

# A simple remote nutritional screening tool and practical guidance for nutritional care in primary practice during the COVID-19 pandemic

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Krznarić, Željko; Vranešić Bender, Darija; Laviano, Alessandro; Cuerda, Cristina; Landi, Francesco; Monteiro, Rosario; Pirlich, Matthias; Barazzoni, Rocco

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## Editorial

# A simple remote nutritional screening tool and practical guidance for nutritional care in primary practice during the COVID-19 pandemic



## S U M M A R Y

Challenging periods like the COVID-19 pandemic require fast and efficient adaptations of the healthcare system. It is vital that every patient has access to nutritional care as a part of primary healthcare services, even if social distancing measures are adopted. Therefore, we propose a simple remote nutritional screening tool and practical guidance for nutritional care in primary practice, and their implementation into telemedicine processes and digital platforms suitable for healthcare providers. The acronym for the tool is R-MAPP, as for **R**emote – **M**alnutrition **A**PP, while the tool will be available also as an app. This protocol consists of two simple validated clinical tools for identifying nutritional risk and loss of muscle mass and function – Malnutrition Universal Screening Tool ('MUST') and SARC-F (5-item questionnaire: **S**trength, **A**ssistance with walking, **R**ise from a chair, **C**limb stairs and **F**alls) – and additional practical guidance on nutritional interventions for family physicians.

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## 1. Introduction

The COVID-19 pandemic has spread rapidly across the world within weeks, changing everyday life and significantly impacting healthcare systems. To fight this unexpected pandemic most of the healthcare systems have adapted their existing resources to try to meet the enormous need to test and track people with suspected infections and to provide care to patients with COVID-19 [1,2].

Additionally, the majority of affected countries have implemented strict measures to ensure social distancing and stringent rules on physical visits to healthcare facilities [3–5]. It has become obvious that remote contact with patients must be ensured to continue to provide adequate care for both non-COVID-19 patients and COVID-19 positive patients who are treated at their homes [6]. One of the recommendations from the World Health Organization (WHO) during the COVID-19 pandemics is to use telemedicine to optimize service delivery platforms and to strengthen the Health Systems Response to COVID-19 [7].

When health services or care are provided outside the traditional healthcare facility – telemedicine – it is critical to follow the standards set by expert organizations and legislation at country level [7,8]. Telemedicine is considered as a useful remote communication and information technology to provide medical and clinical services to patients in different locations. When providing remote nutritional assessment or intervention as a minimum it is vital to ensure that following criteria can be met: patients' clinical needs and interventions are straight forward, the patient's medical records can be accessed, there is no need for physical examination,

all information on intervention can be shared remotely, there is a safe system to prescribe interventions and the patient has capacity to decide about treatment.

A Cochrane systematic review evaluated the effectiveness of interactive telemedicine (provided as remote monitoring and/or real-time video-conferencing) as compared to usual care alone in 93 trials, including 22,047 patients for the monitoring of chronic diseases, post-operative follow-up, etc. The authors concluded that the use of telemedicine can improve the control of blood glucose in patients with diabetes, and can be as useful as face-to-face attention, in the management of heart failure [9].

Telemedicine can be used in the monitoring of children and adult patients with medical nutrition at home, even though, very few articles have been published so far [10–14].

To ensure that adequate remote nutritional assessment and care can be provided to patients in their homes with decreased ability to reach to health care professionals, our aim is to propose simple remote nutritional screening tool and practical guidance for nutritional care in primary practice.

## 2. Patients in the era of COVID-19

In this practical guidance we are addressing all the patients that might need nutritional care during the COVID-19 pandemic. Non-COVID-19 out-patients with chronic and acute diseases have their regular needs provided by healthcare systems that might no longer be able to meet these in the same way as previously. Newly diagnosed patients with disease related malnutrition, or other forms of nutritional imbalances, should be prescribed timely and

appropriate nutritional support by their family physicians. Also, chronic patients with previously prescribed nutritional support should be re-screened, monitored and their nutritional therapy should continue to be prescribed where indicated. Many consulting services can be done remotely by ensuring good digital communication channels between patients, family physicians and hospital physicians or specialists. National health services and health insurance funds should enable the use and reimbursement of referrals for a specialist's services that do not require the patient to physically attend the hospital. Such model is present in Croatia since the year 2015. The Spanish NHS has gradually included modality of e-consultation in different Spanish regions in primary care and hospital specialists during the last decade, and it has been recently included by the insurance companies during COVID-19 pandemics. In Germany, remote monitoring of cardiology patients is well established since several years; a wider application of e-consultation has been facilitated only recently for family physicians and specialists with reimbursement by the NHS.

In Italy, remote monitoring of patients by GPs was not a standard approach, but it was implemented in a few regions for monitoring homecare patients with specific diseases or receiving tailored therapies like artificial nutrition [15]. Nowadays, during the COVID-19 pandemic, family physicians are relying more and more on telemedicine, but specific continuing healthcare teams will be sent to patients' homes in case of possible COVID-19 cases. So, it is essential that family physicians receive correct information by patients or caregivers, as guaranteed by the use of validated screening tools.

In terms of COVID-19 patients, we are aware that majority of confirmed patients have mild to moderate disease, which includes non-pneumonia and pneumonia cases. According to available preliminary data, the median time from onset to clinical recovery for mild cases is approximately 2 weeks and 3–6 weeks for patients with severe or critical disease [16]. During this time patients are confined to their homes or other closed facilities, most of them minimally mobile or bedridden. The consequence of inactivity is rapid muscle atrophy and loss of strength and function [17,18]. It has been shown that even 10-days of bed rest in older healthy individuals leads to a significant decrease in total lean body mass, even without a significant change in total body weight [19,20], and that the sarcopenic phenomenon is greater than observed in young adults after 14 or 28 days of bed rest [18].

### 3. Remote nutritional protocol

Even in the era of a COVID-19 pandemic every patient should have access to nutritional care as a part of healthcare services. With these new circumstances it is crucial to endorse pragmatic protocols for the nutritional assessment and prescription of nutritional support that are suitable for primary care physicians and completely adaptable to telemedicine services. Furthermore, every effort should be made to avoid in-person assessment of outpatients with COVID-19 by their primary care physicians, and therefore we are witnessing rapid attempts to overcome the limitations of our health care system [21]. Nutritional counselling can be performed by telephone, teleconference or other digital channels when appropriate and possible, in order to minimize unnecessary contacts.

In the present situation we promptly need tools for the remote evaluation of nutritional status for all patients that need nutritional care but do not have to visit their physicians in person. Also, clear protocols for assessment and nutritional care for COVID-19 outpatients and those in the recovery phase of the disease are needed. As stated in a recently proposed protocol for nutritional care in hospitalized non-ICU COVID-19 patients in Italy, protocols cannot cover every clinical situation [22]; but they can be of great help in providing practical guidance for the nutritional care of non-

COVID-19 as well as COVID-19 patients outside a hospital setting with limited diagnostic tools.

Therefore, we propose the use of a combination of two simple validated clinical tools to identify nutritional risk and loss of muscle mass and function remotely by incorporating them into telemedicine processes and digital platforms suitable for healthcare providers; namely the Malnutrition Universal Screening Tool ('MUST') [23] and SARC-F [24,25]. The acronym for the tool is R-MAPP, as for Remote – Malnutrition APP, while the tool is being developed as an app. Since the tool is designed for the family physicians in the conditions of remote patient care, it can also stand for Remote – Malnutrition in the Primary Practice. Three criteria are used in 'MUST' to assess the risk of malnutrition: body mass index (BMI), unintentional weight loss, and acute disease effect [26]. In order to assess loss of muscle mass and function without any diagnostic tools and procedures the SARC-F questionnaire can be used as a rapid diagnostic test for sarcopenia based only on muscle contractile performance items: strength, assistance with walking, rise from a chair, climb stairs and falls [27].

As a first step, 'MUST' should be performed in all patients remotely. SARC-F should be performed in elderly patients and in all patients with acute and chronic muscle-wasting diseases [28]. If the patient is classified with or at risk of malnutrition and/or SARC-F is predictive of sarcopenia and poor outcomes, a nutritional care plan should be prescribed [29,30].

Calculation of energy, protein, selected micronutrient and pharmacological needs should be performed in line with the appropriate guidelines in both COVID-19 [31] and non-COVID-19 patients, while taking into consideration all the specific requirements of the elderly [32], polymorbid [33], cancer [34], gastroenterology [35–37], neurology [38] and renal patients [39].

Nutritional therapy should be tailored according to the patient's needs and it can be met by food and supplements. For most patients, energy needs are between 25 and 35 kcal per kilogram body weight (BW) per day, and at least 1 g protein/kg BW/d should be ensured. For obese patients or those with sarcopenic obesity, ideal body weight should be used to calculate requirements. In terms of protein, caution is needed in patients with severe kidney disease (e. GFR  $\leq 30$  mL/min/1.73 m<sup>2</sup>), and it should not be higher than 0.6 g/kg BW/d unless on dialysis which leads to higher requirements.

Loss of muscle mass and function (sarcopenia) is a common problem in the older persons and in other patients of all ages with acute and chronic muscle-wasting diseases, namely cancer, chronic heart failure, chronic kidney disease, liver cirrhosis, chronic obstructive pulmonary disease, neuromuscular diseases, chronic infection and polymorbidity [28]. Sarcopenia may be severe in post-ICU COVID-19 patients that present with ICU-acquired weakness (ICU-AW) [31]. While there is no reliable pharmacologic intervention for sarcopenia, conservative measures are the mainstay of the treatment. These measures include physical therapy and/or resistance training together with nutrition support: supplementation with protein (1–1.5 g/kg/d), specific anabolic amino acids or their metabolites ( $\beta$ -hydroxy- $\beta$ -methylbutyrate, leucine), and vitamin D (800–1000 IU/d). In sarcopenic obesity, we recommend an energy restricted diet, accompanied by supplementation with protein and the other key (pharmaco)nutrients, an approach that is even more challenging than the in case of malnutrition related sarcopenia [40,41]. Supplementation with protein and key nutrients can be performed by use of oral nutritional supplements (medical nutrition) and/or food supplements. Duration and the appropriate dosage should be adapted individually for every patient.

Dysphagia (swallowing difficulties) is a common feature of geriatric patients and neurodegenerative diseases. EAT-10

## R-MAPP: REMOTE CONSULTATION ON MALNUTRITION IN THE PRIMARY PRACTICE

### A SIMPLE GUIDE TO ASSESSING PATIENTS BY VIDEO OR VOICE CALL

This graphic is intended for use in a primary care setting in order to identify patients at risk of malnutrition and ensure optimal nutritional care.

#### SET UP

Prepare yourself for remote consultation

Check medical documentation for malnutrition risk factors and polymorbidity:

COVID - 19

Ageing / frailty

Cancer

COPD

IBD

Stroke

Post-ICU

Chronic kidney and liver disease

Chronic wounds

Diabetes

Obesity

Other chronic diseases

#### CONNECT

Contact patient by phone or video call

Check audio and video

Can you hear/see me?

Confirm the patient's identity

Name  
Surname  
Date of birth

Check patient's location

Where are you right now?  
Home  
Care Home  
Hospital

#### EXAMINATION

Malnutrition screening

Use 'MUST' and 'SARC-F' to identify risk of malnutrition and muscle mass loss

**'Malnutrition Universal Screening Tool' or 'MUST'** is a five-step screening tool to identify adults, who are malnourished, at risk of malnutrition, or obese.

**'SARC-F'** is a rapid diagnostic test for sarcopenia based on 5 components.

#### IDENTIFY MALNUTRITION RISK

Check if your patient is at risk of malnutrition by asking the following 3 questions:

'MUST' Malnutrition screening tool		
What is your current body weight?	0	> 20 (> 30 Obese)
What is your height?	1	18.5-20
Calculate patients BMI kg/m <sup>2</sup> *	2	< 18.5
What is your usual weight?	0	Weight loss < 5 %
Have you experienced unintentional weight loss in the last 3 - 6 months?	1	Weight loss 5-10 %
	2	Weight loss > 10 %
If patient is acutely ill and there has been or is likely to be no nutritional intake for >5 days	0	No
	2	Yes

\*Body Mass Index (or BMI) is calculated as weight (in kg) divided by the square of height (in m)

Add 'MUST' scores together to calculate overall risk of malnutrition:

Score 0 Low Risk  
Score 1 Medium Risk  
Score 2 or more High Risk

#### IDENTIFY LOSS OF MUSCLE MASS AND FUNCTION

If your patient has one or more of the risk factors above (see in "Set up" box) or is at risk of malnutrition, check for sarcopenia.

'SARC-F' Sarcopenia screening Test		
<b>STRENGTH</b>		
How much difficulty do you have in lifting and carrying 4.5 kg? <small>*4.5 kg is approximately the weight of a pet cat or pumpkin</small>	0	None
	1	Some
	2	A lot or unable
<b>ASSISTANCE WITH WALKING</b>		
How much difficulty do you have walking across a room?	0	None
	1	Some
	2	A lot, use aids, or unable
<b>RISE FROM A CHAIR</b>		
How much difficulty do you have transferring from a chair or bed?	0	None
	1	Some
	2	A lot or unable without help
<b>CLIMB STAIRS</b>		
How much difficulty do you have climbing a flight of 10 stairs?	0	None
	1	Some
	2	A lot or unable
<b>FALLS</b>		
How many times have you fallen in the past year?	0	None
	1	1-3 falls
	2	4 or more falls

**'SARC-F'** score equal to or greater than 4 is predictive of sarcopenia

#### DECISION AND ACTION

Advise, intervene and arrange follow-up according to nutritional screening results

**'MUST' Score ≤ 1 or/and 'SARC-F' Score < 4**

**OBSERVE AND REPEAT SCREENING**

in Care Homes monthly and in community annually for at-risk groups e.g. those > 75 yrs

**'MUST' Score ≥ 2 or/and 'SARC-F' Score ≥ 4**

**TREAT**

Recommend oral nutritional supplements (ONS) or continue nutrition support; physical activity should also be encouraged as possible

**If the patient is already on ONS check compliance**  
2 bottles is usual recommended daily dose

**If you need help** refer to clinical dietitian, hospital physician or implement local policy.

#### INTERVENTION

Tailor nutritional therapy to your patient's needs

**ENERGY**

25 - 35 kcal/kg body weight/day\*

**PROTEIN**

> 1.0 g/kg body weight/day\*\*

**MICRONUTRIENTS**

daily requirements\*\*\*

**SPECIAL CONSIDERATIONS:** Kidney disease: formulas with modified protein and electrolytes / Diabetes: formulas with slow-release & low glycemic index carbohydrates / Dysphagia: modified texture diets and thickened drinks / Malabsorption: peptide-based formulas with medium chain triglycerides

**THERAPEUTIC NUTRITION**

- Consider HMB / leucine, vitamin D for patients with muscle mass and/or function loss
- Omega-3 EPA for cancer patients
- Arginine, Glutamine, Zinc, HMB, vitamin C for chronic wounds
- TGF-β2 for IBD patients

HMB - β-hydroxy-β-methylbutyrate | EPA - eicosapentaenoic acid

\* In obese and sarcopenic obese patients should be calculated with ideal body weight

\*\* The level of protein to be used, e.g. in patients with severe kidney disease (e. GFR≤30 mL/min/1.73m<sup>2</sup>), use 0.6 g of protein/kg BW/day

\*\*\* Should be adjusted individually in case of deficiencies

Fig. 1. R-MAPP: Remote Consultation on malnutrition in the primary practice.

questionnaire is an easy swallowing screening tool consisting of ten questions that could also be included in the remote evaluation of patients with dysphagia [42]. In COVID-19 patients, post-extubation dysphagia can be observed, and could be extended for up to 21 days after prolonged intubation particularly in older

persons [31]. Clinical nutrition, which entails different modalities of feeding, from oral diet therapy to specialized artificial nutritional support (enteral or parenteral), is essential for the management of dysphagia. Changes in the consistency (modified texture) of foods and liquids and use of oral enteral formulas with adjusted texture



may ease the ingestion process and help reduce the risk of aspiration [40], while enteral tube feeding should be considered for individuals with an unsafe swallow.

Another common clinical condition observed with older age is chronic wounds and decubital ulcers. Energy requirements for malnourished geriatric patients with chronic wounds are 30–40 kcal/kg BW/day, while protein intakes should be between 1.2 and 1.5 g/kg BW/d [43]. Some specific nutrients are important for wound healing and therefore pharmaconutrients like arginine, glutamine, zinc,  $\beta$ -hydroxy- $\beta$ -methylbutyrate (HMB), and vitamin C should be considered, as well as high intake of proteins [44].

In patients presenting with severe malabsorption syndromes (food allergies, active inflammatory bowel disease, maldigestion, exocrine pancreatic insufficiency, short bowel syndrome, bowel fistulas), special peptide-based enteral formulas containing medium chain triglycerides might be more suitable than standard (whole protein) oral supplements [45]. Fig. 1.

#### 4. Conclusion

A simple and rapid remote nutritional screening tool (R-MAPP) has been developed as a pragmatic measure to be used in primary practice as a part of telemedicine. Although it has been created in response to the COVID-19 pandemic crisis, it could be suitable for every situation in the future that might limit the availability of healthcare system.

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#### References

- [1] Keesara S, Jonas A, Schulman K. Covid-19 and health care's digital revolution [published online ahead of print, 2020 Apr 2]. *N Engl J Med* 2020. <https://doi.org/10.1056/NEJMp2005835>.
- [2] <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/>.
- [3] [https://ec.europa.eu/info/sites/info/files/communication\\_-\\_a\\_european\\_roadmap\\_to\\_lifting\\_coronavirus\\_containment\\_measures\\_0.pdf](https://ec.europa.eu/info/sites/info/files/communication_-_a_european_roadmap_to_lifting_coronavirus_containment_measures_0.pdf).
- [4] <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance>.
- [5] <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>.
- [6] Greenhalgh T, Koh GCH, Car J. Covid-19: a remote assessment in primary care. *BMJ* 2020;368:m1182.
- [7] <http://www.euro.who.int/en/health-topics/Health-systems/pages/strengthening-the-health-system-response-to-covid-19/strengthening-the-health-system-response-to-covid-19-policy-brief/strengthening-the-health-system-response-to-covid-19-recommendations-for-the-who-european-region-policy-brief-1-april-2020>.
- [8] Krupinski, Bernard J. *Healthcare* 2014;2:74–93.
- [9] Flodgren G, Rachas A, Farmer AJ, Inzitari M, Shepperd S. Interactive telemedicine: effects on professional practice and health care outcomes (Review) *Cochrane Database Syst Rev* 2015;(9):CD002098. <https://doi.org/10.1002/14651858.CD002098.pub2>.
- [10] Saqui O, Chang A, McGonigle S, Purdy B, Fairholm L, Baun M, et al. Telehealth videoconferencing: improving home parenteral nutrition patient care to rural areas of Ontario, Canada. *J Parenter Enteral Nutr* 2007;31(3):234–9.
- [11] Marinschek S, Dunitz-Scheer M, Pahsini K, Geher B, Scheer P. Weaning children off enteral nutrition by net coaching versus onsite treatment: a comparative study. *J Paediatr Child Health* 2014;50:902–7. <https://doi.org/10.1111/jpc.12662>.
- [12] Kim H, Spaulding R, Werkowitch M, Yadrich D, Piamjariyakul U, Gilroy R, et al. Costs of multidisciplinary parenteral nutrition care provided at a distance via mobile tablets. *J Parenter Enteral Nutr* 2014;38(2):50S–7S.
- [13] Raphael BP, Schumann C, Garrity-Gentile S, McClelland J, Rosa C, Tascione C, et al. Telemedicine and e-Health. Virtual telemedicine visits in pediatric home parenteral nutrition patients: a quality improvement initiative. *Telemed J e Health* 2019;25(1):60–5. <https://doi.org/10.1089/tmj.2017.0298>.
- [14] Nelson EL, Yadrich DM, Thompson N, Wright S, Stone K, Adams N, et al. Telemedicine support groups for home parenteral nutrition users. *Nutr Clin Pract* 2017;32(6):789–98. <https://doi.org/10.1177/0884533617735527>.
- [15] Deliberazione della Giunta Regionale n. 1863 of 9 July 2019. [https://www.regione.lombardia.it/wps/wcm/connect/06999309-8172-44a7-982f-a38cb3b07bb5/DGR+1863\\_09\\_07\\_2019.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-06999309-8172-44a7-982f-a38cb3b07bb5-mLQt2wk](https://www.regione.lombardia.it/wps/wcm/connect/06999309-8172-44a7-982f-a38cb3b07bb5/DGR+1863_09_07_2019.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-06999309-8172-44a7-982f-a38cb3b07bb5-mLQt2wk).
- [16] Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>.
- [17] Creditor MC. Hazards of hospitalization of the elderly. *Ann Intern Med* 1993 Feb 1;118(3):219E23.
- [18] Ferrando AA, Lane HW, Stuart CA, Davis-Street J, Wolfe RR. Prolonged bed rest decreases skeletal muscle and whole body protein synthesis. *Am J Phys* 1996 Apr;270(4 Pt 1):E627E33.
- [19] Kortebein P, Ferrando A, Lombeida J, Wolfe R, Evans WJ. Effect of 10 days of bed rest on skeletal muscle in healthy older adults. *J Am Med Assoc* 2007 Apr 25;297(16):1772E4.
- [20] Deutz NEP. Effect of b-hydroxy-b-methylbutyrate (HMB) on lean body mass during 10 days of bed rest in older adults. *Clin Nutr* 2013;32:704–12.
- [21] Greenhalgh T, Choon Huat Koh G, Car J. Covid-19: a remote assessment in primary care. *BMJ* 2020;368:m1182. <https://doi.org/10.1136/bmj.m1182>.
- [22] Caccialanza R, Laviano A, Lobascio F, Montagna E, Bruno R, Ludovisi S, et al. Early nutritional supplementation in non-critically ill patients hospitalized for the 2019 novel coronavirus disease (COVID-19): rationale and feasibility of a shared pragmatic protocol. *Nutrition* 2020;74:110835. <https://doi.org/10.1016/j.nut.2020.110835>. ISSN 0899-9007.
- [23] Elia M, chairman, editors. The MUST report: nutritional screening of adults: a multidisciplinary responsibility. Maidenhead, Berks, UK: BAPEN (MAG); 2003.
- [24] Malmstrom TK, Morley JE. Sarcopenia: the target population. *J Frailty Aging* 2013;2:55E6.
- [25] Malmstrom TK, Morley JE. SARC-F: a simple questionnaire to rapidly diagnose sarcopenia. *J Am Med Dir Assoc* 2013;14:531E2.
- [26] Stratton RJ, Hackston A, Longmore D, Dixon R, Price S, Stroud M, et al. Malnutrition in hospital outpatients and inpatients: prevalence, concurrent validity and ease of use of the "malnutrition universal screening tool" ('MUST') for adults. *Br J Nutr* 2004;799–808.
- [27] Biolo G, Cederholm T, Muscaritoli M. Muscle contractile and metabolic dysfunction is a common feature of sarcopenia of aging and chronic diseases: from sarcopenic obesity to cachexia. *Clin Nutr* 2014;33(5):737–48.
- [28] Anker SD, Coats AJ, Morley JE, Rosano G, Bernabei R, von Haehling S, et al. Muscle wasting disease: a proposal for a new disease classification. *J Cachexia Sarcopenia Muscle* 2014;5(1):1–3.
- [29] Cederholm T, Barazzoni R, Austin P, Ballmer P, Biolo G, Bischoff SC, et al. ESPEN guidelines on definitions and terminology of clinical nutrition. *Clin Nutr* 2017;36:49–64.
- [30] Cederholm T, Jensen GL, Correia MITD, Gonzalez MC, Fukushima R, Higashiguchi T, et al., GLIM Core Leadership Committee, GLIM Working Group. GLIM criteria for the diagnosis of malnutrition – a consensus report from the global clinical nutrition community. *Clin Nutr* 2019;38:1–9.
- [31] Barazzoni R, Bischoff SC, Breda J, Wickramasinghe K, Krznaric Z, Nitzan D, et al. ESPEN expert statements and practical guidance for nutritional management of individuals with SARS-CoV-2 infection. *Clin Nutr* 2020. <https://doi.org/10.1016/j.clnu.2020.03.022>.
- [32] Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, et al. ESPEN guideline on clinical nutrition and hydration in geriatrics. *Clin Nutr* 2019;38:10–47.
- [33] Gomes F, Schuetz P, Bounoure L, Austin P, Ballesteros-Pomar M, Cederholm T, et al. ESPEN guideline on nutritional support for polymorbid internal medicine patients. *Clin Nutr* 2018;37:336–53.
- [34] Arends J, Bachmann P, Baracos V, Barthelemy N, Bertz H, Bozzetti F, et al. ESPEN guidelines on nutrition in cancer patients. *Clin Nutr* 2017;36(1):11–48.
- [35] Forbes A, Escher J, Hébuterne X, Kłęk S, Krznaric Z, Schneider S, et al. ESPEN guideline: clinical nutrition in inflammatory bowel disease. *Clin Nutr* 2017 Apr;36(2):321–47.
- [36] Plauth M, Bernal W, Dasarthy S, Merli M, Plank LD, Schütz T, et al. ESPEN guideline on clinical nutrition in liver disease. *Clin Nutr* 2019 Apr;38(2):485–521.
- [37] Meier R, Ockenga J, Pertkiewicz M, Pap A, Milinic N, Macfie J. DGEM (German society for nutritional medicine), Löser C, Keim V; ESPEN (European society for parenteral and enteral nutrition). ESPEN guidelines on enteral nutrition: pancreas. *Clin Nutr* 2006;25(2):275–84.
- [38] Burgos R, Bretón I, Cereda E, Desport JC, Dziewas R, Genton L, et al. ESPEN guideline clinical nutrition in neurology. *Clin Nutr* 2018 Feb;37(1):354–96.
- [39] Cano N, Fiaccadori E, Tesinsky P, Toigo G, Druml W. DGEM (German society for nutritional medicine), Kuhlmann M, Mann H, Hörl WH; ESPEN (European society for parenteral and enteral nutrition). ESPEN guidelines on enteral nutrition: adult renal failure. *Clin Nutr* 2006 Apr;25(2):295–310.
- [40] Vranješ Bender D, Krznaric Z. Nutritional issues and considerations in the elderly: an update. *Croat Med J* 2020;61. <https://doi.org/10.3325/cmj.2020.61>.

- [41] Barazzoni R, Bischoff SC, Boirie Y, Busetto L, Cederholm T, Dicker D, et al. Sarcopenic obesity: time to meet the challenge. *Clin Nutr* 2018;37(6 Pt A): 1787–93.
- [42] Belafsky PC, Mouadeb DA, Rees CJ, Pryor JC, Postma GN, Allen J, et al. Validity and reliability of the Eating assessment tool (EAT-10). *Ann Otol Rhinol Laryngol* 2008;117(12):919–24.
- [43] Fontaine J, Raynaud-Simon A. Pressure sores in geriatric medicine: the role of nutrition. *Presse Med* 2008;37:1150–7. <https://doi.org/10.1016/j.lpm.2007.11.016>.
- [44] Singer P. Nutritional care to prevent and heal pressure ulcers. *Isr Med Assoc J* 2002;4:713–6.
- [45] Alexander DD, Bylsma LC, Elkayam L, Nguyen DL. Nutritional and health benefits of semi-elemental diets: a comprehensive summary of the literature. *World J Gastrointest Pharmacol Therapeut* 2016;7(2):306.

Željko Krznarić\*, Darija Vranešić Bender  
 Department of Gastroenterology, Hepatology and Nutrition,  
 University Hospital Centre, University of Zagreb, Croatia

Alessandro Laviano  
 Department of Translational and Precision Medicine, Sapienza  
 University, Rome, Italy

Cristina Cuerda  
 Nutrition Unit, Hospital General Universitario Gregorio Marañón,  
 Madrid, Spain

Francesco Landi  
 Fondazione Policlinico Universitario “Agostino Gemelli” IRCCS,  
 Catholic University, Rome, Italy

Rosario Monteiro  
 Department of Biomedicine, Biochemistry Unit, Faculty of Medicine,  
 University of Porto, Al. Prof. Hernâni Monteiro, Porto, Portugal

Matthias Pirlich  
 Imperial Oak Outpatient Clinic, Endocrinology, Gastroenterology &  
 Clinical Nutrition, Berlin, Germany

Rocco Barazzoni  
 Department of Medical, Surgical and Health Sciences, University of  
 Trieste, Italy

\* Corresponding author.  
 E-mail address: [zeljko.krznaric1@zg.t-com.hr](mailto:zeljko.krznaric1@zg.t-com.hr) (Ž. Krznarić).

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