Dietitian Connection

Sarcopenia Symposium

Why Muscle Health Matters

Source:: mrmohock / Adobe Stock

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DEAKIN UNIVERSITY

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Honorarium from Abbott Australasia

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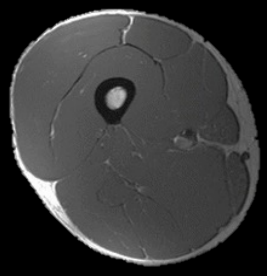
life. to the fullest.

20s

70s

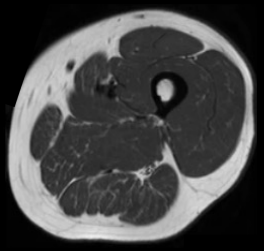
Age-related muscle loss

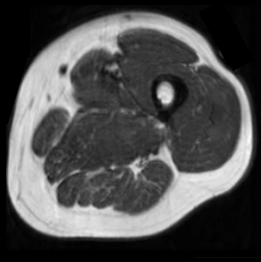


Pre

Post

4-weeks of immobilization





Lifetime loss in total body muscle (lean) mass

~6 kg women | ~10 kg men

Images adapted from McLead et al Biogeront 2016

Elderly: 3-10 days of bedrest

~1.0 kg loss in leg muscle mass

Images adapted from Yoshiko et al Skeletal Radiol 2018

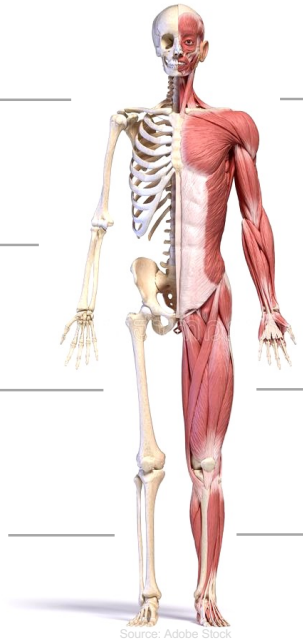
Why **Muscles Matter**

Essential for locomotion and maintaining posture

Critical for muscle strength, balance and mobility

Maintain the integrity and structure of bone

Helps to stabilize joints



Source: Adobe Stock

Reservoir for amino acids essential for protein synthesis and energy production

Key role in balancing the metabolic needs of organs/ tissues during illness

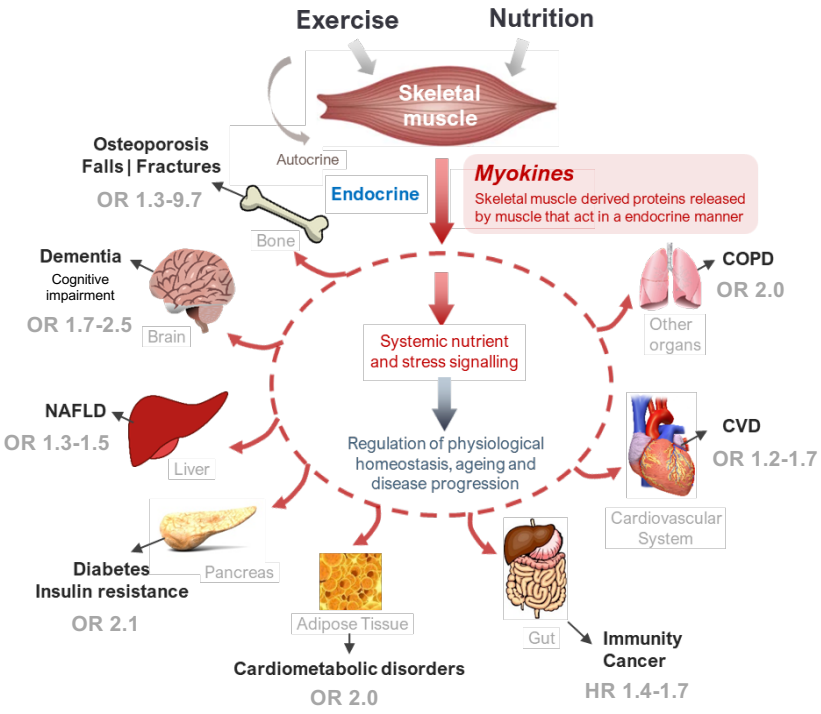
Primary site of glucose disposal (largest mass of insulin sensitive tissue) & influences metabolic rate

Low muscle mass linked to impaired immunity and > risk of infection

Underappreciated

Role of Muscle

Image adapted from Rai M and Demontis F Ann Rev Phyisol 78:85-107, 2016; Yuan et al. Metabolism 2023; Gao et al eClinMed 2022; Benz et al Eur Resp Rev 2019; Au et al. Osteo Sarcop 2021



Timing and Magnitude of **Muscle Loss with Age**

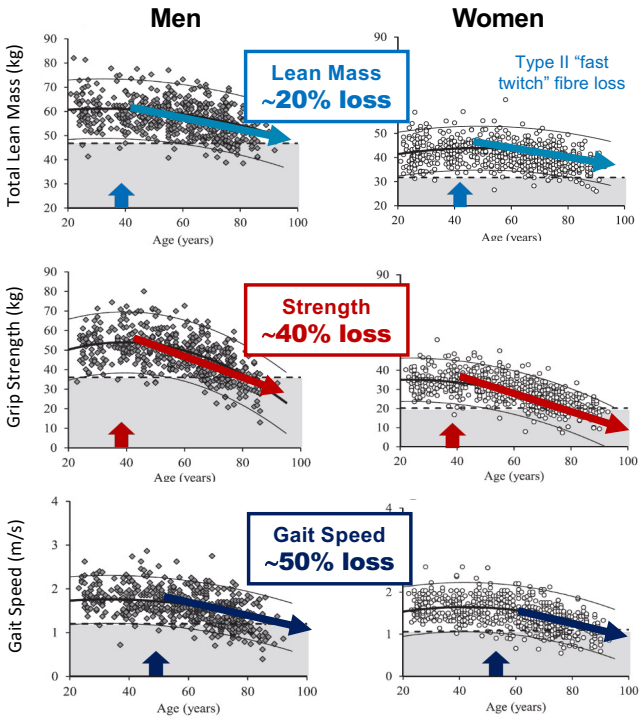


Image adapted from Suetta C et al. J Cachexia, Sarcopenia and Muscle 2019

Source: https://thediogenesblog.wordpress.com/2018/08/18/

FACT

Avoid Being **Slow and/or Weak**

Low muscle strength (*weakness*)
- **1.2 – 1.8** ↑ risk of falls, disability & mortality
- **2.3** ↑ risk of late-life dementia

Slow walking speed (*slowness*)
- **1.3 – 2.2** ↑ risk of falls, disability & mortality
- **2.1** ↑ risk of late-life dementia

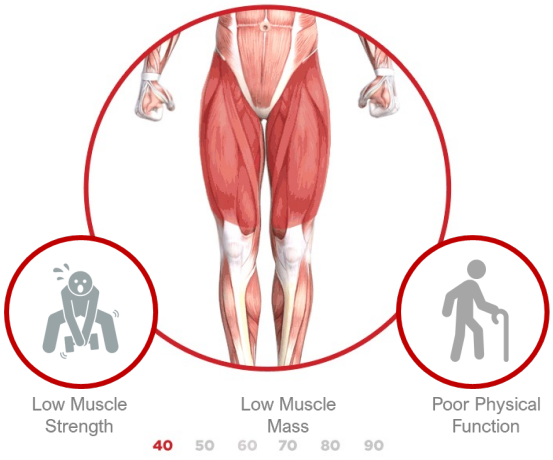
Combination: slowness & weakness *
- **1.3 – 5.5** ↑ risk of falls, fractures & mortality
- **1.9 – 2.5** ↑ risk of late-life dementia

** Slow and weak or greater loss in muscle strength and decline in walking speed*

Radavelli-Bagatini S et al. J Cach Sarcopenia Muscle 14:1508-19, 2023; Sim M et al. J Am Med Dir Assoc. 2019 Jan;20(1):76-82; Sim M et al. Osteop Int 2019; 30(1): 167-76; Cawthorn et al J Am Geriatr Soc 2020; Petermann-Rocha et al Maturitas 138:69-75, 2020; Wnag et al Clin Int Aging 2021

Sarcopenia

A New Clinical Condition



ICD-10-AM Code (2019)

Source: adapted from http://beta.liveup.pl/

Defining Sarcopenia

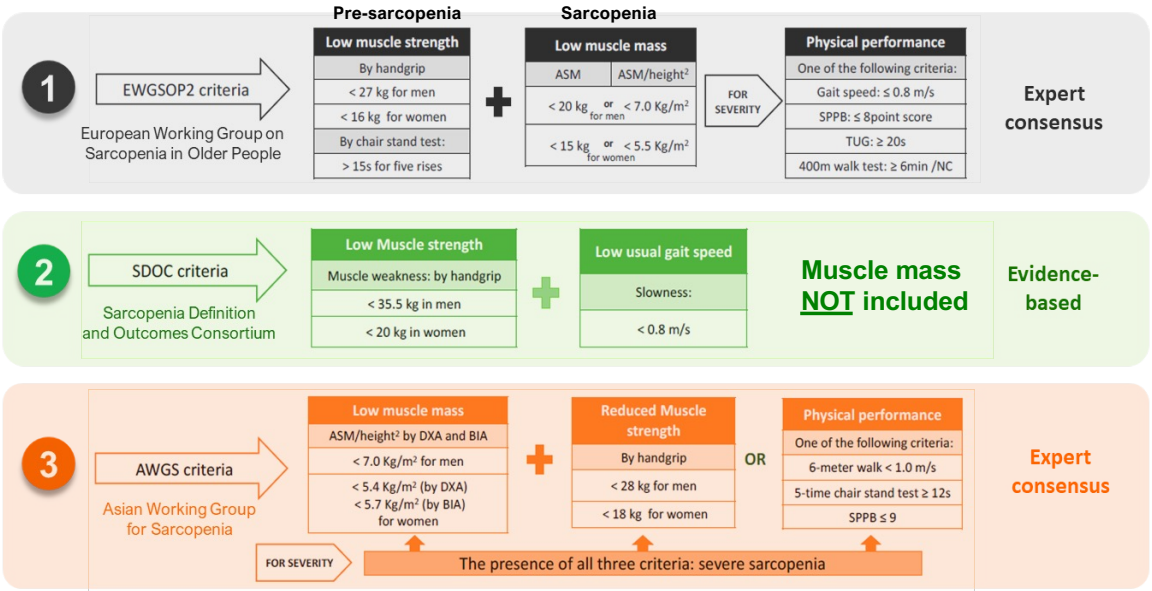
Sarcopenia is a disease characterised by progressive and accelerated loss of skeletal ***muscle mass, strength*** and/or ***physical function***.

Clinical Criteria *

1. Low muscle strength
2. Low muscle mass (appendicular)
3. Impaired function / performance

* No international consensus on the criteria and cut-points for sarcopenia

Sarcopenia Definitions & Criteria…. *But No Consensus*



Meza-Valderrama et al. Nutrients 13(3), 761, 2021

Screening Tools for **Sarcopenia**

✓ Specificity **High**

Identify those WITHOUT sarcopenia

? Sensitivity **Low-moderate**

Limited ability to identify those WITH sarcopenia

Malmstrom TK and Morley JE JAMDA 14:531-32, 2013;
Voelker SN et al. J Am Med Dir Assoc 2021

SARC-F: Self-administered simplified screening questionnaire for assessing sarcopenia risk

Component	Question	Scoring
Strength	How much difficulty do you have in lifting and carrying 10 pounds (~4 kg)	**0** = None **1** = Some **2** = A lot or unable
Assistance in walking	How much difficulty do you have walking across a room?	**0** = None **1** = Some **2** = A lot, use of aids, or unable
Rising from a chair	How much difficulty do you have transferring from a chair or bed?	**0** = None **1** = Some **2** = A lot or unable without help
Climb stairs	How much difficulty do you have climbing a flight of 10 stairs?	**0** = None **1** = Some **2** = A lot or unable
Falls	How many times have you fallen in the past year?	**0** = None **1** = 1-3 falls **2** = 4 or more falls

SARC-F score of ≥ 4 is predictive of sarcopenia

Signs & Symptoms of **Sarcopenia**

Trouble lifting, carrying or opening items

Walking more slowly

Difficulty to get out of chair

Difficulty walking up stairs

Unintentional weight loss

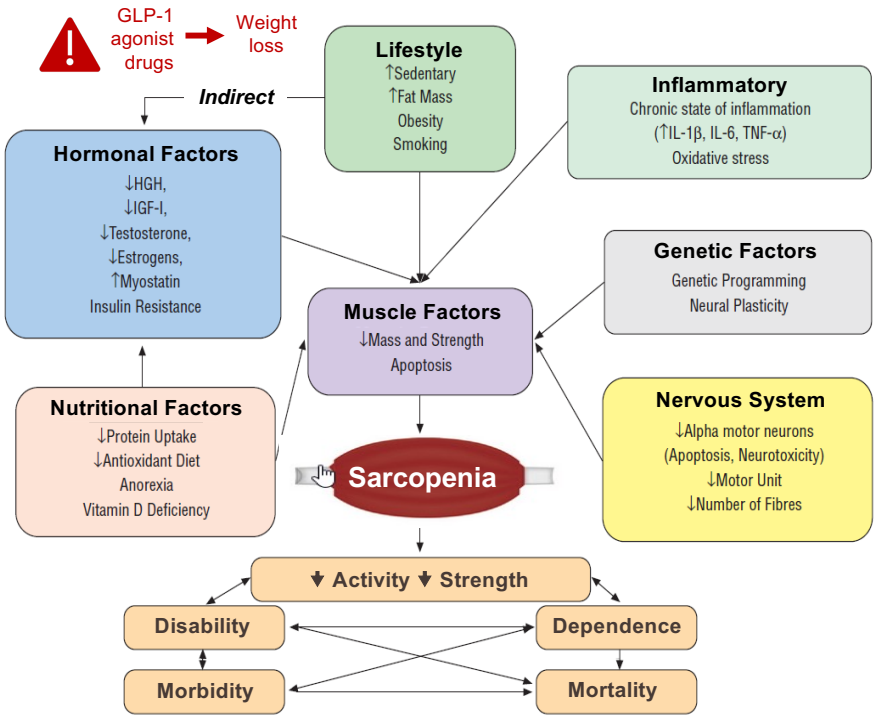
Easily exhausted

Poor balance or mobility

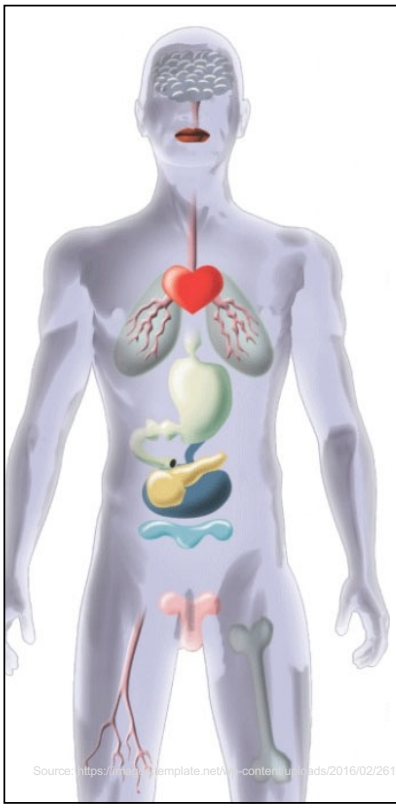
More frequent falling

Influence the ability to undertake normal everyday activities of daily living

Risk Factors
for Muscle Loss



Beas-Jiménez et al. Rev Andal Med Deporte. 2011;4(4):158-166



Source: https://creativetemplate.net/wp-content/uploads/2016/02/26132629/Internal-Body-Parts-Template-Download.jpg

	Odds ratio
Dementia	▲ 3.1
Depression	▲ 1.6
Parkinson's disease	▲ 3.1
Heart disease	▲ 1.1
Respiratory disease	▲ 2.7
NAFLD	▲ 3.8
Diabetes	▲ 2.1
Midlife Obesity	▲ 5.1
Osteoarthritis	▲ 1.3
Osteoporosis	▲ 2.6
Multimorbidity	▲ 2.0

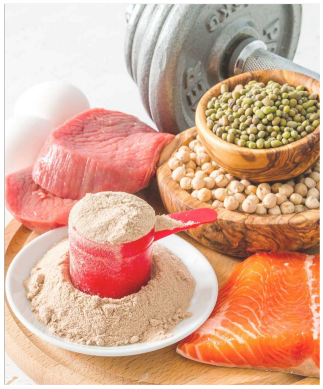
Risk Factors

Secondary Sarcopenia

Pacifico J et al. Exp Gerontol 2020; Yuan and Larsson Metabolism 144: 2023; Damluki et al Circulation 2023; Koo et al J Hepatol 2017

Recommendations for Treating Sarcopenia

Evidence-based recommendations	Strength | certainty of evidence
▪ Multi-component, resistance-based training	✓ Moderate-High
▪ Nutrition (protein) + resistance exercise	✓ Moderate-High
▪ Protein supplementation | protein-rich diet	✓ Moderate *
▪ Discuss adequate calorie + protein intake	? Low *
▪ *Vitamin D supplementation*	✗ Low
▪ *Use of anabolic hormones*	✗ Low



**If habitual protein intake low or malnourished, increasing intake can prevent/slow muscle loss*

Dent et al. JNHA 23:771-87, 2019; Lim et al. J Frailty Aging 11:348-69,2022; Dhar et al. Osteo Sarcop 8:35-57, 2022; Shen et al. J Cachexia Sarcopenia Muscle 14: 1199–1211, 2023

1st Australian National Muscle Health Survey

Anonymous Survey: Australian adults (50+ years) | GPs | Practice Nurses

1. To gain insights into middle and older-aged Australian adults' **understanding, awareness, knowledge, perceptions and beliefs** about muscle health and sarcopenia.

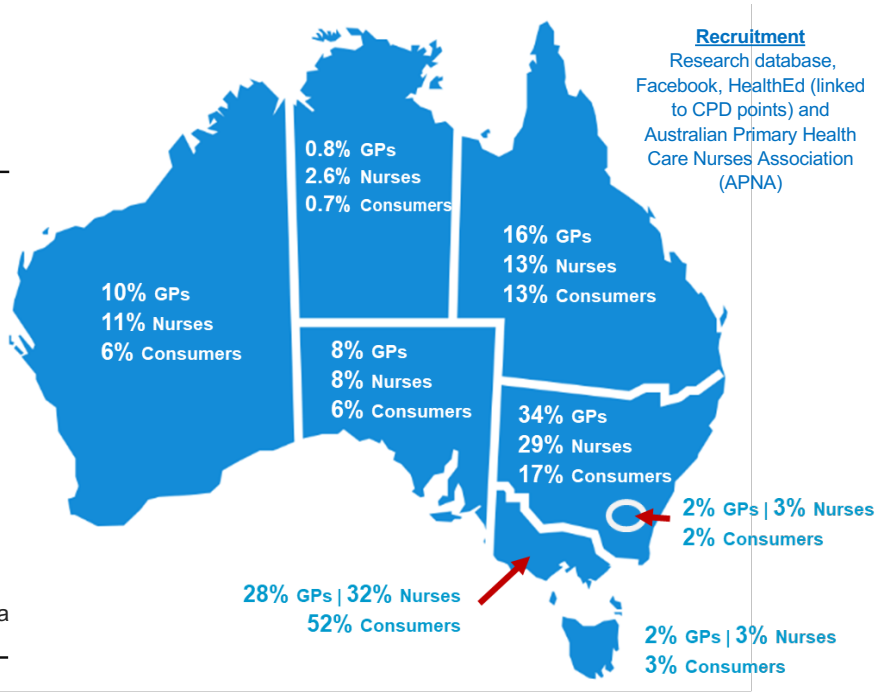
2. To gain insights into GPs and practice nurses' **understanding, awareness, knowledge, attitudes, perceptions, current practices and enables and barriers** related to muscle health and sarcopenia, including screening, diagnosis, prevention and management strategies for this disease.

Study Participants

General Practitioners (GPs)
Age 58 ± 12 y, 61% female
[n=1326 ▶ 1114 completed (84%)]
67% >20 y in profession

Practice Nurses
Age 56 ± 12 y, 92% female
[n=38 ▶ 30 completed (79%)], 63% >20 y in profession

Consumers (Adults ≥50 y)
Age 66 ± 8 y, 71% female
[n=1261 ▶ 1103 completed (88%)]
28% University/Tertiary | 24% Grad. diploma



Recruitment
Research database, Facebook, HealthEd (linked to CPD points) and Australian Primary Health Care Nurses Association (APNA)

Awareness | Knowledge: *Consumers*

Q: What do you consider would indicate as **having poor muscle health** (rate top 3 answers)?

	Rank 1	Rank 2	Rank 3
Decrease in muscle strength	45.3	21.2	11.9
Decrease in physical function	25.7	20.4	19.2
Decrease in muscle size or mass	9.4	18.2	10.7
Decrease in physical fitness	7.1	11.2	11.3
Increased levels of fatigue	4.4	7.1	8.9
Decrease in muscle endurance	3.9	12.5	20.8
Reduced flexibility (range of motion)	3.1	7.9	15.4
Decrease in lung function	1.0	1.3	1.8
Other	0.2	0.2	0.2

Familiar with the term "sarcopenia": **32% YES**

All values represent percent (%)

Awareness | Knowledge: *GPs/Nurses*

Q: Which of the following criteria best represents **<u>your</u> understanding of "sarcopenia"?**

Familiar sarcopenia	GPs
▪ Not at all	6
▪ Slightly	22
▪ Somewhat	29
▪ Moderately/Extremely	43
Best represents sarcopenia	
▪ Low muscle mass	90
▪ Low muscle strength	66
▪ Low physical function	54
▪ Low physical fitness	35
▪ I don't know	3

All values represent percent (%)

Best represents sarcopenia	GPs
Low muscle strength, mass, function + fitness	31.8
Low muscle mass	26.8
Low muscle strength, mass + physical function ✓	16.7
Low muscle strength + muscle mass	10.7
Low muscle strength	4.2
Low physical function	1.3
Mix of other different responses	5.5
Don't know	2.9

All values represent percent (%)

Similar responses for both GPs and practice nurses

Awareness | Knowledge: *<u>About Muscle Loss</u>*

Q: Age muscle loss starts and magnitude of loss in muscle strength throughout life

Age muscle loss starts	Consumers	GPs
✓ 30-39 y	29.1	15.5
40-49 y	30.7	24.7
50-59 y	25.1	36.7 ✗
60-69 y	9.6	18.1
70+ y	2.4	3.7
I don't know	3.1	1.3
Magnitude of loss in muscle strength		
5-10%	4.8	2.6
11-20%	6.1	3.3
21-30%	18.4	13.6
31-40%	24.9	22.2
✓ >40%	35.7	50.9
I don't know	10.1	7.4

All values represent percent (%)

Awareness | Knowledge: *Signs/Symptoms*

Q: What do you consider are the **signs or symptoms** of sarcopenia, that is, having low muscle mass, poor muscle strength and/or impaired physical function?

	GPs		Consumer	
	%Correct	%Don't Know	%Correct	%Don't Know
Difficulty getting out of a chair	98.5	1.0	93.3	4.1
Difficulty climbing stairs	98.3	1.5	91.2	4.1
Trouble lifting, carrying or opening items	97.8	1.4	95.9	2.4
Walking more slowly	97.5	2.0	87.7	4.7
More frequent falling	97.0	2.4	88.6	5.1
Losing weight without trying	85.4	9.9	44.4	26.6
* Gain in body weight or body fat	32.8	30.0	32.4	26.9
* Increase in resting heart rate	19.6	48.7	42.7	21.3
* Persistent muscle pain or discomfort	18.0	29.1	27.4	16.5
* More frequent muscle cramps / spasms	15.3	31.9	40.2	24.1
* Stiff or inflexible muscles	10.2	23.0	10.4	13.6
* Fatigue	1.8	6.8	16.3	8.0

*** Not signs/symptoms**

All values represent percent (%)

Awareness | Knowledge: *Risk Factors*

Q: What do you consider are the **risk factors** which might contribute to sarcopenia, that is, having low muscle mass, poor muscle strength and/or impaired physical function?

	GPs		Consumer	
	%Correct	%Don't Know	%Correct	%Don't Know
Increasing age	99.4	0.3	96.2	1.6
Sedentary lifestyle	98.7	1.1	97.7	1.7
Poor nutritional intake	98.6	0.9	95.0	3.5
Low dietary protein intake	97.0	2.6	86.6	11.4
Presence of other chronic conditions	94.3	4.9	84.3	12.9
Unintentional weight loss	84.3	13.0	53.2	39.4
Short-term bed rest (< 10 days)	70.7	16.1	82.8	14.1
* High cholesterol levels	27.5	52.8	17.8	51.6
* Stress	14.2	36.2	15.1	38.2
* Dehydration	12.5	28.9	10.4	34.3
* Inadequate dietary calcium intake	11.8	29.6	10.2	28.8
* Being female	8.0	24.3	12.5	29.7

*** Not risk factors**

All values represent percent (%)

Awareness | Knowledge: *Consequences*

Q: What do you consider are the **consequences** of sarcopenia, that is, having low muscle mass, poor muscle strength and/or impaired physical function?

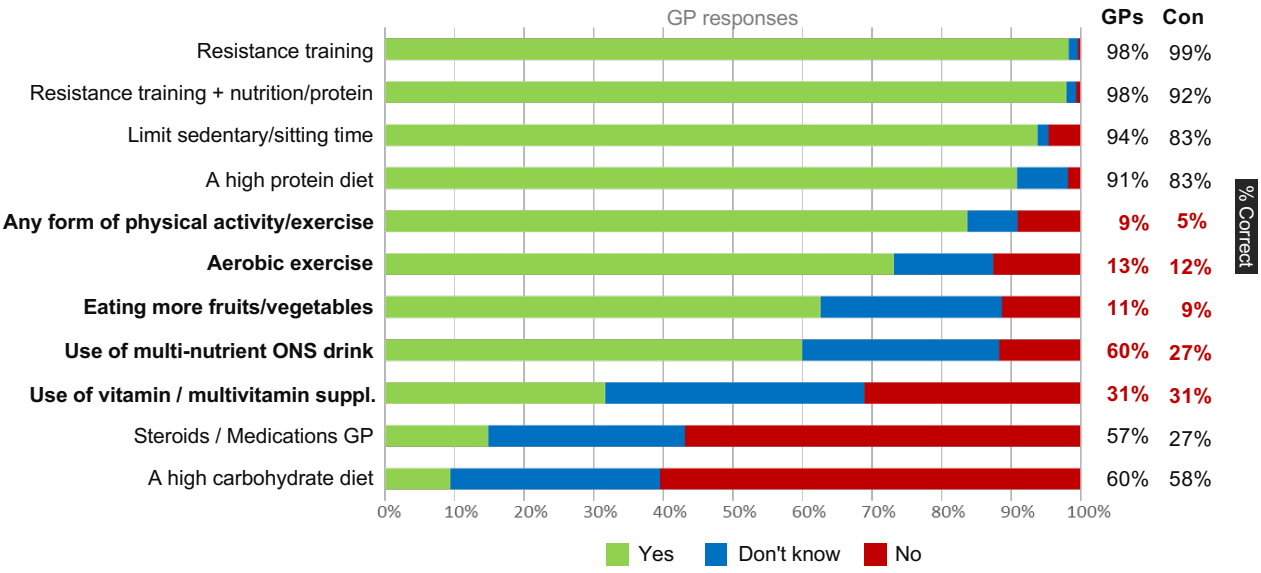
	GPs		Consumer	
	%Correct	%Don't Know	%Correct	%Don't Know
Difficulties performing daily activities	**99.7**	*0.3*	**98.1**	*0.7*
Increased risk of falls or fractures	**99.4**	*0.6*	**97.6**	*1.6*
Loss of independence	**99.4**	*0.4*	**94.8**	*3.2*
Increased risk of hospitalization	**97.2**	*2.2*	**87.5**	*9.6*
Increased risk of bone or joints diseases	**91.6**	*6.5*	**81.8**	*13.8*
Shortened life expectancy	**82.3**	*14.8*	**67.7**	*25.7*
Increased risk cognitive decline/dementia	**67.9**	*22.9*	**48.3**	*32.8*
Increased risk of chronic conditions	**53.6**	*31.8*	**47.5**	*36.2*
Higher risk of infection/reduced immunity	**51.7**	*33.8*	**36.1**	*39.8*
* Dizziness/vertigo	**18.0**	*37.4*	**23.3**	*45.6*
* Reduced hormonal levels	**10.3**	*39.0*	**11.4**	*49.9*
* Sleep disturbances	**9.3**	*32.6*	**16.0**	*33.5*

* **Not consequences**

All values represent percent (%)

Awareness | Knowledge: *Strategies/Treatments*

Q: Which **strategies or treatments** are recommended to prevent or manage sarcopenia?



Australian Adults: *Self-Reported Muscle Health*

Q: How would you currently rate the state of your muscle mass, muscle strength and physical function?

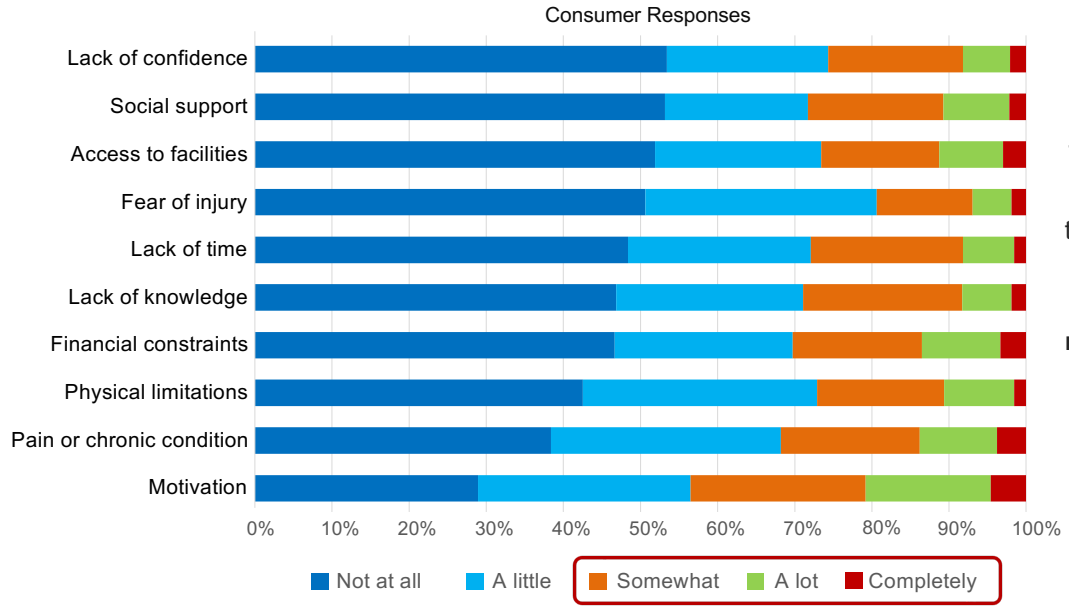
	Muscle Mass	Muscle Strength	Physical Function
Very poor	1.8%	1.6%	2.2%
Poor	15.0%	11.2%	13.9%
Average	40.7%	26.0%	22.3%
Good	34.4%	36.6%	35.4%
Excellent	8.1%	24.6%	26.1%

How would you rate your HEALTH today (0-100): mean 77 (median 80): range 2-100

Attitudes, Importance, Beliefs & Perceptions

9%	Yes response	Has a **doctor or HCP** ever talked to you about **muscle health?**
48%	Very/ Extremely	How **concerned** are you about the **impact of sarcopenia** in the future?
87%	Moderately/ Extremely	How **seriously** do you believe having sarcopenia might **impact your health/well-being**
89%	A lot/ Completely	To what extent to you believe **exercise** can influence your risk for sarcopenia
62%	A lot/ Completely	To what extent to you believe **diet** can influence your risk for sarcopenia
25%	Agree/ Strongly Agree	Consuming **multi-nutrient ONS** can positively impact muscle health
53%	Strongly Disagree/ Disagree	I feel I **don't have the knowledge** to make lifestyle changes to benefit my muscle health

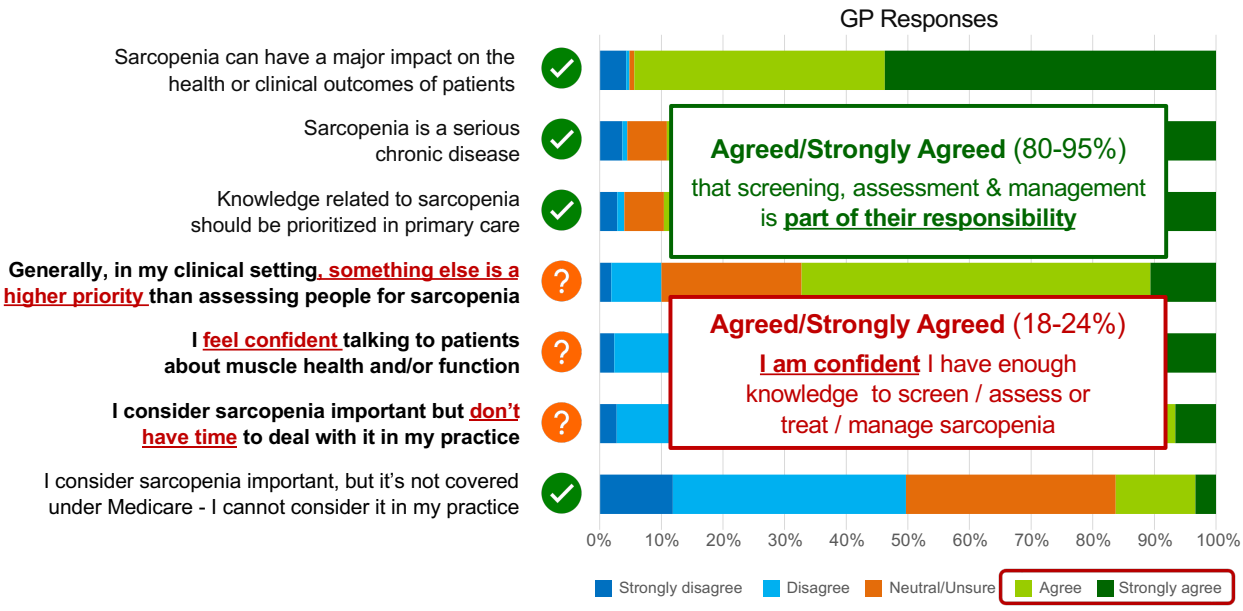
Barriers *to Maintaining a Nutritious Diet*



Question

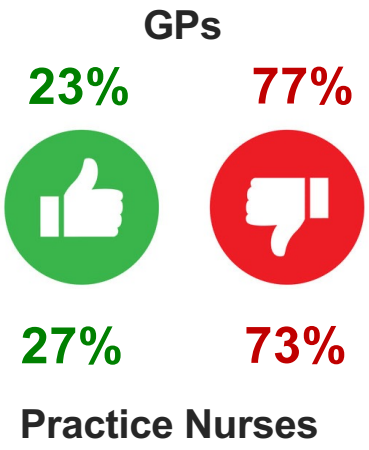
To what extent do you feel each of the following are a barrier for you to **maintaining a nutritious diet** for muscle health or reducing the risk of sarcopenia?

Attitudes, Importance *and* Beliefs *of GPs*



Current Practice: *Screen/Assess for Sarcopenia*

Q: Do you screen or assess for sarcopenia or one or more of its components in your practice?



What measures are tools are used *	
▪ Objective measure (e.g., STS, GpSt, TUG)	**50.8%**
▪ By visual observation or suspicion	**17.0%**
▪ Height, weight, BMI, circumferences	**16.6%**
▪ Other (mostly unspecified)	**10.4%**
▪ SARC-F and general questions	**7.5%**
▪ Non-specified physical or clinical assessment	**7.2%**
▪ Ask about physical activity	**5.5%**
▪ Assess falls or frailty	**4.6%**

***Preliminary data / categories**

Perceptions *of Responsibility & Confidence*

Q: Who should be responsible for **screening or assessment** of sarcopenia?

	GPs	Nurses
GP	96.4	93.8
Physiotherapist	86.7	87.5
Exercise Physiologist	85.3	90.6
Geriatrician	81.8	84.4
Practice nurse	76.3	**90.6**
OT	67.7	75.0
Dietitian	**61.1**	**71.9**
Endocrinologist	44.9	50.0
Healthcare assistant	27.6	37.5
Other	3.1	6.3
Don't support screening	0.5	0.0

Q: Who should be responsible for **treating or managing** sarcopenia?

	GP	Nurse
GP	93.2	87.5
Ex Physiologist	80.8	75.0
Physiotherapist	80.2	**59.4**
Geriatrician	78.2	78.1
Dietitian	**63.2**	**65.6**
OT	53.9	50.0
Endocrinologist	42.2	46.9
Practice nurse	35.1	50.0
Healthcare assistant	18.2	31.3
Don't know who is best	3.5	6.3
Other	2.2	3.1

All values represent percentage (%)

Perceptions *of Responsibility & Confidence*

GP Responses

Q: Which **patient subgroups** should be **prioritized for screening or assessment?**

94	**People with a history of falls**
93	**People with malnutrition or poor nutrition**
90	**People with mobility limitations**
83	**People with osteoporosis**
80	**People following a recent hospitalization or bed rest**
78	People with a history of a previous minimal trauma fracture
76	People with dementia or cognitive decline
76	People with two or more chronic medical conditions
75	Adults aged 70 years and over
70	Adults aged 60 years and over
65	**People with cancer**
59	**People with type 2 diabetes**
57	Women during menopause
43	**People following an acute medical illness**
38	**Adults aged 50 years and over**
7	No specific condition would prompt me to screen/assess for sarcopenia
2	Other

All values represent percentage (%)

Barriers *to Screening, Assessment & Treatment*

GP Responses

Q: What are the **potential barriers** to screening, assessment and treatment of sarcopenia in primary care?

Screening / Assessment		Treatment / Management
57%	There is a lack of services to refer on to if I do identify someone with sarcopenia	**62%**
55%	I do not have access to the tools required to identify sarcopenia	**58%**
41%	I do not know how to identify sarcopenia	**44%**
39%	Identifying sarcopenia is not a priority in primary care	N/A
36%	There are other more important health issues/concerns to focus on	**35%**
34%	Sarcopenia screening / assessment is not covered under Medicare	**29%**
32%	There is a lack of evidence-based guidelines to identify sarcopenia	**33%**
32%	I do not have time to identify sarcopenia	**27%**
12%	I do not find there are any barriers to identifying sarcopenia	**12%**
4%	Other, please specify	**4%**

All values represent percentage (%)

Take Home Message

1

Sound understanding of poor muscle health / sarcopenia

Awareness: weight loss (risk factor); fitness/endurance not a criteria; sarcopenia increases risk of chronic disease (consequence); stiff/inflexible muscles & cramps (not symptoms).

2

Lack of certainly around effective treatment / management

Education: not all forms of exercise are effective (including aerobic, but good for fitness); oral nutritional supplements/drink can play an important role; no evidence F/V or MV suppl.

3

Poor muscle health / sarcopenia is important, *but …….*

GPs, practice nurses (and consumers) all recognised sarcopenia as an important health issues. Few screen/assess for it (and using relevant tools), but thought it was their responsibility yet lack knowledge, confidence and tools.

1st Australian

National Muscle Health Survey

Acknowledgement

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- Dr Brenton Baguley
- Ms Belinda De Ross
- Dr Jenny Gianoudis

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Why muscle health matters? How can Dietitians advocate for their role in the management of muscle loss?

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University of the Sunshine Coast | CRICOS Provider Number: 01595D

Disclosure

- Honorarium received from Abbott Australasia

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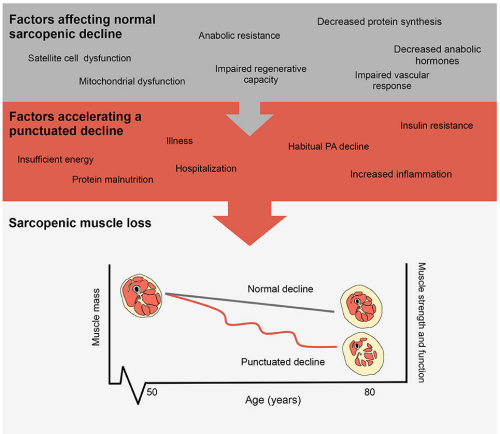
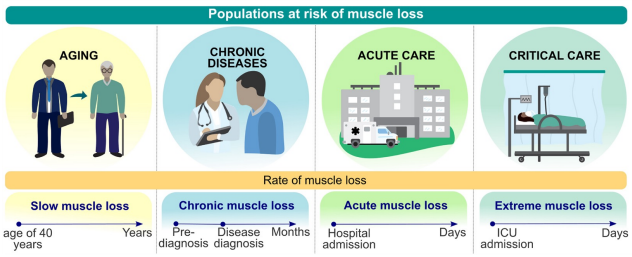
life. to the fullest.

Overview

- Muscle loss and importance of screening
- Barriers to routine screening in practice
- Unveiling the Muscle Health Algorithm
- Implementation into practice

Populations at risk of muscle loss





Muscle mass: up to 1% per year
Muscle strength: up to 3% per year
But….

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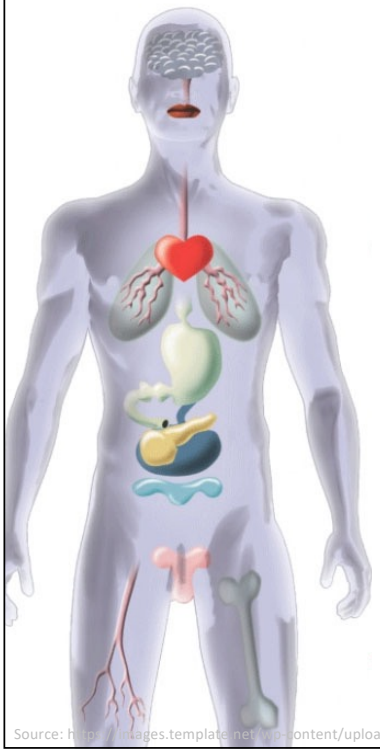
Oikawa SY et al. Front Nutr 2019;6:75; doi: 10.3389/fnut.2019.00075
Prado CM et al. Clin Nutr 2022;41(10):2244-2263

Slide acknowledgement: Prof Robin Daly



	Odds ratio
Dementia	▲ 3.1
Depression	▲ 1.6
Parkinson's disease	▲ 3.1
Heart disease	▲ 1.1
Respiratory disease	▲ 2.7
NAFLD	▲ 3.8
Diabetes	▲ 2.1
Midlife obesity	▲ 5.1
Osteoarthritis	▲ 1.3
Osteoporosis	▲ 2.6
Multimorbidity	▲ 2.0

Source: https://images.template.net/wp-content/uploads/2016/02/26132629/Internal-Body-Parts-Template-Download.jpg

Secondary Sarcopenia

Pacifico J et al. Exp Gerontol 2020; Yuan and Larsson Metabolism 144: 2023; Damluki et al Circulation 2023; Koo et al J Hepatol 2017

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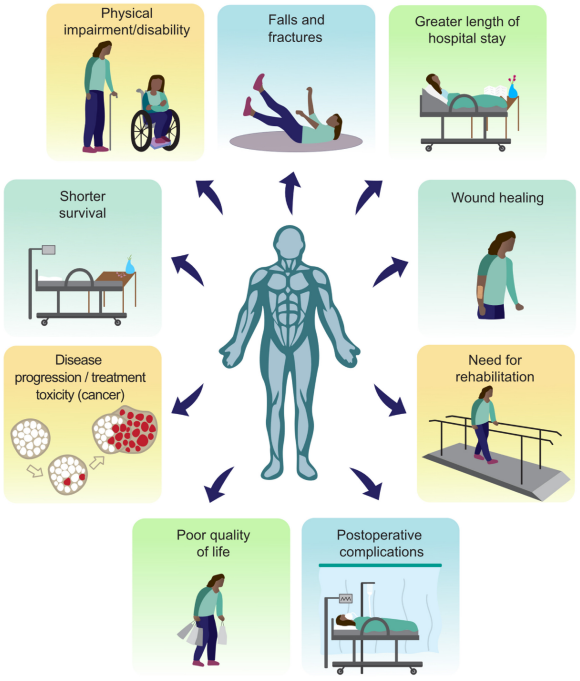
Why is assessment of muscle health so important?

- Extensive body of research on the health-related consequences associated with poor muscle health
- Integrating assessment of muscle health into clinical practice across the continuum of care is challenging but is **<u>required for early identification of at-risk patients</u>**
- Facilitates timely and **<u>personalized nutrition and exercise interventions</u>** in the context of multimodal therapy



Prado CM et al. Clin Nutr 2022;41(10):2244-2263

Nutritional strategies and interventions?

Adequate energy

Protein

Leucine

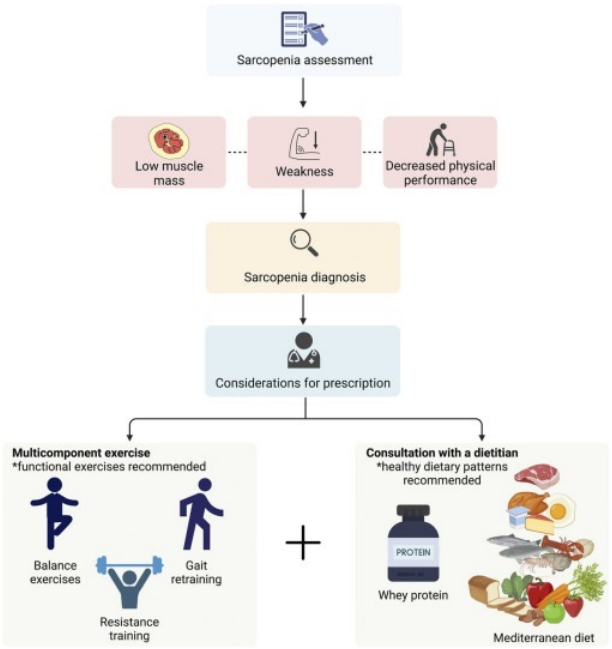
β-hydroxy-β-methylbutyrate (HMB)

Vitamin D

Creatine

n-3 PUFA

Healthy dietary patterns



Prado CM et al. Clin Nutr 2022;41(10):2244-2263

Practice related question…

Who is currently screening or assessing for muscle health (*or sarcopenia*) in their workplace?

?

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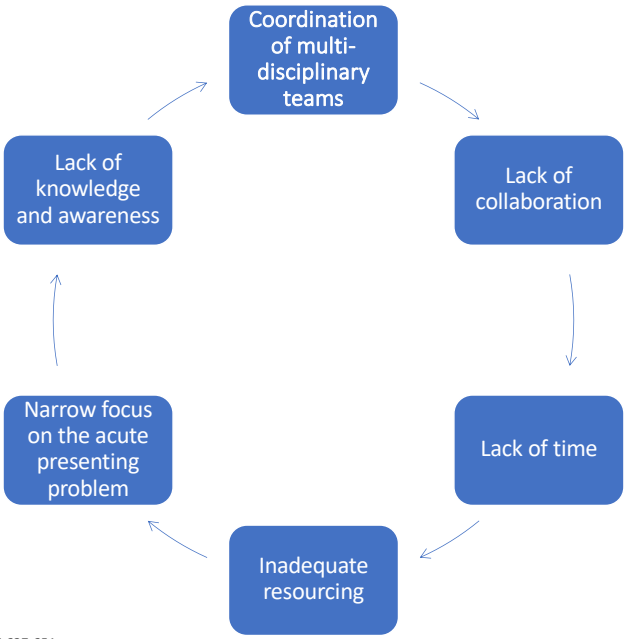
Barriers to routine screening in acute care settings?



Daly R et al. J Nutr Health Aging 2022;6:637-651.
Reijnierse EM et al. PLoS One 2017;12(10);doi: 10.1371/journal.pone.0185837

Sarcopenia awareness in geriatric rehabilitation?

OPEN

High Sarcopenia Awareness Contrasts a Lack of Clinical Implementation Among Geriatric Rehabilitation Health Care Professionals in the Netherlands: EMPOWER-GR

Laure M. G. Verstraeten, MSc[1]; Janneke P. van Wijngaarden, PhD[2]; Carel G. M. Meskers, MD, PhD[3]; Andrea B. Maier, MD, PhD[1,4,5,6]

- 501 health care professionals (*n* = 98; 19.6% Dietitians)
- High awareness of sarcopenia
  - ~10% recognized as a disease
  - Limited implementation of adequate screening, diagnosis, and treatment
- Perception of responsibility for diagnosis of sarcopenia was low
  - Dietitians perceived themselves as responsible for diagnosing sarcopenia, but responsibility of dietitians underrecognized by other health care professionals

Barriers
- × Knowledge
- × Access to resources
- × Time
- × Priority

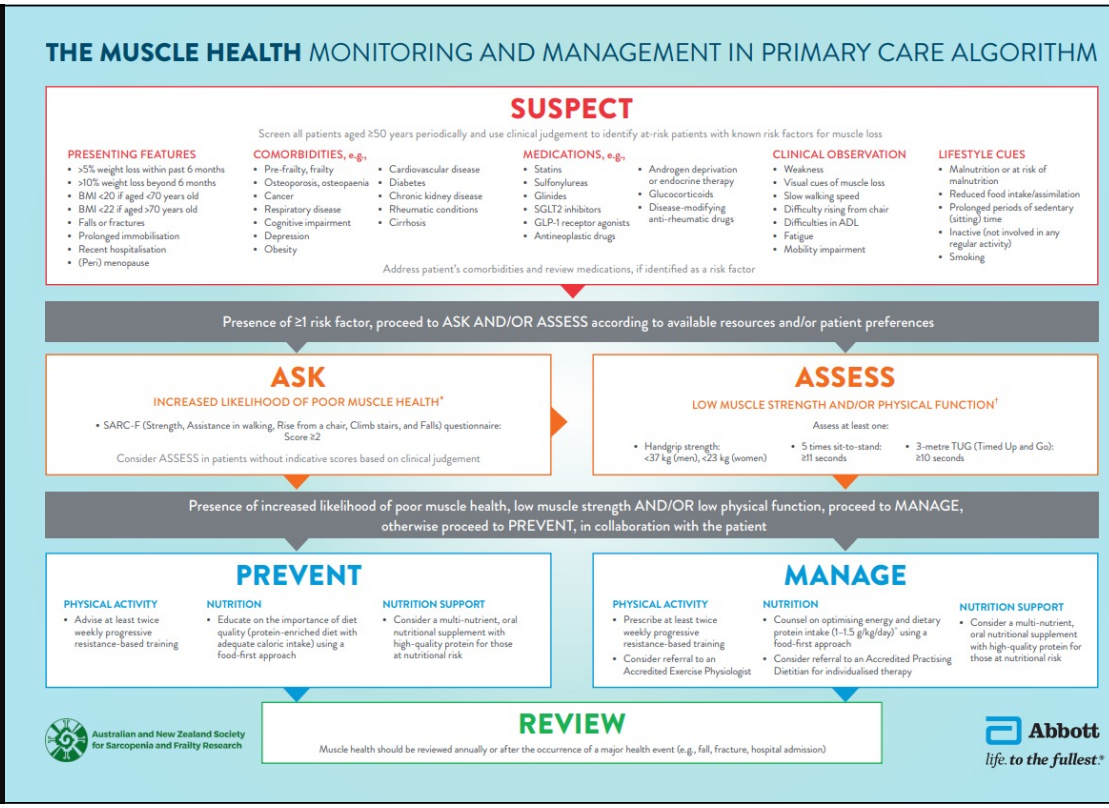
Enablers
- ✓ Protocol implementation
- ✓ Access to training
- ✓ Guidelines to define responsibility for screening, diagnosis, and treatment

Muscle Health Algorithm for Primary Care

This algorithm has been developed **to aid in the early detection of poor muscle health and to help guide timely management** – ensuring optimal outcomes in muscle health. It is based on review of the literature, current guidelines and in collaboration with an Expert Advisory Board.

Prof. Robin Daly[1], Linda Govan[2], Dr Anita Munoz[3,4], Associate Prof. David Scott[1,5], Dr Anthony Villani[5,6], Prof. Simon Willcock.[7]

1 Institute for Physical Activity and Nutrition, Deakin University
2 The Australian Primary Health Care Nurses Association (APNA)
3 Mid-town Medical Clinic
4 Victorian Faculty, Royal Australian College of General Practitioners
5 Australian and New Zealand Society for Sarcopenia and Frailty Research (ANZSSFR)
6 School of Health, University of the Sunshine Coast
7 Macquarie University Hospital and Health Sciences Centre



Muscle Health Algorithm: Suspect

Screen all patients **aged ≥50 years** periodically and **use clinical judgement** to identify at-risk patients with known risk factors for muscle loss

SUSPECT

Screen all patients aged ≥50 years periodically and use clinical judgement to identify at-risk patients with known risk factors for muscle loss

PRESENTING FEATURES
- >5% weight loss within past 6 months
- >10% weight loss beyond 6 months
- BMI <20 if aged <70 years old
- BMI <22 if aged >70 years old
- Falls or fractures
- Prolonged immobilisation
- Recent hospitalisation
- (Peri) menopause

COMORBIDITIES, e.g.,
- Pre-frailty, frailty
- Osteoporosis, osteopaenia
- Cancer
- Respiratory disease
- Cognitive impairment
- Depression
- Obesity
- Cardiovascular disease
- Diabetes
- Chronic kidney disease
- Rheumatic conditions
- Cirrhosis

MEDICATIONS, e.g.,
- Statins
- Sulfonylureas
- Glinides
- SGLT2 inhibitors
- GLP-1 receptor agonists
- Antineoplastic drugs
- Androgen deprivation or endocrine therapy
- Glucocorticoids
- Disease-modifying anti-rheumatic drugs

CLINICAL OBSERVATION
- Weakness
- Visual cues of muscle loss
- Slow walking speed
- Difficulty rising from chair
- Difficulties in ADL
- Fatigue
- Mobility impairment

LIFESTYLE CUES
- Malnutrition or at risk of malnutrition
- Reduced food intake/assimilation
- Prolonged periods of sedentary (sitting) time
- Inactive (not involved in any regular activity)
- Smoking

Address patient's comorbidities and review medications, if identified as a risk factor

Presence of ≥1 risk factor, proceed to ASK and/or ASSESS
according to available resources and/or patient preferences

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Slide acknowledgement: Prof Robin Daly

Muscle Health Algorithm: ASK

ASK

INCREASED LIKELIHOOD OF POOR MUSCLE HEALTH*

- SARC-F (Strength, Assistance in walking, Rise from a chair, Climb stairs, and Falls) questionnaire: Score ≥2

Consider ASSESS in patients without indicative scores based on clinical judgement

ASSESS

LOW MUSCLE STRENGTH AND/OR PHYSICAL FUNCTION†

Assess at least one:

- Handgrip strength: <37 kg (men), <23 kg (women)
- 5 times sit-to-stand: ≥11 seconds
- 3-metre TUG (Timed Up and Go): ≥10 seconds

Presence of increased likelihood of poor muscle health (ASK), low muscle strength (ASSESS) AND/OR low physical function (ASSESS) proceed to MANAGE, otherwise proceed to PREVENT, in collaboration with the patient

Muscle Health Algorithm: Ask

SARC-F

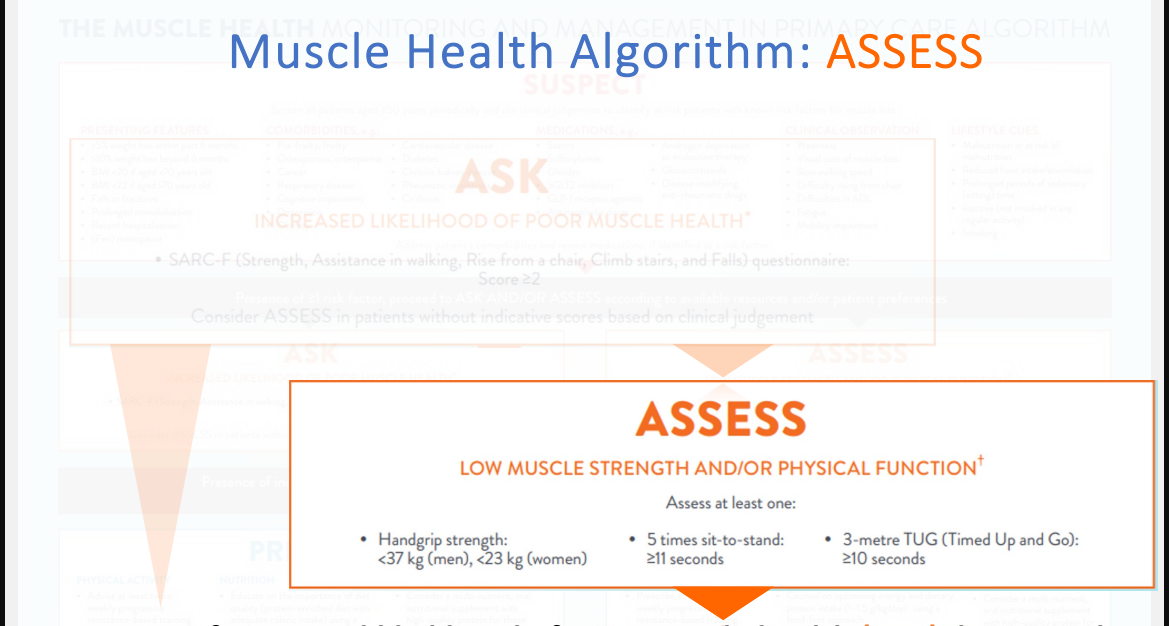
Self-administered simplified screening questionnaire for assessing sarcopenia risk

If score ≥ 2
proceed to ASSESS or MANAGE

Component	Question	Scoring
Strength	How much difficulty do you have in lifting and carrying 10 pounds (~4 kg)	**0** = None **1** = Some **2** = A lot or unable
Assistance in walking	How much difficulty do you have walking across a room?	**0** = None **1** = Some **2** = A lot, use of aids, or unable
Rising from a chair	How much difficulty do you have transferring from a chair or bed?	**0** = None **1** = Some **2** = A lot or unable without help
Climb stairs	How much difficulty do you have climbing a flight of 10 stairs?	**0** = None **1** = Some **2** = A lot or unable
Falls	How many times have you fallen in the past year?	**0** = None **1** = 1-3 falls **2** = 4 or more falls

Malmstrom TK & Morely JE. JAMDA 2013; 14:531-32.
Voelker SN et al. J Am Med Assoc 2021; 22(9):1864-1876.

Muscle Health Algorithm: ASSESS



Presence of increased likelihood of poor muscle health (ASK), low muscle strength (ASSESS) AND/OR low physical function (ASSESS) proceed to MANAGE, otherwise proceed to PREVENT, in collaboration with the patient

Muscle Health Algorithm: ASSESS

Common & feasible tests that can be used to identify poor muscle health

Slide acknowledgement: Prof Robin Daly

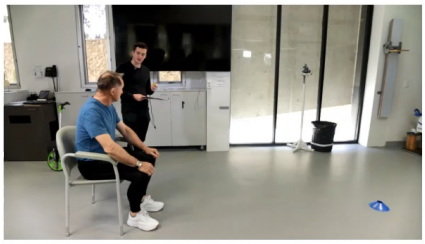
Muscle strength

Grip strength

Weakness
< 37 kg men | < 23 kg women

†Cut-offs represent scores below the 20th to 25th percentile of normative ranges based on data from 60-to-90-year-olds and are indicative of an increased likelihood of experiencing poor muscle health.

Physical function



3 m timed-up-and-go

Slow ≥10 seconds

Five times sit-to-stand

> 11 seconds

Muscle Health Algorithm: ASSESS

Minimal Equipment Required

Slide acknowledgement: Prof Robin Daly

Muscle strength

Handgrip strength

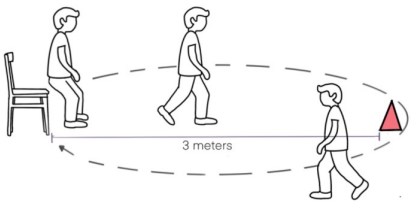
Online
~$30-70
(reliable?)

Jamar
~$800
(research grade)

Physical function

Timed-up-and-go
5 x Sit-to-Stand

Chair
(no arms)
~46 cm



3-metre walkway +
cone/cup + stopwatch

Muscle Health Algorithm: PREVENT / MANAGE

PREVENT

PHYSICAL ACTIVITY
- Advise at least twice weekly progressive resistance-based training

NUTRITION
- Educate on the importance of diet quality (protein-enriched diet with adequate caloric intake) using a food-first approach

NUTRITION SUPPORT
- Consider a multi-nutrient, oral nutritional supplement with high-quality protein for those at nutritional risk

MANAGE

PHYSICAL ACTIVITY
- Prescribe at least twice weekly progressive resistance-based training
- Consider referral to an Accredited Exercise Physiologist

NUTRITION
- Counsel on optimising energy and dietary protein intake (1-1.5 g/kg/day)* using a food-first approach
- Consider referral to an Accredited Practising Dietitian for individualised therapy

NUTRITION SUPPORT
- Consider a multi-nutrient, oral nutritional supplement with high-quality protein for those at nutritional risk

REVIEW

Muscle health should be reviewed annually or after the occurrence of a major health event (e.g., fall, fracture, hospital admission)

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Practice recommendations in Dietetics?

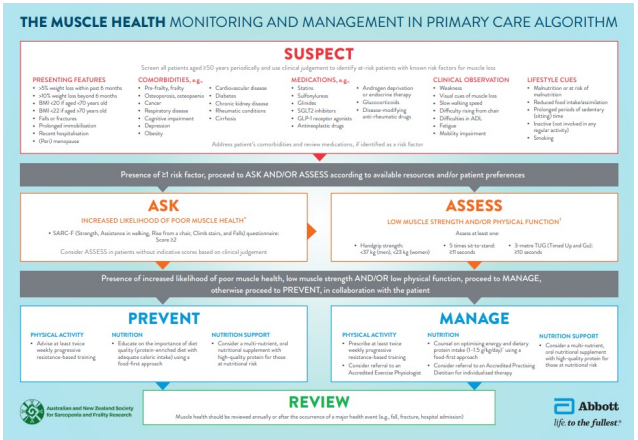
A focus on Primary Health Care…

#1 Advance (and advocate) screening, assessment, and diagnostic practices for malnutrition and muscle health (sarcopenia)

- Assessing muscle health should be an integral part of the **Nutrition Care Process**
- Surrogate measures of assessing muscle mass

#2 Promote multimodal care and interprofessional collaboration

#3 Provision of education to patients, caregivers and members of the multi-disciplinary team



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Prado CM et al. Clin Nutr 2022;41(10):2244-2263
Daly R et al. J Nutr Health Aging 2022;6:637-651.

Dietitians as change champions?

- Advocate, educate, motivate and implement change are key for a sustainable change
  - Barriers to change in health care settings are real and complex but we need to promote a change in culture
- Organizational wide approaches are needed to support strategies to screen for muscle health (or sarcopenia)
- Engage in interprofessional collaboration in patient care
  - Advocate for the role of Dietitians
- Awareness and professional development opportunities
  - Upskill relevant healthcare professionals

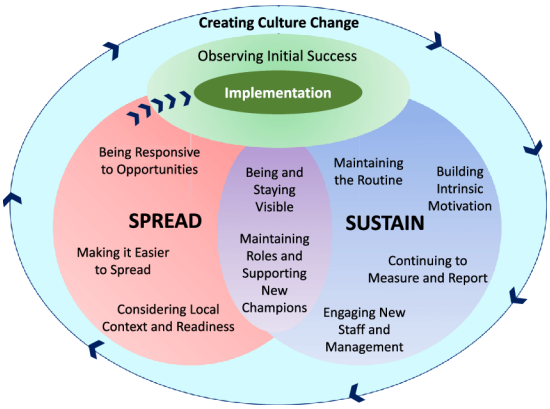

Image from Laur et al 2018; BMC Health Serv Res;18(1):930

Daly R et al. J Nutr Health Aging 2022;6:637-651.

Muscle Matters Education and Tools Portal

THE LATEST RESOURCES FOR HCPS

EXPERT VIDEOS

MUSCLE SCREENING AND ASSESSMENT TOOLKIT

EASY-TO-READ PATIENT RESOURCES

SCAN THE QR CODE to register your interest in accessing the Muscle Matters Education and Tools Portal.

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CRICOS Provider Number: 01595D

Key points and take home messages

- Assessment of muscle health (or identification of sarcopenia) is essential for early identification of at risk patients
- Muscle health (sarcopenia) is not routinely screened in practice with unsatisfactory knowledge, access to resources, time and priority commonly identified as barriers
- Muscle health algorithm has been developed to aid in the early detection of poor muscle health and to help guide timely management
- Screening and assessing muscle health is a shared responsibility….but Dietitians can be change champions

Clinical Oncology Society of Australia

COSA

Cancer-related malnutrition and sarcopenia: introducing the new COSA toolkit

Jane Stewart
Project Dietitian, COSA Nutrition Group
Clinical Lead Dietitian, Peter MacCallum Cancer Centre
jane.stewart@petermac.org

EDUCATION COLLABORATION ADVOCACY RESEARCH

Disclosures

- The project was funded by an educational grant from Abbott Australasia
- Honorarium from Abbott Australasia

Abbott
life. to the fullest.

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Background

- Malnutrition and sarcopenia are prevalent conditions in people with cancer

1 in 3 people with cancer are malnourished or sarcopenic

- The consequences of malnutrition and sarcopenia include[1-4]:

- Cancer-related malnutrition and sarcopenia remain under-recognised and under-treated[5]
- Early identification and treatment can lead to improved clinical outcomes

1. Arends J *et al*., Clinical Nutrition 2007;36(1):11-48
2. Bruyere O *et al*., Maturitas 2019; 119: 61-69
3. Hebuterne X *et al*., JPEN 2014; 38(2): 196-204
4. Isenring E *et al.*, Nut & Diet 2013; 70(4): 312-324
5. Marshall KM *et al*., Clin Nut 2019; 38(2): 644-651

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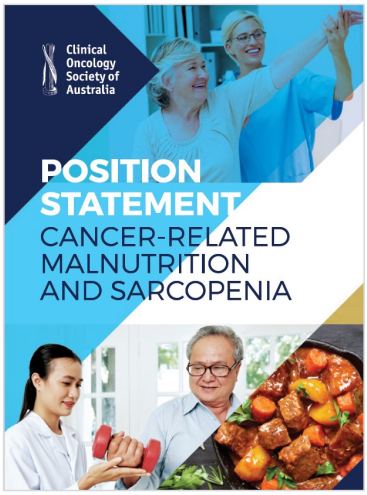
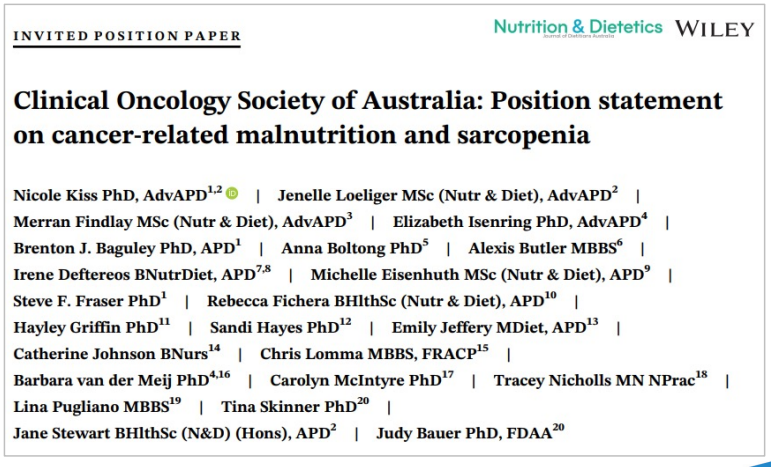
Background





INVITED POSITION PAPER

Nutrition & Dietetics WILEY

Clinical Oncology Society of Australia: Position statement on cancer-related malnutrition and sarcopenia

Nicole Kiss PhD, AdvAPD[1,2] | Jenelle Loeliger MSc (Nutr & Diet), AdvAPD[2] | Merran Findlay MSc (Nutr & Diet), AdvAPD[3] | Elizabeth Isenring PhD, AdvAPD[4] | Brenton J. Baguley PhD, APD[1] | Anna Boltong PhD[5] | Alexis Butler MBBS[6] | Irene Deftereos BNutrDiet, APD[7,8] | Michelle Eisenhuth MSc (Nutr & Diet), APD[9] | Steve F. Fraser PhD[1] | Rebecca Fichera BHlthSc (Nutr & Diet), APD[10] | Hayley Griffin PhD[11] | Sandi Hayes PhD[12] | Emily Jeffery MDiet, APD[13] | Catherine Johnson BNurs[14] | Chris Lomma MBBS, FRACP[15] | Barbara van der Meij PhD[4,16] | Carolyn McIntyre PhD[17] | Tracey Nicholls MN NPrac[18] | Lina Pugliano MBBS[19] | Tina Skinner PhD[20] | Jane Stewart BHlthSc (N&D) (Hons), APD[2] | Judy Bauer PhD, FDAA[20]

Nutrition & Dietetics paper available open access:
https://onlinelibrary.wiley.com/doi/10.1111/1747-0080.12631

Position statement available at:
https://www.cosa.org.au/publications/position-statements/

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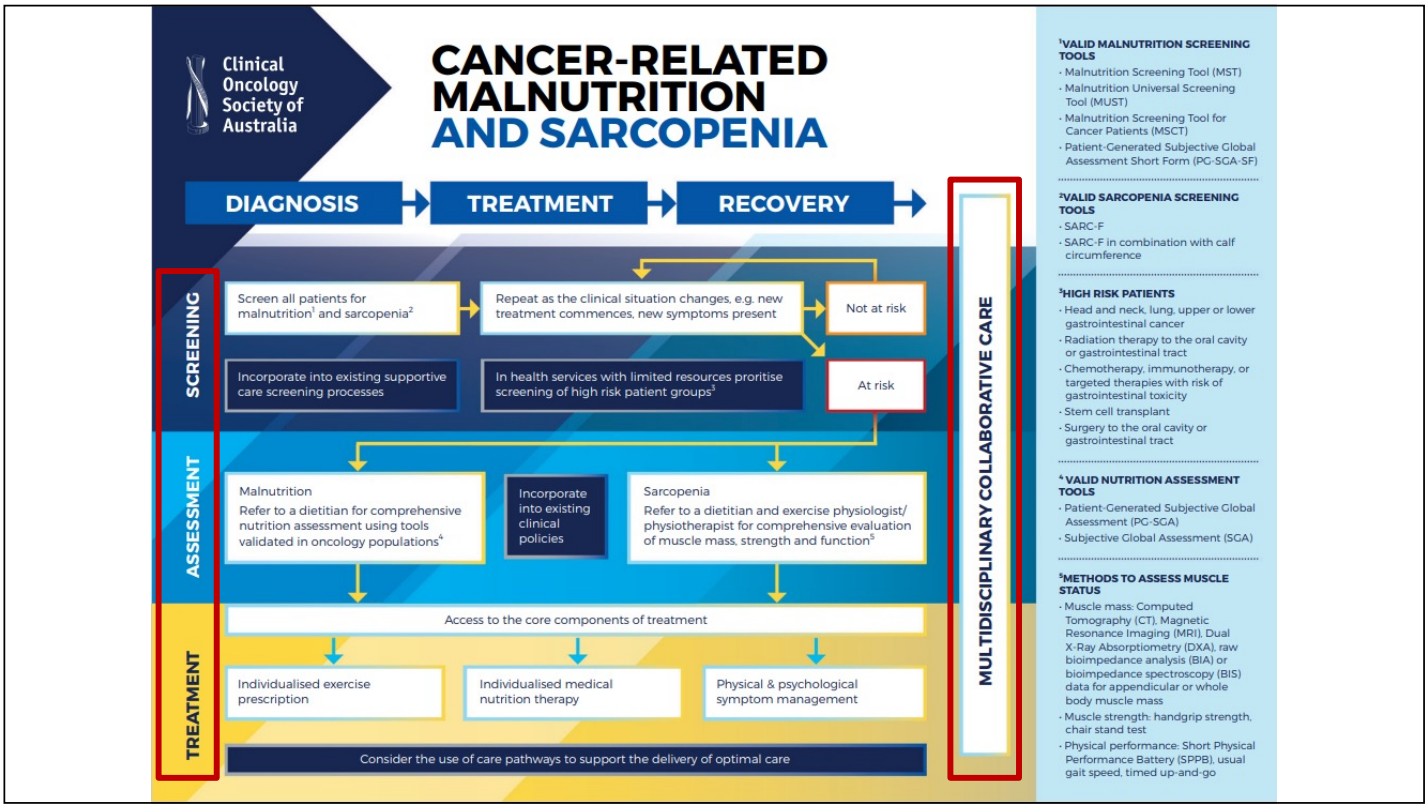
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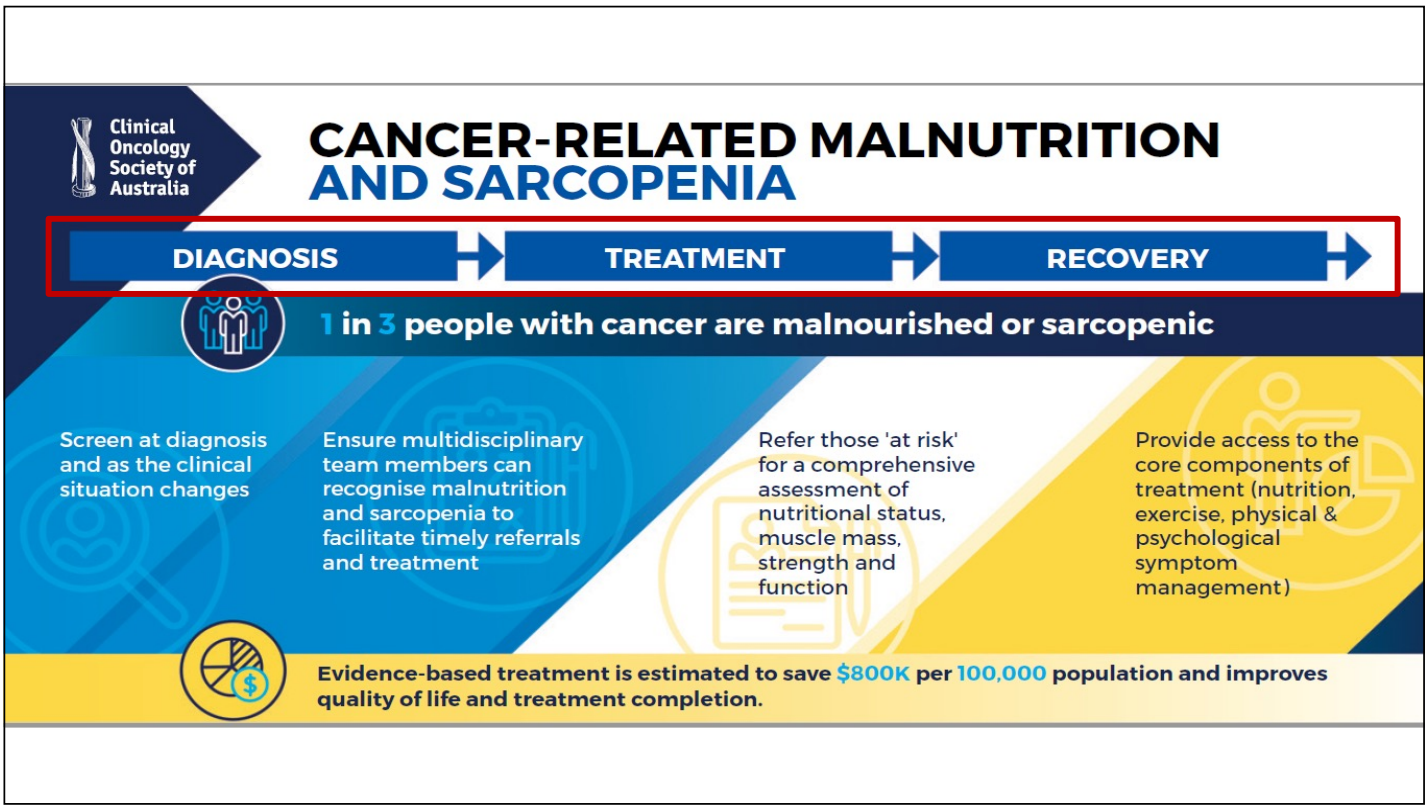
CANCER-RELATED MALNUTRITION AND SARCOPENIA
DIAGNOSIS
TREATMENT
RECOVERY
SCREENING
Screen all patients for malnutrition[1] and sarcopenia[2]
Repeat as the clinical situation changes, e.g. new treatment commences, new symptoms present
Not at risk
Incorporate into existing supportive care screening processes
In health services with limited resources proritise screening of high risk patient groups[3]
At risk
ASSESSMENT
Malnutrition
Refer to a dietitian for comprehensive nutrition assessment using tools validated in oncology populations[4]
Incorporate into existing clinical policies
Sarcopenia
Refer to a dietitian and exercise physiologist/ physiotherapist for comprehensive evaluation of muscle mass, strength and function[5]
TREATMENT
Access to the core components of treatment
Individualised exercise prescription
Individualised medical nutrition therapy
Physical & psychological symptom management
Consider the use of care pathways to support the delivery of optimal care
MULTIDISCIPLINARY COLLABORATIVE CARE
[1]VALID MALNUTRITION SCREENING TOOLS
• Malnutrition Screening Tool (MST)
• Malnutrition Universal Screening Tool (MUST)
• Malnutrition Screening Tool for Cancer Patients (MSCT)
• Patient-Generated Subjective Global Assessment Short Form (PG-SGA-SF)
[2]VALID SARCOPENIA SCREENING TOOLS
• SARC-F
• SARC-F in combination with calf circumference
[3]HIGH RISK PATIENTS
• Head and neck, lung, upper or lower gastrointestinal cancer
• Radiation therapy to the oral cavity or gastrointestinal tract
• Chemotherapy, immunotherapy, or targeted therapies with risk of gastrointestinal toxicity
• Stem cell transplant
• Surgery to the oral cavity or gastrointestinal tract
[4] VALID NUTRITION ASSESSMENT TOOLS
• Patient-Generated Subjective Global Assessment (PG-SGA)
• Subjective Global Assessment (SGA)
[5]METHODS TO ASSESS MUSCLE STATUS
• Muscle mass: Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Dual X-Ray Absorptiometry (DXA), raw bioimpedance analysis (BIA) or bioimpedance spectroscopy (BIS) data for appendicular or whole body muscle mass
• Muscle strength: handgrip strength, chair stand test
• Physical performance: Short Physical Performance Battery (SPPB), usual gait speed, timed up-and-go


Clinical Oncology Society of Australia
CANCER-RELATED MALNUTRITION AND SARCOPENIA
DIAGNOSIS
TREATMENT
RECOVERY
1 in 3 people with cancer are malnourished or sarcopenic
Screen at diagnosis and as the clinical situation changes
Ensure multidisciplinary team members can recognise malnutrition and sarcopenia to facilitate timely referrals and treatment
Refer those 'at risk' for a comprehensive assessment of nutritional status, muscle mass, strength and function
Provide access to the core components of treatment (nutrition, exercise, physical & psychological symptom management)
Evidence-based treatment is estimated to save $800K per 100,000 population and improves quality of life and treatment completion.

Position statement recommendations

SCREENING | ASSESSMENT | TREATMENT | MULTIDISCIPLINAY CARE

All people with cancer should be screened for **malnutrition and sarcopenia** using a **validated screening tool:**

- at **diagnosis**
- and **repeated as the clinical situation changes**

All patients at 'risk' should be referred to a **dietitian and exercise specialist**

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Position statement recommendations

SCREENING | **ASSESSMENT** | TREATMENT | MULTIDISCIPLINAY CARE

All people with cancer identified as being 'at risk' of **malnutrition or sarcopenia** should have:

- a **comprehensive nutrition assessment** using a tool validated in the oncology population.
- a **comprehensive evaluation of muscle status** using a combination of assessments for muscle mass, muscle strength and muscle function

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Position statement recommendations

SCREENING | ASSESSMENT | **TREATMENT** | MULTIDISCIPLINAY CARE

All people with cancer-related malnutrition and sarcopenia should have **access to the core components of treatment** including:

- medical nutrition therapy
- targeted exercise prescription and physical activity advice
- physical and psychological symptom management

Treatment should be:

- **individualised**,
- in collaboration with the **multidisciplinary team**,
- **tailored to meet needs** at each stage of cancer treatment.

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Position statement recommendations

SCREENING | ASSESSMENT | TREATMENT | **MULTIDISCIPLINAY CARE**

A broad range of health professionals should have the **skills and confidence** to:

- **recognise** malnutrition and sarcopenia,
- facilitate timely **referrals** and **treatment**.

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Development of a toolkit

- Despite the development of evidence-based guidelines, the translation of this knowledge into clinical practice often remains poor.[1]
- Toolkits have been used as a knowledge translation strategy to support the uptake and implementation of interventions.[1-3]
- A toolkit has been defined as "a collection of related information, resources, or tools that together can guide users to develop a plan or organise efforts to follow evidence-based recommendations…"[4]

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1. Yamada et al., BMJ Open 2015;5(4):e006808
2. Godinho et al., J Am Med Inform Assoc 2021;28(6):1298-1307
3. Hempel et al., Am J Med Qual 2019;34(6):538-544
4. Agency for Healthcare Research and Quality, 2013

Development of a toolkit

Stage 1
- Develop and disseminate toolkit content to support ***screening*** and ***assessment*** of cancer-related malnutrition and sarcopenia

Stage 2
- Develop and disseminate toolkit content to support ***treatment*** and ***transition of care*** of cancer-related malnutrition and sarcopenia

Stage 3
- ***Evaluate*** implementation of the toolkit via a pilot test in 2-3 health services and a survey of cancer clinicians

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Methodology

Working Group 1: Instructional videos and how to guides

Working Group 2: Case studies and tips to overcome barriers

Working group 3: Audit tool and generic pathway

↓

Hold design workshops to iteratively develop and refine resources

↓

End-user review including usability and acceptability testing, with multidisciplinary end-users

↓

Further refine toolkit content based on feedback

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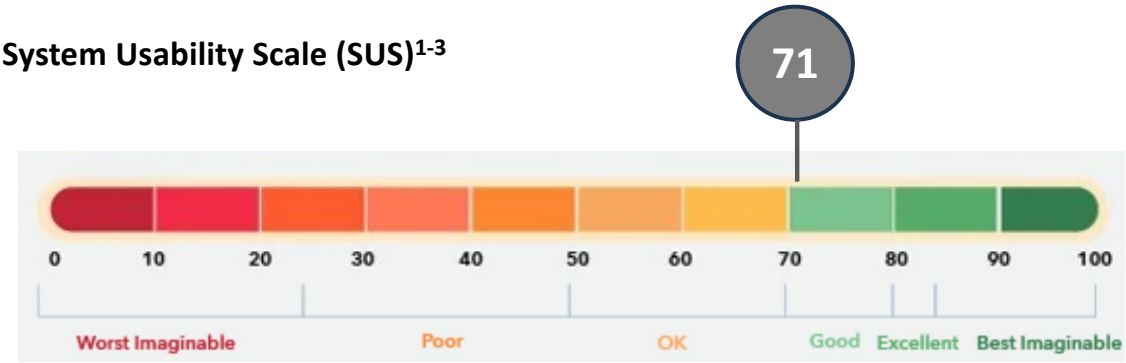
Results

- 14 clinicians participated in end-user review (56% response rate)
- **System Usability Scale (SUS)[1-3]**



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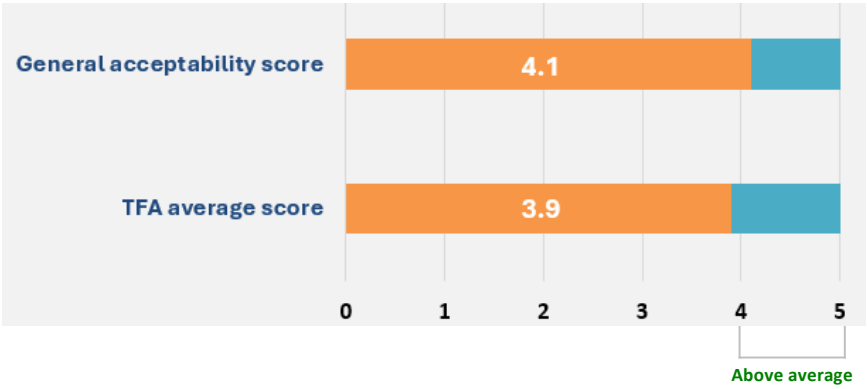
1. Brooke J. Usability Eval. Ind.1995;189.
2. Bangor A *et al.* J of User Experience. 2009;4(3): 114-123
3. https://blog.hubspot.com/service/system-usability-scale-sus

Results

- **Theoretical Framework of Acceptability (TFA)[1,2]**



- Feedback gained from end-users was used to inform further enhancements to the webpage and toolkit resources

1. Sekhon M *et al*. BMC Health Serv Res. 2017;17(1):88.
2. Sekhon M *et al*. BMC Health Serv Res. 2022;22(1):279.

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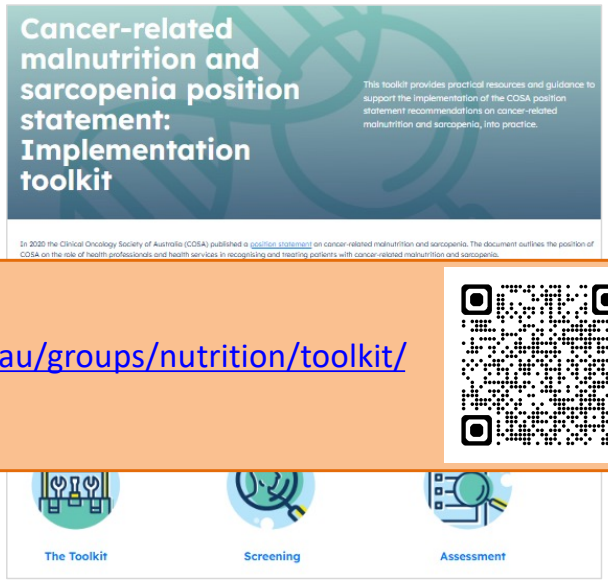
Results

Full PDF document



Visit www.cosa.org.au/groups/nutrition/toolkit/

Quick links via webpage

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Which screening tools to use

Malnutrition

Screening Tool	Inpatient	Chemotherapy	Radiation Therapy
Malnutrition Screening Tool (MST)[1]	Y	Y	Y
Malnutrition Universal Screening Tool (MUST)[2]	Y	Y	Y
Malnutrition Screening Tool for Cancer Patients (MSTC)[3]	Y		
Patient-Generated Subjective Global Assessment Short Form (PG-SGA SF)[4]		Y	

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1. Ferguson M *et al*. Nutrition. 1999;15(6): 458-64.
2. Stratton RJ *et al*. Br J Nutr. 2004;92(5): 799-808.
3. Kim JY *et al*. Clin Nutr. 2011;30(6): 724-9.
4. Abbott J *et al*. Support Care Cancer. 2016;24(9): 3883-7.

Which screening tools to use

Sarcopenia

SARC-F[1]
(Strength, Ambulation, Rising from a chair, stair Climbing and history of Falling)

SARC-CalF[2]
(SARC-F in combination with calf circumference)

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1. Malmstrom TK *et al*. J Cachexia Sarcopenia Muscle. 2016;7(1):28-36.
2. Barbosa-Silva TG *et al*. J Am Med Dir Assoc. 2016;17(12):1136-1141.
3. Fu X *et al*. Clin Nutr. 2020;39(11):3337-3345.

Resources to support Screening


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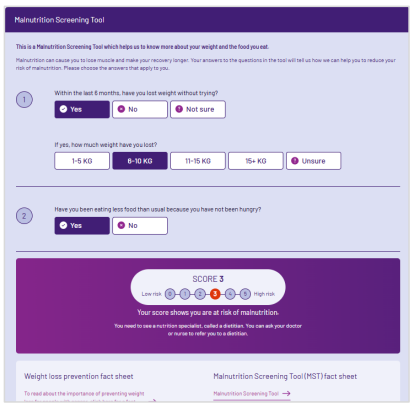
SARC-F

STRENGTH, AMBULATION, RISING FROM A CHAIR, STAIR CLIMBING AND HISTORY OF FALLING

NAME:
UR:
DATE:

Component	Question	Scoring	Score
Strength	How much difficulty do you have in lifting and carrying 4.5 kgs?	None = 0 Some = 1 A lot or unable = 2	
Assistance in walking	How much difficulty do you have walking across a room?	None = 0 Some = 1 A lot, use aids, or unable = 2	
Rise from a chair	How much difficulty do you have transferring from a chair to bed?	None = 0 Some = 1 A lot or unable without help = 2	
Climb stairs	How much difficulty do you have climbing a flight of 10 stairs?	None = 0 Some = 1 A lot or unable = 2	
Falls	How many times have you fallen in the past year?	None = 0 1-3 falls = 1 4 or more falls = 2	

TOTAL SCORE


Malnutrition Screening Tool

This is a Malnutrition Screening Tool which helps us to know more about your weight and the food you eat.

Malnutrition can cause you to lose muscle and make your recovery longer. Your answers to the questions in the tool will tell us how we can help you to reduce your risk of malnutrition. Please choose the answers that apply to you.

1 Within the last 6 months, have you lost weight without trying?
Yes | No | Not sure

If yes, how much weight have you lost?
1-5 KG | 6-10 KG | 11-15 KG | 15+ KG | Unsure

2 Have you been eating less food than usual because you have not been hungry?
Yes | No

SCORE 3
Low risk 0 1 2 3 4 5 6 High risk
Your score shows you are at risk of malnutrition.
You need to see a nutrition specialist, called a dietitian. You can ask your doctor or nurse to refer you to a dietitian.

Weight loss prevention fact sheet
To read about the importance of preventing weight

Malnutrition Screening Tool (MST) fact sheet
Malnutrition Screening Tool →

Links to downloadable PDFs, online tools and publications for each screening tool


British Journal of Nutrition (2004), **92**, 799–808
© The Authors 2004

DOI: 10.1079/BJN20041258

Malnutrition in hospital outpatients and inpatients: prevalence, concurrent validity and ease of use of the 'malnutrition universal screening tool' ('MUST') for adults†

Rebecca J. Stratton*, Annemarie Hackston, David Longmore, Rod Dixon, Sarah Price, Mike Stroud, Claire King and Marinos Elia

Institute of Human Nutrition, University of Southampton, Southampton General Hospital, Southampton, UK

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Resources to support Screening


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EXEMPLAR OF EVIDENCE-BASED CARE IN PRACTICE

Development and feasibility of an inpatient cancer-related sarcopenia pathway

WHAT did the initiative involve?	The project aimed to: 1. Develop an evidence-based care pathway for the identification and management of cancer-related sarcopenia. 2. Test feasibility of the pathway in an inpatient cancer ward. • Screening was completed by nutrition assistants using the SARC-F in combination with calf circumference. • Clinical assessment measures were completed by both dietitians (Patient Generated-Subjective Global Assessment, bioelectric impedance spectroscopy (BIS)) and physiotherapists (chair stand test (CST), Australia-modified Karnofsky Performance Scale (AKPS)). • Diagnosis using EWGSOP2 criteria.
WHO was involved in the initiative?	Nutrition, physiotherapy, allied health assistant clinicians and research clinicians from Peter MacCallum Cancer Centre. Experts in cancer nutrition and exercise oncology/sarcopenia from Deakin university.
WHERE did the initiative occur?	Inpatient ward setting (medical oncology) Peter MacCallum Cancer Centre
WHO was the target of the initiative?	Adult patients (≥18 years) with cancer admitted to a medical oncology ward.
WHEN was the initiative undertaken?	During inpatient admission. Patients could be pre, during or post treatment.
HOW was the initiative undertaken?	Local quality improvement project conducted over 4 months.
OUTCOMES	n=169 99.4% patients approached consented. 30.2% were at risk/had sarcopenia. The screening and assessment components were delivered as intended, however low completion of assessment measures was observed for muscle mass (BIS, 20.5% and CST, 50%). The sarc-pathway was acceptable to patients and health professionals.
REFERENCE	Loeliger J, Edbrooke L, Daly BM, Stewart J, Bucci L, Puskas C, Fitzgerald M, Reguzzi RJ, Kiss N. Development and Feasibility of an Inpatient Cancer-Related Sarcopenia Pathway at a Major Cancer Centre. Int J Environ Res Public Health. 2022 Mar 29;19(7):4038.

6 x exemplars of evidence-based care in practice


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CLINICAL CASE STUDY

Prehabilitation

SITUATION

WHAT care was provided? (Action)

- Initial malnutrition screening:
  - 40kg on admission with history of 20kg weight loss (33%) in 3-6 months. MST= 4 (at risk of malnutrition). SARC-CalF = 16 (at risk of sarcopenia).
  - Referral to dietitian, speech pathologist and physiotherapist
- Initial nutrition assessment:
  - Weight 45.2kg
  - PG-SGA 16 severely malnourished (C)
  - Muscle mass assessed. ALMI/height (m)² = 6 kg/m²
  - Identified at risk of refeeding syndrome
- Initial physiotherapy assessment:
  - Muscle strength assessed. Hand grip strength = 23 kg
  - Muscle function assessed. Gait speed = 0.6 m/sec
  - Sarcopenia diagnosed using EWGSOP 2 diagnostic criteria
- Repeat malnutrition screening:
  - Weekly MST during admission performed by nursing staff.
- Nutrition reviews:
  - Regular review during inpatient admissions (at both tertiary referral hospital and rural hospital after transferring closer to home) prior to neoadjuvant treatment.
  - Regular review by oncology dietitian (2x/week) during neo-adjuvant chemotherapy and radiation at tertiary referral cancer service. PG-SGA repeated at end of treatment (PG-SGA 12 B moderate/suspected malnutrition) and 3 months post treatment (PG-SGA B A moderate/suspected malnutrition) indicating improvement in nutritional status.
  - Support from local community dietitian following handover of nutrition plan by oncology dietitian on return home to rural setting post treatment.
- Nutrition interventions:
  - Education of soft HEHP diet.
  - Food from home allowed as hospital food not culturally appropriate.

2 x clinical case studies

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Assessment

○ Diagnostic Criteria for Malnutrition

- **GLIM Criteria[1]**

	Etiologic	Phenotypic
GLIM criteria: **Presence of at least one phenotypic criteria and one etiologic criteria**	Reduced food intake or assimilation	Weight loss
	Inflammation	Low body mass index
		Reduced muscle mass

- **Patient-Generated Subjective Global Assessment (PG-SGA)[2]**
- **Subjective Global Assessment (SGA)[3]**

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1. Cederholm T *et al*. Clin Nutr. 2019;38(1):1-9
2. Ottery FD. Nutrition. 1996;12(1 Suppl):S15-9.
3. Detsky AS *et al*. J Parenter Enteral Nutr. 1987;11(1): 8-13.

Assessment

○ Diagnostic Criteria for Sarcopenia

Diagnostic Criteria
European Working Group on Sarcopenia in Older People (EWGSOP1)[1]
Foundation for the National Institutes of Health biomarkers consortium sarcopenia project (FNIH)[2]
European Working Group on Sarcopenia in Older People updated definition (EWGSOP2)[3]
Cancer specific CT image analysis[4,5]

Muscle strength	Muscle mass	Muscle function
Handgrip strength	PG-SGA physical exam	Gait speed test
Chair stand test	Calf circumference	SPPB
	BIA	TUG
	BIS	400m walk test
	DEXA	
	CT	
	Ultrasound	

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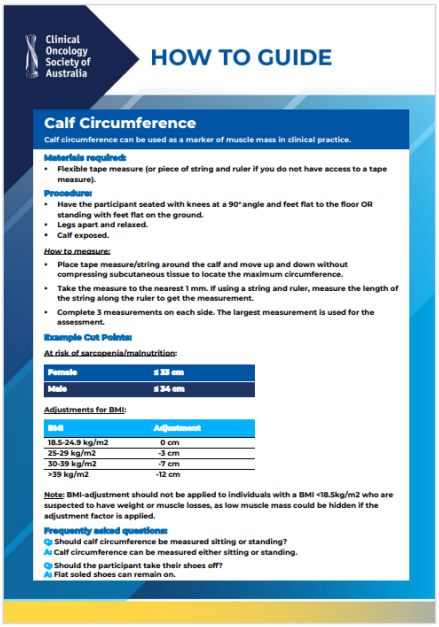
1. Cruz-Jentoft AJ *et al*. Age Ageing. 2010;39(4):412-23.
2. Studenski SA *et al*. J Gerontol A Biol Sci Med Sci. 2014;69(5):547-58.
3. Cruz-Jentoft AJ *et al*. Age Ageing. 2019;48(1):16-31.
4. Prado CM *et al*. Lancet Oncol. 2008;9(7):629-35.
5. Martin L *et al*. J Clin Oncol. 2013;31(12): 1539-47.

Resources to support Assessment



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HOW TO GUIDE

Calf Circumference

Calf circumference can be used as a marker of muscle mass in clinical practice.

Materials required:

- Flexible tape measure (or piece of string and ruler if you do not have access to a tape measure).

Procedure:

- Have the participant seated with knees at a 90° angle and feet flat to the floor OR standing with feet flat on the ground.
- Legs apart and relaxed.
- Calf exposed.

How to measure:

- Place tape measure/string around the calf and move up and down without compressing subcutaneous tissue to locate the maximum circumference.
- Take the measure to the nearest 1 mm. If using a string and ruler, measure the length of the string along the ruler to get the measurement.
- Complete 3 measurements on each side. The largest measurement is used for the assessment.

Example Cut Points:

At risk of sarcopenia/malnutrition:

Female	≤ 33 cm
Male	≤ 34 cm

Adjustments for BMI:

BMI	Adjustment
18.5-24.9 kg/m2	0 cm
25-29 kg/m2	-3 cm
30-39 kg/m2	-7 cm
>39 kg/m2	-12 cm

Note: BMI-adjustment should not be applied to individuals with a BMI <18.5kg/m2 who are suspected to have weight or muscle losses, as low muscle mass could be hidden if the adjustment factor is applied.

Frequently asked questions:

Q: Should calf circumference be measured sitting or standing?
A: Calf circumference can be measured either sitting or standing.

Q: Should the participant take their shoes off?
A: Flat soled shoes can remain on.

Calf circumference instructional video

How to Guides and Instructional Videos for the following measures:

- PG-SGA
- Calf circumference
- BIA
- BIS
- Handgrip strength
- Chair stand test
- Gait speed test
- SPPB
- TUG
- 400m walk test

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Resources to support Assessment

5 x exemplars of evidence-based care in practice

2 x clinical case studies

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Tools and tips for implementation

- Dietitian
- Inpatient oncology ward
- Lack of process for sarcopenia screening, assessment and treatment

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Tools and tips for implementation

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ADHERENCE AUDIT TOOL: COMPARISON OF CLINICAL PRACTICES COMPARED TO THE COSA CANCER-RELATED MALNUTRITION AND SARCOPENIA POSITION STATEMENT

Audit Tool

Under the 'Recommendation clarified' column the inpatient setting has been used as an example. The *Actor* , *Context* , and *Target* can be tailored to each clinical setting (i.e day therapy unit / radiotherapy outpatients) at your organisation using the example AACTT frameworks included in the toolkit. *Time* should be determined with consideration given to best practice and local resourcing.
Under 'Baseline practice' select the outcome from the dropdown box

Component of care	Recommendation	Recommendation clarified (using the AACTT framework*)	Baseline practice *(met = occurs ≥80% of the time partially met = occurs ≥50-79% of the time not met = occurs ≤50% of the time)*
Screening	All people with cancer should be screened for malnutrition in all health settings at diagnosis and repeated as the clinical situation changes, using a screening tool that is valid and reliable in the setting in which it is intended.	**Action:** screening with a valid, reliable tool for cancer patients to identify patients 'at risk' of malnutrition **Actor:** screening can be conducted by nursing staff, allied health assistants or other relevant support staff **Context:** on the ward **Target:** patients with cancer **Time:** on admission to hospital (within 24hrs), repeated for those not considered 'at risk' at regular intervals (approx. 1 week)	did not meet
	All people with cancer should be screened for sarcopenia at diagnosis and repeated as the clinical situation changes, using the validated screening tool SARC-F or SARC-F in combination with calf circumference.	**Action:** screening with a valid, reliable tool for cancer patients to identify patients 'at risk' of sarcopenia **Actor:** screening can be conducted by nursing staff, allied health assistants or other relevant support staff **Context:** on the ward **Target:** patients with cancer admitted to ward X **Time:** on admission to hospital (within 24hrs), repeated for those not considered 'at risk' at regular intervals (approx. 1 week)	did not meet

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Tools and tips for implementation

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COMPONENTS OF THE POSITION STATEMENT DESCRIBED IN ACCORDANCE WITH THE AACTT FRAMEWORK

5 x AACTT Frameworks
- **Inpatient**
- Day therapies
- Radiotherapy
- Rural/community
- Primary care

Example of inpatient or ward setting

Note: this is an example only and recommended timeframes should be adapted to the target population and the local context in which it is being applied

	Action What care is provided?	Actor Who delivers care?	Context Where is the care?	Target Who receives care?	Time When is care provided?
SCREENING	Conduct malnutrition screening (and rescreening) i.e. MST, MUST	Nurse, allied health assistant, other health professional	Inpatient ward	Patients with cancer admitted to the ward	Within 24 hours of admission for initial screen* (day 6-8 for rescreen)
	Conduct sarcopenia screening (and rescreening) i.e. SARC-F, SARC-F in combination with calf circumference	Nurse, allied health assistant, other health professional	Inpatient ward	Patients with cancer admitted to the ward (and those screened as low risk for sarcopenia on admission and still an inpatient at day 7)	Within 24 hours of admission for initial screen* (day 6-8 for rescreen)
	Identify high risk patients for direct referral to dietitian	Dietitian, nurse, allied health assistant, other health professional	Inpatient ward	Patients with cancer admitted to the ward	Within 24 hours of admission*
	Refer patients at risk of malnutrition to dietitian	Nurse, allied health assistant, other health professional	Inpatient ward – referral via existing referral process/ system	Patients considered at risk of malnutrition after screening	Within 24 hours of admission*
	Refer patients at risk of sarcopenia to dietitian and exercise physiologist or physiotherapist	Nurse, allied health assistant, other health professional	Inpatient ward – referral via existing referral process/ system	Patients considered at risk of sarcopenia after screening	Within 24 hours of admission*
ASSESSMENT	Complete full individualised nutrition assessment	Dietitian	Inpatient ward – patients' room	Patients considered at risk of malnutrition after screening	As per local triage criteria
	Complete clinical assessment measures for nutrition assessment and diagnosis of malnutrition/ sarcopenia i.e. PG-SGA, BIA, calf circumference undertaking assessment by dietitian	Dietitian, allied health assistant	Inpatient ward – patients' room	Patients considered at risk of malnutrition after screening and undertaking assessment by dietitian	As per local triage criteria
	Complete full individualised sarcopenia assessment	Physiotherapist, exercise physiologist	Inpatient ward – patients' room, ward or gym	Patients considered at risk of sarcopenia after screening	As per local triage criteria
	Complete clinical assessment measures for evaluation of muscle mass, strength and function, and diagnosis of sarcopenia i.e. HGS, SPPB	Physiotherapist, exercise physiologist, allied health assistant	Inpatient ward – patients' room, ward or gym	Patients considered at risk of sarcopenia after screening and undertaking assessment by physiotherapist/ exercise physiologist	As per local triage criteria

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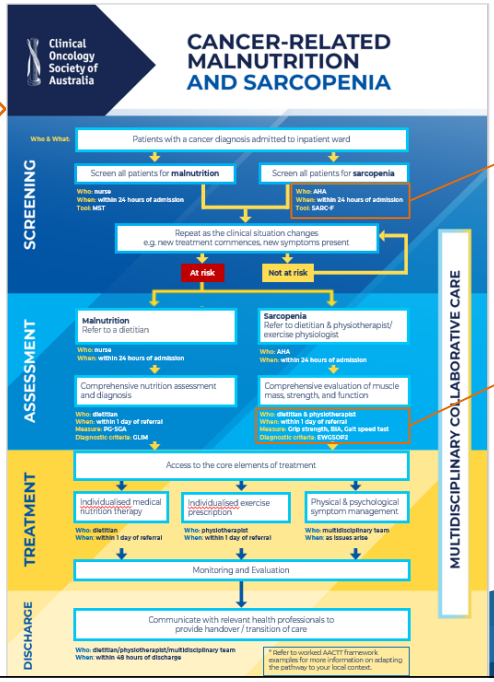
Tools and tips for implementation

Generic pathway



Who: AHA
When: within 24 hours of admission
Tool: SARC-F

Who: dietitian & physiotherapist
When: within 1 day of referral
Measure: Grip strength, BIA, Gait speed test
Diagnostic criteria: EWGSOP2

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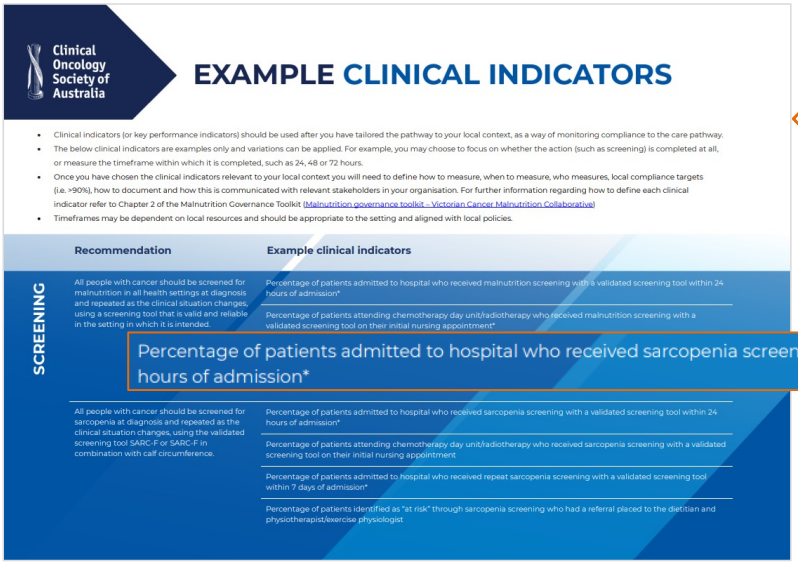
Tools and tips for implementation



Clinical Indicators

Percentage of patients admitted to hospital who received sarcopenia screening with a validated screening tool within 24 hours of admission*

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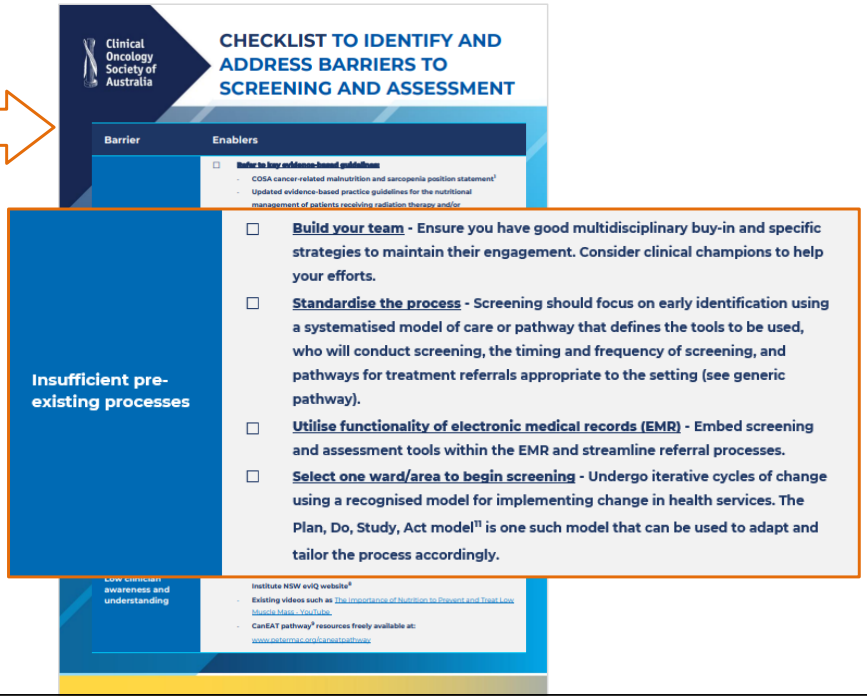
Tools and tips for implementation

Checklist to identify and address barriers



Conclusions

- The toolkit is FREELY available on the COSA website
- Stage 1 of the toolkit provides a suite of pragmatic resources to support implementation of cancer-related sarcopenia screening and assessment across the continuum of care.

Future Work:

- Resources to support treatment and transition of care to be developed in stage 2.
- Evaluation of the toolkit is planned in stage 3.

Visit www.cosa.org.au/groups/nutrition/toolkit/

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