Meeting Handbook & Program
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Welcome

Tēnā koutou and it is my pleasure to welcome you to the 3rd Annual Meeting of the Australian and New Zealand Society for Sarcopenia and Frailty Research.

The University of Otago is New Zealand’s oldest university, having been established in 1869. It hosts more than 20,000 students annually, and confers degrees in all major academic disciplines including Medicine, Dentistry, Law, Physiotherapy and basic sciences. We know you will enjoy spending time in Dunedin and on the University of Otago campus, as much as attending the conference.

This international conference has attracted scientists and clinicians from multiple disciplines including medicine, epidemiology, exercise physiology, nutrition, and basic sciences. At this year’s conference we have speakers and delegates joining us from the US, Spain, Taiwan, Canada, Italy, Brazil, Germany, Singapore, UK, Malaysia, The Netherlands, South Korea, Australia and New Zealand. The meeting will provide opportunities for conference participants to hear from and interact with internationally renowned scientists and clinicians, and to improve their knowledge and skills in the important areas of sarcopenia and frailty.

The 2018 conference programme showcases international speakers, new research, and emerging researchers, while providing time for participants to network with colleagues, share ideas, and explore collaborations. There will be opportunities for participants to interact and engage at the poster session on Friday, followed by the opening event at the Otago Museum, the ‘Meet the Professor’ breakfast session on Saturday morning, and during the tea and lunch breaks. We are also excited that, for the first time, we are offering a hands-on workshop on Sunday morning.

On behalf of our Local Organising and Scientific Committees, I would like to welcome you to Dunedin.

Associate Professor Debra Waters PhD  
Convenor  
Australian and New Zealand Society for Sarcopenia and Frailty Research 2018 Annual Meeting  
Director of Gerontology Research  
Director Collaboration of Ageing Research Excellence Theme (CARE)  
Deputy director Ageing Well National Science Challenge  
Vice President New Zealand Association of Gerontology  
University of Otago

Local Organising Committee
Associate Professor Debra Waters, Convenor  
Associate Professor Philip Sheard  
Dr Kim Meredith-Jones  
Associate Professor Simon Stebbings  
Dr Jon Cornwall  
Dr Lynette Jones  
Lara Vlietstra  
Dr Stephen Chalcroft  
Dr Ruth The

Scientific Committee
Professor Gordon Lynch (Chair)  
Associate Professor Philip Sheard  
Dr Ruth The  
Dr René Koopman  
Professor Rob Daly  
Professor Renuka Visvanathan  
Professor Charles Inderjeeth  
Professor Andrea Maier

ANZSSFR Executive Officer  
Gwen McMaster-Fay  
E: gwen.mcmaster@unimelb.edu.au  
https://www.anzssfr.org

Meeting Secretariat  
Lara Malcolm, Meeting Managers  
The Meeting People Pty Ltd  
PO Box 764 MITCHAM South Australia 5062
President’s Welcome

Welcome to the 2018 Annual Meeting of our still young Australian and New Zealand Society for Sarcopenia and Frailty Research (ANZSSFR). Many exciting things continue happening in our Society: Our Council, which is composed of some of the most respected leaders in the field from all over Australia and New Zealand, is working hard to define our strategic plan for the next five years. Our membership keeps growing not only in number but scope, including biomedical researchers, health professionals and students/trainees from multiple medical disciplines. Our Task Force on Diagnosis of Sarcopenia in Australia and New Zealand led by two early career investigators Drs. David Scott and Jesse Zanker was a total success, and a very productive exercise with one publication in the Journal of Nutrition Health and Aging, which we expect will have a major impact on how sarcopenia care and research is performed in our countries. In addition, with new definitions of sarcopenia coming out in the horizon, our work will continue next year.

This time, we are meeting at beautiful Dunedin to listen to significant authorities in the field. During the two days, we will have the opportunity of attending more than 40 lectures and oral presentations while also visiting a large number of poster presentations. This meeting was initially inspired by the successful International Conference on Sarcopenia and Frailty Research, which is organised in the USA and Europe. Although we have followed some of their innovative ideas, such a short duration with multiple oral presentations, we have added our touch by including a balanced program between frailty and sarcopenia, basic and clinical sciences, medical and allied health professionals, and senior and junior investigators. Our independent Scientific Committee led by Professor Gordon Lynch and our Local Organising Committee led by Professor Debra Waters have prepared an excellent and high-quality program that I hope you will enjoy. Besides, our event organiser The Meeting People has done a fantastic job to assure that this will be a memorable event. Thanks to our newly developed international links, our Conference is expecting presenters and participants from 12 different countries. I profit from this opportunity to welcome them to our region, and to thank them to taking the time and effort to present and attend our Conference.

Although a lot was done this year, we still have a busy agenda facing us. We are working hard to obtain an ICD10 code for sarcopenia in Australia, which I hope will materialise in mid-2019. A new Task Force on imaging for sarcopenia will be created this year with several more task forces coming. We are also trying to integrate sarcopenia and frailty within primary care while also providing CME activities for physicians and allied health professionals. In addition, we already started to prepare our next annual meeting in Sydney (NSW) in November 2019 where frailty will be the main subject.

I would also like to welcome our new President Professor Robin Daly. I am sure that Rob will do a superb job as President of our novel Society. I also invite all of you to become very involved in the Society as members of Council, Committees and Sub-Committees. Only with your strong involvement our Society will be a successful and influential one.

In the meantime, I invite you to attend as many lectures and to do as much networking as possible. I am convinced that this Society is unique, and that this is also an exceptional opportunity to meet many colleagues from multiple backgrounds but with similar interests on sarcopenia and frailty. After this Conference, I hope that all of us will go back home with lots of new knowledge that hopefully will be of significant benefit to our patients, which should be the “raison d’être” of all these scientific initiatives.

GUSTAVO DUQUE, MD, PhD, FRACP, GSAF
President – Australian and New Zealand Society for Sarcopenia and Frailty Research (ANZSSFR)

Professor and Chair of Medicine – Western Health
Director – Australian Institute for Musculoskeletal Science (AIMSS)
MELBOURNE MEDICAL SCHOOL, THE UNIVERSITY OF MELBOURNE

ANZSSFR Council

Professor Gustavo Duque – Founding President
Professor Rob Daly – President Elect
A/Prof Debra Waters – Secretary
Dr Sharon Brennan-Olsen – Treasurer
Regional Councillors:
Associate Professor Ruth Hubbard – Queensland
Professor Andrea Maier – Victoria and Tasmania
Professor Susan Kurile – NSW and ACT
Associate Professor Solomon Yu – South Australia
Clinical Professor Charles Inderjeeth – Western Australia
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The Australian and New Zealand Society for Sarcopenia and Frailty Research 2018 Annual Meeting gratefully acknowledges the support of the following companies and organisations:

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General Information

Venue
St David Lecture Theatre Complex, The University of Otago, Dunedin, New Zealand
The conference is being held at the St David Lecture Theatre Complex within The University of Otago, Dunedin, New Zealand. The St David Lecture Theatre Complex is located in the north-west region of the University of Otago’s Dunedin campus, on the corner of St David and Cumberland Streets.
https://www.otago.ac.nz/its/services/teaching/otago029063.html

Registration Desk
The registration desk will be open at the following times:
Friday 23rd November  08:00 - 17:30
Saturday 24th November 07:30 - 17:30

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 room that they are presenting in. 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 in height. Posters can go up from Friday morning from 8 am and should be removed by the end of afternoon tea on Saturday 25th November. Poster authors should stand by their posters during morning tea on both days to answer queries in relation to their research. Velcro will be provided to affix the poster to the boards.

WIFI
WIFI will be available at the University. 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 the ground floor 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. Please see the staff at the Registration Desk or the wait staff to locate special meals.

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

Welcome Reception

Date:     Friday 23 November 2018  
Time:     6.00pm – 8.00pm  
Venue:    Otago Museum, 419 Great King Street, Dunedin, New Zealand.  

This venue is a 5 minute walk from the St David Lecture Theatre Complex. Please make your way there independently.  

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

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

Meet the Professor Breakfast Session

Date:     Saturday 24 November 2018  
Time:     8.00am – 8.50am  

Venues:  
Meet the Professor 2 - Associate Professor Lora Giangregorio (Canada) – Seminar Room 2  

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

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

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<thead>
<tr>
<th>Booth</th>
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<td>3&amp;4</td>
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<td>Tanita Wedderburn – BRONZE SPONSOR</td>
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<td>8</td>
<td>The Australian Institute for Musculoskeletal Science (AIMSS)</td>
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<tr>
<td>08:00-17:30</td>
<td>Registration Desk Open</td>
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<tr>
<td>09:00-09:20</td>
<td>Conference Opening and Welcome</td>
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<tr>
<td></td>
<td><strong>Convenor:</strong> A/Professor Debra Waters, Director of Gerontology Research, University of Otago, Dunedin New Zealand</td>
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<td><strong>Mihi:</strong> Hata Temo</td>
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<tr>
<td>09:20-10:10</td>
<td>Plenary Session</td>
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<td><strong>Chair:</strong> Prof Gustavo Duque</td>
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<td><strong>Professor Leo Rodriguez Mafias, Geriatrician HOD Department of Geriatrics at Hospital Universitario de Getafe (Madrid, Spain)</strong></td>
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<tr>
<td></td>
<td>Frailty trait score to assess intrinsic capacity</td>
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<tr>
<td>10:15-11:15</td>
<td>Symposium 1 – Physical Frailty and Sarcopenia: Lessons Learned from the Present</td>
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<td><strong>Chair:</strong> A/Prof Matteo Tosato</td>
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<tr>
<td>10:15-10:35</td>
<td>Operationalisation of physical frailty and sarcopenia syndrome in SPRINTT</td>
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<td></td>
<td>Matteo Tosato</td>
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<tr>
<td>10:35-10:55</td>
<td>Biomarkers associate with Sarcopenia and Physical frailty in Elderly persons: The Biosphere study</td>
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<td>10:55-11:15</td>
<td>Screening tool for Sarcopenia: A scoping review</td>
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<td>11:15-11:30</td>
<td>Morning tea, posters and exhibition</td>
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<td>11:30-12:30</td>
<td>Plenary Session</td>
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<td><strong>Chair:</strong> A/Prof Debra Waters</td>
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<td><strong>Professor Steve Heymsfield, Professor and Director, Body Composition-Metabolism Laboratory, Pennington Biomedical Research Center, Louisiana State University, Baton Rouge (Louisiana, USA)</strong></td>
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<td>Skeletal muscle mass: Evolution of modern measurement concepts</td>
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<tr>
<td>12:30-14:30</td>
<td>Lunch and Exhibition and Posters</td>
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<tr>
<td>13:30-14:30</td>
<td>Lunchtime Symposium</td>
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<td><strong>Moderator:</strong> Prof Gustavo Duque</td>
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<td></td>
<td><strong>A/Professor Lora Giangregorio, Professor and Schlegel Research Chair in Mobility and Aging Department of Kinesiology, University of Waterloo (Waterloo, Canada)</strong></td>
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<td>Squat, jump, walk, stand on one foot or downward dog? New advances and opportunities in osteoporosis and exercise research</td>
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<tr>
<td>14:30-15:30</td>
<td>Symposium 3 – The Biological Underpinnings of Sarcopenia</td>
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<td><strong>Chair:</strong> Navneet Lal &amp; A/Prof Phil Sheard</td>
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<tr>
<td>14:30-14:50</td>
<td>Age-related skeletal muscle atrophy may be driven by defects at the motoneuron nuclear envelope</td>
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<td>14:50-15:10</td>
<td>Identification of denervated fibers in elderly skeletal muscles</td>
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<td>15:10-15:30</td>
<td>Is myofiber death a major contributor to age-related skeletal muscle atrophy?</td>
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<td>Symposium 4 – mHealth Technology in Early Prevention of Age-related Functional Decline: the PreventIT project</td>
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<td><strong>Chair:</strong> Lara Vlietstra &amp; A/Prof Debra Waters</td>
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<td>Long term and short term prediction models of functional decline in 60-70 year old people</td>
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<td>Using mHealth technology in assessing function status in 60-70 year old adults</td>
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<td>Using mHealth technology to support intervention deliver</td>
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<tr>
<td>15:30-16:00</td>
<td>Afternoon tea and exhibition</td>
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<tr>
<td>16:00-17:00</td>
<td>Outstanding Abstracts</td>
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<tr>
<td>16:00-16:15</td>
<td>Effects of androgen deprivation therapy for men with prostate cancer on muscle and bone strength and their determinants and the interaction between them</td>
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<td>Jack Dalla Via</td>
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<tr>
<td>16:15-16:30</td>
<td>Fruits and vegetables and olive oil do not preserve appendicular skeletal muscle in obese community-dwelling older adults during energy intake restriction</td>
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<td>Anthony Villani</td>
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<tr>
<td>16:30-16:45</td>
<td>Oxidative stress and inflammatory biomarkers in pre-sarcopenic, sarcopenic and non-sarcopenic individuals with chronic obstructive pulmonary disease (COPD): Preliminary results</td>
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<tr>
<td></td>
<td>Walter Sepúlveda</td>
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<tr>
<td>16:45-17:00</td>
<td>Frailty index creation for New Zealand older adults with complex needs</td>
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<td>Rebecca Abey-Nesbit</td>
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<tr>
<td>17:00-18:00</td>
<td>Poster Session</td>
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<tr>
<td>18:00-20:00</td>
<td>Welcome Reception, Otago Museum</td>
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<td>Time</td>
<td>Event</td>
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<tr>
<td>08:00-08:50</td>
<td>Meet the Professor Breakfast 1</td>
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<td>08:00-08:50</td>
<td>Meet the Professor Breakfast 2</td>
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<tr>
<td>09:00-10:00</td>
<td>Plenary Session</td>
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<tr>
<td>10:15-11:15</td>
<td>Symposium 5 – Modality-Specific Exercise Interventions for Frailty and Sarcopenia</td>
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<tr>
<td>10:15-10:35</td>
<td>Therapeutic potentials of modality-specific exercise interventions for frailty and sarcopenia</td>
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<tr>
<td>10:35-10:55</td>
<td>The effects of lower extremity eccentric-based training on muscle strength and physical function in older adults: A randomized controlled pilot trial</td>
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<td>11:15-11:30</td>
<td>Morning tea, posters and exhibition</td>
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<td>11:30-12:30</td>
<td>Plenary Session</td>
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<td>12:30-13:30</td>
<td>Lunch and Exhibition and posters including</td>
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<tr>
<td>13:30-14:30</td>
<td>Parallel sessions</td>
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<tr>
<td>13:30-13:45</td>
<td>Oral Communications A</td>
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<tr>
<td>13:45-14:00</td>
<td>Effects of age on the acute effects of protein-rich supplements on appetite, gastric emptying, glucose, gut hormones, and energy intake</td>
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<td>14:00-14:15</td>
<td>Healthy community-living older men differ from women in associations between myostatin levels and skeletal muscle mass</td>
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<tr>
<td>13:30-14:30</td>
<td>Oral Communications B</td>
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<tr>
<td>13:30-14:30</td>
<td>Mid-calf skeletal muscle density and its associations with incident falls and bone health in Swedish older adults</td>
</tr>
<tr>
<td>13:45-14:00</td>
<td>Clinical impact of sarcopenia on muscular activation, balance, risk of fall, exercise capacity, physical activity and inflammatory biomarkers in subjects with chronic obstructive pulmonary disease (COPD): Preliminary results</td>
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<tr>
<td>14:00-14:15</td>
<td>Assessment of mid-thigh bone and muscle mass as a new diagnostic and predictive approach to osteosarcopenia</td>
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### Saturday 24th November 2018 continued...

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<tr>
<th>Time</th>
<th>Oral Communications A cont…</th>
<th>Oral Communications B cont…</th>
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<tbody>
<tr>
<td>14:15-14:30</td>
<td>Identifying risk of hip fracture within community-dwelling older people&lt;br&gt;Rebecca Abey-Nesbit</td>
<td>Effects of lower extremity eccentric-based training on muscle strength and physical function in older adults: A randomized controlled pilot trial&lt;br&gt;Dae-Young Kim</td>
</tr>
<tr>
<td>14:30-14:45</td>
<td>Sarcopenic Obesity and Anxiety: Geelong Osteoporosis Study&lt;br&gt;Julie Pasco</td>
<td>Clinical utility of four sarcopenia criteria for the prediction of injurious falls in older Australian women&lt;br&gt;Marc Sim</td>
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<tr>
<td>14:45-15:00</td>
<td>Afternoon tea and exhibition</td>
<td>St David Lecture Theatre Complex Foyer</td>
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<tr>
<td>15:00-16:00</td>
<td><strong>Plenary Session</strong>&lt;br&gt;Chair: A/Prof Simon Stebbings&lt;br&gt;Professor Ian Reid, Distinguished Professor in Medicine at the University of Auckland, Deputy Dean of the Faculty of Medical and Health Sciences (Auckland, New Zealand)&lt;br&gt;Vitamin D: A tonic for bone and other tissues?</td>
<td>St David Lecture Theatre</td>
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<tr>
<td>16:00-17:00</td>
<td><strong>Annual Meeting of the Australian and New Zealand Society for Sarcopenia and Frailty Research</strong>&lt;br&gt;St David Lecture Theatre</td>
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### Sunday 25th November 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Workshop: Advances in Quantifying Skeletal Muscle Mass Sponsored by ANZSSFR&lt;br&gt;Professor Steve Heymsfield</th>
<th>St David Lecture Theatre</th>
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<tbody>
<tr>
<td>08:30-13:30</td>
<td>Plenary&lt;br&gt;Prof Steve Heymsfield - Advances in Quantifying Skeletal Muscle Mass</td>
<td>St David Lecture Theatre</td>
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<tr>
<td>08:30-09:00</td>
<td>Morning tea</td>
<td>St David Lecture Theatre</td>
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<tr>
<td>09:00-10:30</td>
<td>DXA and Ultrasound Breakout Sessions – Part 1</td>
<td>St David Lecture Theatre</td>
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<tr>
<td>10:30-11:00</td>
<td>Lunch</td>
<td>St David Lecture Theatre</td>
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<tr>
<td>11:00-12:30</td>
<td>DXA and Ultrasound Breakout Sessions – Part 2</td>
<td>St David Lecture Theatre</td>
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<td>12:30-13:00</td>
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<td>St David Lecture Theatre</td>
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<tr>
<td>13:00-13:30</td>
<td>Conclusions and discussion (Led by Prof Heymsfield and group leads)</td>
<td>St David Lecture Theatre</td>
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**Sunday Community Event “Fit for Life” - St David Lecture Theatre**<br>*Sponsored by CARE, Ageing Well National Science Challenge*

- 14:00-14:45 Presentations on changes in strength and balance over the life-course (Hutton Theater - emerging researchers)
- 14:45-15:30 Measure your strength and balance score card (Well Balanced Exhibit - Atrium Floor)
- 15:30-16:00 Afternoon tea (Sponsored by CARE)
- 16:00-16:45 Presentations on activities to improve/maintain strength and balance (Hutton Theater - emerging researchers)
- 16:45-17:00 Questions/Closing remarks
Poster Presentations

P3 The effect of post-exercise protein ingestion on lean mass and glycaemic control in Type-2 diabetes mellitus: A randomized controlled trial
Wouter Peeters, Martin Gram, David Rowlands

P4 Evaluation of castration-dependant androgen depletion and hind limb immobilisation on inducing sarcopenia in mice: A pilot study
Danielle Debruin, Cara Timpani, Craig Goodman, Emma Rybalka, Alan Hayes

P5 1,25(OH)D3 abrogates palmitic acid-induced lipotoxicity in normal human osteoblasts in vitro
Ahmed Al Saedi, Damian Myers, Steven Phu, Gustavo Duque

P6 Attenuation of muscle regeneration related to muscle loss in mice fed with sugar-sweetened water
Yen-Hui Chiu, Yu-Ning Liu, Hung-Yu Chien

P7 Benefits of fatty acid synthase inhibition: Impacts on lipotoxicity in myoblasts
Benjamin Lam, Lakshman Singh, Damian Myers, Gustavo Duque

P10 Fast track hip fracture management – Model for sarcopenia treatment?
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P39  Prevalence of frailty in the female cohort of the Geelong Osteoporosis Study
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P44  Interrelationship between malnutrition and dynapenia on predicting 4-year all causes mortality among oldest old male residents in a retired residential care home in southern Taiwan
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ABSTRACTS
Invited Speaker Abstracts

Frailty trait score to assess intrinsic capacity
Professor Leo Rodríguez Mañas
Geriatrician HOD Department of Geriatrics at Hospital Universitario de Getafe (Madrid, Spain)

Skeletal muscle mass: Evolution of modern measurement concepts
Professor Steve Heymsfield
Professor and Director, Body Composition-Metabolism Laboratory, Pennington Biomedical Research Center, Louisiana State University, Baton Rouge (Louisiana, USA)

The first reports of accurate skeletal muscle mass measurement in human subjects appeared at about the same time as introduction of the sarcopenia concept in the late 1980s. Since then these methods, computed tomography and MRI, have been used to gain insights into older (i.e. anthropology and urinary markers) and more recently developed and refined methods (ultrasound, bioimpedance analysis and dual-energy X-ray absorptiometry) of quantifying regional and total body skeletal muscle mass. The presentation will describe the evolution of these methods and their continued development in the context of sarcopenia evaluation and treatment.

Squat, jump, walk, stand on one foot or downward dog? New advances and opportunities in osteoporosis and exercise research
A/Professor Lora Giangregorio
Professor and Schlegel Research Chair in Mobility and Aging Department of Kinesiology, University of Waterloo (Waterloo, Canada)

Clinical practice guidelines for the prevention of osteoporotic fractures often recommend physical activity or exercise. Indeed, exercise is one of the few therapies where the proposed anti-fracture mechanisms that include effects on both bone strength and applied loads, where applied loads can come in the form of a fall, externally applied loads, body weight, or muscle forces. People with osteoporosis often have questions about the safety and efficacy of exercise. However, they are sometimes counselled to avoid bending or lifting, and accordingly they want to know about the safety of activities of leisure or daily living. We will explore research on the potential efficacy of different types of exercise for preventing fractures in people with osteoporosis, including its direct effects on outcomes along the causal pathway to fractures (e.g., falls, posture, bone strength) and what we know about safety. We will explore the next steps in Canada for establishing clinical practice guidelines, and some key research gaps e.g., safety of yoga, the need for trials in individuals with low bone mass, or the most appropriate therapeutic goal (e.g., strength, weight bearing, or hypertrophy) and outcome measures (e.g., fracture, disability, cost-effectiveness).

Dissecting the cellular changes that drive age-related loss of skeletal muscle
A/Professor Phil Sheard
Department of Physiology, University of Otago (Dunedin, New Zealand)

Frailty is a major cause of morbidity and mortality amongst the elderly, and progressive muscular weakness is a major cause of frailty. If we are to develop evidence-based countermeasures to prevent or slow the age-related loss of muscle, then we need a better understanding of what causes it. Thinking broadly about the possibilities, muscle could be lost in two ways. First, a decrease in muscle mass could arise by death of individual muscle fibres. Several studies have sought to establish the magnitude of fibre death by comparing the number of fibres in muscles of old subjects with those of young subjects. Whilst decline in fibre number is commonly reported, we remain unsure how fibres die. I will describe our recent studies directed at investigation of cellular events that lead to muscle fibre death and I will show that widespread loss of whole fibres is not a major contributor to age-related muscle atrophy. The second mechanism by which muscle might be lost is via fibre atrophy. There are many potential cellular drivers of muscle fibre atrophy, but I will describe our work investigating events that result in atrophy due to loss of contact between motor nerves and skeletal muscle fibres. By providing a deeper understanding of the cellular changes that lead to age-related muscle loss, we hope to identify potential new pathways to prevent onset of degenerative change and thereby to preserve muscle mass and strength further into old age.
Invited Speaker Abstracts

Frailty: the Nexus of Physical and Cognitive Aging
Prof. Liang-Kung Chen
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Center for Geriatrics and Gerontology, Taipei Veterans General Hospital, Taipei, TAIWAN

Frailty is a well-recognized geriatric syndrome that features the vulnerable state of older adults. The potential reversibility of frailty highlights the possibility to promote healthy aging in the life course. Frailty has been widely described by two approaches, i.e. comprehensive model as frailty index, and phenotype model as physical frailty. Two operational definitions of frailty eventually overlapped to some extent, and may be applied to different healthcare settings.

Although the synergistic effects of frailty and cognitive impairment has been reported before, little was known regarding to the pathophysiology of this unique phenomenon. Most studies describing the synergistic effects were focused on aged population that were associated with adverse clinical outcomes. Eventually, the chance of each component of physical frailty occurring to an individual was not statistically independent. Clustering phenomenon of these components has been well recognized that categorized physical frailty into mobility type and non-mobility type frailty. Substantial differences between the two subtypes of frailty have been shown that mobility type frailty was associated with poorer neuromusculoskeletal health and all-cause mortality.

The concomitant presence of declines in both physical and cognitive function was conceptually proposed as "cognitive frailty". However, the originally proposed operational definition of cognitive frailty did not sufficiently capture the target population due to very low prevalence with limited supporting evidence for clinical outcomes. The modified operational definition significantly identified at-risk subjects with clear associations with higher mortality, incident disability and incident dementia. Moreover, whole brain images identified potential age-related atrophy of certain regions that accelerate the mutual declines of physical and cognitive health. And an intervention study used clustered randomized-controlled design to demonstrate the potential reversibility of "cognitive frailty" by the multi-domain intervention approach to promote healthy aging.

Vitamin D: A Tonic for Bone and Other Tissues?
Ian R Reid
University of Auckland, New Zealand

The vitamin D endocrine system is critical for the maintenance of circulating calcium concentrations, but recently there has been advocacy for the widespread use of vitamin D supplements to improve skeletal and non-skeletal health. Recent studies of tissue-selective vitamin D receptor knockout mice indicate that the principal action of vitamin D responsible for the maintenance of calcium homeostasis is the regulation of intestinal calcium absorption. High levels of vitamin D can increase bone resorption and impair mineralization, consistent with its role in maintaining circulating calcium concentrations. These findings suggest that circumspection is appropriate in its clinical use.

There is now substantial clinical trial data with vitamin D supplements, which fails to establish their efficacy on bone density, or the prevention of falls or fractures. However, some trials in frail and/or vitamin D deficient populations, have produced positive outcomes. Where there are positive effects of vitamin D supplementation on skeletal outcomes, these are mainly seen in cohorts with baseline circulating 25-hydroxyvitamin D [25(OH)D] levels in the range 25-40 nmol/L, or lower. A great diversity of non-skeletal conditions have been associated with low 25(OH)D, but there is little evidence for efficacy of vitamin D supplementation for such end points. At present, supplements should be advised for populations with risk factors (e.g. lifestyle, skin color, frailty) for having serum 25(OH)D levels in the 25-40 nmol/L range, or below. A dose of ≤800 IU/day is adequate. This approach will maintain 25(OH)D levels well above the threshold for osteomalacia and also makes allowance for the poor accuracy and precision of some 25(OH)D assays.
Over the years, different operational definitions have been elaborated to identify frail older persons and sarcopenia, but none of them has received unanimous consensus. The most notable consequence of these persisting uncertainties and debate is the lack of effective interventions to prevent the development and impede the progression of the two conditions. To overcome the current limitations in the field, the SPRINTT consortium has elaborated a novel operationalisation of physical frailty (PF), which grounds its roots in the recognition of sarcopenia as its central biological substrate. This conceptualisation is based on the fact that the clinical picture of PF overlaps substantially with that of sarcopenia. The two conditions may therefore be merged into a new clinical entity, the PF and sarcopenia (PF&S) syndrome, in which muscle loss represents both the biological substrate for the development of PF and a major pathway whereby the negative health outcomes of PF occur. It is worth noting that all of the components describing the PF&S model are measurable and quantifiable in an objective manner. The implementation of such a paradigm would therefore allow the accurate operationalisation of PF&S, a clear identification of the affected population, and the rapid translation of research findings to the clinical arena. Such a conceptualisation would also make PF&S comparable to other chronic degenerative conditions of old age (e.g., chronic obstructive pulmonary disease and congestive heart failure), mirroring the paradigm of a biological substratum for a specific set of symptoms/signs determining a measurable decreased function. The PF&S syndrome may thus gain its spotlight among the geriatric “giants”, besides becoming easily acceptable by healthcare professionals, public health authorities, and regulatory bodies. The recognition of a precise biological substratum for PF&S (i.e., skeletal muscle decline) also opens new venues for the development of new preventive and therapeutic interventions.

**BIOMarkers associate with Sarcopenia and PHYSical frailty in Elderly peRsons: The Biosphere study**

**Marzetti E**, Calvani R, Tosato M, Landi F

Catholic University of Sacred Heart of Rome

BACKGROUND: So far, the identification of sarcopenia and frailty has been based on clinical characteristics. However, it is conceivable that biological biomarkers might be used to identify/characterize these conditions. Given the pathogenetic complexity of sarcopenia and frailty, the simultaneous analysis of an array of circulating mediators may represent the best strategy to identify the pathways leading to the development of these conditions and their reciprocal interactions.

AIM: to find biomarkers that characterize the pathophysiology of PF&S

METHODS: A panel of 77 candidate biomarkers pertaining to different pathways and processes involved in age-related decline of skeletal muscle mass and function (e.g., inflammation, muscle remodeling, neuromuscular junction damage, muscle growth signalling, amino acid metabolism) was assayed. Multi-block partial least squares-discriminant analysis (PLS-DA) was employed to explore the relationship among the different biomarkers assessed. Double cross-validation procedures were used to validate the predictive ability of the PLS-DA model.

RESULTS: Two hundred older persons, 100 cases (individuals with sarcopenia and physical frailty) and 100 controls (elderly non-sarcopenic persons with no functional impairment), aged 70+ were enrolled. The optimal complexity of the PLS-DA model was found to be three latent variables. Overall, the model was able to correctly classify 87.1% (±3.2%) participants. The proportion of correct classification was 85.3% (±4.5%) for persons with PF&S and 89.3% (±3.2%) for controls. Relative to the latter group, people with sarcopenia and physical frailty showed higher levels of aspartic acid, asparagine, taurine, citrulline, and glutamic acid. Increased levels of alpha-aminobutyric acid, methionine, interleukin-8, myeloperoxidase, and platelet derived growth factor-BB characterized the biomarker profile of controls.

The innovative approach adopted in the BIOSPHERE allowed determining a panel of biomarkers that could serve for (a) integrating specific biochemical measurements into the clinical assessment of sarcopenia and physical frailty, (b) providing hints to the biological pathways leading to functional impairment in old age, (c) identifying novel targets for interventions, and (d) determining surrogate endpoints to be used in clinical and research settings.
Screening tools for Sarcopenia: A Scoping Review
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BACKGROUND: Sarcopenia is associated with poor outcomes and significant healthcare financial burden. Screening tool to detect sarcopenia would be important to identify older persons who would benefit from a confirmatory test, which is expensive and requires access to tertiary hospital.

AIMS: The aim of this scoping review is to critically appraise potential screening tools to detect sarcopenia and to compare their performances.

METHODS: Systematic search was done using online databases “MEDLINE”, “embase”, and “PUBMED”, with keywords “sarcopenia”, “screening”, “low muscle mass”, and “low muscle function”. The articles are included if the studies evaluated and reported the predictive validity measures of the screening tools used to screen specifically for sarcopenia, validated against at least one of internationally recognised group of diagnostic criteria of sarcopenia.

RESULTS: Only three out of 602 articles were chosen for this scoping review. One study used a 5-questions questionnaire (SARC-F) on physical functions as potential screening method for sarcopenia, with sensitivity of 4-10% and specificity of 95-99%. Two studies utilised anthropometric measurements to derive a tools to screen for sarcopenia. One developed a prediction equation of appendicular skeletal mass index and one was in a form of gender specific scoring system based on the anthropometric measurements. These studies are comparable in view of their sensitivities and specificities.

CONCLUSION: the complex nature of sarcopenia makes the task of searching for the best screening method difficult. There are not many validated screening tools available in the literature. The screening tools mentioned were validated in three different populations of various ethnicities. Hence, more work in this field is required as in to see how each tool performs across different populations to reach the consensus in clinical practice.
Reducing the burden of sarcopenia: A healthy lifestyle throughout the lifetime

Dr David Scott
Monash University, Melbourne, Australia; Australian Institute for Musculoskeletal Science (AIMSS), Melbourne, Australia

Sarcopenia describes the age-related decline in skeletal muscle mass and function. The prevalence of sarcopenia may be as high as 30% in community-dwelling older adult populations and presence of this condition significantly increases an older individual’s risk for mobility disability, loss of independence, falls and mortality. Current recommendations for preventing and reversing sarcopenia in older adults include prescription of exercise (particularly resistance training) and nutritional supplements such as protein and vitamin D. However, although sarcopenia is by definition a condition of ageing, it is important to recognise and promote the need for a life course approach to maintenance of muscle mass and function. Genetics clearly play an important role in risk for sarcopenia and twin studies have demonstrated that heritability estimates for some measures of muscle mass and strength are as high as 80%. The developmental origins of sarcopenia are also influenced by the environment during early life with several life course studies demonstrating that body weight at birth and during infancy are positively associated with muscle mass and function in older age. Thus, it follows that health behaviour choices beginning in the pre-natal environment can significantly influence muscle mass and function trajectories throughout the lifetime. This presentation will discuss lifestyle strategies that are likely to maximise the peak lifetime muscle mass and strength achieved in early adulthood, and also minimise their rates of decline through middle and older age. Implementation of life course approaches can reasonably be expected to significantly reduce the prevalence and burden of sarcopenia in older adult populations.

Is sarcopenia socially patterned?

Dr Sharon Brennan-Olsen
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With few exceptions, non-communicable chronic diseases follow a social gradient, whereby greater prevalence and incidences are observed in social disadvantaged populations; here we suggest that sarcopenia is unlikely to be an exception. This session begins by presenting the evidence-base regarding associations between social disadvantage and upstream social determinants of modifiable risk factors for sarcopenia. We then consider the nascent evidence-base regarding the influence of social adversity, social isolation and exclusion, access issues, and health literacy on sarcopenia prevalence, including the role of these factors in influencing precursors for sarcopenia across the life course. Finally, this session presents new findings from the Tasmanian Older Adult Cohort (TasOAC), Australia, concerning longitudinal associations between individual- and area-level social disadvantage and sarcopenia over 5 years of follow up. Implications of a focus on the lifestyle-social nexus would plausibly provide another intervention point to reduce risk, and necessitates consideration in future sarcopenia research.

Sarcopenia: Is the right food the key to prevention?

Dr Sandra Iuliano-Burns
University of Melbourne, Melbourne, Australia

Progression and severity of sarcopenia manifests with inadequate nutrition, in particular protein malnutrition. Additional to achieving protein adequacy, frequency of consumption and composition of proteins consumed may also alter the course to sarcopenia. Metabolic changes with aging increase protein requirement, which are higher than for healthy adults, and is suggested at 1.2 and up to 1.5g/kg body weight daily. How protein is distributed throughout the day may also promote muscle protein synthesis, with 20-30g protein per meal considered adequate. And finally, specific amino acids such as leucine are considered potent stimuli for muscle protein synthesis, and so the ability to maintain muscle in old age. Within these parameters protein intake needs to be manipulated to fulfill these recommendations, whether through supplementation, fortification, via appropriate food choices, or a combination of mechanisms to ensure an adequate intake. Provision of oral protein supplements is effective in the short term, but its long-term sustainability is unclear. Fortification improves nutritional density, so is feasible to increase protein content of foods. Animal sources of protein i.e. dairy, meats, eggs and seafood provide all the essential amino acids, in particular leucine so consumption of these foods in line with recommended guidelines may assist with slowing sarcopenia development. Those at high risk of protein inadequacy include isolated elderly in the community, and those in institutionalized care. Particular attention to menu planning for, and food provision to these vulnerable elderly is critical as sarcopenia risk is high and onset may be masked by other conditions or comorbidities. A better understanding of sarcopenia development and the role of protein nutrition in its prevention will help guide strategies required to curtail the burden of sarcopenia and its associated costs that would otherwise rise as the population ages.
Age-related skeletal muscle atrophy may be driven by defects at the motoneuron nuclear envelope

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Life expectancy continues to extend along with 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. Denervation is also a feature of some neurodegenerative diseases and recent data suggests degradation of the nucleocytoplasmic barrier and nuclear envelope transport process are responsible for nerve loss in such cases, so we asked whether similar defects accompany motoneuron death in normal ageing. We used immunohistochemistry on young and old mouse tissues to explore potential links between motoneuron death and nucleocytoplasmic transport regulatory proteins, and we used a nuclear permeability assay to investigate the patency of the nuclear barrier on extracts of spinal cord from young and old mice. We found that loss of lumbar motoneurons in old age was accompanied by both reductions in immunodetectable levels of key nucleocytoplasmic transport proteins and increased nuclear permeability. Our results suggest that emergent defects in nucleocytoplasmic transport and in the integrity of the nuclear barrier may contribute to age-related motoneuron death and therefore these events may be significant indirect drivers of skeletal muscle loss.

Identification of denervated fibers in elderly skeletal muscles

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Skeletal muscle fibre denervation is a significant driver of the atrophy that characterises advancing age in mammalian species. Specific causes of denervation across the whole muscle remain unknown, including whether muscle fibre type or location is a “risk factor” for denervation. This has been unexplored because techniques to investigate denervation at high spatial resolution across the whole muscle level have been absent. Glycogen depletion has previously been used to investigate location of fibres within whole motor units, however it has not successfully been adapted to localise denervated fibres across the whole muscle. The method is generally ineffective in mice due to difficulties associated with both low background glycogen and poor contrast between depleted and non-depleted fibres. We therefore sought to develop a technique that identified active fibres in the entire population of muscle fibres in whole stimulated muscles. We utilised 2-NBDG (2-(N-(7-Nitrobenz-2-oxa-1,3-diazol-4-yl)Amino)-2-Deoxyglucose, a fluorescent analogue of deoxyglucose in elderly C57Bl/6J mouse soleii. In this method, deoxyglucose is taken up by active cells during muscle stimulation in proportion to their metabolic activity but is not metabolised, becoming “trapped” inside the muscle cell. Inactive (denervated) muscle fibres are subsequently identified by virtue of their low fluorescence due to the lack of 2-NBDG accumulation. We stimulated whole muscle-nerve complexes using this method, successfully labelling active fibres and leaving denervated (inactive) fibres largely unlabelled.

This novel method, developed in a murine model, allows determination of whether age-related denervation correlates with either fibre type or location across the muscle belly. It has advantages over previous methodologies in that it presents information on the denervation status of individual muscle cells across the entire muscle, and not just selected sections or parts of the muscle.

Is myofiber death a major contributor to age-related skeletal muscle atrophy?

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Age-related skeletal muscle atrophy results in weakness and disability amongst the elderly. Muscle atrophy is widely thought to result from losses in myofibre number and size, neither of which adequately explain the magnitude of elderly muscular weakness. In an attempt to identify additional features of muscle ageing, we investigated the gross anatomical & histological differences between young and elderly mouse muscles. Six young and ten elderly mouse biceps brachii (BB), extensor digitorum longus (EDL), soleus and tibialis anterior (TA) muscles were stained for acetylcholine esterase to visualise myofibres, tendons and myotendinous junctions. Muscles were imaged under a dissection microscope to measure muscle girth & length, tendon lengths, and pennation angles. Histological assessment (myofibre number and size) was performed using two different sectioning techniques. Right sided muscles were sectioned using standard transverse sections whilst left sided muscles were sectioned obliquely to exclude tendons. Statistical differences between young and elderly muscles were tested using one-way ANOVA (post-hoc Tukey) (p<0.05).

The intramuscular terminations of proximal and distal tendons in young solei were separated by 600±400µm (mean±SD). These tendons lengthened by 27.6 and 17.7 µm/month (respectively), such that tendons of elderly solei overlapped in the mid-belly region by 310±350µm. Moreover, whilst myofibre counts from transverse sections revealed ~15% reduction between young (1023±65) and elderly (889±162, p=0.04) solei, oblique sections mitigated age-related disparities in myofibre counts (1075±88 vs 1023±105, p=0.39). Similar results were observed in EDL muscles; however, no other age-related changes to morphology were evident in BB or TA.

The occurrence of age-related connective tissue expansion in muscle, may be a confounding factor in previously reported disparities between young and elderly myofibre counts. Our findings call into question the existence of myofibre death as a contributor to age-related muscle atrophy.
Symposium 4 - mHealth Technology in Early Prevention of Age-related Functional Decline: the PreventIT project

**Long term and short term prediction models of functional decline in 60-70 year old people**

**Prof. Andrea B. Maier**

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*Department of Human Movement Sciences, @AgeAmsterdam, Faculty of Behavioural and Movement Sciences, Vrije Universiteit Amsterdam, Amsterdam Movement Sciences, The Netherlands.*

**BACKGROUND:** Early identification of people at risk of functional decline is essential for delivering preventive interventions. The aim of this study is to identify and predict trajectories of functional decline over nine years in males and females aged 60-70 years.

**METHODS:** We included 403 participants from the InCHIANTI study and 395 from the LASA study aged 60-70 years, with data on ≥2 measurements of functional ability during nine-year follow-up. Functional ability was scored with six items on activities of daily living. We performed latent class growth analysis to identify trajectories of functional decline and applied multinomial regression models to develop prediction models of identified trajectories. Analyses were stratified for sex.

**RESULTS:** Three distinct trajectories were identified: no/little decline (219 males, 241 females), intermediate decline (114 males, 158 females), and severe decline (36 males, 30 females). The final model in males included three predictors: gait speed, fear of falling, and alcohol intake (no/little decline, area under receiver operating curve [AUC] 0.68, 95%CI 0.62-0.73; intermediate decline AUC 0.63, 95%CI 0.56-0.69; severe decline AUC 0.79, 95%CI 0.71-0.87). The final model in females included age, living alone, economic satisfaction, balance, gait speed, physical activity, BMI, and cardiovascular disease (no/little decline AUC 0.80, 95%CI 0.75-0.85; intermediate decline AUC 0.74, 95%CI 0.69-0.79; severe decline AUC 0.95, 95%CI 0.91-0.99).

**CONCLUSION:** Already in people aged 60-70 years, three distinct trajectories of functional decline can be identified over nine-year follow-up. Predictors of trajectories differed between males and females. Identification of people at risk is the basis for targeting interventions.

**Using mHealth technology in assessing function status in 60-70 year old adults**

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**INTRODUCTION:** Physical performance is traditionally measured by clinical tests such as Repeated Chair Stand (CST) test and Timed-Up-and-Go (TUG) test. Inertial sensors are rapidly emerging to measure physical performance, since the instrumented measures obtain more details. Our aim is to compare the outcome of the standard clinical with instrumented measures of physical performance in distinguish between High and Very High Functional Status (HFS, VHFS) in community-dwelling adults aged 61-70 years.

**METHODS:** Data is from the baseline assessment of the PreventIT study. The Late Life Function and Disability Instrument (LLFDI) was used as a measure of functional status (median score as cut-off for HFS and VHFS). Participants performed the CST and TUG wearing a smartphone at L5. The number of CST repetitions and the total TUG duration were recorded. Instrumented measures were computed from the smartphone embedded sensors. The area Under the Receiver Operating Curve (AUC) was calculated and compared using the DeLong test.

**RESULTS:** We included 189 participants (66.3±2.5 years, 92 females, LLFDI score 146±15, median 151). Standard clinical and instrumented measures of CST showed moderate discriminative ability: AUC of 0.68 (95%CI 0.60-0.76) and 0.72 (95%CI 0.65-0.80) respectively, p-value 0.19. Similarly, for TUG: AUC of 0.68, (95%CI 0.60-0.77) and 0.65 (95%CI 0.56-0.73) respectively, p-value 0.27.

**CONCLUSION:** In a relatively fit and healthy population of adults aged 61-70 years, standard clinical and instrumented measures distinguish, with moderate discriminative ability, between HFS and VHFS. This finding supports the hypothesis that an early identification of risk of age-related functional decline can be achieved.
Symposium 4 - mHealth Technology in Early Prevention of Age-related Functional Decline: the PreventIT project

Using mHealth technology to support intervention delivery

Dr. Stefanie Mikolaizak
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BACKGROUND: A rapidly ageing population places increased strain on healthcare infrastructure. Advances in healthcare technology allow large numbers of older adults, currently underserved by health promotion services, to receive and complete individualised exercise programmes, bringing with it psychological and physical benefits.

METHODS: eLiFE represents an mHealth solution of transferring an evidence-based exercise programme to an ICT platform. eLiFE allows older adults to test their fitness and receive personalised advice on how to improve their strength, balance, and physical activity. Sensors embedded into smartphones and smartwatches monitor participants’ activity throughout the day.

RESULTS: Following detailed baseline assessment to determine individual starting levels, 60 participants used the eLiFE programme to integrate specific exercises into daily life. Four home visits and three support phone calls were provided over a 6-month follow-up period. Participants were encouraged to increase the number, difficulty, and location of their exercises. A virtual trainer was always accessible to provide guidance on how to perform activities and included additional information regarding the benefits of the exercises. Based on sensor data and participants’ self-reporting, personalised feedback was provided related to previously selected goals and personal exercise preference in order to improve long-term adherence.

CONCLUSION: The potential of mHealth intervention delivery to provide a tailored exercise programme in a fast and location independent manner will be discussed.
Symposium 5 – Modality-Specific Exercise Interventions for Frailty and Sarcopenia

Therapeutic potentials of modality-specific exercise interventions for frailty and sarcopenia
Jae-Young Lim, MD, PhD.
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BACKGROUND & PURPOSE: Frailty and sarcopenia have risen to become the new geriatric giants having very high rates of functional deterioration, hospitalization and death. Recent studies have focused on evidence-based interventions to prevent mobility decline and enhance physical performance in older adults with frailty and sarcopenia. Several modalities, in addition to traditional strengthening programs, are designed to manage age-related functional decline more effectively. In this study, we reviewed the current relevant literatures to assess the therapeutic potentials of power-oriented and eccentrically biased exercises for frailty and sarcopenia.

REVIEWS: Age-related changes in human skeletal muscle, and their relationship with physical performance, are discussed with reference to in vitro physiologic and human biomechanics studies. A decline in mobility among the aging population is closely linked with changes in the muscle force–velocity relationship. Muscle power declines earlier and more with advancing age compared to muscle strength. The relative preservation of eccentric strength in older adults, that is, less decline with age compared to concentric force underpins the therapeutic potentials as a mechanism-based exercise intervention. Interventions based specifically on increasing velocity and eccentric strength can improve function more effectively compared to traditional strengthening programs. Power oriented and eccentrically biased exercise programs are introduced as a specific method for improving both muscle force and velocity.

CONCLUSIONS: To be more effective, exercise interventions for frailty and sarcopenia should focus on enhancing the muscle force–velocity relationship. Programs based specifically on increasing velocity and eccentric strength can improve function more effectively compared to traditional strengthening programs. Power oriented and eccentrically biased exercise programs are introduced as a specific method for improving both muscle force and velocity.

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Concept of Spinal Sarcopenia and Clinical Interventions
Sang Yoon Lee, MD, PhD.
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BACKGROUND & PURPOSE: Sarcopenia on lumbar paraspinal muscles is receiving renewed attention as a cause of spinal degeneration. Both the atrophy and fatty change of paraspinal muscles originated from spinal sarcopenia are also known to be associated with functional disorders and chronic back pain. However, there are few studies on the precise concept and diagnostic criteria for spinal sarcopenia and no clinical trials to determine whether it can be treated or prevented by strengthening exercise or nutritional support. Therefore, we aimed to review the updated relevant literatures to establish the concept of spinal sarcopenia and the clinical intervention that can treat and prevent it.

REVIEWS: While feasible, inexpensive, and less radiation-exposed tools such as dual energy X-ray absorptiometry have been used to measure appendicular skeletal muscle mass, paraspinal muscle assessment is still needed using spinal CT or MRI. In addition, spinal extensor strength measurement is necessary to confirm the function of lumbar paraspinal muscle, but isokinetic exercise equipment for accurate measurement is not as feasible as a dynamometer for hand grip strength to evaluate sarcopenia. Furthermore, many elderly people may experience pain during the measurement of spinal extension strength. Therefore, it is necessary to develop a simple, accessible, and clinically meaningful measurement index to confirm the myofunction of spinal extension. The main two axes of treatment and prevention of conventional sarcopenia are muscle strengthening exercises and high protein nutritional supplements. Therefore, after the concept of spinal sarcopenia has been established, it is necessary to confirm the clinical effect by intervention for spinal extension exercise and nutritional supplementation.

CONCLUSIONS: Spinal sarcopenia needs to be formulated differently from conventional sarcopenia because it has different characteristics from limb skeletal muscle. More precise conceptualization of spinal sarcopenia and clinical intervention studies are needed.

The effects of lower extremity eccentric-based training on muscle strength and physical function in older adults: A randomized controlled pilot trial
Dae-Young Kim, MS.
Aging & Mobility Biophysics Lab, Seoul National Bundang Hospital

PURPOSE: A decrease in muscle mass and physical function in older adults is accompanied by reduced muscle strength and physical performance. We investigated the effects of eccentric-based training on skeletal muscular strength and physical function in older adults.

MATERIALS & METHODS: Sixteen healthy older subjects (age, 73.2 ± 4.4 years) underwent either eccentric training or conventional resistance training twice a week for 8 weeks. Body composition, isometric and isokinetic strength, and power were evaluated in all participants. To assess physical functional ability, subjects performed the short physical performance battery (SPPB), stair climbing, and chair stand tests.

RESULTS: Eccentric training significantly improved gait speed (P = 0.049; effect size, 0.15) and stair climb (P = 0.046; effect size, 0.19) compared with conventional resistance training. Eccentric training also improved isokinetic strength and muscle power in isotonic knee tests (P = 0.048; effect size, 0.63 and P = 0.005; effect size, 0.13, respectively).

CONCLUSION: Regular eccentric exercise is therefore effective at countering the reduction in muscle strength and physical function due to aging.
Emerging assistive technologies for diagnosis, management and treatment of sarcopenia

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Consensus guidelines for diagnosing sarcopenia have been available for almost a decade and the condition was recognised with its own ICD-10 code in 2016. Progressive resistance training and nutritional supplementation are also recommended as key treatment strategies for sarcopenia. However, diagnosis and treatment pathways for sarcopenia remain poorly implemented in clinical settings. Low diagnosis and treatment rates are in part attributable to poor knowledge of the condition, as well as lack of resources and time, among clinicians. Technology potentially has a role to play in addressing the concerning low levels of attention to sarcopenia in the clinic. Several new devices may support clinicians to simply and rapidly identify patients with low skeletal muscle mass and function. Assistive technologies (AT) are devices or systems used to maintain or improve physical functioning, and are often utilised in other populations at risk of disability. While there is a paucity of research on the benefits of AT for sarcopenia, emerging forms of AT including smart homes, exoskeletons and robotics, may in future support sarcopenic older adults to maintain independence and age in place. In addition to overcoming its consequences, devices including neuromuscular electrical stimulation and whole-body vibration systems may have a role in treatment of sarcopenia. Moreover, newer technologies, such as interactive and virtual reality games, wearable activity trackers, smartphone applications, and three-dimensional printing, hold promise in increasing engagement in physical activity and nutrition behaviours which prevent and reverse sarcopenia in older adults. It is clear however that AT needs to be appropriately prescribed in order to minimise patient abandonment and also to prioritise movement over muscle disuse. This presentation will summarise strategies by which emerging technology may support clinicians in the diagnosis, management and treatment of sarcopenia, and propose several research questions which need to be addressed in order to confirm its effectiveness.

Mobile Health Technology - The future of healthcare for falls and frailty

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With the progressive ageing of our population there are increasing demands for healthcare services to keep older adults disease-free, independent and ageing in place longer. The rapid evolution and access to mobile technology has provided new opportunities in geriatric healthcare for remote patient communication, diagnostic assessment, monitoring, education, and the delivery of preventive and rehabilitative services for chronic diseases. For falls and frailty, which is characterised by muscle weakness, slowness, inactivity, exhaustion and unintentional weight loss, smartphone or wearable inertial sensors (accelerometers and gyroscopes), low cost video/depth cameras (Microsoft Kinect), pressure sensors (Wii board, smart shoes, socks) and motion ambient sensors (radar/laser) have been shown to efficiently capture and analyse movement and postural patterns/ transitions and abnormalities, and provide an accurate objective falls and frailty risk assessment. Smart-homes including eFurniture integrating wireless sensor technology have also shown promise as a tool for home-based fall and frailty detection. Technology-assisted dietary assessment systems using smartphones and wearable cameras with automated image-analysis techniques are emerging as useful tools to evaluate (mal)nutrition. For falls and frailty prevention and management, there is emerging evidence to support the use interactive exergaming, virtual reality training, socially assistive robots, tele-mentoring or -coaching incorporating remotely monitored narrated video-based exercise prescription apps (e.g. Physitrack) with built-in reminder notifications, in-app logging of exercise completion and real-time feedback, as safe and effective platforms to deliver individually-tailored and evidence-based exercise (home) and behavioural change programs to promote disease self-management and improve physical activity, nutritional status, cognition, physical function and reduce the risk of falls. This presentation will provide an overview of existing and emerging mobile technologies for the assessment, prevention and management of falls and frailty, as well as issues related to the usability, feasibility and validity of such tools and the older person's perspective of using such technology as a mode of healthcare.
PreventIT: Lifestyle-integrated activity intervention in young seniors by use of ICT or an instructor to prevent age-related functional decline

Dr A. Stefanie Mikolaizak1, Prof Clemens Becker1, Prof Beatrix Vereijken2, Prof Chris Todd3, A/Prof Sabato Mellone4, Prof Mirjam Pijnappels5, Prof Kamiar Aminian7, Dr Elisabeth Boulton5, Dr Kristin Taraldsen2, Dr Jeanine Van Ancum6, Prof Andrea Maier6, Mr Ronny Bergquist2, Dr Wei Zhang6, Prof Jorunn Helbostad2

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AIM: A rapidly increasing number of recent retirees calls for health promotion and prevention of age-related functional decline (FD). Early screening and interventions for FD is important considering its prevalence, reversibility, and prognostic value. The EU PreventIT consortium adapted the Lifestyle-integrated Exercise programme (LiFE) by Clemson et al. to recently retired seniors, and included more challenging activities and a behavioural change framework (aLiFE). aLiFE was subsequently transferred to an ICT platform to offer the intervention via smartphones and smartwatches (eLiFE). Two pilot studies indicated that the aLiFE/eLiFE activities were physically appropriately challenging. PreventIT is a multicentre, three-armed, feasibility RCT in three European cities aiming to compare aLiFE and eLiFE against a control group (physical activity recommendations).

METHODS: Participants, aged 60-70 years old, were encouraged to integrate balance, strength and physical activity throughout their day. Participants were assessed at baseline, six and twelve months post-randomisation. The primary outcomes were the Late-Life Function and Disability Instrument (LLFDI) (range score 0-100) and a physical behaviour complexity metric based on accelerometry data obtained from wearable sensors (higher scores indicating better behaviour).

RESULTS: At baseline, 189 participants (99 females) with mean age of 66.3±2.5 years were assessed. Mean gait speed was 1.4±0.2 m/sec. Baseline functional LLFDI scores were 73.4±12.2 and the weekly mean complexity value was 0.105±0.011. Participants were on average moderately/vigorously active for 59.8±27.9 min and inactive for 625.2±105.3 min/day. In total, 157 participants were re-assessed after six months, with 12-month follow-up data available in September 2018. 90% and 58% of participants were using the system after 50 days and six months, respectively.

CONCLUSION: The PreventIT activity concept could potentially protect against diverse components of FD by improving balance, strength and mobility by progressively increased challenges based on the individuals’ competency and performance. Preliminary results from all stages of PreventIT will be further discussed.
Outstanding Abstracts

Effects of androgen deprivation therapy for men with prostate cancer on muscle and bone strength and their determinants and the interaction between them

Mr Jack Dalla Via1, Dr Patrick Owen1, Professor Robin Daly1, Ms Niamh Mundell1, Dr Timo Rantalainen1,2, Patricia M Livingstone1,2, Associate Professor Steve Fraser1

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AIM: Androgen deprivation therapy (ADT) is the mainstay for metastatic and locally advanced prostate cancer (PCa) treatment, but may lead to bone and muscle loss and increased adiposity. The aim of this study was to evaluate the effects of ADT on muscle and bone strength and its determinants, and the relationship between them.

METHODS: Cross-sectional comparison of 70 ADT treated PCa men (mean duration 25 months), 52 PCa controls and 70 healthy controls. Tibial (66%) muscle cross-sectional area (mCSA), total, cortical and medullary area, total and cortical volumetric bone mineral density [vBMD] and bone strength (density-weighted polar cross-sectional moment of inertia) were assessed by pQCT. Lean mass (LM) and lumbar spine (LS), femoral neck (FN) and total hip BMD were assessed by DXA.

RESULTS: On average, ADT treated men had higher BMI than PCa but not healthy controls. There were no group differences in whole-body LM or tibia mCSA, but appendicular LM adjusted for BMI was 7.5-8.9% lower in ADT men than PCa (P<0.001) and healthy controls (P=0.002). ADT men also had 6.8-7.3% lower BMI adjusted LS-BMD than PCa (P=0.06) and healthy controls (P=0.02), with a trend for lower total hip BMD (5.5%) than PCa controls (P=0.07). FN-BMD and tibial bone outcomes did not differ significantly between groups. In all groups, there was a similar significant association between lean mass and FN-BMD (r=0.29-0.49) and tibia mCSA with cortical area and bone strength (r=0.27-0.49) (all P<0.05), but the strength (slopes) of the relationship between lean mass and LS-BMD tended to differ (P=0.09) between ADT men (r=0.10) and PCa (r=0.48, P<0.001) and healthy controls (r=0.21, P=0.08).

CONCLUSION: ADT treated prostate cancer patients had lower appendicular lean mass and LS-BMD after accounting for higher BMI compared to non-ADT treated PCa men or healthy controls, but bone strength and its determinants were not compromised.

Fruits and vegetables and olive oil do not preserve appendicular skeletal muscle in obese community-dwelling older adults during energy intake restriction

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AIM: Energy restricted weight loss diets in older adults results in loss of skeletal muscle mass (SMM), which may predispose to disability. A high protein intake may attenuate loss of SMM. Fruit and vegetables (F&V) and extra-virgin olive oil (EVOO) are rich sources of carotenoids and polyphenols, both of which are inversely associated with sarcopenic symptomology. This study investigated the effect of an increased intake of carotenoid-rich F&V and EVOO, against a background high protein diet, on body composition, muscle strength and physical function in obese community-dwelling older adults during dietary energy-restricted weight loss.

METHODS: Sixty-five obese older adults (68.7 ± 5.6yrs; BMI: 33.7 ± 4.8kg/m2) were randomized to a 12-week energy restricted, isocaloric diet (30% protein (1.2g/kg); 30% carbohydrate; 40% fat) enriched with either: a) high carotenoid F&V and EVOO (HC+EVOO); or b) lower carotenoid F&V, and a polyunsaturated based oil (LC+PUFA). At baseline and post-intervention, body mass, body composition (DXA), muscle strength (hand-grip strength) and physical performance (Short Physical Performance Battery) were assessed.

RESULTS: Body mass reduced similarly in both groups (HC+EVOO: -6.2kg; 95% CI: -7.4,-4.9kg; LC+PUFA: -6.5kg; 95% CI: -8.2,-4.8kg; P = 0.570). Appendicular skeletal muscle also decreased, with no difference between groups (HC+EVOO: -0.9kg; 95% CI: -1.3,-0.5kg; LC+PUFA: -1.0kg; 95% CI: -1.4,-0.6kg; P = 0.368). No significant change in muscle strength was observed, with no difference between groups (HC+EVOO: 0.7kg; 95% CI: -0.7,2.2kg; LC+PUFA: 0.8kg; 95% CI: -0.5,2.2kg; P = 0.842). Small, non-significant improvements were observed in physical function, with no difference between groups (P = 0.260).

CONCLUSIONS: High carotenoid F&V plus EVOO does not preserve appendicular skeletal muscle during energy intake restriction. However, a supervised weight loss intervention emphasising dietary protein, fruits and vegetables did not adversely affect measures of muscle strength and physical performance in community-dwelling obese older adults.
Oxidative stress and inflammatory biomarkers in pre-sarcopenic, sarcopenic and non-sarcopenic individuals with chronic obstructive pulmonary disease (COPD): Preliminary results

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AIM: This study aimed to compare oxidative stress and inflammatory biomarkers between sarcopenic, pre-sarcopenic, and non-sarcopenic subjects with COPD and check their correlations with clinical measurements of sarcopenia.

METHOD: 59 subjects with COPD were classified as pre-sarcopenic, sarcopenic and non-sarcopenic according to the European Working Group on Sarcopenia in Older People. Advanced oxidation protein products (AOPP), paraoxonase 1 (PON1), superoxide dismutase activity (SOD), nitric oxide metabolites (NOX), total radical trapping antioxidant parameter (TRAP), C-reactive protein (CRP), interleukin-6 (IL-6), interleukin-1β (IL-1β), tumor factor-α (TNF-α) and interleukin-12 (IL-12) were measured. Maximal inspiratory and expiratory pressure (MIP and MEP, respectively), gait speed (GS), handgrip strength (HGS), quadriceps strength (QS) and fat-free mass index (FFMI) were also assessed. Parametric and non-parametric ANOVA with post-hoc analysis were used to compare the variables between groups. Pearson and Spearman correlations were used to assess relationships among the variables.

RESULTS: Pre-sarcopenia and sarcopenia prevalence in COPD were 22% and 20%, respectively. Sarcopenic subjects were older than non-sarcopenic COPD (P=0.07) and also presented lower TRAP and AOPP levels and higher IL-1β levels compared to non-sarcopenic individuals (P<0.04). Pre-sarcopenic presented lower SOD levels and higher CRP levels compared to non-sarcopenic individuals (P<0.04). GG was correlated with TRAP levels (r: 0.51; P=0.001). QS was correlated with TRAP, IL-1β and IL-8 levels (r: 0.46 and 0.42, respectively, P< 0.04). HGF presented correlations with TRAP, AOPP and TNF-α levels (r: 0.42, 0.44 and 0.32, respectively, P<0.004). QS was correlated with TRAP levels (r: 0.55; P<0.001). GS was correlated with TRAP, IL-1β and IL-8 levels (r: 0.51, 0.46 and 0.42, respectively, P< 0.04). HGF presented correlations with AOPP (r: 0.45 P<0.0003). MIP and MEP were correlated with SOD levels (r: -0.36 and -0.33, respectively, P< 0.007). Conclusion: Pre-sarcopenia and sarcopenia were characterized by decreased antioxidant capacity and augmented inflammation in subjects with COPD. Additionally, the clinical measurements of sarcopenia were correlated with oxidative and inflammatory biomarkers in this population.

Frailty index creation for New Zealand older adults with complex needs

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AIMS: To create a frailty index (FI) for community dwelling older people in New Zealand and to assess differences in mean frailty by demographic characteristics and five-year outcomes.

METHODS: A FI was derived following the cumulative deficit model, using the interRAI home care assessments, of 90,512 adults aged ≥65 years with an assessment conducted between September 2012 and May 2017 in New Zealand. Outcomes such as mortality and entrance into aged residential care (ARC) were used to assess its associations. Differences in frailty between males and females and for ethnicities (Māori, Pacifica, Asian and European) were assessed.

RESULTS: Participants mean age was 82.1 years (range: 65, 109 years), and 54,513 (60.2%) were female. The median FI was 0.22, with a range from 0 to 0.79. There was a significant relationship between frailty index and mortality (χ2(6) = 19039.61, p<0.05). The five year mortality rate, including those who entered ARC, for this cohort was 44.7% (n=40,491), when stratified by FI, mortality rates differ significantly (F=0.1, 24.9%, n=2,027 – FI<0.5, 89.2%, n=2,840). The five year rate for ARC entry for this cohort was 20.7% (18,767), and there was a significant difference between ARC entry and the different levels of frailty (χ2(6)=400.56). There were significant differences between mean frailty index and sex (χ2(74712.20)=18.80 p<0.05), and mean frailty index and ethnicity (F=105.5, p<0.05). Median frailty for both males and females increased in relation to age. When stratified by age, older Pacifica people had the highest median frailty.

CONCLUSIONS: The FI is associated with mortality and entrance into ARC. There were significant differences between frailty and age, sex and ethnicity. This offers the opportunity for health care professionals and clinicians to identify older people at risk of health decline and mortality so that appropriate services and interventions may be implemented.
Dairy supplementation reduces risk of malnutrition in institutionalised older adults

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**AIM:** Malnutrition is prevalent in older adults contributing to comorbidities and care costs. Dairy foods (milk, cheese, yoghurt) provide protein; therefore we aimed to determine if supplementing aged-care residents for 12 months with dairy foods would reduce malnutrition risk.

**METHOD:** Sixty aged-care facilities housing 3600 residents were recruited; 30 facilities randomised to provide additional dairy products to residents, with the remaining 30 facilities serving as controls. Nutritional status (mini nutrition assessment; MNA) and food intake (plate waste analysis) were assessed in 713 residents (72% females, aged 86.5±7.2 years), of which 302 provided blood samples at baseline and 12 months. Group differences were determined using robust regression analysis.

**RESULT:** Dairy servings increased from 1.4±1.0/d to 3.0±1.3/d and protein intake from 84±28% to 97±30% of recommended levels, with supplementation, which remained near 1.4±0.8 servings/d and 84±36% respectively in controls. Dairy-supplementation was associated with a 0.6 higher MNA score (95%CI: 0.0, 1.2, p=0.05), and less deterioration in nutritional status (MNA score declined in 21.8% of dairy-supplemented residents vs 31.9% in controls, p=0.019). Hemoglobin levels were 4.1 g/L higher (95%CI: 1.0, 7.1, p=0.01) in dairy-supplemented residents than controls.

**CONCLUSIONS:** Dairy food supplementation prevented age-related decline in nutritional status in aged-care residents, and may be a suitable public health approach to reduce malnutrition risk in older adults.

Effects of age on the acute effects of protein-rich supplements on appetite, gastric emptying, glucose, gut hormones, and energy intake

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**BACKGROUND:** Protein-rich supplements are widely used in older people to prevent and manage under-nutrition. However, not much is currently known about the acute appetite suppressive effects of such supplements in older people.

**AIM:** To determine the effect of age on the acute effects of substitution, and addition, of carbohydrates and fat to whey protein on appetite, gastric emptying, glucose, gut hormones, and energy intake in healthy older compared to younger men.

**METHOD:** In randomized, double-blind, order, 13 older (age: 75±2yrs; body mass index (BMI): 26±1kg/m²) and 13 younger (23±1yrs, 24±1kg/m²) men ingested drinks (450mL) containing: (i) 70g protein (280kcal; ‘P280’), (ii) 14g protein, 28g carbohydrate, 12.4g fat (280kcal; ‘M280’), (iii) 70g protein, 28g carbohydrate, 12.4g fat (504kcal; ‘M504’), or (iv) a control drink (~2kcal) on 4 study days. Appetite (visual analogue scales), gastric emptying (younger: n=11; older: n=9, 3D-ultrasonography), and blood glucose, plasma insulin, ghrelin, cholecystokinin (CCK) and glucagon-like peptide-1 (GLP-1) concentrations were determined after overnight fasting (8-10 hours) for 3 hours. Ad libitum energy intake was subsequently determined from a buffet-style meal. Results were analysed using ANCOVA.

**RESULT:** Suppression of energy intake by P280 compared to control was less in older (increase of 49±42kcal) than younger (suppression of 100±54kcal) men (P=0.038). After all caloric drinks, the increase in GLP-1 concentrations was higher in older than younger men (P=0.05). During the first phase of gastric emptying (0-60min), ghrelin was less suppressed by M280 and hunger was less suppressed by control, M280 and M504 in older than younger men (P<0.05). Hunger (r=0.27, P=0.039) was, within-subjects, inversely, and GLP-1 positively (r=0.68, P<0.001) related to gastric retention. Gastric emptying, glucose, insulin and CCK responses were comparable between younger and older men.

**CONCLUSIONS:** Age affects the suppressive effects of preload ingestion on appetite and energy intake, as well as postprandial plasma GLP-1 concentrations.
Oral Communications A

Multi-site pain and muscle loss in community-dwelling older adults: Does the distribution of pain sites matter?

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AIM To determine whether wider anatomical distribution of pain sites reduces muscle mass, strength and muscle quality over 10 years, independent of the number of painful sites.

METHOD: 1036 participants (51% women; mean age 63±7.4 years) were prospectively followed for 10 years. Appendicular lean mass was assessed using Dual-energy X-ray absorptiometry. Handgrip and knee extension strength were measured using a dynamometer. Whole body muscle quality was calculated as muscle strength per unit of muscle mass. Pain at multiple anatomical sites was assessed using a questionnaire. Depending on the presence and distribution of pain, participants were classified as having no pain, not widespread pain or widespread pain. Widespread pain was defined as pain in the axial skeletal region and also the upper and lower limbs.

RESULTS: Increasing number of painful sites was associated with lower muscle strength (Handgrip strength: β = –0.11, 95% CI: –0.16, –0.06; Knee extension: β = –0.24, 95% CI: –0.40, –0.08) and muscle quality (β = –0.06, 95% CI: –0.08, –0.03) but not muscle mass (β = 0.03, 95% CI: –0.003, 0.07). Similarly, older adults with widespread pain had lower muscle strength and muscle quality but not muscle mass (all P<0.05), compared to those with no pain/not widespread pain. After further adjustment for widespread pain, the association between number of painful sites and muscle loss remained significant, whereas, widespread pain did not.

CONCLUSIONS: These findings suggest that the number of painful sites rather than the pattern of pain locations could be most suitable for identifying older adults with a greater risk of decline in muscle strength and function over 10 years.

Healthy community-living older men differ from women in associations between myostatin levels and skeletal muscle mass

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BACKGROUND: Myostatin is a negative regulator of muscle growth but the relationship between serum myostatin levels and muscle mass is unclear. This study investigated the association between serum myostatin levels and skeletal muscle mass among healthy older community residents in Taiwan, to evaluate the potential of serum myostatin as a biomarker for diagnosing sarcopenia and/or evaluating the effect of its treatment.

METHODS: Data were excerpted from a random subsample of the I-Lan Longitudinal Aging Study population. Serum myostatin levels were determined and categorized into tertiles (low, medium, high). Relative appendicular skeletal muscle mass (RASM) was calculated as appendicular lean body mass by dual-energy X-ray absorptiometry divided by height squared (kg/m2). Low muscle mass was defined as recommended by the Asian Working Group for Sarcopenia.

RESULTS: The study sample comprised 463 adults (mean age: 69.1 years; 49.5% men). Compared with subjects with normal RASM, those with lower RASM were older and frailer, with a significantly higher prevalence of malnutrition, lower serum dehydroepiandrosterone (DHEA) levels, and were more likely to have low serum myostatin status. Multivariable logistic regression analysis showed that male sex (OR 3.60, 95% CI 1.30 -9.92), malnutrition (OR 4.39, 95% CI 1.56 -12.36), DHEA (OR 0.99, 95% CI 0.99-1.00), and low myostatin (OR 3.23, 95% CI 1.49-7.01) were all independent risk factors for low RASM (all P < 0.05). In men, DHEA (OR 0.99, 95% CI 0.98-1.00) and low myostatin (OR 4.89, 95% CI 1.79-13.37) were significantly associated with low RASM (both P < 0.05); however, only malnutrition was associated with low RASM in women (OR 13.59, 95% CI 2.22-83.25, P < 0.05).

CONCLUSIONS: Low serum myostatin levels were associated with low skeletal muscle mass in men, but not in women. Our results do not support using serum myostatin levels to diagnose sarcopenia, or to treat responses.
Oral Communications A

Identifying risk of hip fracture within community-dwelling older people
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AIM: Identify risk factors for hip fracture using New Zealand interRAI home care data.

METHODS: The cohort consisted of 45,046 people aged 65 years and over who had an interRAI home care assessment from September 2012-October 2015. Hip fracture diagnosis was identified by linking ICD codes from hospital admissions data to the home care data. Variables of interest were taken from the interRAI home care (version 9.1). Unadjusted and adjusted competing risk regressions, where mortality is a competing event, were created to identify risk factors for hip fracture.

RESULTS: The mean age of the cohort was 82.7 years and 61% were female. By the end of the study period (October 2015) 3,010 (6.7%) people had sustained a hip fracture. The median follow-up time of participants was 440 days (Q1 184, Q3 733) and median time until first hip fracture was 261 days (Q1 119, Q3 477). After adjusting for a sociodemographic and potentially confounding variables the significant risk factors for hip fracture identified in the model were, older age (SHR 3.33, 95% CI 2.44, 4.54); female sex (SHR 1.38, 95% CI 1.22, 1.55); falls (SHR 1.17, 95% CI 1.05, 1.31); prior hip fracture (SHR 4.16, 95% CI 2.93, 5.89); wandering (SHR 1.36, 95% CI 1.07, 1.72); low BMI (SHR 1.67 95% CI 1.39, 2.02); tobacco use (SHR 1.56 95% CI 1.25, 1.96); and Parkinson’s disease (SHR 1.45 95% CI 1.41, 1.84). Shortness of breath (SHR 0.80, 95% CI 0.71, 0.90) was associated with a reduced risk of hip fracture.

CONCLUSIONS: Risk factors for hip fracture within the interRAI HC have been identified and may be used to identify those who may need a hip fracture prevention as part of their care plan. Knowledge of any of these potential risk factors may be used to tailor preventions around specific risks.

Sarcopenic Obesity and Anxiety: Geelong Osteoporosis Study
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AIM: Some evidence supports a positive association between obesity and anxiety, but little is known about sarcopenia and anxiety. The rationale for investigating links between musculoskeletal and mental health rests with the notion of shared pathophysiology and risk factors. The aim of this study was to determine associations between sarcopenia and obesity, and its components, with symptoms of anxiety.

METHODS: This cross-sectional study involved 313 postmenopausal women aged >60yr and participating in the Geelong Osteoporosis Study; median age 70.6yr (IQR 65.0-75.8), mean weight 73.6kg (±SD 15.1). Sarcopenia was identified as low DXA-derived appendicular lean mass expressed relative to height (rALM<6.07kg/m2, Lunar) in combination with low handgrip strength (maximum HGS<20kg, Jamar). Obesity was identified as high DXA-derived body fat mass, expressed as a percentage of whole body (%BF>40%). Sarcopenic obesity referred to the co-existence of sarcopenia and obesity. Anxiety symptomatology was documented via the Hospital Anxiety and Depression Scale (HADS-Anxiety score>8). Multivariable logistic regression was used to determine the likelihood of anxiety in association with the components of sarcopenic obesity. Potential confounders included age, physical inactivity, smoking, alcohol consumption and energy intake.

RESULTS: Among 75 women with anxiety, 16(21.3%) had sarcopenia, 55(73.3%) were obese, 9(12.0%) had sarcopenic obesity and 13(17.3%) were non-sarcopenic and non-obese. In a multivariable model, sarcopenia and obesity were independently associated with anxiety: sarcopenia OR 2.36 (95%CI 1.17-4.74, p=0.02) and obesity OR 1.84 (95%CI 1.02-3.31), p=0.04. There was no sarcopenia*obesity interaction. No confounders were identified.

CONCLUSION: These findings warrant further research to consider the extent of muscle deficit, severity of obesity and subtypes of anxiety. However, our data do suggest that poor muscle health and obesity are independently associated with anxiety symptomatology, and that their effects are additive rather than multiplicative in this relationship. Thus, anxiety and attendant complications should be considered when managing older women with sarcopenic obesity.
Mid-calf skeletal muscle density and its associations with incident falls and bone health in Swedish older adults

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AIM: Higher skeletal muscle density, indicating lower infiltration of adipose tissue into muscles, is associated with reduced fracture risk in older adults. We aimed to determine whether mid-calf muscle density is associated with falls risk and bone health in community-dwelling Swedish older adults.

METHOD: 2,167 community-dwelling men and women who participated in the Healthy Ageing Initiative study at age 70 were included in this analysis. Mid-calf muscle density (mg/cm³) was assessed by proximal peripheral quantitative computed tomography, and bone parameters at the distal and proximal tibia and radius were also assessed using this technique. Whole-body lean mass, lumbar spine and total hip bone mineral density (BMD) were assessed by dual-energy X-ray absorptiometry. Participants completed the timed up-and-go test, seven-day accelerometer measurements of physical activity, and self-reported falls data were collected 6 and 12 months later.

RESULT: 258 (12%) participants experienced a fall within 12 months. After adjustment for confounders, each mg/cm³ increase in mid-calf muscle density was associated with 4% and 11% reduced likelihood of experiencing a fall or multiple falls, respectively (both P<0.05). The association with multiple falls remained significant after further adjustment for timed up-and-go (OR: 0.91 95% CI: 0.83, 0.99). Mid-calf muscle density was not associated with total hip BMD, was negatively associated with lumbar spine BMD (B= -0.003, 95% CI -0.005, -0.001 g/cm²), and at the radius, was positively associated only with proximal cortical density (B=0.784, 95% CI 0.246, 1.323 mg/cm³). However, at the tibia, muscle density was positively associated with distal total and trabecular BMD, and also proximal total and cortical BMD, cortical thickness and stress-strain index (all P<0.05).

CONCLUSIONS: Higher mid-calf muscle density is independently associated with decreased likelihood for multiple incident falls and appears to have localised positive effects on bone structure. Interventions which improve muscle density may reduce fracture risk in older adults.

Clinical impact of sarcopenia on muscular activation, balance, risk of fall, exercise capacity, physical activity and inflammatory biomarkers in subjects with chronic obstructive pulmonary disease (COPD): Preliminary results

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AIM: To compare muscular activation, balance, exercise capacity, physical activity and inflammation in COPD subjects with and without sarcopenia.

METHOD: Thirty-five subjects with COPD were classified as sarcopenic and non-sarcopenic, according to the definition of the EWGSOP. Static balance was measured in a force platform during four tasks: standing with feet hip-width apart and eyes opened (FHEO), standing with feet hip-width apart and eyes closed (FHEC), standing on unstable surface (US) and one-legged stance (OLS). Electromyographic activity of lower limbs and trunk muscles was concomitantly assessed. Brief-balance evaluation systems test (BBT), timed up & go test (TUG), six-minute walking test (6MWT), handgrip and quadriceps strength (HGS and QS), maximal inspiratory and expiratory pressures (MIP and MEP), bioelectrical impedance and physical activity in daily life were also performed. IL-6, IL-1β and TNF-α were dosed.

RESULTS: After adjustments for gender and age, sarcopenia was associated with risk of falls (detected with specific cut-off point of TUG) (OR:13 CI 95%, 1.3-130, P<0.028). BBT and TUG were worse in sarcopenic COPD (P<0.02 for all). Regarding balance, during the task FHEC, FHEO and US, the velocity and amplitude of oscillation, as well as, the center of pressure displacement area in the US position, were higher in sarcopenic COPD (P<0.02 for all). Sarcopenic COPD presented higher activation of scalene, sterno-cleido-mastoid and abdominal muscles during OLS, as well as lower tibialis anterior activation during OLS and US and lower vastus medialis activation during FHEC and US (P<0.04 for all). 6MWT, HGS, QS, MIP, MEP and total energy expenditure were lower in sarcopenic (P<0.04 for all). IL-1β was higher in sarcopenic COPD (P<0.045).

CONCLUSION: Sarcopenia is highly associated with risk of falls in individuals with COPD. Worse balance, reduced muscular activation in lower limbs, lower exercise capacity, poor physical activity and higher inflammation were present in sarcopenic COPD.
Assessment of mid-thigh bone and muscle mass as a new diagnostic and predictive approach to osteosarcopenia
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BACKGROUND/AIMS: Diagnostic methods for osteosarcopenia (important risk factor for falls, fractures, disability, frailty and mortality) are not well-defined. Therefore, more sensitive and specific methodologies are required to diagnose and follow up osteosarcopenia. Assessment of bone/muscle mass using mid-thigh slice of whole-body DXA is a CT-validated, low-radiation method to measure bone/muscle. We hypothesised that compared to conventional indices, mid-thigh muscle and bone masses show better associations with strength, falls and fractures.

METHODS: Men and women (n=204), aged 65-96 (78±6.8) with at least one fall (mean=2.49±2.4) within last year were studied. DXA was carried out and bone, muscle and fat masses were quantified in two additional mid-thigh regions of interest (ROIs; 1.2 and 6 mm thick) on whole-body scans. Bone and muscle masses were correlated with conventional bone (hip and spine) and muscle mass (ALM/BMI & ALM/h2), strength (grip strength, gait speed and TUG) indicators and number of falls and fractures.

RESULTS: ALM/BMI showed strongest association with grip strength (R=0.503, p<0.001), followed by the mid-thigh region (corrected for BMI; R=0.385, p<0.001) and ALM/h2 (R=0.314, p<0.001). Similarly, ALM/BMI and mid-thigh muscle mass showed similar correlations with gait speed (R=0.338 & 0.318, respectively, p<0.001), whereas ALM/h2 or mid-thigh lean mass/h2 did not show such associations. Mid-thigh lean mass/BMI and ALM/BMI were negatively associated with TUG (R=−0.257 & −0.219, respectively, p<0.001). ALM/h2 was not associated with TUG test. While falls showed negative associations with ALM/BMI (R=−0.194, p=0.007), fractures showed negative associations with muscle mass in the mid-thigh (R=−0.206, p=0.004). Fractures were negatively associated with BMD at the mid-thigh regions (rs=−0.235, p=0.001) and total hip (rs=−0.199, p=0.007). After adjusting for the number of falls, only the muscle mass of mid-thigh region was negatively associated with fractures (rs=−0.194, p<0.01).

CONCLUSION: Compared to conventional indices, mid-thigh ROI has better or comparable associations with strength, falls and fractures. Longitudinal studies are warranted.

Effects of lower extremity eccentric-based training on muscle strength and physical function in older adults: A randomized controlled pilot trial
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A decrease in physical function and muscle mass in older adults is accompanied by reduced physical performance and muscle strength. We investigated the effects of eccentric-based training on skeletal muscular strength and physical function in older adults. Sixteen healthy older subjects (age, 73±2 years) underwent either eccentric training or conventional resistance training twice a week for 8 weeks. Body composition, isometric and isokinetic strength, and power were evaluated in all participants. To assess physical functional ability, subjects performed the short physical performance battery, stair climbing, and chair stand tests. Eccentric training significantly improved gait speed (P = 0.049; effect size, d = 0.15) and stair climb (P = 0.046; effect size, d = 0.13) compared with conventional resistance training. Eccentric training also improved isokinetic strength and muscle power in isotonic knee tests (P = 0.040; effect size, d = 0.63 and P = 0.005; effect size, d = 0.13, respectively). Eccentric training is therefore more efficient at counteracting the reduction in muscle strength and physical function due to aging than conventional resistance training.
Clinical utility of four sarcopenia criteria for the prediction of injurious falls in older Australian women

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AIM: Sarcopenia is characterised by a reduction in muscle mass in conjunction with poor muscular strength and/or physical function, and is considered a risk factor for falling. The aim of this prospective, population-based cohort study of 903 Caucasian Australian women (mean age 79.9±2.6 years) was to compare the clinical utility of four sarcopenia definitions for the prediction of injurious falls and recurrent injurious falls over 9.5 years.

METHODS: The four definitions were the United States Foundation for the National Institutes of Health (FNIH), the European Working Group on Sarcopenia in Older People (EWGSOP) and modified FNIH (AUS-POPF) and EWGSOP (AUS-POPE) definitions using Australian population-specific cut-points we developed (<2 SD below the mean of young healthy Australian women). Incident 9.5-year injurious falls-related hospitalisations were captured by the Hospital Morbidity Data Collection via the Western Australian Data Linkage System. RESULTS: Baseline prevalence of sarcopenia by the four definitions differed substantially (FNIH n=85 [9.4%], EWGSOP n=218 [24.1%], AUS-POPF n=108 [12.0%], AUS-POPE n=97 [10.7%]). Sarcopenia did not increase the relative hazard ratio (HR) for injurious falls before or after adjustment for age (aHR): FNIH aHR 1.00 95%CI (0.69-1.47), EWGSOP aHR 1.20 95%CI (0.93-1.54), AUS-POPF aHR 0.96 95%CI (0.68-1.35) and AUS-POPE aHR 1.33 95%CI (0.94-1.88). Compared to age alone, none of the definitions that included age improved the model discrimination for first injurious fall using ROC. Regardless of definition used, sarcopenic women also did not have an increased risk for recurrent injurious falls. Muscle function measures (grip strength and timed-up-and-go) but not appendicular lean mass (ALM) variants (ALM/height2; ALM/BMI) were associated with increased injurious falls risk.

CONCLUSION: Current definitions of sarcopenia were not associated with injurious falls risk in this cohort of community dwelling older Australian women. Finally, strength and physical function as opposed to ALM variants should be considered when examining injurious falling.
P3
The effect of post-exercise protein ingestion on lean mass and glycaemic control in Type-2 diabetes mellitus: A randomized controlled trial

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AIMS: Persons with type-2 diabetes mellitus (T2DM) have greater age-related decline in lean mass compared to non-diabetic persons. Post-exercise protein ingestion improves the development of lean mass in elderly non-T2DM persons, but it is unknown how post-exercise protein supplementation may affect lean mass and glycaemic control in persons with T2DM. We investigated the effect of post-exercise protein ingestion on lean mass and glycaemic control in T2DM persons.

METHODS: Persons with T2DM participated in a 14-week exercise intervention (1hr/day, 5 days/week; weights, interval training). Additionally, participants were randomly assigned to ingest two daily doses of 20g whey protein (PROTEIN, n=12) or isocaloric maltodextrin (PLACEBO, n=12), with one dose immediately post-exercise. Pre and post intervention, body composition (lean mass) was measured via whole-body bio-impedance. Glycaemic control (fasted blood samples; HOMA-IR, HbA1c) and glucose disposal rates (hyperinsulinaemic isoglycaemic clamp) were also assessed.

RESULTS: No change was observed for either group in total (PROTEIN; 90%CI; -0.68%, 2.95%, p=0.29, PLACEBO; 90%CI; -2.6%, 1.16%, p=0.52) or relative (PROTEIN; 90%CI; -0.63%, 1.27%, p=0.56, PLACEBO; 90%CI; -0.37%, 1.5%, p=0.31) lean mass. HbA1c improved in PLACEBO (90%CI; -1.41%, -0.54%, p<0.0001) with unclear effects in PROTEIN (90%CI; -0.42%, 0.16%, p=0.5). Glucose disposal rates showed likely improvements in both PROTEIN (90%CI; 0.13%, 1.4%, p=0.07) and PLACEBO (90%CI; -0.01%, 1.4%, p=0.15); HOMA-IR was unchanged in both groups (PROTEIN; 90%CI; -0.2%, 0.51%, p=0.47, PLACEBO; -0.54%, 0.22%, p=0.49).

CONCLUSION: Findings indicate post-exercise protein ingestion during a short-term exercise programme in persons with T2DM does not alter lean mass compared to a placebo. However, both improve glucose disposal while the placebo had a positive effect on glycaemic control. This suggests post-exercise protein ingestion to prevent sarcopenia in T2DM may not be more effective than exercise alone.

P4
Evaluation of castration-dependant androgen depletion and hind limb immobilisation on inducing sarcopenia in mice: A pilot study

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INTRODUCTION: Sarcopenia (the loss of muscle mass and function), is becoming increasingly prevalent in the ageing population. Drug-induced or genetically modified animal models of muscle wasting are widely used to pre-clinically evaluate sarcopenia treatment strategies. However, little is known about the effectiveness of models that physiologically mimic the ageing condition, such as castration-dependant androgen depletion (to mimic age-reduced testosterone levels) and limb immobilisation (to mimic inactivity). We aimed to evaluate the effectiveness of castration and hind limb casting on inducing sarcopenia in mice.

METHODS: Male C57BL/6j mice (n=144) were obtained from the Animal Resources Centre (WA, Australia) and randomly separated into two groups, sham (testes intact) and castrated (testes removed). After two weeks, right hind limbs were casted for two weeks (immobilisation) and casts were then removed (relaxing) for an additional two weeks. At various end points, animals were anaesthetized and hind limb muscles removed, weighed and stored for further analysis.

RESULTS: Castration caused a greater decline in body weight during immobilisation compared to sham (p=0.0001). Interestingly, the body weight of shams recovered during the relaying phase whereas for the castrated mice it did not. Casting produced muscle atrophy in all major hind limb muscles; plantaris, soleus, gastrocnemius, extensor digitorum longus and tibialis anterior. Overall, when grouped together, the castrated groups had lower absolute muscle mass after immobilisation and relaying, with significantly lower absolute weights (p=0.01) in the gastrocnemius after immobilisation. Partial prevention of muscle atrophy with a proprietary protein (Bega Cheese Limited) demonstrates applicability of the model.

CONCLUSIONS: We achieved significant atrophy of the muscles (>30%) in our physiological animal model of sarcopenia. Applying treatments before casting can be used to assess prevention of sarcopenia. Future studies should consider beginning treatment during the reloading period, with longer monitoring, to evaluate potential treatment strategies.
Poster Abstracts

P5
1,25(OH)D3 abrogates palmitic acid-induced lipotoxicity in normal human osteoblasts in vitro

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AIM: Bone loss begins in the third decade of life and involves decreased bone formation associated with a progressive reduction in osteoblasts (Ob) survival, function and number. In ageing, MSC number and differentiation potential decrease due to reduced capacity to transform into Ob, leading instead to increased adipogenesis and lipid accumulation in the bone marrow of osteoporotic bones. Adipocytes produce palmitic acid (PA), a fatty acid (FA) known to be toxic to OB in vitro. Potential mechanisms include induction dysfunctional autophagy and reduced differentiation. Vitamin D - (1,25(OH)2D3) induces osteoblastogenesis and has an anti-apoptotic effect on Ob. We therefore hypothesised that 1,25(OH)2D3 might rescue Ob from PA-induced lipotoxicity in vitro.

METHODS: Initially, we compared the capacity of human Ob (Lonza, CC2538) to differentiate and form bone nodules in the presence of PA or 1,25(OH)2D3 or in combination. Cell survival was assessed using a 3-(2,5-diphenylterazolium bromide (MTT) assay. Autophagy was also assessed via LC3-II expression, confocal microscopy, and monitoring life autophagosomes at different time points. Changes in nuclear activity of β-catenin and runt-related transcription factor 2 (Runx2) were assessed to determine the osteogenic activity.

RESULTS: Co-addition of 1,25(OH)2D3 with PA exposure increased Ob survival (P<0.01). 1,25(OH)2D3 also increased mineralization and differentiation of Ob in these cultures in the presence of PA. In addition, a significant increase in the transcription of β-catenin that is associated with Runx2 signalling.

CONCLUSION: This study identified potential mechanisms to explain how 1,25(OH)2D3 might abrogate PA-induced lipotoxicity, including facilitation of mineralization and significant activation of the β-catenin signalling pathways in Ob exposed a strong lipotoxic milieu, mimicking human bone marrow. Further evidence of the relationship between elevated lipid levels in tissues and the deleterious impacts on bone was provided. Future work should characterise the mechanisms of this effect to develop novel therapies to overcome lipotoxicity in the bone setting.

P6
Attenuation of muscle regeneration related to muscle loss in mice fed with sugar-sweetened water

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AIMS: Consumption of sugar-sweetened beverages raise risk of metabolic disorders such as obesity, metabolic syndromes, cardiovascular disorders as well as cancers. However, little is known on the effects of sugar consumption on muscle function. Here, we evaluated the muscle regeneration capacity in mice fed with sugar-sweetened water.

METHODS: The C57BL/6J mice were divided into three groups. Each group of mice received standard chow and either with RO water (ND group), or 8% fructose-sweetened water (HFr group), or 8% sucrose-sweetened water (HS group). Both the diet and drinking water were given ad libitum. After 20-25 weeks of feeding, snake notexin were injected to the left tibialis anterior and left the right muscle as non-injured control. The ability of muscle regeneration were evaluated by histological and RT-qPCR analysis.

RESULTS: Mice fed with sugar-sweetened water represented increasing body weight and reducing lean composition without significant difference in blood glucose levels. In mice fed with sugar-sweetened water, the mRNA levels of Adipoq (adiponectin) and Lep (leptin) were dramatically reduced but no difference in insr (insulin receptor), Cpt1b (representing to lipolysis) and Fasn (representing to fatty acid synthesis) before injury. Compared to ND group, genes related to pro-inflammatory, including Il1b, ccl2 and Adgre1, and anti-inflammatory, including Il10 and cd163, were elevated before notexin injection, while these genes failed to response to muscle regeneration in both HFr and HS groups. Furthermore, the mRNA expression of Mstn gene were significantly increased in mice fed with sugar-sweetened water before and after notexin injection.

CONCLUSION: Although the expression of satellite cell activation was not affected, mice fed with sugar-sweetened water showed the attenuation of inflammatory response and muscle maturation with up-regulated myostatin. We hypothesises that increased consumption of sugar would be one of the keys related to muscle loss in later life.
P7
Benefits of fatty acid synthase inhibition: Impacts on lipotoxicity in myoblasts
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With age, ectopic adipocyte infiltration and increasing levels of local fatty acid in muscle tissues have been shown to compromise the viability and function of the surrounding cells. This lipotoxic effect is a well-documented mechanism behind age-related sarcopenia—a condition of increasing importance in ageing populations. Previous in vitro co-culture studies on osteoblasts have demonstrated that lipotoxicity is reversible by the inhibition of fatty acid synthase (FAS) in adipocytes by cerulenin. In this study, we hypothesised that, by directly inhibiting FAS, cerulenin will also be able to rescue satellite cells and myotubes from lipotoxicity induced by adipocytes, without having any direct effects on the viability and function of these cells. We used mouse satellite cell line (C2C12) as a model and cultured them in conditions with palmitate and cerulenin to investigate any direct effects cerulenin might have on C2C12 cells. Here we show that cerulenin does not affect C2C12 proliferation and viability, nor does it rescue C2C12 cells from palmitate-induced lipotoxicity. No significant difference in viability, measured using MTT, was found in C2C12 treated with up to 10nM cerulenin, after up to 72 hours, compared to control. Likewise, MTT revealed no difference between C2C12 treated with both palmitate and cerulenin, versus those treated with palmitate alone. Furthermore, palmitate was shown to exhibit toxicity in a concentration-dependent manner. These preliminary results formed a basis for the study as we move on to co-culturing adipocytes and C2C12 and investigate the impact FAS inhibition by cerulenin has on this system.

P10
Fast track hip fracture management – Model for sarcopenia treatment?
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AIM: We have embarked on a fast track management of acute hip fractures at Christchurch hospital, New Zealand. This was achieved by wide cooperation between all disciplines from arrival in the emergency department to discharge from hospital.

METHODS: Data analysis was performed by the use of SFN (Signal From Noise) data set. This data set tracked all activities that occurred during the patient journey throughout their stay within the hospital.

RESULTS: Using this approach, the average time in the emergency department has decreased slightly to under one hour (2.87hrs), the wait for theatre did not change significantly (1.47 hours), the wait for rehabilitation decreased from between three and four days and the length of stay in the rehabilitation wards has decreased between three and eight days. The overall length of stay has decreased by approximately four days (24.4 to 20.4 days). In the rehab setting grip strength was measured as a marker of Sarcopenia and frailty and only one male had a grip strength over 30gm and no females had a grip strength of over 20gm. Their functional status as measured by data from the Australian Rehabilitation Outcome Centre (AROC data) which looked at Functional and Independent Measuring tool (FIM™). The average FIM gain prior to the fast track process was 28.9% and after fast track was 29.0%

CONCLUSION: Using this fast track approach we decreased the length of stay, we did not compromise their functional status on discharge. Projected cost savings using this approach was approximately NZ$700,000 across the whole care pathway. The addition of anti-sarcopenic agents in addition to their standard high protein diet, early mobilisation, etc. may help the rehabilitation period and overall length of stay and functional status to improve.
P11
Gait speed assessed using a 4-meter walk test is not representative of daily-life gait speed in community-dwelling adults

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AIM: Preferred gait speed measures, as obtained in a standardised setting, are indicative and predictive of an individual’s physical performance. Yet, as such assessment is performed in optimal conditions it might not reflect daily-life gait. The aim of the study was to relate 4-meter gait speed to the distribution of daily-life gait speed in community-dwelling adults.

METHOD: The cross-sectional Grey Power cohort included 268 community-dwelling participants of 18 years and older. Participants’ 4-meter gait speed was assessed using a timed 4-meter walking test at preferred pace. The distribution of daily-life gait speed was captured in 254 participants, using a tri-axial accelerometer worn for seven consecutive days on the lower back. The relation was investigated, in consideration of an offset of 4-meter gait speed, using Pearson’s correlations between 4-meter gait speed and the peak in the distribution of daily-life gait speed, as well as the 50th and 99th percentiles of the distribution.

RESULT: Participants (median age 66.7 years [IQR 59.4 – 72.5], 66.7% female) had a mean 4-meter gait speed of 1.43 m/s (SD 0.21), and 96.0% showed a bimodal distribution of daily-life gait speed. 4-meter gait speed was not correlated to the peak in the distribution of daily-life gait speed (r=0.181, p=0.004), and showed negligible to low correlations with the percentiles of daily-life gait speed (50th percentile r=0.132, p=0.036; 99th percentile r=0.399, p<0.001). The median percentile that best matched the 4-meter gait speed was 91.2 (IQR 75.4 – 98.6).

CONCLUSIONS: 4-meter gait speed does not highly correlate to the distribution of daily-life gait speed. Daily-life gait speed seems to capture different information of mobility than 4-meter gait speed, which could be complementary for use in clinical practise.

P12
The lack of knowledge contrasts the willingness to counteract sarcopenia: Results of a community-dwelling cohort study

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AIM: Sarcopenia is highly prevalent in older adults, and is associated with adverse outcomes, including functional dependency and mortality. Awareness in community-dwelling adults is important to enable prevention and effective treatment. This study in a community-dwelling cohort aimed to assess the current knowledge about sarcopenia, the awareness of their own muscle health, and the willingness to treat and prevent the development of sarcopenia.

METHOD: Participants aged 18 years and older who attended health educational events across the Netherlands, completed a questionnaire on terminology, etiology, consequences, treatment and prevention of sarcopenia. Pearson’s correlations were performed to analyze the participant’s rating of their own muscle health using the Visual Analogue Scale (ranging from 0-100 points, higher scores indicating better self-perceived muscle health), with sex-specific z-scores of muscle mass (bioelectrical impedance analysis), handgrip strength (dynamometry) and gait speed.

RESULT: A total of 197 participants were included (median age 67.9 years [IQR 57.0-75.1], 71% female, mean education 18.4 years, SD 4.8). Eighteen participants (9%) reported to know what sarcopenia is. Participants thought that muscle mass starts to decline at a mean age of 46.2 years (SD 15.5).

Ratings of the participants’ own muscle health showed negligible correlations with muscle mass (relative skeletal muscle mass r=0.291, p=0.001), handgrip strength (r=0.123, p=0.092) and gait speed (r=0.192, p=0.008). 76% of participants were willing to start treatment including both a high protein diet and strength training, and 71% were willing to increase both their protein intake and strength training to prevent the development of sarcopenia.

CONCLUSIONS: Although there is a lack of knowledge about sarcopenia amongst this community-dwelling cohort with a high mean education, participants stated to be willing to take action to treat and prevent sarcopenia. Actions increasing the knowledge and creating awareness are highly needed to prevent sarcopenia.
Poster Abstracts

P13
The association between SARC-F status and quality of life in High Risk Foot Clinic patients

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AIM: To investigate whether SARC-F positive status is associated with lower quality of life among attendees of a High Risk Foot Clinic (HRFC).

METHODS: A prospective cross-sectional study was conducted in the setting of multidisciplinary ambulatory High Risk Foot Clinic at a metropolitan tertiary referral hospital (Melbourne, Australia) during February 2017 to February 2018. Demographics, comorbidities, SARC-F and EQ-SD-3L (EuroQol Group) outcomes were collected. Association between SARC-F status and EQ-SD visual analogue scale measurement, as well as 5 individual EQ-SD-3L dimensions were investigated using, respectively, linear robust and ordinal logistic regression modelling adjusted for gender and Charlson Comorbidity Index.

RESULTS: Over 12 months, 122 new patients attended the clinic. Eighty five out of 122 (69%) individuals completed the questionnaires, with no selection bias on demographic or clinical characteristics identified. One hundred and six out of 122 (87%) individuals had diabetes. Of those who completed questionnaires, 43/85 (51%) were SARC-F positive as indicated by a score of 4 or greater. No significant difference between SARC-F positive and negative patients were identified in age (SARC-F negative: median 67 (IQR 58-77), SARC-F positive: median 71 (IQR 59-83)) or diabetes status (SARC-F negative: 88% diabetes, SARC-F positive: 88% diabetes). SARC-F positive patients had consistently and statistically significantly worse EQ-SD-3L visual analogue scale measurement [mean 5.31 (SD 2.01); median 5 (IQR: 4, 6.5)] compared to SARC-F negative patients [6.63 (SD 1.87); 7 (5.5, 7.5)], adjusted mean difference -1.23 (95%CI: -2.1, -0.35; p=0.007). SARC-F positive patients demonstrated consistent and statistically significantly worse EQ-SD-3L scores on mobility, personal care and usual activities, but not on anxiety/depression and pain/discomfort components.

CONCLUSIONS: Approximately half of HRFC patients are SARC-F positive and exhibit lower quality of life as measured by EQ-SD-3L compared to SARC-F negative patients.

P14
Current knowledge and practice of Australian and New Zealand healthcare professionals in sarcopenia diagnosis and treatment

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AIMS: Treatment of sarcopenia requires early diagnosis and subsequent intervention. Awareness amongst healthcare professionals is a prerequisite. This study aimed to address the current knowledge, practice and barriers diagnosing and treating sarcopenia of healthcare professionals in Australia and New Zealand.

METHODS: This longitudinal study included Australian and New Zealand healthcare professionals who attended a professional development event on sarcopenia ("Sarcopenia Roadshow"). Participants completed questionnaires on current knowledge, practice and barriers regarding sarcopenia before, directly after and 6 months after attendance.

RESULTS: 250 professionals (median age 40 years (IQR 28-55), 83.8% female) including dietitians (58.8%), medical doctors (21.6%) and nurses (14.4%) participated, of whom 84 (47.2%) completed the 6 months follow up questionnaire. Before, directly after and at 6 months follow up 14.7%, 93.4% and 59.5% of the participants stated that sarcopenia is a disease and respectively 2%, 79.6% and 38.1% gave correct answers for the sex-specific cut-off for low handgrip strength. Before attendance of the lecture, 13% of the participants reported to diagnose sarcopenia, which was 14% at 6 months follow up. Participants who reported to diagnose sarcopenia, less than half stated to use muscle mass and less than a quarter to use muscle strength as diagnostic criteria. Of the ones using muscle mass as diagnostic criteria, more than half used inappropriate methods such as calf circumference and skinfold thickness. Lack of diagnostic tools was stated to be the main barrier next to time constraints, lack of treatment protocols and awareness among healthcare professionals.

CONCLUSION: There is a lack of knowledge about sarcopenia among Australian and New Zealand healthcare professionals. Continuous education is necessary to improve diagnosis and treatment of sarcopenia. This study provides useful directions for effective strategies to overcome barriers in diagnosing and treating sarcopenia.
P15 Efficacy of exercise and nutritional interventions on muscle mass in older adults – A systematic review and meta-analysis

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AIM: To define the efficacy of exercise (EXE) and nutritional (NUT) interventions on muscle mass in older adults. This is crucial to design future strategies to prevent and manage sarcopenia.

METHODS: A systematic review and meta-analysis using the databases Medline, EMBASE, Cochrane Central Register of Controlled Trials, CINAHL and SPORTDiscus were searched for eligible studies. Inclusion criteria were RCT’s, mean/median age of 65 years and older and report of changes in muscle mass. Exclusion criteria were muscle mass measured by anthropology, anabolic drug therapies, cancer, HIV/AIDS, chronic kidney disease, renal failure, caloric restriction, genetically inherited muscular diseases and animal studies.

RESULTS: Out of 8281, 135 studies were included of which 66 studies evaluated EXE interventions alone, 33 studies NUT interventions alone and 36 studies the combination of EXE and NUT interventions. Of the 66 EXE intervention studies, 50 showed positive effects on muscle mass of which 37 provided resistance exercise training (RET), 11 aerobic/endurance/cardio training, 6 RET combined with another EXE intervention, and 4 other EXE interventions. Of the 33 NUT intervention studies, 22 showed positive effects on muscle mass of which 12 used protein/amino acids supplementation, 4 beta-hydroxy-beta-methylbutyrate, 3 creatine and 6 other NUT interventions. Of the 36 studies combining EXE and NUT interventions compared with an EXE group (n=32) or a non-interventional control group (n=14), 11 and 4 studies respectively showed positive effects on muscle mass. Results of the meta-analysis pooling the studies combining EXE and NUT interventions showed overall small to moderate positive effects on muscle mass.

CONCLUSION: The majority of the studies of EXE and NUT interventions showed positive, but small to moderate, effects on muscle mass in older adults. Optimization of EXE and NUT interventions require further in-depth analysis, e.g. type and length of intervention, targeted muscle group(s), training intensity, dosage and timing of supplement.

P16 Sarcopenia in the setting of subacute geriatric rehabilitation: Feasibility of diagnosis, prevalence and clinical determinants

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AIMS: Geriatric patients admitted to subacute rehabilitation are at high-risk of sarcopenia due to muscle atrophy arising from their acute hospital admission in combination with older age/multimorbidity. In this context, sarcopenia may be a key determinant of functional rehabilitation outcomes. Nevertheless, the feasibility of diagnosing sarcopenia in this setting, its prevalence, and major clinical correlates, remain uncertain.

METHODS: This preliminary analysis included 128 patients (82±9y; 42% male) admitted to subacute geriatric rehabilitation at a large teaching hospital in Melbourne, Australia. Sarcopenia was defined by the European Working Group on Sarcopenia in Older People (EWGSOP) algorithm. Standard protocols were used to measure gait speed (abnormal: ≤0.8m/s), grip strength (abnormal: <30kg [men]; <20kg [women]) and skeletal muscle mass (indexed to height [SMI]) using bio-electrical impedance analysis (abnormal: ≤10.75kg/m² [men]; ≤6.75kg/m² [women]).

RESULTS: Gait speed was measured in 81 patients (63%), with reasons for incompleteness including non-ambulation/other medical (n=38) and refusal/unknown (n=9). Grip strength was recorded in n=106 (83%), with incompletion reflecting medical reasons (n=7) and refusal/technical/unknown reasons (n=15). Abnormalities of gait speed (96%) and grip strength (87%) were prevalent and 100% were abnormal in ≥1. Assuming ‘worst case’ for those without valid data, all 128 patients progressed to the final stage of the EWGSOP algorithm (SMI), which was completed in n=111 (87%; missing data reflecting pacemaker/other medical [n=12] and refusal/technical/unknown reasons [n=3]). Abnormal SMI was found in 42 (38%). Aside from older age and male sex, clinical correlates of sarcopenia (admission diagnoses/comorbidities only) included fall/fracture (p=0.095) and COPD (p=0.016).

CONCLUSION: Diagnosing sarcopenia is feasible in the subacute geriatric rehabilitation setting, although rates of incompletion/abnormalities on gait speed and grip strength may render these tests redundant for diagnostic purposes. The high proportion with sarcopenia vindicates the importance of diagnosis in this setting and the need for further investigation of therapeutic strategies.
P21

Comparison of different criteria to diagnose sarcopenia with lower mobility and associations with disease severity and muscle weakness in subjects with chronic obstructive pulmonary disease (COPD)

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AIM: This study aimed to compare different criteria to detect sarcopenia with lower mobility (SALM) and its associations with disease severity and muscle weakness in subjects with COPD.

METHODS: 270 subjects with COPD were classified as SALM, which was defined as lower muscle mass (fat-free mass index, FFMI) plus lower physical performance (six-minute walking test, 6MWT) by the Society of Sarcopenia, Cachexia and Wasting Disorders (SCWD). Three cut-off points for FFMI (SCWD Travassos and Franssen) and two for 6MWT (SCWD and Britto) were combined and compared (SALM1=SCWD&SCWD; SALM2=SCWD&Britto; SALM3=Travassos&Britto; SALM4=Travassos&SCWD; SALM5=Franssen&Britto and SALM6=Franssen&SCWD). Bioelectrical impedance, peripheral (quadriceps, biceps and triceps [QS, BS and TS]) and respiratory (maximal inspiratory and expiratory pressures [MIP and MEP]) muscle strength were measured. The agreement of SALM was verified by Cohen's Kappa analysis. ANCOVA was used to calculate the effect of SALM and logistic regression to calculate the associations with COPD severity (GOLD ≥3) and inspiratory muscle weakness.

RESULTS: Difference between the prevalence of SALM was observed (1%-19%; p=0.002). Strong agreement between SALM 3-6 (kappa 0.73-0.81; P<0.001) and poor agreement between SALM 1-2 with SALM 3-6 (kappa 0.03-0.08; P<0.04) were found. SALM3 and SALM4 showed lower MEP (-23Kg and -19Kg), QS (-8Kg and -9Kg), BS (-4Kg and -4Kg) and TS (-4Kg and -5Kg) compared to normal composition (P<0.01 for all). SALM5 and SALM6 showed lower MEP (-21Kg and -21Kg), QS (-5Kg and -5Kg), BS (-3Kg and -4Kg) and TS (-4Kg and 5Kg) compared to normal composition (P<0.04 for all). COPD severity was associated with SALM3 and SALM5 (OR:3.7 and OR:3; P<0.04). Inspiratory muscle weakness was associated with SALM6 (2.4-OR<3; P<0.02 for all).

CONCLUSION: Since the criteria of Travassos or Franssen combined with Britto showed strong agreement and high association with COPD severity and muscle weakness, they should be recommended to identify SALM in COPD.

P22

Analysis of hormonal factors related to skeletal muscle regulation in women with hip fracture

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Sarcopenia is an age-related decline in muscle mass and function. Studies have shown the association between sarcopenia with increased morbidity and mortality. The association between sarcopenia and hip fracture risk is increasingly recognised. Sarcopenic individuals with hip fracture have poor functional outcomes following hospitalisation. We recruited a group of post menopausal women with hip fracture, those awaiting total hip replacement for osteoarthritis and well women from the community for this study.

AIMS: To determine the prevalence of sarcopenia in women with hip fracture compared to controls

METHODS: 36 women in the following groups were recruited: Hip fracture (n=20), those awaiting total hip replacement (n=10) and those in the community (n=6).

RESULTS: Mean age in this group was 76.81 ± 10.1 years (61-99 years). A higher proportion of women in the hip fracture group were sarcopenic, (55% vs 30%). They were older, lighter and had a lower body mass index. Women in the hip fracture group have reduced skeletal muscle mass assessed by muscle CT, bioelectrical impedance analysis and DEXA.

Paired fasting glucose and insulin levels were analyzed, with 3 individuals excluded (blood glucose level ≥7mmol/L), n=33. Mean glucose levels were similar in both groups (5.6 vs 5.4mmol/L). Lower insulin levels (8.3 vs 10.2 mU/L, p value 0.224), insulin like growth factor (10.6 vs 17.2 mmol/L, p value <0.001) and beta cell function was observed in the hip fracture group (77.1 vs 97.6%, p value 0.007).

CONCLUSION: Women in the hip fracture group have lower insulin, insulin like growth factor levels and beta cell function compared to controls.
Poster Abstracts

P23
The effect of β-hydroxy-β-methylbutyrate (HMB) on sarcopenia and functional frailty in older persons: A systematic review
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AIM: β-hydroxy-β-methylbutyrate (HMB) has been shown to be effective and superior to other types of protein supplements to attenuate loss of muscle mass, strength and function, however, its benefits in sarcopenic and frail older people remain unclear. We seek to determine the effect of HMB on muscle mass, strength and function in older people with sarcopenia or frailty by reviewing results from available randomised controlled trials (RCTs).

BACKGROUND: This review was registered at PROSPERO (University of York) with registration number CRD42018088462 and conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines. Using a pre-determined e-search strategy, we searched PubMed, Medline, EMBASE, CINAHL, LILACS, Web of Science, Cochrane and Scopus databases. Our inclusion criteria were RCTs that assessed the effect of HMB on muscle mass, strength and function in older people with sarcopenia or frailty aged ≥60 years. The main outcomes were lean body mass, handgrip, leg press strength, and Short Physical Performance Battery (SPPB) score.

RESULTS: Three studies matched our eligibility criteria which enrolled 203 subjects through a variety of definitions of sarcopenia or frailty. Lean body mass increased and muscle strength and function were preserved following HMB supplementation.

CONCLUSION: HMB improves lean muscle mass and preserves muscle strength and function in older people with sarcopenia or frailty.

P24
The effect of protein supplements on functional frailty in older persons: A systematic review and meta-analysis
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AIM: The effect of protein supplementation in attenuating loss of muscle mass, strength and function in community-dwelling older people has been promising, however, its benefits on frail older people remains unclear. We seek to determine the effect of protein supplementation on muscle mass, strength and function on frail older people by reviewing and conducting meta-analysis of results from available randomised controlled trials (RCTs).

METHOD: This review was registered at PROSPERO (University of York) with registration number CRD42017079276 and conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines. Using a pre-determined e-search strategy, we searched PubMed, Medline, EMBASE, CINAHL, LILACS, Web of Science, Cochrane and Scopus databases. Our inclusion criteria were studies that assessed the effect of protein supplementation on muscle mass, strength and function in frail older people aged ≥65 years. The main outcomes were lean body mass, handgrip, leg extension, leg press strength, Short Physical Performance Battery (SPPB) score, and gait velocity.

RESULT: Eight studies matched our eligibility criteria and were thus included in this review. These studies enrolled 503 subjects and involved commercially-available nutritional drink, milk protein concentrates, soy protein or branched-chain amino acid. Despite the variation in methodology, studies were homogenous with I² <10.0%. The meta-analysis showed no significant effect of protein supplementation on lean body mass (mean difference 1.17 kg, 95% CI: -1.97 – 4.31), handgrip (mean difference 0.15 kg, 95% CI: -0.95 – 1.24), leg extension (mean difference -3.68 kg, 95% CI: -12.72 – 5.36), leg press (mean standardised difference 0.26 kg, 95% CI: -0.30 – 0.82), SPPB (mean difference 0.61, 95% CI: 0.02 – 1.23), or gait velocity (mean difference -0.20 m/s, 95% CI: -0.95 – 0.55).

CONCLUSION: There exists minimal evidence to suggest that protein supplementation significantly influences muscle mass, strength or function in frail older people.
P25
Establishing an operational definition of sarcopenia in Australia and New Zealand: Delphi Method Based Consensus Statement. On behalf of the Australian and New Zealand Society for Sarcopenia and Frailty
Research Task Force on Diagnostic Criteria for Sarcopenia
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AIM: To reach consensus on the operational definition of sarcopenia for use by clinicians and researchers in Australia and New Zealand.

METHOD: A four-phase modified Delphi process was used to achieve consensus on an operational definition of sarcopenia. Twenty-four experts from different fields across Australia and New Zealand were selected as Task Force members. An initial meeting was held in November 2017. Two subsequent phases involved surveys of Task Force members. A final phase was used to confirm the results. Responses were analysed using a pre-specified strategy. The level of agreement required for consensus was 80% of respondents.

RESULTS: 94% of Task Force respondents voted in favour of adopting an existing definition of sarcopenia. The pre-specified level of agreement was not reached in phase two for a preferred definition. In Phase three 94% of respondents voted in favour of adopting the European Working Group on Sarcopenia in Older People (EWGSOP) (Cruz-Jentoft et al 2010) as the operational definition of sarcopenia in Australia and New Zealand.

CONCLUSIONS: The Australian and New Zealand Society for Sarcopenia and Frailty Research will adopt and promote the EWGSOP operational definition of sarcopenia in Australia and New Zealand. Validation studies will be undertaken using this definition in Australian and New Zealand populations.

P26
Frailty screening in older adults with osteoarthritis: prevalence, feasibility and impact of disability
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AIMS: There are multiple ways to detect frailty, but the optimal assessment tool is not yet known. The aims of this study were to determine the prevalence of frailty using two self-reported frailty tools and to identify baseline characteristics associated with frailty. The utility of the two different tools were also assessed, in terms of their comparability at detecting frailty.

METHODS: This was a cross-sectional study. The FRAIL scale and Frail Non-Disabled (FiND) questionnaire were administered to people 65 years and older, referred to orthopaedics for management of hip or knee osteoarthritis. Participant characteristics were gathered from general practitioner referral information.

RESULTS: The study included 98 participants and 88 (89.8%) completed either the FRAIL scale or FiND questionnaire. The prevalence of frailty, pre-frailty and health was 30.6%, 41.8% and 17.3% respectively using the FRAIL scale. The prevalence of frailty, disability and robustness was 22.4%, 52% and 15.3% respectively using the FiND questionnaire. The FRAIL scale resulted in 72.4% of the cohort being classified as pre-frail/frail compared to 22.4% classified as frail using the FiND questionnaire. Frailty was significantly associated with increasing age (p < 0.025) using the FRAIL Scale and BMI < 25 using the FiND questionnaire, whilst disability was associated with BMI > 30 (p < 0.021). The two frailty tools differed significantly in the classification of patients as frail and healthy (p < 0.001).

CONCLUSIONS: Frailty was prevalent in this cohort of older Australians, affecting between one fifth and one third of the cohort. Age and body mass index were markers of frailty. There was incomplete agreement between the two tools at detecting frailty in this cohort, largely due to the exclusion of disability with the FiND questionnaire. This has clinical implications when considering the optimal tool to assess frailty in older adults with hip and knee osteoarthritis.
P27
Regional population-specific sarcopenia criteria is associated with the greatest mortality risk in older Australian women

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AIM: Numerous sarcopenia definitions exist. The long-term prognosis after diagnosis of sarcopenia remains unclear. We investigated the 5 year and 9.5 year prognosis in a prospective cohort of 903 older Caucasian Australian women (mean age 79.9±2.6 years) using four definitions of sarcopenia.

METHOD: The four definitions were the United States Foundation for the National Institutes of Health (FNIH), the European Working Group on Sarcopenia in Older People (EWGSOP) and modified FNIH (AUS-POPF) and EWGSOP (AUS-POPE) definitions using Australian population-specific cut-points we developed (<2 SD below the mean of young healthy Australian women). All-cause mortality was captured by the Mortality registry, linked via the Western Australian Data Linkage System.

RESULTS: Muscle function measures (grip strength and timed-up-and-go) but not appendicular lean mass (ALM) variants (ALM/height2; ALM/BMI) were associated with increased mortality risk over 5 years and 9.5 years. Baseline prevalence of sarcopenia by the four definitions differed substantially (FNIH n=85 [9.4%], EWGSOP n=218 [24.1%], AUS-POPF n=108 [12.0%], AUS-POPE n=97 [10.7%]). Sarcopenic women according to EWGSOP and AUS-POPE had increased age-adjusted relative hazards (aHR) for all-cause mortality over 5 years (aHR 1.88 95%CI [1.29-2.85], p<0.01; aHR 2.52 95%CI [1.55-4.02], p<0.01, respectively) and 9.5 years (aHR 1.39 95%CI [1.06-1.81], p=0.11; aHR 1.94 95%CI [1.40-2.69], p<0.01, respectively). No associations were observed for FNIH or AUS-POPF. Despite being associated with all-cause mortality, the addition of each sarcopenia definition to a model including age alone did not improve model discrimination (ROC) for mortality over 5 years and 9.5 years.

CONCLUSION: EWGSOP and its population specific equivalent (AUS-POPE) may be preferable when examining long-term prognosis in older Australian women, especially over relatively shorter periods (5 years). Regional population-specific sarcopenia criteria should be considered when diagnosing sarcopenia as a marker for poor prognosis.

P28
Circadian lights in a hospital setting to improve sleep, recovery and decrease psychological distress in older adults

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AIMS: Long-stay hospital inpatients suffer considerable sleep and circadian rhythm disturbances, partly due to inadequate daytime lighting and excess evening/overnight light. Ageing is associated with changes in sleep and circadian rhythms, such as greater nocturnal sleep fragmentation and daytime sleepiness. Studies show a possible association between frailty and poor sleep quality, while daytime sleepiness has been linked with poor functional recovery in older adults. We hypothesize that current hospital lighting exacerbates age and frailty-related sleep deregulation, resulting in decreased sleep quality and recovery, increased fatigue and psychological distress. We are studying the effects of circadian lighting to improve outcomes in a hospital setting. Here we present baseline data, prior to installing circadian lights.

METHODS: For this baseline assessment, we recruited long-stay (>7d) inpatients in an older adult rehabilitation unit at Dunedin Hospital. We collected data including: objective sleep and circadian measures (actigraphy); questionnaires on anxiety and depression, daytime alertness and fatigue, sleep quality, overall well-being and chronotype; and other clinical outcomes.

RESULTS: 14 patients were recruited, for median 10 days (range: 7-22). This sample was 64% male, median 79 years-old, and spent median 14 days (range: 2-50) in the hospital prior to the study. Patients exhibited a variety of sleep issues, with low duration and poor quality. Average scores per person indicate that 21%, 36% and 57% of patients had signs of moderate/severe anxiety, moderate/severe depression, and sub-threshold/clinical insomnia, respectively.

CONCLUSIONS: This pilot baseline data indicates substantial sleep deregulations, high levels of anxiety and depression, and daytime sleepiness in older hospital inpatients. We are currently conducting a full-scale efficacy trial, which is one of the first studies to investigate the effects of improved lighting in a hospital setting.
Poster Abstracts

P29
Prognostication accuracy of final destination in post-stroke patients requiring transitional care: A retrospective cohort study
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OBJECTIVE: Patients requiring extended stroke rehabilitation are often transferred to transitional care program (TCP) for further restorative care or to wait for residential care. It is a requirement to nominate a predicted discharge destination (DD) following a TCP. This prediction is a combined decision made between the medical team (MT) and multidisciplinary team (MDT). Aim of the study is to assess the accuracy of this prediction.

METHODOLOGY: The study was designed as a retrospective observational study involving all patients transferred to TCP from Osborne Park Hospital (OPH) Stroke Rehabilitation Unit (SRU) from 2008 to 2015. Information regarding the DD prediction was taken from patient records. The actual destination following a TCP was obtained from the TCP registry of the Department of Health, Western Australia.

RESULTS: DD prediction was equivalent between the MT and MDT (kappa = 0.868). However, only 56% of predictions were accurate. Subgroup analysis, as measured by the Modified Barthel Index (MBI) in both hospital and the TCP, suggested that, functional gain was a better predictor of DD.

CONCLUSION: Functional improvement i.e. MBI is the best predictor of final DD post TCP.

P31
Prevalence of malnutrition in advanced age adults newly admitted to age-related residential care
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AIM: To establish the prevalence of nutrition risk and associated risk factors among adults of advanced age recently admitted to age-related residential care (ARRC).

METHODS: A cross-sectional study was conducted among participants aged ≥85 years within five days of admission to ARRC within the Waitemata District Health Board. Sociodemographic and health characteristics of the participants were ascertained during personal interviews. Body composition, grip strength and gait speed were recorded using standardised measures. Nutrition risk was determined using the Mini Nutritional Assessment-Short Form (MNA-SF), dysphagia risk using the 10-Item Eating Assessment Tool (EAT-10) and cognitive status using the Montreal Cognitive Assessment (MoCA).

RESULTS: Among 97 participants (mean age 90.9 ± 3.8 years), half (50.5%) were malnourished, 40.2% were at nutrition risk and a third (37.1%) were at risk of dysphagia. Malnourished vs. well-nourished/at risk participants were more likely to be ≥90 years (p = 0.019), admitted to ARRC on a permanent basis (p = 0.016), at dysphagia risk (p = 0.015), have a BMI <23 (p = 0.022), lower fat mass (p = 0.005), and fewer comorbidities (p = 0.030). The MNA-SF score was inversely correlated with age (r = -0.225, p = 0.027) and positively correlated with BMI (r = 0.499, p = <0.001) and fat mass (r = 0.765, p = <0.001).

CONCLUSIONS: Malnutrition and dysphagia risk were prevalent among advanced age adults, especially among those ≥90 years with a low BMI who are an easily identifiable group. Early screening and intervention is critical upon admission to ARRC.
Poster Abstracts

P32
Tools used to measure prevalence of frailty in community-dwelling older persons: A systematic review

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**AIM:** The aim of this systematic review was to explore the tools used to measure prevalence of frailty in community-dwelling older people.

**METHOD:** Records were identified through searches of CINAHL, Embase, SCOPUS, Medline, Cochrane and PsychInfo databases with two constructs (frailty assessment and prevalence). Studies were eligible if data on prevalence of frailty in participants aged ≥ 65 and community-dwelling was reported or when data was sufficient for prevalence of frailty in this population to be calculated. Studies were screened by title, then abstracts and finally full-text, by two independent reviewers. Disagreements were decided by a third reviewer. Data extracted from eligible articles included the tool used to measure frailty, prevalence of frailty, study setting and number of participants.

**RESULT:** Forty-six studies, using 23 tools were included in this review. The Fried Phenotype was the most common tool used to measure the prevalence of frailty (22 studies). The second most common tool used was the Study of Osteoporotic Fracture (9 studies), and the third most common tool used was the Frailty Index (8 studies). One study assessed frailty with 7 tools, 5 studies assessed frailty with 4 tools, 2 with 3 tools, 15 with 2 tools, and 23 with a single tool. Of the 23 different tools that were identified to assess frailty, 9 tools focused on the physical domain and 14 tools combined measurements of physical, psychosocial and cognitive domains.

**CONCLUSIONS:** Although a large number of different tools have been used to measure the prevalence of frailty in community-dwelling older persons, the principles used to measure frailty have been to either assess the physical domain alone, or to assess a combination of the physical, psychosocial and cognitive domains. These approaches are likely to generate different estimates of the prevalence of frailty.

P33
Role of gait speed and grip strength in predicting 10-year cognitive decline among community-dwelling older people

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**AIM:** To examine the associations of gait speed and handgrip strength with 10-year cognitive changes among community-dwelling older people.

**METHODS:** This ten-year longitudinal cohort study recruited 1096 community-dwelling older people aged 60 years for study. Gait speed and handgrip strength were classified into 5 groups based on quintiles at baseline. Cognitive functions were assessed using the Mini-Mental State Examination (MMSE) and Digit Symbol Substitution Test (DSST) every two years from baseline for a period of 10 years. Linear mixed effects models were used to determine the role of gait speed and handgrip strength in the prediction of 10-year cognitive changes by adjusting covariates such as age, gender, education, depressive symptoms, marital status, smoking status, instrumental activities of daily life (IADL), Charlson Comorbidity Index (CCI), and body mass index (BMI) at baseline.

**RESULTS:** The slowest gait speed group (as reference, Q1) showed a significantly greater decline in DSST and MMSE scores in 10 years than the other quintiles. The lowest handgrip strength group (as reference, Q1) also showed a significantly greater decline in DSST and MMSE scores in 10 years than the other quintiles.

**CONCLUSIONS:** Slower gait speed and lower handgrip strength can predict 10-year cognitive decline, as assessed by MMSE and DSST, in community-dwelling older people. Further study is needed to explore whether interventions for those with slower gait speed and lower handgrip strength can prevent cognitive decline.
Poster Abstracts

P34
Myopenia and myosteatosis in oesophagogastric cancer surgery: Prevalence, anthropometric characteristics and impact on postoperative outcomes
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AIMS: Skeletal muscle mass loss (myopenia) and intramuscular adipose tissue infiltration (myosteatosis) are associated with worse postoperative outcomes in some solid tumors but there is limited data on the impact of abnormal muscularity in oesophagogastric cancer surgery. We aimed to describe the anthropometric characteristics of patients with myopenia and myosteatosis and the effect on postoperative length of stay (LOS), complications and hospital readmission.

METHODS: Body mass index (BMI), oncological, surgical and postoperative outcome data were collected from patients undergoing curative oesophagogastric cancer resection at The Alfred Hospital. Skeletal muscle mass and muscle attenuation were assessed using preoperative abdominal computed tomography (CT) images. Myopenia and myosteatosis were defined using published cut offs.

RESULTS: Ninety two patients were included, 74% (n = 68) male, mean age 66 years (± 10.1), mean BMI 25.1kg/m2 (± 4.3). Normal muscle mass and muscle attenuation was identified in 23 patients (25%), 56 (60.9%) had myopenia, 31 (33.6%) had myosteatosis and 18 (19.5%) had both. Patients with myopenia had a healthy (62.5%) or overweight (23.2%) BMI and 10.7% were obese. The myosteatosis group was predominantly overweight (41.9%) or obese (29%) and 29% had a healthy BMI. The myopenia group had a higher proportion of total complications and increased incidence of pneumonia (14 vs 2, p = 0.023) but showed no difference in postoperative LOS (p = 0.668) or readmission rates (p = 0.933) compared to the non-myopenia group. Postoperative LOS was higher in patients with myosteatosis (16 days, IQR 7 vs 13 days, IQR 6.5, p = 0.003) compared to those without. Myosteatosis did not impact postoperative complications (p = 0.141) or readmission rates (p = 0.314).

CONCLUSION: Myopenia and myosteatosis are common in oesophagogastric cancer patients, despite being within or above the healthy weight range. Abnormal muscularity appears associated with adverse outcomes during the postoperative period.

P35
Inconsistent factors associated with frailty between middle age and older community-dwelling adults
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INTRODUCTION: Frailty was a common geriatric syndrome which increase the risk of mobility and mortality. The aim of this study was to explore the associated risk factors related to frailty in community-dwelling older people and the difference of associated factors between middle age and older participants.

METHODS: Residents living in I-Lan County of Taiwan were invited for study. Demographic data was interviewed by trained nurses, including age, gender, educational level, MMSE, Waist circumference, SBP, DBP, BMI, CCI, CESD, MNA, ADL, gait speed, handgrip strength, relative appendicular skeletal muscle, albumin, total cholesterol, triglycerides, HC-ERP, IGF1, history of DM and hypertension. The severity of WMH were recorded by FLAIR-T2-weighted MRI and was rated by the modified Fazekas scale. The physical frail status was assessed according to the Cardiovascular Health Study (CHS) criteria. Logistic regression was used to test the independent factors associated with subjects with pre-frailty or frailty.

RESULTS: Totally, 1245 participants were recruited for study. Among them, 450 (36.1%) were aged 65 years and over (mean age 72.7±5.5 years, 54.0% male) and 273 (60.7%) were classified as prefrailty or frailty. There were 795 participants aged less than 65 years (mean age 56.9±3.9 years) and 250 (31.4%) were defined as prefrailty or frailty. After adjusting covariates, the multivariate forward logistic regression showed that among older participants, age (aOR 1.088, 95%CI 1.039 -1.139, p=0.001), MMSE (aOR 0.914, 95%CI 0.862-0.968, p=0.002), CCI (aOR 1.076, 95%CI 1.009-1.148, p=0.025), MNA scores(aOR 0.876, 95%CI 0.777-0.987, p=0.030) and sum of total WMH area (aOR 1.034, 95%CI 1.001-1.067, p=0.018) were significantly associated with prefrailty or frailty but among young participants, there were CESD (aOR 1.105, 95%CI 1.059-1.153, p=0.017) and IGF1 (aOR 0.997, 95%CI 0.994-1.000, p= 0.032) were related to prefrailty and frailty.

CONCLUSION: Between middle age and older participants, there were different associated factors with prefrailty or frailty.
P36
Comparison of strength and power training on muscular fitness and body composition in older adults

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AIMS: Muscle mass and strength decline as we age, resulting in sarcopenia. More concerning is that muscle power declines at a faster rate than strength, as power is a better indicator of physical function than strength in older adults. With regular physical activity (especially strength training) helping to offset sarcopenia, we aimed to assess whether a power/agility training program would provide similar effects as strength training on fitness measures in older adults.

METHODS: Eighty-five older adults were assigned to i) a strength training group following ACSM guidelines (ST; n=56); and ii) a group focusing on power, agility and mobility exercises (PT; n=29). Participants completed two 90-minute sessions weekly for 16 weeks with pre- and post-test design. Tests included strength, power, balance, speed and agility, as well as DXA for body composition.

RESULTS: Both groups significantly improved handgrip strength, 30-second arm curl, chair stand, gait speed, medicine ball throw, timed up-and-go, and 6-minute walk. Lower-body differences were observed, as only PT group improved (by 8%) vertical jump (1.56cm, p<0.05 vs 1.02 cm, ns), while only ST group improved (by 7%) back-leg strength (8kg, p<0.05 vs 4kg, ns). ST group also improved bone mineral density (BMD) and relative muscle mass, while total lean mass increased for both ST and PT groups.

CONCLUSIONS: Older adults respond well to both types of training stimulus. Both programs elicited lean muscle mass increases and performance improvements, with few differences between groups for the majority of the measures. Strength training alone was able to elicit comprehensive improvements in older adults, even in power, speed and agility. Similarly, a power and agility-based program also elicited comprehensive improvements in strength and muscular endurance. Supplemental power, agility and mobility exercises may lead to more comprehensive fitness improvements by improving lower-body power, which is critical for physical function.

P37
Impact of preoperative sarcopenia on postoperative outcomes following pancreatic resection: A systematic review and meta-analysis

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AIM: Morphometric analysis of sarcopenia has garnered interest due to a putative role in predicting outcomes following surgery for a number of diseases but has been largely unexplored in the setting of pancreatic disease. The aim of this review was to evaluate the prognostic impact of preoperatively diagnosed sarcopenia on outcomes following pancreatic resection.

METHOD: A search of PubMed, MEDLINE and SCOPUS databases were performed using PRISMA guidelines.

RESULT: Thirteen studies, including 3608 patients, were selected. Although there was a significant increase in the mean duration of post-operative hospital stay (mean difference of 0.73 days, CI 0.06-1.40, P=0.033), there was no difference in the postoperative outcomes, including: clinically relevant postoperative pancreatic fistula, delayed gastric emptying, post-operative bile leak, surgical site infection, significant morbidity and overall morbidity.

CONCLUSIONS: Preoperative sarcopenia is associated with prolonged hospital stay after pancreatic surgery.
**Poster Abstracts**

**P38**

**Health literacy among frail and pre-frail women**

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**AIM:** The declines in physical and cognitive function that characterise frailty often leave frail individuals managing complex comorbidities with reduced cognition. The current study aimed to investigate the health literacy needs of frail women.

**METHODS:** Data were collected as part of the 15yr follow-up of women in the Geelong Osteoporosis Study, a population-based cohort study. Participants aged ≥60yr were included in the analyses. Frailty scores were calculated using a modified version of the Fried frailty phenotype. Participants were categorised as ‘robust’, ‘pre-frail’ or ‘frail’. Health literacy was determined using the Health Literacy Questionnaire (HLQ), which determines scores for health literacy abilities and resources across nine scales. One-way Analysis of Variance (ANOVA) was used to investigate differences in mean HLQ scale scores across frailty groups. Post-hoc analyses were undertaken where appropriate.

**RESULTS:** Among 282 women (median age 69.9yr [IQR 64.7 -75.0]), 113 (40.1%) were categorised as robust, 145 (51.4%) as pre-frail and 24 (8.5%) as frail. Using one-way ANOVA, trends for differences in mean HLQ scale scores were observed between frailty groups for scales ‘Navigating the healthcare system’ (mean [95%CI]; ‘robust’ 4.18 [4.08, 4.28], ‘pre-frail’ 4.05 [3.96, 4.15], ‘frail’ 3.76 [3.33, 4.19] p-value 0.07) ‘Actively managing health’ (mean [95%CI]; ‘robust’ 3.06 [2.97, 3.14], ‘pre-frail’ 2.96 [2.89, 3.02] ‘frail’ 2.73 [2.73, 3.13] p-value 0.05) and ‘Understanding health information’ (mean [95%CI]; ‘robust’ 4.18 [4.07, 4.28], ‘pre-frail’ 4.16 [4.07, 4.26], ‘frail’ 3.98 [3.62, 4.34] p-value 0.09). Post-hoc analyses determined the differences in mean HLQ scale scores occurred largely between the ‘robust’ and ‘frail’ categories.

**CONCLUSION:** Frail women may experience greater difficulties in understanding health information, navigating the healthcare system and actively managing their health. These findings suggest the need to communicate health information and provide health services in ways that meet the health literacy needs of frail individuals to improve health outcomes in this group.

**P39**

**Skeletal muscle and cognitive function in older men: Geelong Osteoporosis Study**

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**OBJECTIVE:** Midlife obesity predicts cognitive decline, but it is unclear whether skeletal muscle, another metabolically-active tissue, is associated with cognitive function. Our aim was to examine muscle mass and strength in relation to specific domains of cognitive function in older men.

**METHODS:** For 174 men (ages 60-92yr) in the Geelong Osteoporosis Study, we measured DXA-derived relative appendicular lean mass (rALM kg/m², Lunar) and maximum handgrip strength (HGS, kg) by dynamometer (Vernier, LoggerPro3). Cognitive function was assessed in four domains: psychomotor function, visual identification/attention, visual learning, and working memory/attention (CogState-Brief-Battery). Higher scores represent poorer cognitive performance in all domains except visual learning. Associations between muscle parameters and cognitive function scores were tested using Pearson correlation and age-adjusted partial-correlations.

**RESULTS:** There was an age-related decline in HGS (r=-0.40, p<0.001) and cognitive function in each domain (r = +0.19, +0.30, -0.19, +0.34, respectively; all p<0.001), whereas the decline with rALM was not significant (r=0.08, p=0.28). Inverse associations between rALM and psychomotor function (r= -0.16, p=0.04) and visual identification/attention (r= -0.24, p=0.002) were sustained after adjustment (partial r= -0.14, p=0.08; r= -0.22, p=0.003). No associations were detected between rALM and scores for working memory/attention or visual learning either before or after accounting for age. There was an inverse association between HGS and psychomotor function which was sustained after adjustment (r= -0.29, p=0.001; partial r= -0.22, p=0.004), while the association with visual identification/attention was attenuated (r= -0.22, p=0.003; partial r= -0.11, p=0.15). Associations between HGS and scores for working memory/attention and visual learning were explained by age (r= -0.26, p=0.01, partial r= -0.07, p=0.36; r= +0.13, p=0.098, partial r=+0.02, p=0.80).

**CONCLUSION:** Our results suggest that lower muscle mass and strength are associated with cognitive declines affecting visual function and psychomotor skills. These physical and cognitive declines in tandem could place the ageing individual at increased risk for personal injury, including falls and fall-related fractures.
**P40**
Prevalence of frailty in the female cohort of the Geelong Osteoporosis Study

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AIM: Frailty is an age-related clinical condition associated with adverse health outcomes that can be debilitating. Few Australian studies have investigated the prevalence of frailty in the general population. This study aimed to determine the prevalence of frailty in a population-based sample of women and to examine the relationship between frailty and comorbidities.

METHODS: Women (n=360, ages 60-90yr) were assessed as part of the Geelong Osteoporosis Study (GOS) between 2011 and 2014. Frailty was identified using a modified Fried frailty phenotype that segregated participants into frail, pre-frail or robust groups. Prevalence estimates were standardised to the 2011 Australian population. Comorbidities and lifestyle factors were self-reported. ANOVA, Kruskal Wallis and Chi-square tests were used to investigate associations between frailty groups.

RESULTS: Of 360 women (median age 71yr, IQR 65 -77), 49(13.6%) were frail, 183(50.8%) pre-frail and 128(35.6%) robust. Frailty prevalence increased with advancing age: 60-69yr(7.8%), 70-79yr(14.4%) and 80+yr(27.4%). Overall population-standardised prevalence for frailty was 14.2% (95%CI 10.5 -18.0), pre-frail 50.9% (44.2-57.6) and robust 34.9% (29.0 -40.5). Women who were frail were older, shorter, weighed less and tended to have lower BMI compared to the pre-frail and robust groups. The proportions of cardio-metabolic, pulmonary and musculoskeletal conditions were higher in the frail and pre-frail groups. The proportions across frail, pre-frail and robust groups [n (%)] were: cardio-metabolic conditions 46(93.9) -vs-160(81.4)-vs-101(78.9) (p =0.021); pulmonary conditions 15(30.6) -vs-41(22.4)-vs-15(11.7) (p=0.008); and musculoskeletal conditions 47(95.9) -vs-155(84.7)-vs-101(78.9) (p=0.020). Cancer was not associated with frailty 12(24.5)-vs-31(16.9)-vs-17(13.3) (p=0.199).

CONCLUSION: Just over 14% of older women in our study were frail and a further 50.9% were pre-frail. These estimates fall within the range reported by other similar studies. Additionally, the prevalence of frailty increased with age. These findings have important implications for public health, clinical practise and service utilisation, given the association between frailty and comorbid conditions in the context of an ageing population.

**P41**
Sarcopenic obesity and anxiety: Geelong Osteoporosis Study

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AIM: Some evidence supports a positive association between obesity and anxiety, but little is known about sarcopenia and anxiety. The rationale for investigating links between musculoskeletal and mental health rests with the notion of shared pathophysiology and risk factors. The aim of this study was to determine associations between sarcopenic obesity, and its components, with symptoms of anxiety.

METHODS: This cross-sectional study involved 313 postmenopausal women aged >60yr and participating in the Geelong Osteoporosis Study; median age 70.6yr (IQR 65.0-75.8), mean weight 73.6kg (±SD 15.1). Sarcopenia was identified as low DXA-derived appendicular lean mass expressed relative to height (rALM<6.07kg/m<sup>2</sup>, Lunar) in combination with low handgrip strength (maximum HGS<20kg, Jamar). Obesity was identified as high DXA-derived body fat mass, expressed as a percentage of whole body (%BF>40%). Sarcopenic obesity referred to the co-existence of sarcopenia and obesity. Anxiety symptomatology was documented via the Hospital Anxiety and Depression Scale (HADS-Anxiety score>8). Multivariable logistic regression was used to determine the likelihood of anxiety in association with the components of sarcopenic obesity. Potential confounders included age, physical inactivity, smoking, alcohol consumption and energy intake.

RESULTS: Among 75 women with anxiety, 16(21.3%) had sarcopenia, 55(73.3%) were obese, 9(12.0%) had sarcopenic obesity and 13(17.3%) were non-sarcopenic and non-obese. In a multivariable model, sarcopenia and obesity were independently associated with anxiety: sarcopenia OR 2.36 (95%CI 1.17-4.74, p=0.02) and obesity OR 1.84 (95%CI 1.02 -3.31), p=0.04. There was no sarcopenia*obesity interaction. No confounders were identified.

CONCLUSION: These findings warrant further research to consider the extent of muscle deficit, severity of obesity and subtypes of anxiety. However, our data do suggest that poor muscle health and obesity are independently associated with anxiety symptomatology, and that their effects are additive rather than multiplicative in this relationship. Thus, anxiety and attendant complications should be considered when managing older women with sarcopenic obesity.
**P42**
Randomised controlled study of the change in frailty level with additional functional training during live-in slow stream rehabilitation

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**AIMS:** This randomised controlled study aimed to investigate changes in frailty level when additional functional training was added to normal physiotherapy for patients in a live-in slow stream rehabilitation (SSR) program in a regional centre of Victoria, Australia.

**METHODS:** Older people admitted to a live-in SSR program were assessed for level of frailty using the Study of Osteoporotic Fractures Index at admission, discharge and six-months from admission. The intervention group were encouraged to practice additional individualised progressive functional training four times daily as well as the standard physiotherapy. They also received twice weekly visits from a research assistant to progress the program. The control group received standard physiotherapy only.

**RESULTS:** Sixty older adults were assessed and randomised. There was a statistically significant improvement in frailty for the intervention group as tested on a sign test from admission to six-months (p = .002). There was no statistically significant change for the control group. For the intervention group, at discharge and six-months there were less than half the number of frail participants in comparison with at admission (admission frail n = 16, discharge frail n = 8, six-months frail n = 7). In addition, there were twice as many intervention group participants who were classified as robust at six-months in comparison with admission (admission robust n = 4, six-months robust n = 8). The control group showed no statistically significant improvement in change of frailty level. There were no adverse effects.

**CONCLUSION:** Frailty levels for participants in this study decreased for the intervention group to the six-month re-assessment. This shows that targeting frail and pre-frail participants for additional functional exercise during the live-in SSR program can improve frailty level with no adverse events.

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**P44**
Interrelationship between malnutrition and dynapenia on predicting 4-year all causes mortality among oldest old male residents in a retired residential care home in southern Taiwan

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**INTRODUCTION:** Malnutrition and dynapenia could individually lead to mortality in older people. The aim of this study was to explore the interrelationship between malnutrition and dynapenia on all-cause mortality among oldest old men.

**METHODS:** Residents living in a retired residential care home were invited for study in 2013. All participants were interviewed and tested by trained nurses, including age, MMSE, GDS, CCI, MNA-Short form (MNA-SF), gait speed and handgrip strength(HS). Dynapenia was defined as HG < 26kg according to the definition of Asian Working Group for Sarcopenia. Risk of Malnutrition was classified as MNA-SF scores < 12 points. Four-year survival status was recorded according to the medical record. Cox regression was used to exam the hazard ratio(HR) of 4-year all-cause mortality among participants divided into 4 groups based on with or without dynapenia and malnutrition.

**RESULTS:** Totally, 333 participants (mean age: 85.4±6.7 years, all male) were recruited, and 167(50.2%) and 182(54.7%) participants were classified as risk of malnutrition and dynapenia, respectively. Kaplan-Meier curves along with their respective log-rank test were significant for both risk of malnutrition and dynapenia. After fully adjusting covariates, participants with both risk of malnutrition and dynapenia had higher 4-year all-cause mortality risk (adjusted HR 2.629, 95% CI: 1.413-4.890, p=0.002), compared with those with well-nutrition and without dynapenia. The aHR for those with risk of malnutrition but no dynapenia also increased with borderline significantly (aHR 1.918, 95% CI = 0.975-3.773, p=0.059). However, those with dynapenia only couldn’t predict 4-year all-cause mortality (aHR: 1.241, 95% CI: 0.624-2.468, p=0.537).

**CONCLUSION:** Risk of malnutrition, but not dynapenia, was an important risk factor for mortality. Moreover, dynapenia had an obviously synergistic effect for those with risk of malnutrition on the prediction of 4-year all-cause mortality among oldest old male residents in the retired residential care home.
Poster Abstracts

P46
Clinician attitudes regarding the utility of frailty tools in managing older adults with end stage kidney disease: Literature review and survey study
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AIM: To describe clinicians’ attitudes and practices in using a validated frailty tool as a decision-making aid, in older adults with ESKD (End Stage Kidney Disease) approaching the need for dialysis.

METHODS: A literature search was conducted using three online databases PubMed, Embase and Cochrane Library, with a focus on validated frailty assessments in ESKD. Eight studies were included in the final literature review following consideration of inclusion and exclusion criteria. A questionnaire was subsequently developed, with input from two nephrologists and three geriatricians. A prospective cohort study was undertaken. Participants were clinicians in geriatrics and nephrology. A secure web-based survey was conducted over a 12-week period from 8th May to 31st July 2017.

RESULTS: 133 of 1161 clinicians responded, reflecting a crude response rate of 11.3%. The majority (81%) were geriatricians. Sixty-one percent of respondents usually or always assessed frailty. Only 36% routinely used a validated frailty tool. The most commonly used frailty tool was the Clinical Frailty Scale (CFS). Simplicity (92.3%) and utility as a bedside test (93.8%) were important attributes of a frailty tool.

CONCLUSION: There exist valid frailty assessments which can be used to prognosticate ESKD patients. Clinicians value the concept of frailty. However, frailty tools appear underutilised. If widely accessible and simple to complete as a bedside test, frailty assessment can be valuable in managing older adults with ESKD. Based on our survey responses, CFS appeared the most preferred tool for assessing frailty in older adults with advanced kidney disease.

P47
Prevalence of prodromal sarcopenic-obesity in middle-aged adults: Association with BMI and physical function
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AIMS: Determine the prevalence of pro-dromal (early onset) sarcopenic-obesity and the association with BMI and physical function in the Dunedin Study birth cohort at age 45.

METHODS: The first 660 study members with both total body DXA and physical function data at were analysed. A phenotype of high fat mass index/height2 (HFMI) with low appendicular skeletal muscle index/height2 (LASMI), was derived using age and sex-specific cut-scores proposed by Prado et. al. [1]. VO2max was categorized based on cut-scores as proposed by Heywood et. al. [2], grip strength and gait speed were categorized based on cut-scores as proposed by Bohannon et. al. [3] and Bohannon et. al. [4], respectively. Logistic regression stratified for sex determined the relationship between body composition phenotypes and BMI. Spearman Rank Correlations, stratified for sex, were used to investigate the relationship between sarcopenic-obesity and physical function (VO2Max, grip strength, and walking speed).

RESULTS: At age 45, 10.79% of females and 16.51% of males were classified as HFMI-LASMI (sarcopenic-obese). 100% of the females and 79.59% of the males that are classified as sarcopenic-obese were classified as having low VO2max. Low grip strength was prevalent among 2.70% of the females and 7.69% of the males with sarcopenic-obesity. The odds of being sarcopenic-obese were 7.5 times higher among overweight females and even 26 times higher among overweight males. Binary correlation between VO2max and sarcopenic-obesity was weak but significant for both females (r= -0.13, p<0.02) and males (r= -0.17, p<0.00). Grip strength and self-rated fitness was also weakly but significant related, but only in males (respectively, r= -0.12, p=0.04 and r= -0.15, p=0.01).

CONCLUSION: These data suggest that being overweight is a risk factor for sarcopenic-obesity in middle-aged adults and is associated with low cardiorespiratory function.
Poster Abstracts

P48
From Research to Practice: Improving the uptake of community based exercise - "Prehabilitation" for frail older adults
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AIM: "Prehabilitation" is a proactive, supervised exercise intervention shown to reduce morbidity in patients with frailty or sarcopenia. For eligible Australians, government funds may be available to reduce premature admission to residential aged care, however uptake of preventive exercise in this group remains low. We aimed to develop a protocol for incorporating clinical exercise prescription into goal directed care plans for frail, community dwelling older Australians.

METHODS: We assembled a multi-disciplinary panel to develop a protocol to increase use of clinical exercise prescription for frail older adults who had undergone an aged care assessment and review by their medical practitioner. This panel included case managers, exercise scientists and accredited exercise physiologists. The protocol was developed following literature review, using clinical expertise of panel members.

RESULTS: The protocol describes the progression of assessment, incorporating clinical exercise prescription, and regular evaluation and review. It also promotes effective collaboration between members of the care team. After assessment by an Aged Care Assessment Service, a frail older adult begins working with a case manager to establish a goal directed care plan. Where appropriate, an exercise physiologist is engaged to prescribe an evidence based exercise program which supports achievement of the individual's goals, such as improved mobility, cardiovascular fitness, reduced risk of falls or facilitating an earlier return from hospital. Measures of success include validated clinical outcomes, fewer acute presentations, subjective perception of improvement and reduction in the overall cost of care.

CONCLUSION: Community based care teams can support safe and appropriate exercise in frail older Australians. By encouraging proactive planning, exercise prescription may reduce the risk of poor health outcomes. Further research is required to evaluate the impact this protocol would have on promoting clinical exercise to reduce morbidity, improve health outcomes and decrease the overall cost of aged care.

P50
Meteorin-like (Metrnl) adipomyokine improves glucose tolerance in type 2 diabetes
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Meteorin-like (metrnl) is a recently identified adipomyokine that has beneficial effects on glucose metabolism. However, its underlying mechanism of action is not completely understood. In this study, we have shown that a level of metrnl increase in vitro under electrical-pulse-stimulation (EPS) and in vivo in exercise mice, suggesting that metrnl is an exercise-induced myokine. In addition, metrnl increases glucose uptake through the calcium-dependent AMPK pathway. Metrnl also increases the phosphorylation of HDAC5, a transcriptional repressor of GLUT4, in an AMPK-dependent manner. Phosphorylated HDAC5 interacts with 14-3-3 proteins and sequesters them in the cytoplasm, resulting in the activation of GLUT4 transcription. In conclusion, we have demonstrated that metrnl is a promising therapeutic candidate for glucose-related diseases such as type 2 diabetes.