

IS THE MNA® VALID IN DIFFERENT POPULATIONS AND ACROSS PRACTICE SETTINGS?

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Abstract: *Objective:* The MNA® is a successful screening tool in geriatric medicine, but this success is in Europe or countries with Western health care practice settings. The MNA® is not directly applicable in many ethnic groups or countries or those with non-Western cultural and dietary habits or health care systems. There is an increased prevalence of type 2 diabetes, the metabolic syndrome and obesity among the elderly; however, the MNA® does not include questions or measures related to these or other important health conditions affected by nutritional status. This paper addresses the relevance of anthropometry and the impact of different clinical practice settings on the MNA® and discusses the development of the Chinese Nutritional Screen (CNS) in China. *Conclusions:* If the MNA® is to continue to be successful among groups of elderly around the world, then the MNA®, CNS or similar instruments should be as country or culturally and ethnically specific as possible. The development of the CNS maintained the underlying assumptions and concept of the MNA® but modified them for a country with diverse food and cultural habits and health care settings.

Key words: MNA®, elderly, nutritional status, Chinese Nutritional Screen, CNS.

Introduction

Nutritional status of the elderly affects their overall quality of life and the demand for and cost of health care services in this growing segment of the world's population (1-4). The Mini Nutritional Assessment or MNA® was created as a new way of screening for undernutrition in elderly nursing home residents. Other screening methods or indices reflecting nutritional status for the general elderly population or specifically for those in clinical settings (2, 5-8) have reasonable to limited sensitivity in identifying those at risk or who are undernourished compared to the MNA® (7, 9-11). The MNA® includes four body measurements but no biochemical tests, and it can be administered easily in a short period of time. The MNA® has been used successfully in geriatric medicine since its introduction, but this success is mostly in Europe or countries with Western health care practice settings. In 2001, a shortened version of the MNA®, the MNA®-SF was created that is also valid and successful (12), but its specificity is reduced compared to the full MNA® (13). A description of the MNA®, its questions, application, validity and interpretation are found elsewhere in this issue.

Since the introduction of the MNA®, the spectrum of health and nutritional profiles among the elderly has shifted. There were and continue to be concerns regarding the prevalence of undernutrition, low body weights and body mass indexes (BMIs), and sarcopenia in the elderly (14, 15). Also, at the time the MNA® was introduced, obesity was a common but poorly documented problem among the elderly (16-18). Today, the prevalence of frank obesity has increased in this group as it has among the general population, and there is an increased prevalence of type 2 diabetes, the metabolic syndrome and

obesity among the elderly. However, the MNA® does not include questions or measures related to these conditions. Poor nutritional status and increased mortality are associated with these health conditions; thus, the need to screen the elderly for their nutritional status is an important and ongoing public health concern (19).

The MNA® was validated in nursing home and hospital-bound elderly (19, 20), but it has subsequently been used to screen healthy, free-living elderly for the risk of chronic disease (21, 22) and for pre- and post-operative outcomes (23, 24). Can the MNA® be used to screen the home-bound elderly, those of color or ethnicity, or those of low socioeconomic status in metropolitan or rural population centers? Is there an age limit to the MNA®, considering it has already been used in younger adults? Can it be used over time in the same individuals to monitor change (25, 26)?

The application and continued validity of the MNA® also depends upon the type of health care system (Western versus non-Western and provider-payment or self-payment) in which it is applied. Health and nutritional concerns for the elderly are not population or country specific but are of world-wide importance. Inter-population or country differences in health prevalences are affected by demographic, cultural, dietary and economic factors that vary within and between countries, especially those with large multi-ethnic or racial populations. If the MNA® is to be a useful, valid screening tool world-wide, then should it be country, region or population specific? The current MNA® has limitations in its application to non-Western or non-European groups of elderly, and a translation into different languages is not sufficient to make it culturally sensitive and applicable (27).

The current form of the MNA® is not applicable to many

ethnic groups or countries with non-Western cultural and dietary habits or health care systems, or to those with population-specific differences in demography, body size and shape, morbidity and mortality (13, 14, 27). This paper will address the relevance of anthropometry and the impact of different clinical practice procedures or settings on the MNA® and will also include a brief discussion of the cultural adaptation or revision of the MNA® to China.

Anthropometry

The body measurements included in the MNA® are weight and stature, which are used to calculate BMI, and arm and calf circumferences. These measurements were selected in order to determine the degree of undernutrition on body composition; however, the cut-points that determine the scores assigned to these measurements are based on French data that are over 20 years old. In the current MNA®, weight loss is an indicator of poor nutritional status, but in light of the obesity and diabetes epidemic, it could indicate a positive health response. If an elderly person can not stand, stature for BMI in the MNA® is predicted using equations from the United States. Similar equations are now available for many different population groups that were not available when the MNA® was developed. Given the recognized differences in body size and composition between countries, if the MNA® is to be useful in the U.S. or other countries for which there are national anthropometric data, then those data should be considered in any country-specific version of the MNA®.

Historically, arm circumference has been used to assess nutritional status, due in part to its ease of measurement and its validity in children and younger adults. It is highly correlated with triceps skinfold and is recommended by some instead of BMI for identifying low nutritional status (13). However, arm circumference reflects muscle mass poorly because movement of the arms in daily activities occurs until the very late stages of wasting, which helps to maintain muscle mass locally. Thus arm circumference is a poor indicator of the decline in muscle mass in the remainder of the body, and its use as a possible indicator of wasting in hospital and intensive care settings has met with limited success. Alternatively, calf circumference is recommended as a better descriptor of overall muscle mass because the legs contain over half of the muscle mass of the body. One of the first things that happens during wasting or undernutrition is reduced walking which precipitates the cascade of reduced mobility, loss of weight and fat-free mass, leading to increased morbidity and subsequent mortality.

There are no body measurements that reflect overweight and obesity in the MNA® except BMI. However, the specificity of BMI values in classifying obesity has limitations. The WHO has provided guidelines for determining overweight and obesity, but the validity of these are not well described in the elderly and are population specific. Skinfolts are difficult to take, require skill and there are few reference data available

beyond age 65 years in most countries. The inclusion of waist circumference, possibly based on a relatively high BMI value, could be added to help identify the obese and those at risk for diabetes and the metabolic syndrome.

To Screen or to Monitor

There are reports of repeated use of the MNA® in the same individuals (25, 28). A screening tool's validity is based upon its sensitivity and specificity, and a valid screening tool is not designed to measure and assess change over time. Is the purpose of repeated administration of the MNA® to the same individuals to document change in nutritional status or change in risk? These are two separate constructs with different underlying assumptions and subsequent clinical interpretations. How should repeated MNA® assessments be interpreted in relation to real changes in body composition, nutritional status, risk relationships and morbidity? The ability of the MNA® to detect or be sensitive to such changes is unclear. Since some clinicians are making repeat uses of the MNA®, careful thought should be given to the clinical ramifications of this practice and whether it should be recommended or discouraged. It is possible that the MNA® is a good instrument to monitor change in nutritional status or risk; however, this should be determined through appropriate investigations.

Practice Settings

To our knowledge, the MNA® is used exclusively in Western-style health care systems that are either provider payment or self payment. Stature and weight are more likely to be taken in a provider payment system. Entry levels of care are different with people entering self-payment systems at lower levels of health and nutritional status compared to people entering provider-payment systems. The MNA® for a provider-payment system may act effectively as a nutritional screen in, for instance, family medicine, internal medicine or geriatric neighborhood clinics. The MNA® may not be used as commonly for people entering a self-payment system because they tend to seek medical care less frequently and to enter self-payment systems at higher levels of care (such as to a specialist or the emergency room) having delayed seeking care until there is full expression of disease. The MNA® for a self-provider system may need to be administered at a higher level of care than might occur with a provider-payment system. These differences depend upon the degree of urbanization, what portion of health services are covered by private or public insurance, and the level of geriatric care within the medical community. For example, in Europe, geriatric medicine is a separate medical specialty while in the United States it falls under either family medicine or internal medicine. Also, the availability of medical and nursing home facilities will be more common in urban than rural areas.

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The Chinese Nutritional Screen

The need to be able to screen the elderly for risk of poor nutritional status is a world-wide problem. As a partial response, the MNA® has been translated into numerous languages. This has had little if any effect on its validity due in part to the similarities of the cultures among the countries that have used the MNA® with respect to their food supply, diets, and medical care systems. Using the MNA® as a guide, the Chinese Nutritional Screen or CNS was recently developed for China (27). In the development of the CNS, investigators were faced with several problems: very diverse dietary habits and food supplies; a well established traditional holistic medicine program at the local level; and a mixture of government supported or self-payment Western-style health care programs. In addition, China has the world's largest population in a single country within which the number of elderly, while only a small percentage of the Chinese population, is greater than the entire populations of many other countries.

For cultural reasons, body measurements are not important descriptors for the Chinese at social, medical or government levels. Thus, a person's weight and height are not considered especially relevant, and most people at the community level have little idea of how tall they are or how much they weigh in terms of centimeters or kilograms. This cultural practice extends into routine entry-level medical care so that it would be uncommon for a health care professional to have a reason or the occasion to take a patient's weight or height or to even contemplate calculating a BMI (27). As a result, the CNS did not include body measurements for stature and weight. This did not mean that persons in China were unaware of their body weight, because they knew if they had experienced changes in weight which were reflected in the fit of their clothes. Thus, the question on weight loss, which is also in the MNA®, was amended to also query whether clothes fit tighter or looser.

Dietary habits in China are much more variable than the menus most Westerners encounter in a visit to a Chinese restaurant. Rice is not a universal staple, and dairy products are common in some regions while less common in others. As a result, the food questions in the CNS include slightly more detail than the MNA® to guide an administrator in collecting the data. For example, the question on consumption of beans includes bean soup, bean curd and soy milk; the question on poultry includes chicken, duck, geese and pigeon; and beer and wine, which are on the MNA®, are replaced by soft drink, soup and congee.

The development of the CNS occurred in Shanghai and in Hong Kong. The health care in Shanghai is both traditional and Western, and payment for health care is the responsibility of the individual. In Shanghai, the CNS was tested at the hospital level; if the tool is valid, this is the level at which it would be used. It was determined during development that the CNS would not be effective or sufficiently implemented and interpreted at a local level. In contrast, health care in Hong

Kong is more westernized and is universally provided by the local government, based on its historical relationship with Great Britain. Here the CNS was tested in nursing homes.

The development of the CNS occurred in three phases. The first phase involved the development of the questions in the CNS and its translation and back translation within the two written forms of Chinese and also English. The second phase was a test of the reliability and initial validity of the CNS. The CNS was administered on two separate occasions to the same elderly persons and each of these persons was seen on two separate occasions by a physician who made a medically based determination of their nutritional status based on local standards of care. This testing allowed the determination of the reliability of the CNS in comparison with the reliability of the physicians' determination of nutritional status, and an initial testing of the validity of the CNS against the physicians' assessments. In the third phase, the validity of the CNS was tested. The CNS was administered only once to a large sample of elderly participants who were also seen only once by a physician for a medical assessment of their nutritional status. The validity of the CNS was determined based on its sensitivity, specificity, receiver operating curves, Kappa coefficients and Cronbach's alpha. A distinction of the CNS is that it separates those Chinese elderly who are screened into those who are healthy or those who are at risk for undernutrition. A complete discussion of the development and validity testing of the CNS is in the report by Woo and colleagues (27).

Summary

The current MNA® is a useful, valid and successful screening tool for the elderly. The MNA® sensitizes health care professionals to the nutritional status of the elderly and the type of questions and concerns that are important in assessing nutritional status. If the MNA® is to continue to be successful among groups of elderly around the world, then the MNA®, CNS or similar instruments to be developed should be as country or culturally and ethnically specific as possible. The development of the CNS demonstrated that the underlying assumptions and concept of the MNA® can be maintained but adapted to fit a country with diverse food and cultural habits and health care settings.

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DISCUSSION

Bruno Vellas, MD, Toulouse University, Toulouse, FR: *When we look at all of the 150 plus Medline publications relating to the MNA®, we find that many of the studies were done in different countries, including the US. They all found similar results. For that reason I do not see a validity problem on a country by country basis because the Medline studies were carried out not in one country, but in many different countries.*

Cameron Chumlea, PhD, Wright State University, Dayton, OH, USA: *All of those countries have very similar healthcare systems and very similar food sources. In a sense there may be differences between one country and the next, but the cultural differences are small. The cultural differences between the US and France or between France and Germany are small. How many of the studies in Medline have been done in San Diego over the last five years or in parts of the US where we have had tremendous demographic shifts?*

David Thomas, MD, Saint Louis University, St. Louis, MO, USA: *I have two questions. First, the sensitivity, specificity, and receiver operating curves were all measured against the gold standard, which was the diagnosis by the physician. Can you clarify what the criteria was or what the gold standard for the diagnosis of malnutrition was?*

Cameron Chumlea: *The diagnosis was determined by the Chinese physicians. They filled out the questionnaire and each physician made their own determination of whether the person was well nourished, at risk of malnutrition, or was malnourished. It was determined by the Chinese physicians. In one sense, I do not have the answer for you. They did their own training and determined the diagnosis based on that. We do not have good documentation as to what they did specifically to determine the diagnosis. We found that the reliability testing, between physicians or within physicians both in Shanghai and Hong Kong, tended to be fairly similar across the board. There was a degree of uniformity in the determination of malnutrition risk from one location to the other.*

David Thomas: *Was this done by a single physician or by two physicians?*

Cameron Chumlea: *The testing was done by teams of physicians. In phase two the person was seen twice, either by the same physician or a different physician. In phase three they were seen once by a physician. In both instances they were seen by a team of physicians.*

David Thomas: *Could the difference between the two actually be due to differences between definitions in a physician's mind?*

Cameron Chumlea: *Correct.*

David Thomas: *The second question; briefly looking at the instrument, it looks as though it is measuring cachexia. It refers to diseases and albumin rather than oral intake in the case of the MNA®. It is really a disease model.*

Cameron Chumlea: *Correct. In China they have a disease model. The population selected and provided for the analysis and testing was actually a very healthy population. There was a low prevalence of disease. The albumin was slightly on the low side; hemoglobin was slightly on the low side, but everything else for which we had biochemical values tended to be fairly normal.*

David Thomas: *That drives the question as to whether we are measuring disease or nutrition?*

Cameron Chumlea: *I agree.*

Bruno Vellas: *I know that the MNA® was not designed for an Asiatic population, but in Nutrition 2005 there was a publication from the Department of Geriatrics, Nagoya University, Japan, where they did a study of 226 elderly Japanese people. They concluded that the full- and short-form MNA® were useful tools for Japanese people. The question is, are you sure that China's tool is better than the MNA®?*

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Cameron Chumlea: *Within one group in Hong Kong they have made a translation. I would imagine that the Japanese healthcare system is probably more similar to the US or a western healthcare plan than it would be to China. When we were discussing this with Dr. Woo and Dr. Lui in Shanghai, they recommended testing the instrument in hospitals because that is the level of care at which people come in. Many people in Shanghai use traditional medicine, so you will never see them. They have what we can refer to as neighborhood clinics, where people receive a combination of western and traditional medicine, depending on the inclination of the clinic staff. In Hong Kong it is more of a socialized system of healthcare where the people visit clinics. The healthcare system in Hong Kong is more standardized across the population. In the Peoples Republic of China, the level of healthcare is extremely unstandardized across the country, except in particularly heavily urbanized areas.*

Antonio Salva, MD, Barcelona University, Barcelona, ES: *If I understood, the sensitivity of the Chinese tool was 34 %. If this is correct, this tool has many false negatives. I think is a different tool, which measures similar questions than the MNA®. I am not sure whether the cut point will have to be moved in order to cross culturally adapt the questionnaire. Perhaps the specific cut point for each one of the anthropometric parameters will have to be adapted, but not the cut point of the full test.*

Cameron Chumlea: *Attempting to adjust the anthropometric parameters raises an interesting question. Using the most current reference data from the National Centre for Health Statistics ongoing HANES study would demonstrate that the prevalence of obesity in the adult population is over 50% in some ethnic groups. The use of the cut points from that study raises a question as to what a healthy condition is. The same question arose when growth charts were developed in 2000. Using current data from the HANES III study would have indicated that American kids are basically fat, which we all know. They decided to use a combination of data from the 1960's and 1970's, which they considered to be healthy data. That way, it allowed a child who is overweight to appear as overweight and not just at the 50th percentile. When you want to make those decisions about the cut points, we really need to look closely at the amount of data which is available, how it reflects the population and whether you want to reflect the population or provide a determination of what is in fact healthy. That becomes a difficult task. You need sufficient data to be able to do that.*

Pat Anthony, MS, RD, Nestlé Nutrition, Vevey, CH: *Working on the Chinese nutrition screen reinforced one of the concerns that I had when I came to Nestlé and saw that the form had been translated into 14 or 15 languages. Unfortunately I could not cross-validate them to say whether it translated correctly. This is an issue which also arose today. I have looked at the studies that have been published in Japan and Taiwan. We know that there is an MNA® form in China that has not been validated. When we tried this exercise with the Chinese nutrition screening, we had numerous cultural challenges. I begin to get worried about the translated forms. In some of the studies, which have shown that the MNA® is a useful tool in Taiwan and Japan, I would question whether the form was changed. The MNA® is a validated tool, but if it is changed it is not the same tool. Am I correct in understanding that a lot of the people involved in the study adjusted the MNA® for use in their different countries?*

Bruno Vellas: *I do not know. We need to look more carefully at the study in Japan. Was this also the case for the study in Taiwan?*

Yves Guigoz, PhD, Nestlé Product Technology Center, Konolfingen: *The study in Taiwan was changed somewhat. They did not ask them to compare their overall health status relative to people of the same age. Instead they asked them more directly, do you think you have good health?*

Pat Anthony: *Did they not change the dietary questions?*

Bruno Vellas: *They changed the question relating to protein-rich foods because there was a problem with the original portion size, as there is no such portion size in Taiwan. To my knowledge they are two different Chinese versions of the MNA®. There is one group in Hong Kong and one group in Taiwan. We can look at that, but I do not think that they really changed the meaning. It is like a guideline, for how to ask the questions. We also need to compare the guidelines for the Japanese questionnaire. It has not changed the MNA® much; rather, it was adapted to suit the culture.*

Cameron Chumlea: *The other issue is that Taiwan is a relatively small country, with a relatively homogenous population as are Japan, France and Germany. The changes within these systems may be small and insignificant. With a large country such as the United States, China or Brazil, there are tremendous amounts of heterogeneity within the population in terms of diets, body sizes, etc.*

To design a real test of the validity of an instrument in any large country, the sample would probably approach approximately 50,000 people or more, if money was no object. To provide adequate validity testing, it would have to be a randomly sampled and weighted analysis similar to the HANES study.

Bruno Vellas: *The MNA® is not a tool to measure diet. The MNA® is a tool to measure if a physical condition can result in malnutrition in elderly people. This seems to be a universal process that could also be the same for obesity. If some obese, elderly people do not eat because they have a disease, that will be targeted with MNA®. That is different from the case where you have one obese, elderly person changing their diet a little. It is important to recognize that MNA® is a tool for use in clinical practice to detect the consequences of a disease, frailty or handicap on nutritional status. This is a universal process. This may explain why the MNA® is working in all of the studies we see. Without that, we would not have all of the positive results, which we saw yesterday.*

Cameron Chumlea: *The MNA® is a screening tool, as opposed to a questionnaire which looks at physical activity or a test of physical fitness. We administer two-page questionnaires on physical activity all the time, which ask people questions related to levels of exercise. The only questions, which fall out when we do an analysis, are whether the patient's level of activity in leisure time is low, medium or high. Hours of watching TV are not important. When you are testing for physical fitness, the only factor, which comes into play, is how many minutes you can stay on a treadmill. Frequently when we gather information which we think is potentially useful, it is important to throw everything into the pot to reach the particularly important questions as to exactly what you want to do. Perhaps that could be identified within the MNA® by using groups of questions in short form. You can get down to a central core of questions. If you are going to use this in other cultures, it is important to coming up with that central core of questions.*

Bruno Vellas: *It could be important to look at which questions are the strength of the MNA®, whether it is a question of disease such as anorexia.*

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Phillip Garry, MD, University of New Mexico, Albuquerque, NM, USA: *I think that it is incorrect to say that this is a Chinese version of the MNA®.*

Pat Anthony: *That is why it is called the Chinese nutrition screen.*

Phillip Garry: *Putting those two things together does not make sense to me.*

Bruno Vellas: *It is mostly a tool to assess disease.*

Tommy Cederholm, MD, Karolinska University Hospital Huddinge, Stockholm, SW: *Developing countries are only beginning to be cautious about the health and well-being of their elderly populations. We have to be aware that there will be a large growth in the elderly population of developing countries in the coming years. Therefore, I think it is very good to provide them with instruments for improving their healthcare. I think that the MNA® is such an instrument. The question relating to the lack of a weight gauge, is whether we should adapt to that or whether we should continue to expect that people are being weighed.*

I also wanted to talk about a collaboration between myself and some Bangladeshi doctors and researchers. We are looking at a cohort of 600 elderly rural Bangladeshis outside Dhaka. They all went through a very thorough physical examination and we have retrospectively performed MNA® assessments on this group, which worked out very well. We had to adjust for the question of whether the elderly person lives independently. In Bangladesh, they do not live independently because they always live with relatives. We also had to adjust the BMI cut offs. We did not do any specific validity test but we did a classification of their nutritional status and tried to find out what medical factors and what social factors could underlie the nutritional status. That turned out good data. As you would expect, this will be published in Public Health Nutrition over the coming months. I think that you can use a somewhat adjusted MNA® for large populations and for various populations.

Bobbi Langkamp-Henken, PhD, University of Florida, Gainesville, FL, USA: *How are the physicians in China going to use their version of the nutritional screen when healthcare is not reimbursed? Once they have identified people at nutritional risk, how are they going to use that information to improve health? What are their plans?*

Cameron Chumlea: *Dr. Woo in Hong Kong was very excited about it. Hong Kong intends to continue its healthcare system. It has not changed its healthcare system over to that of the rest of China. A very large proportion of the population is elderly and they felt that they had no particular way of documenting the proportion of the population who were at risk of undernutrition in Hong Kong. They will be screening at nursing homes and outpatient clinics. Once you get outside Hong Kong, I do not know. The level of care at which they were using the instrument was people who could afford to go to a more western type of nursing home. I would assume that that is a very small proportion of the population, compared to the general population. I do not know whether it will be used outside of the major metropolitan areas within China. In a population of 1.3 billion people, there are probably several times the population of the US living in rural conditions. I have no idea of what their health care system is like. I doubt that the MNA® would be useful there.*

Pat Anthony: *I wish that Jean Woo could have been here because she is passionate about the CNS. She is somewhat disappointed because we challenged the data and had some heated discussions about what we would call it. It was a very interesting process. She will use it in Hong Kong. The problem in China, which I find very frustrating, is that between mainland Hong Kong and Taiwan everything is so different. The health care systems are different including how they plan to implement it and what they plan to do. Trying to take this tool and to implement it or to even offer it, it is not greeted with open arms. People want the MNA® because they believe that western things are better.*

I am now struggling with the issue of having to translate it into another Chinese language. How will they use it? Jean will have several publications out in relation to this so we will continue to see. As people used the MNA® it gained more strength and showed more validity from the numerous studies that were published. Jean really feels very strongly that this will also happen with this tool. Only time will tell. We are now trying to focus on getting it formally introduced in Hong Kong and mainland China. Jean will help us a lot in Hong Kong, but mainland China will continue to be a struggle as we figure out how to get it used in their very diverse health care system. The only place it will get started in is the big cities. Getting into rural care is really a dream.

CONCLUSION

Bruno Vellas, MD, Toulouse University, Toulouse, FR: *In the future, we need to do two things. We need to remodulate the MNA® somewhat after 15 years. In light of our experiences, some questions may need to be changed, for example the anthropometric cut off must be rethought. What we can also do is to try to share the data, which we have from different cities, to have a large population of patients with MNA®.*

Yves Guigoz, PhD, Nestlé Product Technology Center, Konolfingen: *What we could do is to collect some of the data from several studies and analyze them on a global basis. The cut off was based on the first population. We could confirm that with a broader database and analysis.*

Bruno Vellas: *Around this table we have a database of a thousand patients.*

Pat Anthony, MS, RD, Nestlé Nutrition, Vevey, CH: *Where do we think the MNA® is valuable as regards site of care? I would like us to talk more about the issue of nursing home, acute care, long term care and residential care. I would like the people with expertise in that area to address the issues. One take-home message that I have is that I need to look at the guide for using the MNA®. We need to make it more available and more readily used. We also need to question whether it is written appropriately. In order to increase the use of the MNA®, where should we push it? I would question whether we should take it to an acute care setting? Is it a useful tool there? I would like to know where the most appropriate places to use the MNA® are.*

Bruno Vellas: *I feel that we should target frail elderly people. There are many definitions of frail. What we can say at this time is that almost all elderly people over 85 years old are frail. 95% of elderly people over 85 are frail. I think that every elderly person over 85 must have an MNA® assessment, which can be done anywhere. After frail elderly people, there are some younger elderly people, who could be between 65 and 85, and have some kind of impairment; they live alone or they have a cognitive impairment or something else. It is very easy for the clinician to target the frail elderly people. What is interesting about the frail people is that, if you intervene, you will be much more cost effective than intervening with very severely demented elderly people in long term care or in some other population. In the future, if we can use the nutritional*

IS THE MNA® VALID IN DIFFERENT POPULATIONS AND ACROSS PRACTICE SETTINGS?

assessment in the frail, we will have the most cost effective results. This does not mean that we do not need to do it in nursing home.

Janet Skates, MS, Nutrition Consulting Services, Kingsport, TN, USA: I come from the perspective of a large acute care facility with patients from premature babies to 95 year olds, and for the tool to be used in an acute care setting, it needs to be quick and easy. In most US hospitals, the nurses incorporate the nutrition screening as part of their total admissions screen, where they look at every component of the patient. The nutritional screening component needs to be very quick and very easy for nurses to implement. It would also be nice to have a screen applicable for obesity, etc. However the reality is that in an acute care setting, we need one screening tool which can quickly break out, at least, the adult population. Can we say that the tool has been validated or is it realistic to use it for the younger population?

Cameron Chumlea, PhD, Wright State University, Dayton, OH, USA: We applied it to a younger population, just to see what it would do, but this instrument was not designed to do that. The report is in the Nestlé book on the MNA® (Vellas B [ed], Mini Nutritional Assessment [MNA] Research and Practice in the Elderly, Nestlé Nutrition Workshop Series Clinical and Performance Programme, Vol 1, pp. 13-22, S. Karger AG, Basel, 1999). There are probably important aspects and questions in here that would be useful, but if you really want an assessment tool for people who are not elderly, whatever that age cut off point is, something else needs to be developed.

Bruno Vellas: This tool is for the elderly. One other good target could be elderly people living in assisted living. Most frail elderly people live in this kind of setting.

Cameron Chumlea: No, I do not think so. There is a need within assisted living, but that is still only 5-10% of the population. We need something that can be administered when elderly people go to their physician, be that the family practice or internal medicine or something of that nature.

David Thomas, MD, Saint Louis University, St. Louis, MO, USA: The issue that we should focus on is what we want a tool to do. What we have seen is that the MNA® clearly predicts abnormalities in lab tests. It clearly predicts nutritional assessment by physicians. It predicts mortality. It predicts immune function, etc. What it does not predict is whether or not someone is going to get better when you give them nutrition. None of the tools do that. In terms of the population studied, which was older adults, the six questions in the screening test, are very useful in predicting those outcomes. If you are interested in who is going to die in your hospital, this is very useful at predicting that. You can sort out who is going to live and die, who is going to do well, who is frail and who is not. However, you cannot predict who will get better with nutrition. That is another issue, which this group or some other group ought to examine. That is why I like Kondrup's list. He provides a list and says this is what we know you can work on. If you have one of those diseases, you ought to take his card and keep it in your pocket. You know that you can fix these people. If they are not on that list, the data shows that you cannot fix them. Remember it is really not a nutritional predictor, but it is a superb mortality predictor.

Riva Touger-Decker, PhD, RD, University of Medicine & Dentistry of New Jersey, Newark, NJ, USA: There are two points. You are getting at what we are using to measure outcome, which may not be the tool that says yes intervene with some of the assessments versus no. If you think of the nutrition care process, you are getting at stage three. The MNA® short form gives a stage one, i.e. screening to put them into identification and assessment. We then need a tool which will identify the outcomes, which you will monitor, that may be a mortality predictor. That tool will likely change with the care setting.

David Thomas: This does not do that. From our discussions about doing nutritional screening within 24 hours in acute care hospitals, I submit that, that is a totally irrational process. Anything you use and any questions you ask have never been tested. It does not stand to reason to me for us to use four questions in place of the MNA® six questions. It makes rational sense that we should use those six questions.

Gordon Jensen, MD, Vanderbilt University, Nashville, TN, USA: In 1999, when I was on the Food and Nutrition Board panel for Medicare beneficiaries, we actually questioned the utility of required 24-hour screening. We recommended that it should be dropped because it is not evidence-based and has no established validity. That is still true today. Fundamentally a lot of us have been asking these tools to do things for which they were never validated nor intended to do. Trying to ascertain, who actually warrants interventions is far into the realm of assessment not screening. To get at that will be very tricky because it will require acuity and disease burden assessments. There are certainly many patients for whom nutrition assessments and interventions are going to be futile; at the very least, futile unless they are multi-disciplinary. They must involve multiple other interventions to have any opportunity for success. That is way beyond screening.

David Thomas: Do you not think that we need to assess everybody? So why even do a screening? Why not just see everybody? The only reason to screen people is to rule out normal. We are talking about trying to rule in who is malnourished. The deal is trying to get rid of people that you do not need to see, because you have scarce resources and you do not have enough people to do this, and you have a 24 hour time limit. It makes sense to me to see the sicker people. This measures sick people really well.

Cameron Chumlea: Does this also mean that you need an age value attached to it? If a 45-year-old comes in, this may not be the instrument to use, but if someone is 65 or 70, this may be the instrument to use.

David Thomas: Two thirds of all admissions to acute care hospitals are over the age of 65. You have some young people. Nobody has tested it but we could do that fairly easily using younger people in hospitals. What this does is just to predict sick people. If you are short staffed and do not have enough time, you see the sick people first. That is what I do when I make rounds, then I see the well people. This will only tell you to see the sick people. I would much rather do it with this tool, which I know works.

Riva Touger-Decker: This may predict those at risk and in need of what we have traditionally called nutritional support, but it will not predict the guy who comes in who has a BMI of 29 and is coming in for a triple CABG (coronary artery bypass graft), who has every marker of metabolic syndrome and who also needs intervention. The question is what are we using this for?

David Thomas: In my QA process in a university teaching hospital, with nutritional assessment on admission questions, I do not pick that person up either. We are not losing anything. We are not picking these people up. Every study, which has been published, says that if we are admitting sick people to hospital, when they leave they are sicker. We admit people to hospital when they are undernourished and when they leave they are more undernourished. Then you send them to my nursing home and want me to fix them, with no technology. That is the way it is. That is reality. I get the sense that we are sometimes talking about being careful not to throw out this wonderful system in order to adopt a new one.

THE JOURNAL OF NUTRITION, HEALTH & AGING©

Antonio Salva, MD, Barcelona University, Barcelona, ES: *There are two questions in the MNA® that we could consider modifying. One is question (g); lives independently not in a nursing home or a hospital. This is sometimes confusing because people ask whether independence has a relationship with autonomy. In this case the question is used to find out if you are living at home or if you are living in a nursing home or in a residential setting. We can formulate the question more simply. The second question is question (a); has food intake declined? Where the answer is severe loss of appetite, then the answer has to be qualified in relation to the question.*

Pat Anthony: *My take-home message is that in a patient who is already being tube fed, the MNA® will not tell you anything else. I know that that is frustrating for those of you admitting patients to nursing homes, but I do not want us to try to make the MNA® more than it is. Some of this discussion has been excellent in that way. I would like your thoughts on the frustrations in your work in trying to use the MNA®.*

Bobbi Langkamp-Henken, PhD, University of Florida, Gainesville, FL, USA: *I came here wanting you to change the scoring for the food, the protein and the fruits and vegetables. If somebody is on tube feeding we should give them full points for all of the MNA® questions related to dietary intake. If they are receiving supplements, where the assessment says protein servings per day, we could include the nutritional supplement there. It is truly an example of a protein containing food. When I talk to my students and colleagues about my experiences, I will tell them, that if a patient or a long term resident is already receiving tube feeding or already receiving supplements, the MNA® is not for them. They have already been assessed and screened and somebody has already provided an intervention. The problem I have with that is that I think a lot of people are coming to nursing homes with a prescription for between meal formulas or supplements or tube feeding. Does that mean that we automatically do not do the MNA® on this percentage of patients entering the nursing home?*

Bruno Vellas: *That is a different question. The MNA® must be done on entry of elderly people to a nursing home. Usually they do not have tube feeding at this stage. It is important to do the MNA® before the decision is taken to tube feed a person. It is also important to have the MNA® score before tube feeding. If you want to use the MNA® again afterwards, you are using the MNA® as a follow-up tool for which it was not designed. It may work in some studies, but that is not a good indication in the case of tube feeding. This is not the same for oral supplementation. You can still use the MNA® for the people using oral supplementation.*

Bobbi Langkamp-Henken: *If they are receiving supplementation and are getting all of their calories, protein, vitamins and minerals in between meal snacks, does it matter that they are not eating fruits and vegetables?*

Bruno Vellas: *The aim of the MNA® is to find out what the nutritional standard in normal life is without oral supplementation. If the MNA® is normal, you do not need to give oral supplementation. If the MNA® is not normal, you must give some kind of oral supplementation.*

Bobbi Langkamp-Henken: *You would not believe all the commercials on TV for nutritional formulas. Independently living elderly are constantly bombarded with supplements. It is not unusual that people are replacing meals with dietary supplements.*

Bruno Vellas: *There are two different indications of nutritional supplementation in the elderly. The first indication is how to have good supplementation. If elderly people are at risk of malnutrition, we need to give them something to get to the right level. The second problem of supplementation is what we need to take to prevent some age-related disease? That is another question.*

Bobbi Langkamp-Henken: *If you have somebody who is taking oral supplements as their primary nutrient source, they may score as "at risk" because they are not eating fruits and vegetables or dairy products and eggs. In reality their nutritional status could be pretty good because they have been using alternative forms of energy, protein, vitamins and minerals.*

Kathleen Niedert, RD, Western Home Communities, Cedar Falls, IA, USA: *The MNA® could be used as a tool for those people who come to our open houses, to enable us to identify people who are at risk, and are moving into a continuing care retirement facility. This would be a great tool to start screening out those people who are at risk within our community, our community being the Western Home Communities. I can start some kind of intervention earlier, or the doctor and I can work together to improve their quality of life, prior to entering the medical center. When they get into the nursing home, these people are acutely ill. They fall out as high risk. 90% of them have some sort of functional disability or mental disability, and are being treated for either depression or dementia. Those people are at high risk. Once they get to the nursing home, I do not worry about if they eat fruits and vegetables or whether they eat meat, or if they live on ice-cream. I want to make sure that these people eat something. If all they will do is drink their meals, fine. By the time they get to long term care, they are acutely ill; their life span is 2.5 years at the very most. I really do not care what they eat at that stage. Doing the MNA® once they get to the nursing home is probably a moot point. I will do a full assessment because that is what is needed, and I will do that on every resident who comes into the nursing home. The MNA®, however, would be very helpful for those people who are within the community, in their own homes. Dietitians could do this at congregate meal sites. We have a Medicaid Elderly Waiver program in Iowa with dietitians at our congregate meal sites. That would put us in a position to screen those people early on. That is where this is needed, not by the time they are 85 and in the nursing home. It is essentially too late to worry about this. They are at the end of life and we should be more concerned about palliative care.*

Bruno Vellas: *How do you score elderly people who take supplementation with MNA®?*

Cornel Sieber, MD, Erlangen-Nürnberg University, Nürnberg, DE: *I agree that you make the assessment first and then you introduce something, either supplements or something else they prefer. Sometimes, these very clear and easy American slogans are helpful because you need to use easy language. If you have a 'no go', I am happy for them to eat whatever they will eat. That is the limit where beyond you do not have to perform a very well established nutritional evaluation. You give them what they can eat. You do the screening, the assessment and then you make the intervention. A supplement or a tube feeding is an intervention. It certainly always comes after the screening.*

Pat Anthony: *Do we need a question which scores a supplement? If a GP in Europe does the MNA® on somebody in the community and gives a supplement and then 6-8 months later, he sees that patient again, will he use a different tool or will he use the MNA® again? If he does the MNA® again when the patient is taking a supplement, the supplement should play into it. I am not quite sure how I would score the MNA®, or whether I would give it positive or negative points. It can go either way.*

Bruno Vellas: *In practice we have seen some studies with oral supplementation in frail elderly people. If you have a low MNA® you can give a supplement. After perhaps six months you can redo the MNA® and increase the score of the MNA® because of weight increase, or disease decrease. It may result in a normal score and you can then stop the supplementation. This is another way in which you can use the MNA®.*

IS THE MNA® VALID IN DIFFERENT POPULATIONS AND ACROSS PRACTICE SETTINGS?

Tommy Cederholm, MD, Karolinska University Hospital Huddinge, Stockholm, SW: *I would agree that hopefully those who are receiving oral supplementation or tube feeding are already assessed. Then you do not need to do the MNA® because you have already made the decision that they need supplementation. For this group you need an instrument for surveillance or for follow up, and maybe that is easier to do by way of a weight or functional test.*

Cornel Sieber: *After six months, if you do the MNA® again and the person is on supplements, I would factor this into the MNA®. If the patient gets a once-a-day, high-protein supplement, practically, I would probably include it as a daily serving of a dairy product.*

Bobbi Langkamp-Henken: *Where I see the problem is that if we want to use this as a tool in nursing home settings, we must use it on everyone who comes in the door. You need to have something in place. If this is what you are going to put in place, it needs to address everyone who walks in the door or comes into your nursing home setting. You will admit people, who are being assessed for the very first time or who were assessed at some point before admission and are receiving tube feedings or nutritional supplements. If you score them using the MNA®, a person on tube feeding or oral supplements may be identified as severely malnourished and trigger the need for further assessment. I agree that the MNA® should be used before initiating tube feedings or nutritional supplements, but if you are trying to establish a protocol to use in your facility, it would be nice to be able to use the same tool for every person admitted to the facility.*

Bruno Vellas: *In my personal opinion, if I was using the MNA® on people with tube feeding, I would score zero for each question concerning their intake. The aim of the MNA® is to get information regarding the patient's normal life condition. Therefore, for the question, how many full meals does the patient eat daily, I would answer zero. Selective consumption of protein markers, I would answer zero.*

Bobbi Langkamp-Henken: *If you do so, their indicator score may be severely malnourished, when in fact they could have a fantastic nutritional status because they are receiving everything they need via their tube.*

Bruno Vellas: *This is my personal point of view. What will happen without tube feeding?*

Gordon Jensen: *Basically, everyone presenting to us is high risk. They will all warrant comprehensive assessment whether they are receiving tube feedings or supplements or not. Clearly the MNA® has in no way been validated for repeated assessments over time, or looking at the efficacy of a tube feeding intervention. My clinical experience of going on rounds in the hospital or in a sub-acute unit is that you will walk into a room and there will be 25 cans of supplement stacked on a corner table, which correspond to the past 2-weeks of this person's daily liquid supplement prescription. These have not been consumed and yet are diligently documented. They are documented as having been administered and consumed despite the fact that they were never opened or consumed.*

Bruno Vellas: *One of the aims of MNA® is the diagnosis of whether the patient has a problem. If we take the example of hypertension, can we decide that in a person with hypertension, if they take a drug, they no longer have hypertension? If they take the drug, we are able to lower the level of hypertension, but it is still not normal. We have the same problem with nutrition and MNA®. They do not have high blood pressure because they have taken a pill, but they remain a person with hypertension.*

Cameron Chumlea: *The MNA® divides people into those that you do and do not need to see. If they are already in the nursing home, then they are already in the "do need to see" category. In a sense it is not an effective tool there. What you want is something which will give you an assessment of the nutritional status of people, who are being tube fed within a nursing home. That is a completely different instrument. That is what people have been trying to do and there are various forms out there. The problem is that as these people progress through the nursing home, they either get better or get out, which is what your instrument will hopefully tell you. At some point all of these instruments break down and stop working. This is because the people are admitted in such a frail condition that nothing really works. What you want is another animal. I do not know what is available, but I do not think that this is quite the one that you want.*

Cornel Sieber: *We just want to make small changes. For example we have found out that appetite in question one in the screening part does not always fit semantically, so we have to change appetite to intake. With regard to supplements - not tube feeding - I think you would be happy, if in question K, where it asks for protein intake of at least one serving of dairy product a day, we added high-protein supplements as a choice along with milk, cheese, and yogurt. It may be that this is part of normal life in an elderly American person. Would you be happy with that?*

Bobbi Langkamp-Henken: *I would be happy with that, if they were taking it in a between-meal format. Maybe the full meals that the patient takes daily could be adjusted as well. For example, we frequently observed instances where the patient or resident of a nursing home did not eat their morning meal, but at 10 o'clock the nurse fed them a can of very high-calorie, high-protein supplement. To me, that is the same as having their morning meal. We could adjust it to ask how many full meals or meal replacements did they have.*

Kathleen Nirdert: *That gets back to why they did not eat their breakfast. Was there no staff available to adequately assist them? Are they not a morning person? If you had given them eggs and bacon at 10 o'clock, would they have eaten it then? That plays into a lot of other issues in a long term care facility, besides not eating breakfast but eating a snack. I am not sure that you can validate that at all. There are too many variables to tell why they did not eat it. We are finding that more and more in the long term care facility. In my facility we allow them to eat when they want to eat. We have decreased our weight loss and decreased our supplements because we have food available for them all the time. Maybe they do not eat fruit at breakfast but they can go out at 9 or 10 o'clock and grab some fruit from the snack bar.*

Cameron Chumlea: *What you are getting at is that this was designed for people who are elderly and are living a normal lifestyle, compared to those who are not. What you have is a group, who are not living a normal lifestyle. What you need therefore is another tool, which addresses those particular specific questions.*

Kathleen Niedert: *The other issue is the screening on question (e). I would certainly like to see zero if they have severe dementia or depression; then it goes to mild dementia. It is all or nothing. Could you have mild depression or controlled depression, where the person is getting an anti-depressant?*

David Thomas: *Obviously, we can tweak this but remember that the score runs from 30 to 17. One or two questions, one or two points, one or two mis-assessments will not change the score overall. If they are on supplements, they are on them for a reason. Most of the time it may be a dumb reason but never mind that. Somebody thought that they were having trouble, or they have triggered for weight loss. For follow up, we have the RAI, weight loss and all the stuff that we can follow people with. If you are looking for a way to categorize in documentation where somebody is when they came in, that is a good idea and I think you should do the six questions. If that screens positive, you should do the full*

THE JOURNAL OF NUTRITION, HEALTH & AGING®

thing. You may have to fudge a bit in terms of answering these questions. However, even if you fudge on three questions you are not going to move the score.

Bruno Vellas: *That is a good point, that there is room between 0-30 on the MNA®, and we do not have to place too much importance on one single item in clinical practice. One point that is very common in the case of obesity is that we may have to replace weight loss with involuntary weight loss during the last months.*

Gordon Jensen: *The only concern which I would raise about that is that I am not sure that I trust a lot of older persons to reliably report the voluntary nature of their weight loss. Many overweight persons who are losing weight may be quite willing to attribute it to dieting or increased physical activity when it may well very likely reflect underlying disease processes.*

Maureen Otto, MS, RD, Director, American Dietetic Association (ADA), Chicago, IL, USA: *Getting back to the adjustments, which we have discussed, this would ensure that we have categorized a patient in their proper category of malnutrition, but it does not necessarily equate to whether they have to be visited by a registered dietitian. If a person came in on tube feeding and we adjusted their scores so that their nutrition risk is lower, because in fact it would be, it does not mean that the registered dietitian would not see that patient. In the acute care setting, at least, we are screening for two different things. We are looking for the risk, but we are also looking for scenarios that a registered dietitian would want to be on top of right away.*

Riva Touger-Decker: *We are mixing apples and oranges. The MNA® was designed to identify risk, according to the definition given earlier. I do not believe that it was validated in individuals receiving tube feedings. It was validated in people who were not on tube feeding. You can have some very well nourished healthy tube feeders, who are better nourished than even some of us in this room, from the standpoint that they are well fed and well cared for. You will also have some who are undernourished. In order to do that we really need to validate the tool in a broader population including those on tube feedings. We are mixing apples and oranges in that regard, but also in regard to the fact that we need a monitoring tool with identified outcomes, which hopefully we could tie to the nutrition diagnostic codes. We have two people from the standardized language task force here. That is an important point to raise. The other point on the issue of the BMI is that we are only taking those people who are undernourished by virtue of a BMI of underweight, not the overweight obese person who may be undernourished. I do not know how to address that. I should not bring up a problem without knowing a possible solution, but I do think that it is a purple elephant sitting on the table.*

Bruno Vellas: *In fact we see that by spending a day speaking about MNA® we are actually speaking about nutrition and that was one of the aims of the MNA®, to stimulate nutritional practice and to stimulate nutritional research. When you have a tool for measuring nutrition, it is important you do research and you take care of the patient. If you do not have a tool, it is much more difficult.*