

# Oral Nutritional Supplementation

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**I**t is well established that malnutrition may contribute to adverse outcomes among hospitalized patients that include increased complications, length of hospital stay, readmission rates, and mortality. Such undesirable outcomes are often tied to elevated healthcare costs. While there has been considerable interest in demonstrating that use of oral nutritional supplementation (ONS) might therefore result in more favorable outcomes, in practice this has sometimes been challenging to demonstrate. Nutrition is but 1 covariate that may impact upon many of the outcomes of interest and with relatively short duration of hospital stays now the norm, there is only a brief window of opportunity for nutrition intervention during the majority of hospitalizations. It is imperative to also appreciate that some of the adverse outcomes of malnutrition are likely related to the “company” that malnutrition keeps. In particular in the setting of disease or injury, the pathophysiology of malnutrition invariably is associated with acute or chronic inflammation, leading to altered body composition, diminished biological function, and undesirable outcomes.<sup>1</sup>

In the hospital setting ONS is generally provided as protein-calorie supplements to patients that have oral intakes that are inadequate to otherwise meet their nutrient requirements. ONS is typically formulated as a combination of macronutrients (protein, carbohydrate, and fat) and micronutrients (vitamins, minerals, and trace elements). Some ONS is prepared as powders or semi-solid formulations, but the majority of ONS for clinical use is formulated as ready-made energy and nutrient dense liquids that provide 1.0 to 2.4 kcal/mL. They may also be formulated for specific disease states or conditions. For ease of use, ONS is typically packaged in cartons, bottles, or flexible packs. In those patients with compromised oral intakes, the energy and nutrient density of ONS can be highly advantageous. Patients generally prefer to eat foods that they are familiar with, but when oral intake is highly curtailed, then it is often preferable to use ONS. Selection criteria for an ONS prescription generally include diagnosis of malnutrition or the identification of high risk for developing malnutrition. In addition, “calorie counts” are often used to document inadequate dietary intake. Evidence-based clinical

guidelines provide a basis for appropriate ONS prescription,<sup>2</sup> but in practice prescription is often highly

variable depending upon the clinical setting and knowledge of practitioners.<sup>3,4</sup>

Some clinical trials with ONS have been disappointing. Limitations have included the difficulty of securing adequate numbers of patients with the disease or condition of interest resulting in underpowered studies. Selection bias can also be problematic. ONS is generally contrasted with routine care, but standards of routine care may vary and other options like medical nutrition therapy using nutritionally complete foods and fortified foods and snacks are also available. Outcome measures are sometimes ill defined. Studies can therefore prove difficult to compare. None the less, many ONS trials have suggested potential benefits in malnourished adults and among those with specific diseases or conditions that include chronic renal disease, chronic obstructive pulmonary disease, diabetes mellitus, cancer, hip fracture, gastrointestinal surgery, and pressure wounds. Benefits attributed to ONS include reduced infections, shorter hospital stays and fewer readmissions, improved well-being and functional status, reduced mortality among acutely ill older persons, and enhanced healing of pressure wounds.

In this issue of *The American Journal of Managed Care* findings are reported from an 11-year retrospective analysis of a matched sample of 1.2 million episodes of oral nutrition supplementation (ONS) use in the Premier Perspectives Database. Philipson and colleagues<sup>5</sup> found that ONS use was associated with decreased length of stay, episode cost, and 30-day readmission risk. The cost savings projections were quite impressive, with a return on investment of \$52.63 in immediate net episode cost savings and \$2.56 net savings due to averted 30-day readmissions for every dollar spent on ONS in the matched sample.

A major strength of this investigation is its great power due to substantial sample size. It is by far the largest such analysis of ONS use yet reported. Recognition of a number of limitations is however warranted. Detailed health and nutrition information was not available in the Premier Perspectives database to further probe relationships. For example, it is not possible to discern whether patients that received ONS were actually malnourished or to access more detailed information regarding those who appeared to benefit. Those individuals that received ONS were however older and less healthy. Since higher acuity and disease burden would favor adverse outcomes in association with ONS use, instrumental vari-

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ables regression analysis was therefore applied by the investigators to account for this selection bias. Hospital readmission analysis was limited to a subset of patients with known follow-up, so that only delayed readmission events could be identified. It is likely that the database did not capture all episodes of ONS use since it was defined only by “complete nutritional supplement use, oral.” Consequently, it is also not possible to address whether certain ONS formulations were more advantageous than others. In addition, prescribed ONS is often not consumed by patients, making the observed benefits all the more remarkable in the present investigation. ONS had the greatest length of stay and readmission benefits for the sickest subgroup of patients. This is not necessarily what one would predict, as these are sometimes the patients with advanced disease states that would not be expected to benefit. These observations may be partially explained by the fact that terminal cases were excluded from analysis. There was also no access to information on further ONS use following hospital discharge. This could likely be a key variable in regard to readmission outcomes. Another important question would be the impact of ONS use in relation to site of disposition; to community, sub-acute, rehabilitation, or chronic care settings.

The retrospective analysis of ONS use by Philipson and colleagues is an important contribution to the field that serves to highlight impressive potential benefits in healthcare resource use and associated costs. The study does not actually address the “causal impacts” of ONS on health outcomes but does allow for causal inferences that are hypothesis generating for further investigation. Key research questions remain as to

which patients should best be targeted with ONS to secure benefits? How may they be readily identified? What ONS formulation and dose should they receive? How long should they receive it? Can practical indicators of nutritional status be developed to aid in monitoring? In the meantime education of healthcare providers and application of evidence-based guidelines for appropriate ONS use are likely to promote improved patient outcomes.

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