fat diet-induced obesity or type 2 diabetes (db/db) by decreasing the levels of insulin and glucose in the blood, but not in AMPK-dependent AMPK pathway in skeletal muscle C2C12 cells. The intraperitoneal injection of recombinant metrnl improves glucose tolerance in mice with high-fat diet-induced obesity or type 2 diabetes (db/db) by decreasing the levels of insulin and glucose in the blood, but not in AMPK-dependent AMPK pathway in skeletal muscle C2C12 cells.
P56
Nocturnal hypoxemia is associated with reduced hand grip strength in males

Dr David Stevens1, Dr Sarah Appleton1,2,3, Dr Andrew Vincent3, Dr Yohanes Melaku1, Dr Sean Martin1, Dr Tiffany Gill1, Prof Catherine Hill1,6, Prof Gary Wittert1,4, Prof Robert Adams1,2,7

1 Adelaide Institute For Sleep Health, College of Medicine and Public Health, Flinders University, Bedford Park, Australia, 2 The Health Observatory, Basil Hetzel Institute, Adelaide Medical School, University of Adelaide, Woodville, Australia, 3 Freemason’s Centre for Men’s Health, Adelaide Medical School, University of Adelaide, Adelaide, Australia, 4 Adelaide Medical School, University of Adelaide, Adelaide, Australia, 5 Rheumatology Unit, The Queen Elizabeth Hospital, Central Adelaide Local Health Network, Woodville, Australia, 6 Rheumatology Unit, The Queen Elizabeth Hospital, Central Adelaide Local Health Network, Adelaide, Australia, 7 Respiratory and Sleep Services, Southern Adelaide Local Health Network, Bedford Park, Australia

Aim: Hand-grip strength (HGS) is an independent predictor of mortality and disability in numerous conditions, yet there has been little research examining the association with sleep disorders, such as obstructive sleep apnea (OSA). The aim of this study was to determine associations between polysomnography (PSG) measures of sleep, and HGS.

Methods: The population-based Men Androgen Inflammation Lifestyle Environment and Stress (MAILES) Study of men ≥40y conducted in-home 8 channel PSG (Embletta X-100). Clinical assessment included dynamometry in dominant hand and non-dominant hands, anthropometry, dual x-ray absorptiometry, and a fasting blood sample for sex hormones, inflammatory markers and cardiometabolic function.

Adjusted linear models determined cross-sectional associations of PSG sleep and respiratory measures with HGS adjusting for age; muscle mass, serum testosterone, inflammation; physical activity; arthritis; depression; and diabetes.

Results: HGS was positively associated with oxygen nadir and sleep efficiency and inversely associated with mean oxygen desaturation, and time spent below 90% oxygen saturation, and percent time in stage 2 sleep. In covariate adjusted models, the associations with hypoxemia metrics persisted, with the addition of oxygen desaturation index. There was also a trend toward association with rapid eye movement sleep apnea hypopnea index. Associations with sleep efficiency, and percent time in stage N2 were no longer present.

Conclusion: Metrics of intermittent hypoxemia were independently associated with reduced HGS. These results suggest that OSA-induced hypoxia may be associated with reductions in functional abilities. Future research should determine mechanisms as to how HGS is reduced. Further, research should examine whether HGS predicts adverse health outcomes in adults with OSA.

P57
Nocturnal hypoxemia is associated with increased appendicular skeletal muscle mass index in middle aged, but not elderly, males

Dr David Stevens1, Dr Ronaldio Piovezan1, Dr Yohannes Melaku1, Dr Sarah Appleton1,2,3, Prof Gary Wittert1,4, Prof Robert Adams1,2,3

1 Adelaide Institute For Sleep Health, Flinders University, Bedford Park, Australia, 2 Sleep Medicine Division, Universidade Federal de São Paulo, São Paulo, Brazil, 3 The Health Observatory, Basil Hetzel Institute, Adelaide Medical School, University of Adelaide, Woodville, Australia, 4 Freemason’s Centre for Men’s Health, Adelaide Medical School, University of Adelaide, Adelaide, Australia, 5 Respiratory and Sleep Services, Southern Adelaide Local Health Network, Bedford Park, Australia

Introduction: Sarcopenia is a leading cause of disability, yet factors that may cause reductions in muscle mass are poorly understood. There is significant underdiagnosis of obstructive sleep apnea (OSA), which results in nocturnal intermittent hypoxia, in the general population. Other respiratory conditions, such as chronic obstructive pulmonary disease, results in muscle wastage. Thus, the aim of this study was to determine associations between nocturnal intermittent hypoxia and appendicular skeletal muscle index (ASMI).

Methods: The population-based Men Androgen Inflammation Lifestyle Environment and Stress (MAILES) Study of men ≥40y conducted in-home 8 channel PSG (Embletta X-100). Clinical assessment, dual x-ray absorptiometry, and a fasting blood sample for sex hormones, inflammatory markers and cardiometabolic function.

Adjusted linear models determined cross-sectional associations of PSG respiratory measures with ASMI adjusting for age; serum testosterone, inflammation; physical activity; arthritis; and diabetes. The adjusted linear models were performed on those above and below 65 years old.

Results: For those below 65 years old, both unadjusted and adjusted models demonstrated ASMI was inversely associated with lowest oxygen saturation, and positively associated with increasing mean oxygen desaturation. By contrast, in those over 65 years old, there was no association between any nocturnal respiratory measures.

Conclusion: Metrics of intermittent hypoxemia were associated with increased ASMI in middle ages male, but not elderly males. It is possible the increases in ASMI during hypoxia could be an adaptive mechanism. Exercise studies have shown training in hypoxic environments results in improvement in muscle function. Future research should establish why this inverse relationship between ASMI and hypoxia is present.
Prevalence of sarcopenia as a comorbid disease: A systematic review and meta-analysis

Mr Jacob Pacifico1, Miss Milou Geerlings2,3, Dr Esme Reijnierse1, Dr Christina Phassouliotis1, Prof Wen Kwang Lim1, Prof Andrea Maier1,3
1@AgeMelbourne, University of Melbourne, Parkville, Australia, 2 VieCuri Medical Centre, Venlo, The Netherlands, 3@AgeAmsterdam, Vrije Universiteit, Amsterdam, The Netherlands

AIM: Sarcopenia is age-related low muscle mass and strength and shares risk factors with various other age-related diseases such as cardiovascular disease, dementia, diabetes mellitus and respiratory disease. This meta-analysis aimed to determine the prevalence of sarcopenia as a comorbid disease in cohorts with cardiovascular disease, dementia, diabetes mellitus or respiratory disease.

METHOD: Articles were searched using the online Medline, EMBASE and Cochrane databases from inception to 8th June 2018. Articles were included when reporting the prevalence of sarcopenia in individuals with a diagnosis of cardiovascular disease, dementia, diabetes mellitus or respiratory disease. If individuals with the disease were compared to controls, sarcopenia prevalence in the control group was also extracted. No exclusion criteria were applied with regards to definition of sarcopenia, individuals’ age, study design and setting. Meta-analyses were stratified by disease. Subgroup-analyses were performed for the applied definition of sarcopenia and continent.

RESULT: From the 6727 articles identified through the systematic search, 63 articles were included. The articles included 17,206 diseased individuals (mean age: 65.3±1.6 years, 49.9% females) and 22,375 non-diseased controls (mean age: 54.6±16.2 years, 53.8% females). The prevalence of sarcopenia was 26.4% (95% CI: 13.6–44.8) in individuals with dementia compared to 8.3% (95% CI: 2.8–21.9%) in their controls; 31.1% (95% CI: 19.8–45.2%) in individuals with diabetes mellitus compared to 16.2% (95% CI: 9.5–26.2%) in their controls; and 26.8% (95% CI: 17.8–38.1%) in individuals with respiratory diseases compared to 13.3% (95% CI: 8.3–20.7%) in their controls. No articles which focused on cardiovascular disease were included. Stratification for sarcopenia definition and continent showed similar results.

CONCLUSIONS: The prevalence of sarcopenia is higher when present as a comorbid disease in individuals with dementia, diabetes mellitus and respiratory disease. Future research should investigate if individuals with sarcopenia as a comorbid disease experience worse health outcomes than their non-sarcopenic counterparts.