




**FRESENIUS  
KABI**

caring for life

# Malnutrition

Overlooked, untreated  
and cost intensive



*Early detection  
and treatment is  
the key to effective  
nutritional care!*





Early detection and treatment is the key to effective nutritional care!"

Dear colleagues,

Malnutrition is a major public health problem. It is not always obvious in our affluent and increasingly overweight society – but on a closer look you see it much more often than expected and where it could have been avoided.

Malnutrition affects not only the patient, but indirectly also the carer, healthcare professional and society as a whole. It includes both over-nutrition (obesity) as well as under-nutrition, but in this context the focus is on under-nutrition and nutritional risk. There are numerous negative consequences of malnutrition, such as higher rates of hospital admission, prolonged stays and treatments, increased morbidity and poorer quality of life. Especially in older people malnutrition severely affects function, mobility and independence. It leads to increased resource use and treatment costs for the healthcare system and our society.

Early detection of malnutrition or nutritional risk and appropriate management is the crucial key to fight against malnutrition. Nutritional screening of patients at admission to hospital, nursing home or appropriate care plans and adequate follow up with nutritional support and regular monitoring are vital to tackle malnutrition and stop the vicious circle.

Good nutritional practice (gnp) addresses the major points on how to identify and manage malnutrition in your institution. The program can support you in your efforts to reduce malnutrition and to improve patient overall outcome.

I wish you lots of success

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## Malnutrition – a global health problem, a local issue.

Malnutrition is highly prevalent, still too often overlooked and cost intensive

In Europe, 33 million people are estimated to be malnourished or at risk of malnutrition<sup>1</sup> (20 million in the EU<sup>2</sup>). About 1 in 4 hospital patients and more than 1 in 3 residents in care homes are malnourished or at risk of malnutrition.<sup>3-11</sup>

The economic costs of malnutrition are double the costs of overweight and obesity.<sup>12,13</sup> In the EU malnutrition is estimated to cost €170 billion per year.<sup>1</sup>

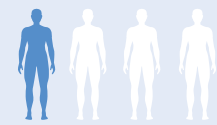
Even when identified, malnutrition is not always appropriately treated.<sup>14,15</sup>

Often less than 50% of patients identified as malnourished receive nutritional intervention.<sup>14-17</sup>

Nutritional screening and appropriate nutritional support is the key to reduce the serious consequences of malnutrition.

# Do you know how many people are affected by malnutrition?

prevalence of malnutrition in **the hospital**



## 1 in 4

patients in hospitals are at risk of malnutrition or already malnourished.<sup>3-8</sup>

29%

Internal medicine<sup>18,19</sup>



28%

Surgery<sup>18,19</sup>



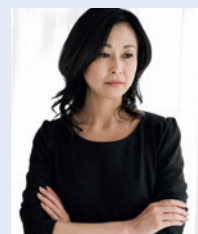
21%

Intensive care<sup>18,19</sup>



60%

Geriatrics<sup>18,19</sup>



15%

Orthopaedic<sup>18,19</sup>



16%

Urology<sup>18,19</sup>



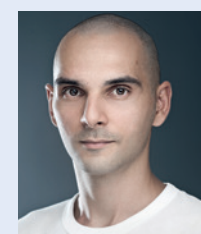
31%

Gastroenterology<sup>18,19</sup>



21%

Cardiology<sup>18,19</sup>

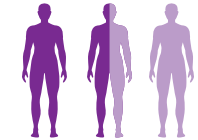


41%

Oncology<sup>18,19</sup>



prevalence of malnutrition in **nursing homes**



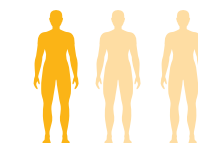
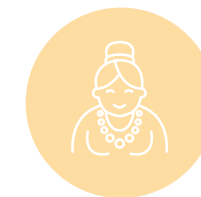
More than

## 1 in 3

patients in nursing homes are at risk of malnutrition!<sup>3-11</sup>



prevalence of malnutrition the **community**



Around

## 1 in 3

older people living independently are at risk of malnutrition.<sup>20</sup>

## Malnutrition can affect all patients

- Despite differences in the age of subjects, there is consistent and overwhelming evidence that malnutrition is a widespread and highly prevalent problem in hospitals across the world including affluent and developed societies.<sup>18</sup>
- Malnutrition and risk of malnutrition are common in many hospital wards with high prevalence rates in geriatrics, oncology, surgery, internal medicine and gastroenterology wards.<sup>18,19</sup>

## Elderly people are at high risk of malnutrition

- Malnutrition affects people of all ages, but is significantly more common in older people: the risk is 40 % greater in people aged over 65 years than people aged under 65 years.<sup>3</sup>
- Multi-morbidity is thought to be the most important cause of malnutrition in the elderly population.



More than  
**50%**  
of patients  
in the hospital  
do not eat their  
entire meal.<sup>24</sup>



**30%**  
of nursing home  
residents eat less  
than half their  
lunch.<sup>25</sup>



## Malnutrition – how can it happen to your patients?

Insufficient dietary intake can lead to further deterioration of the nutritional status!

- Malnutrition can be caused by reduced dietary intake, inadequate absorption of nutrients or due to increased nutritional requirements. Poor dietary intake is the most common reason, and is often caused by disease and/or its treatment effects. For example patients with cancer may have altered taste, nausea and anorexia due to medical treatment as well as the condition itself.<sup>21</sup>
- During the hospital stay a deterioration in nutritional status was identified in a variety of patient groups;<sup>21</sup> a significant increase of

malnutrition from admission to discharge was evident, particularly seen in elderly patients.<sup>22</sup>

- Patients with stroke or other neurological conditions may have swallowing difficulties or problems with self-feeding. Malnutrition is 3 to 5 times more prevalent in nursing home residents with dysphagia and cognitive impairment compared to those without these conditions.<sup>23</sup>
- In the elderly additional factors such as dental problems, swallowing difficulties, depression and decline in taste changes can contribute to the development of malnutrition.<sup>21</sup>

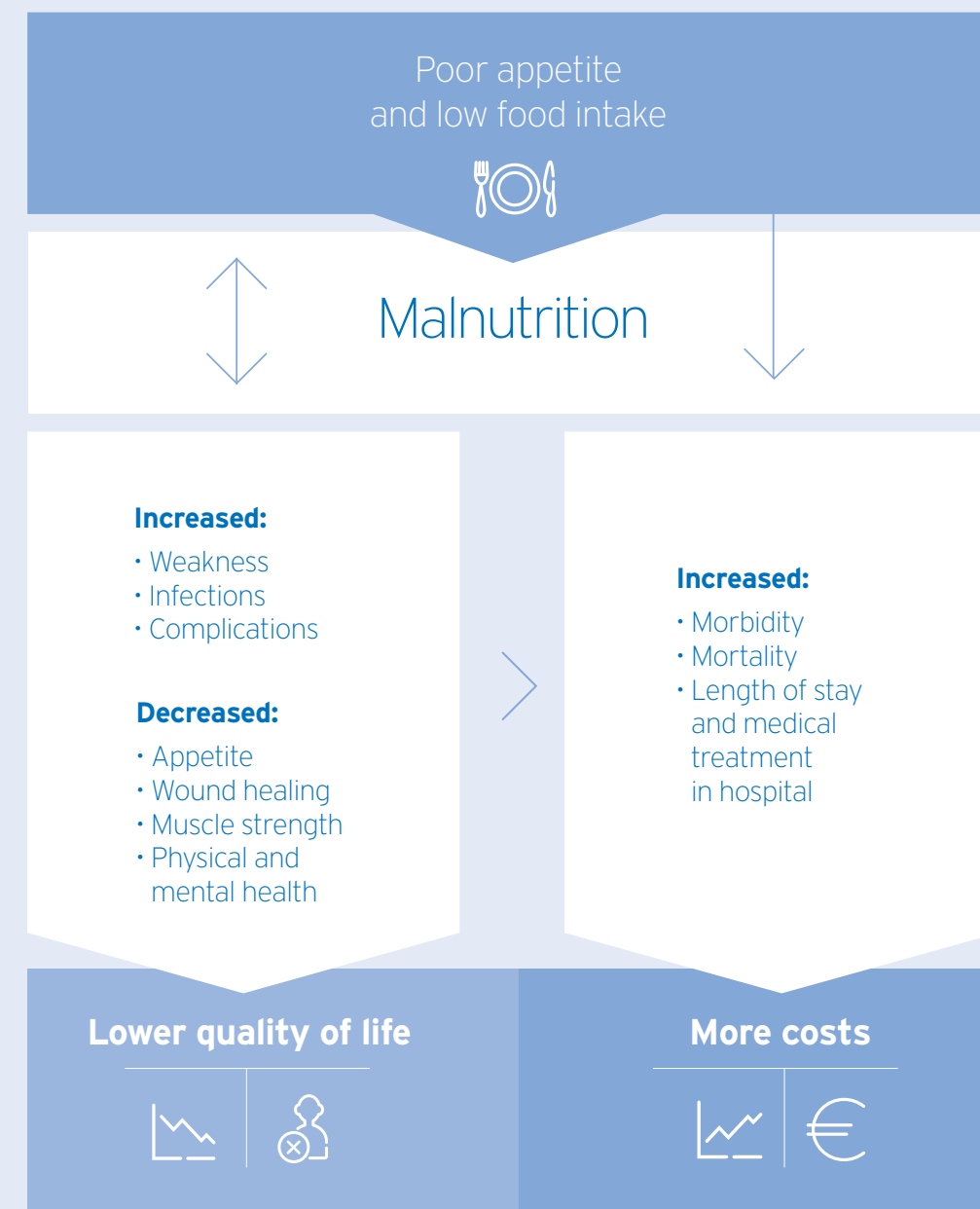


Figure:  
Prognostic  
impact of  
malnutrition  
(adapted  
from 28)

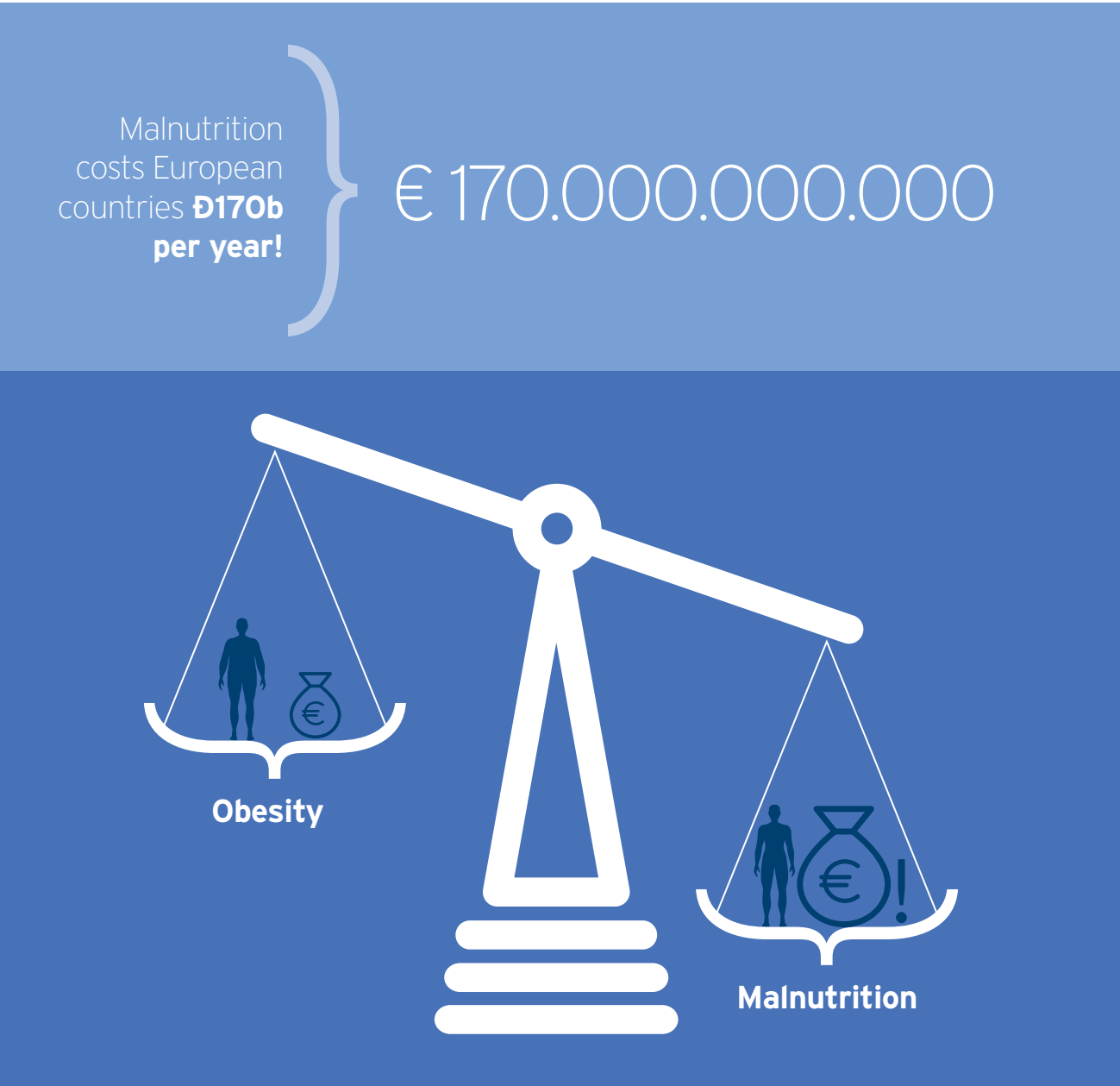
## Good reasons to take malnutrition seriously!

**Malnutrition is associated with significantly increased morbidity and mortality:**

- In a large multi-region, multi-centre study mortality was 12-fold higher in malnourished patients.<sup>26</sup>
- Furthermore, significantly more complications, such as infections, were seen in patients 'at-risk' of malnutrition than in 'not-at-risk' patients.<sup>26</sup>

- Average length of hospital stay may be increased by over 30% in malnourished patients.<sup>27</sup>
- Malnutrition leads to poorer quality of life.<sup>21</sup>
- Malnutrition is associated with increased use of health care resources.<sup>21</sup>

# Is malnutrition a relevant healthcare problem? YES!



## Malnutrition is twice as expensive as obesity!

- The estimated costs of malnutrition in Europe were calculated to be € 170 billion a year!<sup>1</sup>
- In Ireland data shows that costs associated with malnutrition are estimated at over € 1.4 billion, representing 10 % of the healthcare budget. The costs of nutritional support are estimated to account for less than 3 % of healthcare spending.<sup>32</sup>
- By comparison, the economic costs of managing disease-related malnutrition are twice as expensive as the costs of overweight and obesity.<sup>12,13</sup>

# Are you aware of the effect of malnutrition on your own budget?

		Resource use	Cost
Hospital		Malnourished patients stay longer in hospital than similar well-nourished patients. <sup>29</sup>	Malnutrition is associated with an increased length of hospital stay of 3 days per hospital stay. <sup>29</sup>
Nursing Homes		Malnutrition in Dutch care homes is equivalent to 3 % of the annual care home budget and equivalent to 0.7 % of the annual healthcare budget. <sup>30</sup>	Extra costs of malnutrition in Dutch care homes is € 10,000 per person, per year. <sup>30</sup>
Community		Malnourished patients utilised significantly more healthcare resources. Malnourished patients visit their general practitioner twice as often as those who are well nourished. <sup>31</sup>	Malnutrition costs the UK National Health Service € 1,128 per patient over a six-month period. <sup>31</sup>

**Malnutrition increases use of healthcare resources regardless of the healthcare setting.**

**Malnutrition generates costs for healthcare systems regardless of the healthcare setting.**

Malnutrition leads to increased resource use and costs in hospitals and nursing homes!

What is your own cost saving potential?



### Hospital

$$\begin{aligned} &= \frac{\text{patients/year}}{\text{patients/year}} \rightarrow \text{thereof } 1/4 \\ &= \frac{\text{(malnourished patients)}}{\text{(malnourished patients)}} \times \frac{\text{(Euro)}}{\text{(Euro)}} \\ &= \text{(Euro/year cost saving potential)} \end{aligned}$$

Example

$$\begin{aligned} &= \frac{10,000}{\text{(patients/year)}} \rightarrow \text{thereof } 1/4 \\ &= \frac{2,500}{\text{(malnourished patients)}} \times \frac{1,500}{\text{(Euro)}} \\ &= \frac{3,750,000}{\text{(Euro/year cost saving potential)}} \end{aligned}$$

\* estimation of 3 days hospital stay based on reference 29.

### Nursing home

$$\begin{aligned} &= \frac{\text{residents/year}}{\text{residents/year}} \rightarrow \text{thereof } 1/3 \\ &= \frac{\text{(malnourished patients)}}{\text{(malnourished patients)}} \times \frac{10,000^{**}}{\text{(Euro)}} \\ &= \text{(Euro/year cost saving potential)} \end{aligned}$$

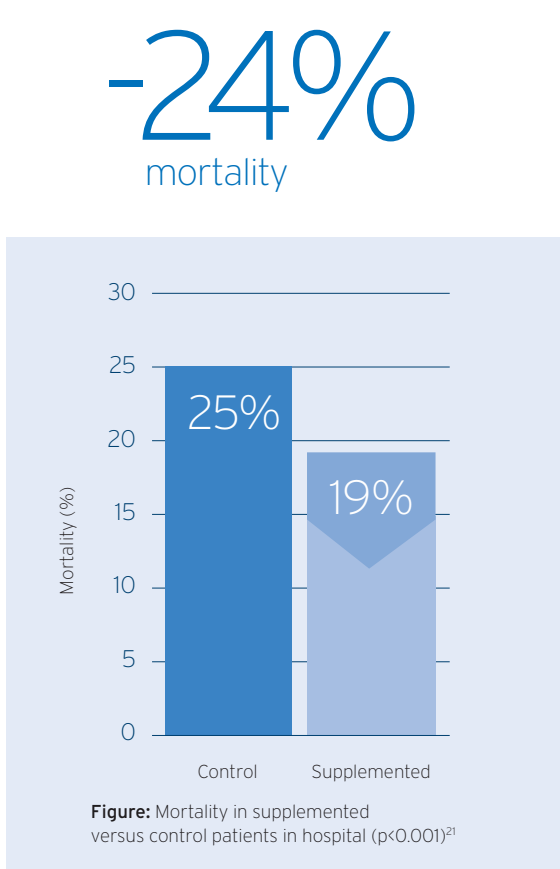
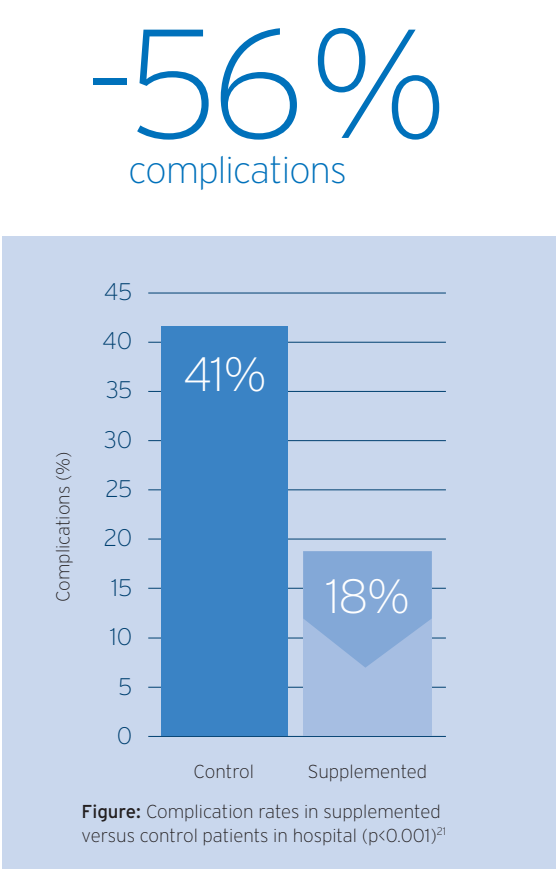
Example

$$\begin{aligned} &= \frac{100}{\text{(residents/year)}} \rightarrow \text{thereof } 1/3 \\ &= \frac{33}{\text{(malnourished patients)}} \times \frac{10,000^{**}}{\text{(Euro)}} \\ &= \frac{333,000}{\text{(Euro/year cost saving potential)}} \end{aligned}$$

\*\* additional cost of malnutrition management for 1 year based on reference 30.



# Oral nutritional supplements (ONS) an effective solution to tackle malnutrition!



## Improving patients' outcomes, improving quality of life!

- ONS lead to weight gain and prevention of weight loss in patients who are malnourished or at risk of malnutrition in hospital and in community settings.<sup>34,35</sup>
- ONS use is consistently linked to lower complication and mortality rates for malnourished patients when compared to standard care.<sup>21</sup>
- ONS can significantly improve quality of life and dietary intake more effectively than nutritional advice alone.<sup>36</sup>
- Compliance to ONS is high: Overall mean compliance to ONS was 78 % (SD 16) in 53 trials. Furthermore, it was shown that compliance is higher with more energy dense supplements.<sup>33</sup>

# Are you aware of the cost saving potential of ONS?



	Hospital cost saving	Community cost saving
UK	Around £ 1,000 per patient can be saved if ONS is used (based on length of stay costs) <sup>37</sup>	
The Netherlands	Over £ 40 million can be saved annually if ONS is used in abdominal surgery patients alone <sup>38</sup>	Over £ 13 million can be saved annually if ONS is used in older patients in the community <sup>39</sup>
Germany	Up to £ 257 per patient can be saved resulting from reduced hospital costs <sup>40</sup>	Over £ 600 million can be saved resulting from reduced hospitalisation <sup>40</sup>

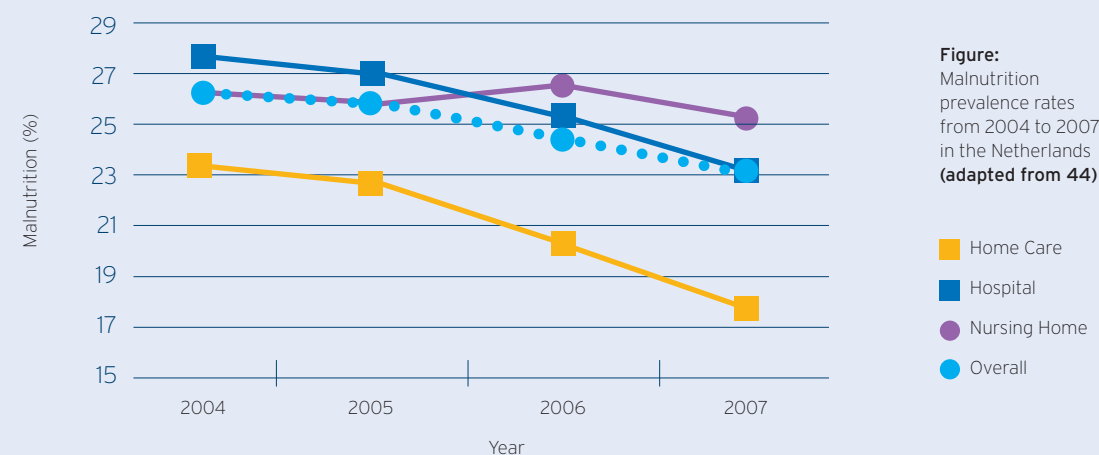
## ONS leads to substantial cost savings in hospitals and community settings!

- In addition to the reduction of readmissions, the use of ONS can shorten the average length of hospital stay by 2 to 33 days, depending on the patient group.<sup>21,43</sup>
- These reductions contribute to reducing costs for healthcare systems.
- Community patients given ONS have fewer healthcare visits at home, and fewer and shorter hospital admissions with an average reduction in medical costs of € 195 per patient (after investment in ONS is accounted for).<sup>41</sup>
- The costs of prescribing ONS in the community can be offset by preventing future hospital admissions.<sup>37,42</sup>

# Early diagnosis is the key to effective management!

The introduction of mandatory screening for malnutrition in the Netherlands resulted in a decrease in the prevalence of malnutrition in hospitals and home care.<sup>44</sup>

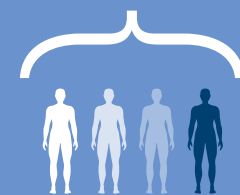
## Mandatory screening reduces malnutrition



# How can you meet your patient's nutritional needs?



## 4 steps to good nutrition practice



1.  
Screening

2.  
Assessment

3.  
Nutrition therapy

4.  
Monitoring

## Nutritional management is an integral part of the treatment to improve patient outcomes

- Nutritional screening is a rapid and simple procedure to detect those at risk of or with nutritional problems.<sup>45</sup>
- All patients should be screened within the first 24 hours after admission, followed up by appropriate management. Such a routine practice can help to reduce future costs and healthcare resource constraints.

- A variety of tools exist to detect nutritional risk that can be used by any healthcare professional across all healthcare settings: Validated tools such as NRS 2002\*, MUST\*\* and MNA\*\*\* vary slightly in approach, but in principle mostly aim to look at weight relative to height (BMI), weight loss, appetite and food intake. Nutritional screening should be done using a validated screening tool and followed up with appropriate action.

\* Nutritional Risk Screening - 2002  
 \*\* Malnutrition Universal Screening Tool  
 \*\*\* Mini Nutritional Assessment

- Good nutritional practice includes nutritional screening which should directly lead to an individualised patient nutrition therapy plan.
- This plan should be clearly documented and the patient's progress monitored regularly against the goals set out in the nutrition therapy plan.
- Optimal nutrition therapy means to cover nutritional requirements at each step of the patient pathway by enteral and parenteral nutrition as appropriate.

Nutritional management can lead to improved clinical outcome:<sup>21</sup>

- Less complications
- Less infections
- Improved wound healing
- Reduced length of stay
- More rapid mobilization, and convalescence
- Fewer re-hospitalizations
- Better quality of life
- Better survival

gnp – good nutrition practice

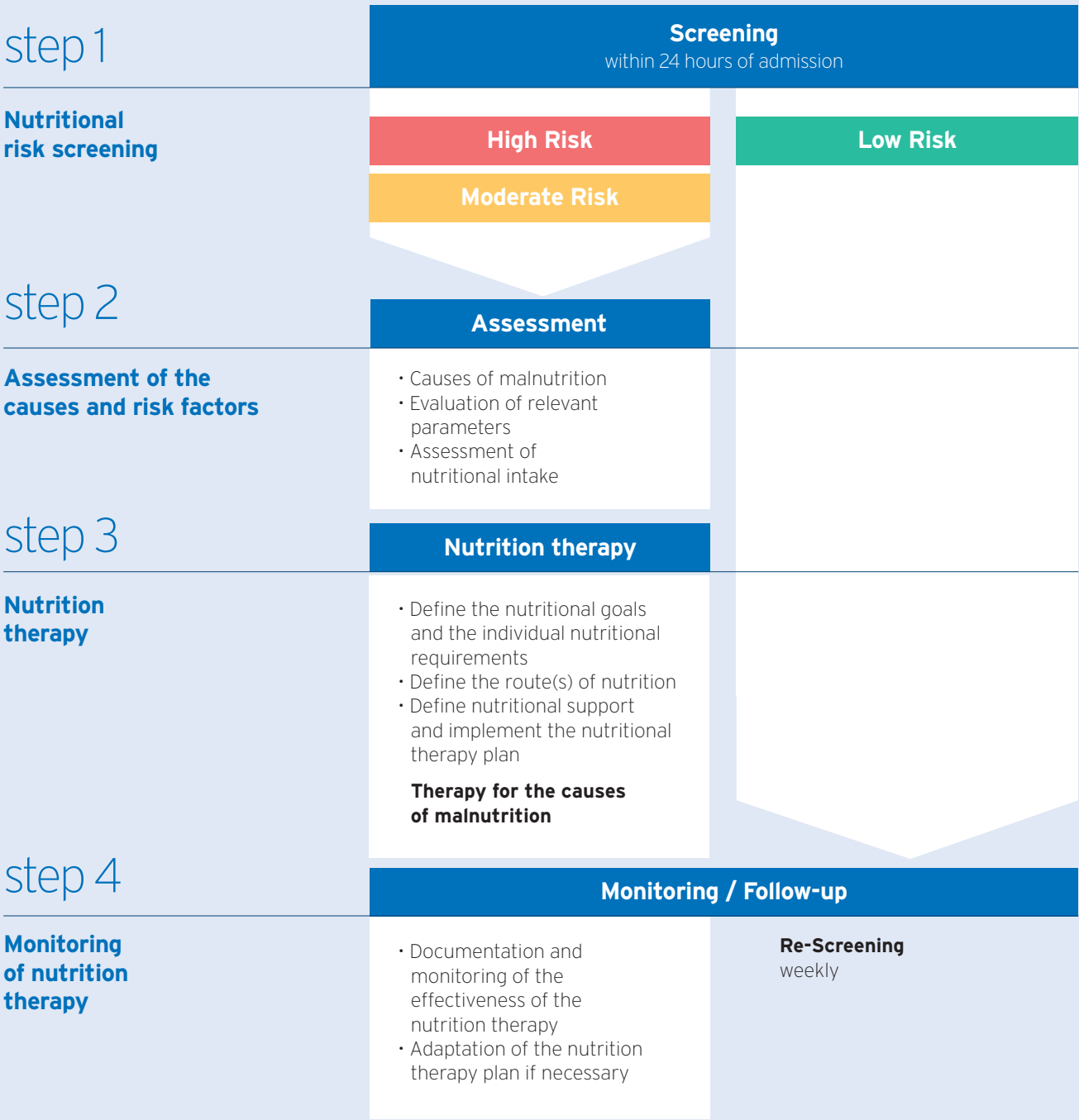
Good for you, good for your patients

The philosophy of gnp is to make nutritional management as quick and easy as possible to improve the nutritional status of your patient!

Practice-oriented	<div>gnp – practice-oriented toolkit</div> <ul style="list-style-type: none"><li>• Extensive set of materials based on the actual scientific knowledge and practical experiences</li><li>• Validated by experienced healthcare professionals in the daily practice</li></ul>
Good nutritional status	<div>gnp – improves nutritional status of your patients</div> <ul style="list-style-type: none"><li>• The unique gnp pathway has only 4 steps for practical guidance</li><li>• Highly relevant and validated tools to identify patients at risk of malnutrition or already malnourished patients</li><li>• The results of screening and assessment lead directly into an individual nutrition therapy plan</li></ul>
Effective	<div>gnp – quick and easy to use</div> <ul style="list-style-type: none"><li>• Simple, quick and reliable</li><li>• Screen a patient in less than 5 minutes</li><li>• Easy to use materials developed for daily practice</li></ul>
It's worth it	<div>gnp – it's worth it</div> <ul style="list-style-type: none"><li>• Early recognition and intervention improves outcome</li><li>• Supports therapy success and quality of life</li><li>• Reduces hospital stay and avoids future hospital readmissions</li><li>• Prevents future costs and healthcare constraints</li><li>• Helps to improve hospital quality management</li></ul>

The gnp pathway

4 steps to improve the nutritional status of your patient



gnp – to support the nutritional care process in your hospital to achieve the nutritional targets of your patients and to maximize your quality of care!



## References

1. Ljungqvist O, de Man F. Under nutrition - a major health problem in Europe. *Nutr Hosp* 2009; 24(3):368-370.
2. Ljungqvist O, van Gossum A, Sanz M, de Man F. The European fight against malnutrition. *Clin Nutr* 2010; 29:149-150.
3. Russell C, Elia M. Nutrition Screening Survey in the UK in 2008: Hospitals, Care Homes and Mental Health Units. 2009. Redditch, BAPEN.
4. Meijers JM, Schols JM, van Bokhorst-de van der Schueren MA, Dassen T, Janssen MA, Halfens RJ. Malnutrition prevalence in The Netherlands: results of the annual Dutch national prevalence measurement of care problems. *Br J Nutr* 2009; 101(3):417-423.
5. Russell C, Elia M. Nutrition screening survey and audit of adults on admission to hospitals, care homes and mental health units. 2008. Redditch, BAPEN.
6. Russell C, Elia M. Nutrition Screening Week in the UK and Republic of Ireland in 2010. Hospitals, care homes and mental health units. 2011. Redditch, BAPEN.
7. Imoberdorf R, Meier R, Krebs P, Hangartner PJ, Hess B, Staubli M et al. Prevalence of undernutrition on admission to Swiss hospitals. *Clin Nutr* 2010; 29(1):38-41.
8. Kruizenga HM, Wierdsma NJ, van Bokhorst MA, de vdS, Hollander HJ, Jonkers-Schuitema CF et al. Screening of nutritional status in The Netherlands. *Clin Nutr* 2003; 22(2):147-152.
9. Suominen MH, Sandelin E, Soini H, Pitkala KH. How well do nurses recognize malnutrition in elderly patients? *Eur J Clin Nutr* 2009; 63(2):292-296.
10. Lelovics Z, Bozo RK, Lampek K, Figler M. Results of nutritional screening in institutionalized elderly in Hungary. *Arch Gerontol Geriatr* 2009; 49(1):190-196.
11. Parsons EL, Stratton RJ, Elia M. An audit of the use of oral nutritional supplements in care homes in Hampshire. *Proc Nutr Soc* 2010; 69:E197.
12. Elia M, Russell C. Combating Malnutrition: Recommendations for action. Report from the Advisory Group on Malnutrition, Led by BAPEN. 2009. Redditch, BAPEN.
13. House of Commons Health Committee. Obesity: Third Report of Session 2003-04. Volume 1. 2004. London, The Stationery Office.
14. Lamb CA, Parr J, Lamb EI, Warren MD. Adult malnutrition screening, prevalence and management in a United Kingdom hospital: cross-sectional study. *Br J Nutr* 2009; 102(4):571-575.
15. Meijers JM, Halfens RJ, van Bokhorst-de van der Schueren MA, Dassen T, Schols JM. Malnutrition in Dutch health care: prevalence, prevention, treatment, and quality indicators. *Nutrition* 2009; 25(5):512-519.
16. van Nie-Visser NC, Meijers JM, Bartholomeyczik S, Lohrmann C, Reuther S, Schols JMG et al. Comparing prevalence of malnutrition and nutritional care in care homes in Germany, Austria and The Netherlands. *Clinical Nutrition* 2009; 4(Suppl 2):45.
17. Guest JF, Panca M, Baeyens JP, De MF, Ljungqvist O, Pichard C et al. Health economic impact of managing patients following a community-based diagnosis of malnutrition in the UK. *Clin Nutr* 2011; 30(4):422-9.
18. MNI: Medical Nutritional International Industry. Oral Nutritional Supplements to tackle malnutrition. A summary of the evidence base. Third version 2012. [www.medicalnutritionindustry.com](http://www.medicalnutritionindustry.com).
19. Pirlich M, Schutz T, Kemps M, Luhman N, Burmester GR, Baumann G et al. Prevalence of malnutrition in hospitalized medical patients: impact of underlying disease. *Dig Dis* 2003; 21(3):245-251.
20. Kaiser MJ, Bauer JM, Ramsch C, Uter W, Guigoz Y, Cederholm T et al. Frequency of malnutrition in older adults: a multinational perspective using the mini nutritional assessment. *J Am Geriatr Soc* 2010; 58(9):1734-1738.
21. Stratton RJ, Green CJ, Elia M. Disease-related malnutrition: an evidence based approach to treatment. Wallingford: CABI Publishing; 2003.
22. Cansado P, Ravasco P, Camilo M. A longitudinal study of hospital undernutrition in the elderly: comparison of four validated methods. *J Nutr Health Aging* 2009; 13(2):159-64.
23. Kiesswetter E, Schindler K, diekmann R, Mouhieddine M, Hiesmayr M, Sieber C, Volkert D. Dysphagia and cognitive impairment increase the risk of malnutrition in nursing home resident - new data from the NutritionDay in European nursing homes. *Clin Nutr* 2011; 6(Suppl): 31.
24. Hiesmayr M, Schindler K, Pernicka E, Schuh C, Schoeniger-Hekele A, Bauer P et al. Decreased food intake is a risk factor for mortality in hospitalised patients: the NutritionDay survey 2006. *Clin Nutr* 2009; 28(5):484-491.
25. Valentini L, Schindler K, Schläffer R, Bucher H, Mouhieddine M, Steiner K et al. The first nutritionDay in nursing homes: participation may improve malnutrition awareness. *Clin Nutr* 2009; 28(2):109-116.
26. Sorensen J, Kondrup J, Prokopowicz J, Schiesser M, Krahenbuhl L, Meier R et al. EuroOOPS: an international, multicentre study to implement nutritional risk screening and evaluate clinical outcome. *Clin Nutr* 2008; 27(3):340-349.
27. Elia M, Stratton RJ. A cost-benefit analysis of oral nutritional supplements in preventing pressure ulcers in hospital. *Clin Nutr* 2005; 24:640-641.
28. Norman K, Pichard C, Lochs H, Pirlich M. Prognostic impact of disease-related malnutrition. *Clin Nutr* 2008; 27(1):5-15.
29. Pernicka E, Wilson L, Bauer P, Schindler K, Hiesmayr M. Malnutrition assessed by BMI and weight loss causes increased length of hospital stay. Results of the NutritionDay study. *Clin Nutr Suppl* 2010; 5(2):168.
30. Meijers JMM, Wilson L, Schols JMGA, Halfens RJG. Estimating the costs associated with malnutrition in Dutch nursing homes. *Clin Nutr* 2012; 31(1):65-8.
31. Guest JF, Panca M, Baeyens JP, de Man F, Ljungqvist O, Pichard C, Wait S, Wilson L. Health economic impact of managing patients following a community-based diagnosis of malnutrition in the UK. *Clin Nutr* 2011; 30 (4): 422-429.
32. Rice N, Normand C. The cost associated with disease-related malnutrition in Ireland. *Public Health Nutr*. 2012; 15(10):1966-72.
33. Hubbard GP, Elia M, Holdoway A, Stratton RJ. A systematic review of compliance to oral nutritional supplements. *Clin Nutr*. 2012 Jun;31(3):293-312.
34. National Institute for Health and Clinical Excellence (NICE). Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition (clinical guidelines 32) 2006. London, National Institute for Health and Clinical Excellence (NICE).
35. Milne AC, Potter J, Vivanti A, Avenell A. Protein and energy supplementation in elderly people at risk from malnutrition. *Cochrane Database Syst Rev* 2009;(2):CD003288.
36. Parsons EL, Stratton RJ, Cawood AL, Smith TR, Elia M. Oral nutritional supplements in a randomised trial are more effective than dietary advice at improving quality of life in malnourished care home residents. *Clin Nutr* 2016, In press.
37. Elia M, Stratton RJ, Russell C, Green CJ, Pang F. The cost of disease-related malnutrition in the UK and economic considerations for the use of oral nutritional supplements (ONS) in adults. 2005. Redditch, BAPEN.
38. Freijer K, Nuijten MJ. Analysis of the health economic impact of medical nutrition in the Netherlands. *Eur J Clin Nutr* 2010; 64(10):1229-1234.
39. Freijer K, Nuijten MJ, Schols JM. The budget impact of oral nutritional supplements for disease related malnutrition in elderly in the community setting. *Front Pharmacol* 2012; 3:78.
40. Nuijten M, Mittendorf T. The health economic impact of oral nutritional supplements (ONS) in Germany. *Aktuel Ernährungsmed* 2012; 37:126-133.
41. Arnaud-Battandier F, Malvy D, Jeandel C, Schmitt C, Aussage P, Beaufre B et al. Use of oral supplements in malnourished elderly patients living in the community: a pharmaco-economic study. *Clin Nutr* 2004; 23(5):1096-1103.
42. Russell C. The impact of malnutrition on healthcare costs and economic considerations for the use of oral nutritional supplements. *Clin Nutr* 2007; 2(Suppl 1):25-32.
43. Gariballa S, Forster S, Walters S, Powers H. A randomized, double-blind, placebo-controlled trial of nutritional supplementation during acute illness. *Am J Med* 2006; 119(8):693-699.
44. Meijers JM, Candel MJ, Schols JM, van Bokhorst-de van der Schueren MA, Halfens RJ. Decreasing trends in malnutrition prevalence rates explained by regular audits and feedback. *J Nutr* 2009; 139(7):1381-1386.
45. Kondrup J, Allison SP, Elia M, Vellas B, Plauth M; Educational and Clinical Practice Committee, European Society of Parenteral and Enteral Nutrition (ESPEN). ESPEN guidelines for nutrition screening 2002. *Clin Nutr* 2003; 22(4):415-21.