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# Plates and Dietary Advice: A Current Trend in Nutrition Education Messaging for the Public

Judy E. Perkin, DrPH, RD, CHES, Claudia Sealey-Potts, PhD, RD, Rachel Hochwald, RD

## ABSTRACT

*Numerous dietary advice plate icons are currently being promoted in the United States. These icons are based on scientific studies related to diet and the prevention or treatment of chronic diseases. Icons also have been targeted to specific populations related to age, ethnicity, eating preferences, and level of physical activity. Plate icons currently being advocated stress the importance of portion size and the desirability of fruit and vegetable consumption while giving other types of advice as well. The multiplicity of icons may enable more individually tailored dietary advice but may also be confusing for the public. This paper reviews 16 plate icons to enable public health practitioners and nutrition educators to help clients make the most appropriate decisions regarding the use of plate images in planning meals.*

*Florida Public Health Review, 2014; 11, 36-51.*

## BACKGROUND

For many years, health professionals have been trying to develop simple, easy to understand messages to convey nutritional guidance to the public. Use of icons (or visual images) has traditionally been part of this guidance (Welsh, Davis, & Shaw, 1993; U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, A Brief History of USDA Food Guides, 2011). The use of a plate icon to convey dietary advice has been traced back to Sweden beginning in 1970 (*Idaho Plate Method- About Us*, 2013). In the late 1980s, the dietary advice plate icon was being encouraged as a nutrition education tool by the British Dietetic Association's Community Nutrition Group and the Swedish Dietetic Association (Camelon, et al., 1998). In 1993, the *Idaho Plate Method* was implemented in the United States (U.S.) to aid in providing nutritional recommendations to those with diabetes (*Idaho Plate Method - About Us*, 2013). Benefits of a plate model to convey dietary advice have been noted as: (1) high learner involvement; (2) linkage to the daily action of meal consumption; (3) ease of tailoring to individual and cultural food preferences; and (4) the ability to serve as an in-home education aid fostering not only individual but household nutrition education (Camelon, et al., 1998).

The purpose of this paper is to review the nutrition education plate icons currently being promoted in the U.S. and discuss issues related to their use in public health and nutrition practice. The current multiplicity of dietary plate icons could potentially be a source of

confusion for the American public but if used appropriately could enhance public health and nutrition practice. Consumers need guidance as to which plate icon might be most appropriate to promote good health specific to their individual situation and needs.

## CURRENT PLATE DIETARY GUIDANCE

In this review, we address current dietary plate advice in three major categories – (1) plate icons aimed at general health promotion, healthy weight maintenance, and the prevention of chronic diseases and conditions; (2) plate icons aimed at prevention and/or treatment of specific chronic diseases of public health importance; and (3) plate icons tailored to specific populations by age, ethnicity, eating style, and activity level. Information about plate icons for this article has been identified through search of the Internet and use of One Search – a university-based search engine for multiple databases.

## PLATE ICONS FOR GENERAL HEALTH PROMOTION AND PREVENTION OF CHRONIC DISEASES

### MyPlate

The *MyPlate* icon is the icon now being used by the U.S. government and is promulgated through the U.S. Department of Agriculture (U.S.D.A.) and the Department of Health and Human Services (U.S.D.A., *Choose MyPlate. gov-Food Groups*, n.d). The antecedents of this government icon and associated dietary advice can be traced back to the late 19th

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century with U.S. government sources indicating that its dietary advice efforts were initiated in 1894 (Davis & Saltos, 1999). The first U.S. food guide was developed in 1916 for children and consisted of five food groups (Welsh, Davis, & Shaw, 1993; U.S.D.A., Center for Nutrition Policy and Promotion, A Brief History of USDA Food Guides, 2011). Major U.S. government food guidance systems developed since that time have included the *Basic Seven Food Groups* (mid-1940s), the *Basic Four Food Groups* (mid-1950s through the 1970s), the *Hassle-Free Daily Food Guide* with five groups of foods (1979), the *Food Wheel: A Pattern for Daily Food Choices* (1984), and two pyramid icon guides- the *Food Guide Pyramid* (1992) and the *MyPyramid Food Guidance System* (2005) (Davis & Saltos, 1999; U.S.D.A., Center for Nutrition Policy and Promotion, A Brief History of USDA Food Guides, 2011).

The icon *MyPlate* is based on the *2010 Dietary Guidelines for Americans* (U.S.D.A. and U.S. Department of Health and Human Services, 2010). The purpose of the *2010 Dietary Guidelines for Americans* is to provide guidance related to decreasing the prevalence of overweight and obesity and to support dietary habits that might help decrease the risk of chronic diseases such as cardiovascular disease, cancers, and diabetes mellitus (U.S.D.A. and U.S. Department of Health and Human Services, 2010). The *2010 Dietary Guidelines for Americans* have multiple recommendations but cite two overall strategies to help improve diet: (1) maintenance of appropriate calorie intake and healthy weight throughout life; and (2) consumption of nutrient-dense foods (U.S.D.A., Center for Nutrition Policy and Promotion. Development of *2010 Dietary Guidelines for Americans*, 2011). More specific recommendations relate to having low dietary intakes of fat, cholesterol, sugar, sodium, and refined grains while increasing intakes of vegetables, fruits, whole grains, non-fat and low fat dairy products, and seafood (U.S.D.A. and U.S. Department of Health and Human Services, 2010). Some of the specific nutrients highlighted in the 2010 guidelines relate to ensuring that Americans are consuming adequate amounts of Vitamin D, calcium, potassium, and fiber (U.S.D.A. and U.S. Department of Health and Human Services, 2010).

The conversion of the U.S. government dietary advice icon from a pyramid to a plate is putting the *MyPlate* icon in the public spotlight with multiple materials available to support health care professionals and teachers using this new image (U.S.D.A., *Choose MyPlate.gov*- Health and Nutrition information for educators, n.d.; U.S.D.A. *Choose MyPlate.gov* – Information for health professionals, n.d.). The icon,

which made its debut in June 2011, was developed using consumer focus groups as well as surveys of adults and children, interviews with governmental and organizational key stakeholders, analysis of news articles and other media sources, an environmental scan of major national initiatives aimed at improving diet and increasing physical activity, and a literature review (U.S.D.A., Center for Nutrition Policy and Promotion. Development of *2010 Dietary Guidelines for Americans*, 2011). According to one of the *MyPlate* websites, it is acknowledged that the purpose of this new dietary guidance campaign is to “to remind Americans to eat healthfully; it is not intended to change consumer behavior alone” (U.S.D.A., Center for Nutrition Policy and Promotion. *ChooseMyPlate.gov* - Getting Started with *MyPlate*, 2012).

The basic *MyPlate* icon includes five groups – vegetables, fruits, grains, and protein on a plate with a circle labeled as dairy sitting next to the plate (U.S.D.A., *ChooseMyPlate.gov*, Printable Materials and Ordering, *MyPlate* Graphic Resources, n.d.). According to a government website, a “key consumer message” for *MyPlate* is “Make half of your plate fruits and vegetables” (U.S.D.A., *ChooseMyPlate.gov* - What are Foods in the Fruit Group?, n.d.; U.S.D.A., *ChooseMyPlate.gov* - What Foods Are in the Vegetable Group?, n.d.). The other half of *MyPlate* is divided between grains and protein with dairy on the side in a round shape (U.S.D.A., *ChooseMyPlate.gov*, Printable Materials and Ordering, *MyPlate* Graphic Resources, n.d.). The *MyPlate* icon is also available in Spanish (U.S.D.A., *Choose MyPlate.gov*, Printable Materials and Ordering, *MyPlate* Graphic Resources, n.d.).

The *ChooseMyPlate.gov* website, in addition to promoting the *MyPlate* icon, has supporting tools which enable dietary advice and tracking of diet to be tailored individually depending on age, sex, activity level, and status such as pregnancy or lactation (U.S.D.A., *ChooseMyPlate.gov*, *SuperTracker*, n.d.). Tools for *MyPlate* include: *SuperTracker* - a nutrient and food group analysis program (U.S.D.A., *ChooseMyPlate.gov*, *SuperTracker*, n.d.), daily food plans and worksheets (U.S.D.A., *ChooseMyPlate.gov* Daily Food Plans and Worksheets, n.d), quizzes related to portion size (U.S.D.A., *ChooseMyPlate.gov* Portion Distortion, n.d.), physical activity (U.S.D.A., *ChooseMyPlate.gov*. Physical Activity, n.d.) and other resources such as a communications calendar, games and coloring books for children, and sample menus and recipes (Post, Haven, & Maniscalco, 2012). The *MyPlate* materials are also expanding into social media to include

Facebook, Twitter, Pinterest, and GovDelivery (Post, Eder, Maniscalco, Johnson-Bailey, & Bard, 2013). A report has been presented for *MobileMyPlate* which used texting to educate college students about *MyPlate* (O'Connor, 2012). Numerous companies in the private sector are also providing *MyPlate* products for educators and health professionals.

According to a 2011 U.S.D.A. news release, more than 2,000 organizations including the Academy of Nutrition and Dietetics (at that time, the American Dietetic Association), the American Society for Nutrition, the American Diabetes Association, corporate entities, and community organizations supported the initiation and use of the *MyPlate* icon (U.S.D.A., Office of Communications, 2011). The debut of *MyPlate* was covered by major television networks and newspapers in the U.S. (Epstein, Jean-Pierre, Lynn, & Kant, 2013). The U.S.D.A. noted in 2011 that it had formed a network of national, regional, and local partners called the Nutrition Communications Network to promote the use of the *MyPlate* icon by the American public (U.S.D.A., Office of Communications, 2011). In 2013, it was reported that the Nutrition Communications Network had over 7,000 community partners, over 1,000 campus ambassadors, and over 100 strategic partners (Post, Haven, Maniscalco, & Brown, 2013).

Because it is being promoted by the government, *MyPlate* has probably been the most commented upon of all of the current dietary plate icons. Marion Nestle, noted nutritionist and author, has expressed the view that *MyPlate* is easily comprehensible to all age groups as well as having the following strengths - (1) emphasis on vegetable and fruit consumption; (2) a lack of a requirement to count servings; (3) flexibility of food types that can be chosen for the plate; and (4) putting dairy on the side which she interprets as meaning it is optional (Nestle, 2011). Nestle has criticized the use of the term "protein" on *MyPlate* because protein is a nutrient as opposed to being a food. Nestle points out that protein is in a variety of foods – meats, legumes, poultry, animal seafood products, grains, and dairy (Nestle, 2011). Health professionals helping consumers understand the *MyPlate* icon will need to clarify what foods constitute healthy protein choices and some alternatives to the governmental *MyPlate* have chosen to focus either solely or primarily on plant-based sources of protein (Physicians Committee for Responsible Medicine, *The Power Plate*, n.d.; The Vegetarian Resource Group, *My Vegan Plate*, n.d.).

Alice Lichtenstein of Tufts University (How to Make "MyPlate" Your Plate, 2011) has noted that some consumers might benefit from having more

images on the plate to better illustrate the specifics of each food group. She also notes that the *MyPlate* icon does not provide guidance with regard to important nutrient recommendations in the *Dietary Guidelines for American, 2010* notably in regard to the desirability of limiting intake of fats, sugars, and sodium (How to Make "MyPlate" Your Plate, 2011).

Another issue with *MyPlate* identified in consumer focus groups was that most people felt it could be used for dinner but experienced difficulty in seeing how the icon provided guidance for the other meals (U.S.D.A., Center for Nutrition Policy and Promotion. Development of *2010 Dietary Guidelines for Americans*, 2011). Suggestions for following *MyPlate* at breakfast have been developed to help consumers (Amidor, 2012).

To what extent the *MyPlate* icon and related materials will be successful as a public health education effort is as yet unknown, but an evaluation framework and sample research questions have been proposed related to formative, process, and outcome evaluation at the individual level as well as to evaluate effectiveness related to institutional environments and systems such as agribusiness and the healthcare system (Levine, Abbatangelo-Gray, Mobley, McLaughlin, & Herzog, 2012). In the 2012 *Food & Health Survey* conducted by the International Food Information Council, major findings were that 95% of persons viewing the message felt it effectively conveyed the dietary advice principles of variety and balance and 75% of respondents felt the *MyPlate* icon was effective in communicating that fruits and vegetables should comprise one-half of a meal plate (International Food Information Council Foundation, 2012). A study grounded in the diffusion of innovation theory found that mothers who were early users of *MyPlate* were those who had familiarity with the previous government icon-*MyPyramid*, those who found *MyPlate* to be understandable, and those who stated a liking for vegetables (Wansink & Kranz, 2013).

Another small study using health fair participants found that slightly over 40% of the subjects felt they would use *MyPlate* (Uruakpa, Moeckly, Fulford, Hollister, & Kim, 2013). An online survey of over 900 university students found that the majority reported they felt that *MyPlate* would be useful in helping to plan lunch and dinner menus (Quinlan, Lee, Mangroo, & Vierow, 2012).

Several small studies published in 2013, however, were not overly optimistic about the use of *MyPlate* (Bachman, Cuy Castellanos, Christaldi, & Tomasko, 2013; Baker, 2013; Christaldi, Cuy Castellanos, Bachman, & Violi, 2013). A study of university faculty, staff, and students reported that most

participants had difficulty using *MyPlate* for menu planning (Bachman, Cuy Castellanos, Christaldi & Tomasko, 2013). Baker (2013) in a study of 564 college students reported that even though most students indicated a preference for *MyPlate* over *MyPyramid*, most said that would not go the *MyPlate* website even after seeing the icon. Another study of 50 participants found that its subjects said they relied more on text with *MyPlate* rather than the visual icon but this study did not demonstrate an association with icon use and positive dietary behavior change (Christaldi, Cuy Castellanos & Violi, 2013).

### Healthy Eating Plate

In response to the new government *MyPlate* icon, Harvard School of Public Health scientists have proposed an alternative icon which they believe represents a better synthesis of the research about dietary habits associated with disease prevention, particularly chronic disease prevention (Harvard School of Public Health, The Nutrition Source-*Healthy Eating Plate & Healthy Eating Pyramid*, 2011-2104). Harvard is the home of the Health Professionals' Follow-up Study and a collaborative institution with The Nurses' Health Study which have both been significant incidence cohort studies shedding light on the role of diet and nutrients as both risk factors and protective factors for chronic diseases (Harvard School of Public Health, 2011; The Nurses Health Study, n.d). In 2011, Harvard nutritionists noted weaknesses of *MyPlate* including: (1) the limitation on fat calories; (2) failure to put greater emphasis on whole grains; (3) failure to specifically encourage reduction of intake of specific foods linked to chronic diseases such as red meat, cheese, butter and sugar; (4) continued overemphasis on consumption of dairy products; and (5) failure to make more prominent the advice to limit intake of beverages sweetened with sugar (American Running Association, 2011; Willet & Ludwig, 2011).

Harvard's alternative plate icon is called the *Healthy Eating Plate* (Harvard School of Public Health, *Healthy Eating Plate & Healthy Eating Pyramid*, 2011-2014). The *Healthy Eating Plate* is based on the latest scientific evidence which shows that a diet rich in fruits, vegetables, whole grains, healthy fats, and healthy protein choices (beans, eggs, fish, poultry with limited amounts of red meats and processed meats) lowers the risk of weight gain and chronic disease (Harvard School of Public Health, *Healthy Eating Plate & Healthy Eating Pyramid*, 2011-2014). The Harvard *Healthy Eating Plate* is simple and easy to understand while illustrating concepts related to both diet quantity and quality with a special emphasis on quality (Harvard School of

Public Health, The Nutrition Source- Food Pyramids and Plates: What Should You Really Eat?, n.d). It is applicable to adults of all ages (International Council on Active Aging, 2011).

The Harvard *Healthy Eating Plate* icon includes not only an image of a plate but includes text as well (Harvard School of Public Health, The Nutrition Source - Food Pyramids and Plates: What Should You Really Eat, n.d.) The visual image of the plate is divided into two parts – one half of the plate is vegetables and fruit with the vegetable sector being the larger of the two (Harvard School of Public Health. The Nutrition Source - Food Pyramids and Plates: What Should You Really Eat?, n.d.). The other half of the plate is divided equally between whole grains and healthy protein. In addition to the plate, the icon includes a cruet labeled "Healthy Oils, a glass labeled "Water" and a figure in motion with the words "Stay Active!" (Harvard School of Public Health. The Nutrition Source - Food Pyramids and Plates: What Should You Really Eat?, n.d.). Text which is linked to the icon does the following – (1) describes healthy oils; (2) indicates that potatoes should not be considered as a vegetable; (3) gives examples of whole grain sources; (4) provides examples of healthy protein sources versus protein choices to limit such as red meats, processed meats and fatty meats; (5) describes beverages to consume while stating to limit juice to 1 small glass per day and to limit milk/dairy products to 1-2 servings per day; and (6) cautions to avoid sugary drinks (Harvard School of Public Health, The Nutrition Source - Food Pyramids and Plates: What Should You Really Eat?, n.d.).The Harvard *Healthy Eating Plate* can be downloaded from its website (Harvard School of Public Health, The Nutrition Source-*Healthy Eating Plate & Healthy Eating Pyramid*, 2011-2014).

### PLATE ICONS FOR PREVENTION OR TREATMENT OF SPECIFIC CHRONIC DISEASES

#### The New American Plate

The *New American Plate* promulgated through the American Institute for Cancer Research (AICR) was developed in 1999 (Plates and More Plates, 2011). The *New American Plate* promotes a meal with two-thirds or more of the plate filled with these foods - legumes, vegetables, fruits, and whole grains, and the remainder of the plate (one-third or less) filled with animal protein sources including dairy (AICR. *The New American Plate*, 2013; Prince, 2004). Educational materials designed by AICR provide transitional guidance on how to move from a plate where meat is predominant to one where the meat serving is only three ounces (Prince, 2004; AICR - *The New American*

*Plate- How it works*, n.d.). *The New American Plate* uses the U.S.D.A. standard serving sizes (Prince, 2004) and emphasizes appropriate portion sizes to achieve or maintain healthy weight since obesity is associated with increased risk of certain cancers (Prince, 2004). The basis of *The New American Plate* is a review of scientific research which suggests that a diet including large amounts of fruits, vegetables, and legumes is more likely to reduce incidence of certain cancers related to the high phytochemical content and lower calorie content of these plant foods (Prince, 2004, AICR - *The New American Plate- Science based approach*, 2012). The World Cancer Research Fund and AICR (2007) have linked these plant foods to decreased risk for gastrointestinal system cancers (mouth, pharynx, larynx, esophagus, stomach, pancreas, and colorectal) as well as decreased risk for cancers of the lung and prostate. The AICR emphasizes that *The New American Plate* is different from the U.S.D.A. *MyPlate* in that it does the following- (1) encourages a reduction of the intake of red meats and processed meats; (2) places more emphasis on whole grain and plant foods high in fiber; (3) emphasizes reduction of portion sizes; and (4) offers greater flexibility both in both the transitioning and implementing of its recommendations (Plates and More Plates, 2011; AICR – *The New American Plate-How it works*, 2012).

The *New American Plate* is supported by numerous tools available to nutrition educators and the public. These include: *The New American Plate Cookbook* (AICR- *The New American Plate Cookbook*, 2012) as well as a poster, a serving size finder wheel, placements, and a variety of brochures which not only address *The New American Plate* concept in general but also address *The New American Plate* as it relates to eating various food groups and meal types (AICR - *The New American Plate- Brochures and other materials*, 2013). In addition to *The New American Plate*, the AICR identifies “Foods that Fight Cancer” which currently includes many fruits and vegetables with others soon to be added (AICR- AICR’s Foods that Fight Cancer, 2013).

### **The Idaho Plate Method**

This icon was developed in 1993 to aid in providing dietary advice to persons with diabetes (*Idaho Plate Method - About Us*, 2013). The *Idaho Plate Method* (also called *My Plate Method*) icon shows a plate divided into four equal sections of fruits, vegetables, breads/starches/grains, and meat/protein (*Idaho Plate Method - Our Products*, 2013). A glass of milk is on the side and special side information provides diabetic management guidance on how to

count fruits, vegetables, and starches in terms of carbohydrates (*Idaho Plate Method- Our Products*, 2013). There is a second icon that shows a plate with one-half vegetables; one-fourth bread, starches, and grains; and one-fourth meat/protein with fruit and milk on the side (Raidel & Safaii, 2013; *Idaho Plate Method- Our Products*, 2013). The patient/client handout available for the *Idaho Plate Method* provides guidance for use of the plate for breakfast as well as lunch and dinner (*Idaho Plate Method- Our Products*, 2013). Some *Idaho Plate Method* materials are free and some may be purchased through the *Idaho Plate Method* website. Educational materials are available in both English and Spanish (*Idaho Plate Method- Our Products*, 2013).

### **The Healthy Diabetes Plate**

*The Healthy Diabetes Plate* was an icon that first appeared in 2009 on a website of the University of Idaho and is a nine-inch plate with three sections - (1) starch – one-fourth of the plate; (2) lean protein - one-fourth of the plate; and (3) non-starchy vegetables-one-half of the plate - accompanied by two circles for fruit and milk/yogurt (Raidel & Safaii, 2013). This plate icon is related to one used in the *Idaho Plate Method* (Raidl, et al. 2007). *The Healthy Diabetes Plate* is a part of a four lesson curriculum which emphasizes how the icon can be used in meal planning (Raidl et al., 2007). Published evaluation of the curriculum taught to over 100 individuals indicated that significant increases in fruit and vegetable consumption were seen (Raidl et al., 2007). It is envisioned *The Healthy Diabetes Plate* can provide persons with diabetes help with meal planning with a potential expansion of the curriculum to include exercise (Raidl et al., 2007). A Spanish version of *The Healthy Diabetes Plate* was released in 2012 (Raidl & Safaii, 2013).

### **Create Your Plate**

The website for the American Diabetes Association ® includes a page which uses a plate icon giving dietary advice under the title of *Create Your Plate* (American Diabetes Association®, 1995-2014). The *Create Your Plate* is shown as a still picture of a plate which begins a short video. This is followed by a description of a plate to be divided into three parts - a large section with non-starchy vegetables and two small sections with protein foods and grains/starchy vegetables (American Diabetes Association ®, 1995-2014). The *Create Your Plate* is accompanied by advice to include fruit and dairy as per the individual’s diabetes meal plan and to include low calorie or non-

calorie beverages (American Diabetes Association ®, 1995-2014).

### **The Balance Plate**

*The Balance Plate* is a plate icon with accompanying products (melamine plates) designed to aid weight loss through portion control (*The Balance Plate*, 2009-Present). The basic *The Balance Plate* icon is divided into three parts – one-half fruits and vegetables, one-fourth whole grains, and one-fourth lean meats/proteins with a circle in the middle for sweets, fats, and oils (*The Balance Plate*, 2009-Present). Text is found on the plate to provide additional information (*The Balance Plate*, 2009-Present). *The Balance Plate* is available with three different visual styles with two styles being for adults (featuring food photos and persons in exercise poses and another plate utilizing the symbolism of Yin and Yang) and one style for children called *The Balance Rainbow Plate for Kids* (*The Balance Plate*, 2009-Present). *The Balanced Plate* products for adults are 10 inches in diameter and the plate product for children is 9.5 inches in diameter (Lynn- Pullman, 2013).

### **The Portion Plate®**

*The Portion Plate®*, using similar scientific evidence as *MyPlate* and the *Healthy Plate*, is actually several plate products which are marketing for portion control related to weight management and diabetes (*The Portion Plate®*- Use the Portion Plate to Control Portions, n.d.; *The Portion Plate ®* - Portion Plate Products, 2014). There is a 9.5 inch melamine plate for adults in which one- half the plate is fruits and vegetables, one-fourth is whole grains, one-fourth is meat/protein, and there is a small center circle for fats and oils (*The Portion Plate®* - New Adult Plate- Food, 2014). The adult plate is trimmed with figures of figures in movement (*The Portion Plate®* - New Adult Plate- Food, 2014). There is a Portion Plate ® for children with similar divisions to the adult plate but smaller in size (*The Portion Plate®*-New Kids Portion Plate – Food, 2014). There is also a Diabetes Portion Plate® which is one-half non-starchy vegetables, one-fourth starchy foods, and one-fourth protein with a small circle for fats and oils (*The Portion Plate®* -New Adult Diabetes Portion Plate, 2014.). Text relates to the use of milk and fruit and drawings indicating movement on the plate rim suggest the importance of exercise (*The Portion Plate®* - New Adult Diabetes Portion Plate, 2014). There is also a Spanish version of The Portion Plate ® (*The Portion Plate®* - Spanish Portion Plate Products, 2014).

## **OTHER PLATE ICONS FOR SPECIFIC POPULATIONS**

The general goal of icons discussed in this section is to provide guidance to decrease chronic disease risk and promote general good health. These plate icons are discussed separately because they are designed for special populations rather than being modifications of icons aimed at the general public or a population with a specific disease condition. The icons discussed relate to age, eating styles, ethnic cuisine, and activity.

### **Nutri-Plate™**

The *Nutri-Plate™* icon was developed to help adolescents better manage portion sizes (Bohnert, Randall, Tharp, & Germann, 2011). The designs on the plate are drawings and include text (Bohnert, Randall, Tharp, & Germann, 2011). The majority of the plate features vegetables with smaller drawings of a fish (to indicate lean protein), bread, and a small circle within the plate labeled fats (*Nutri-Plate™*, 2012). Evaluation with a small group of African American teens indicated that the plate significantly reduced amounts of foods consumed and was associated with greater fruit and broccoli (with cheese) consumption (Bohnert, Randall, Tharp, & Germann, 2011). A melamine *Nutri-Plate™* is also available for purchase (*Nutri-Plate™*, 2012).

### **MyPlate for Older Adults**

The ‘older adult’ has been defined as someone who is 60 years or older (Berstein & Munoz, 2012). *MyPlate for Older Adults* is based on *MyPlate*, but highlights the specific needs of this population (*Tufts Now*, 2011). It was created by Tufts University’s U.S.D.A. Human Nutrition Research Center on Aging and is tailored to the older adult as it focuses on the components of choosing healthy food options through including foods prepared in a variety of ways, adequate fluid intake, and incorporation of regular physical activity (Life Examiner, 2013). The target audience is healthy, independent living older adults (Grossman, 2012).

This modification of the *MyPlate* will be particularly relevant as a greater number of Americans enter the category of elderly (Vincent & Velkoff, 2010). The elderly population in the United States (defined by government sources as aged 65 years and older) is expected to grow from 13 % of the population in 2010 to 19% of the population in 2030 (Vincent & Velkoff, 2010). Public health professionals in Florida may particularly want to become familiar with and use the *MyPlate for Older Adults* in practice. Government sources indicate that in 2010, Florida had the highest percentage of elderly in its population compared with

all states in the U.S. (Federal Interagency Forum on Aging Related Statistics, 2012).

*MyPlate for Older Adults* is split into two halves with a cut out circle in the center (Tufts Now, 2011). The left half of the plate has colorful graphics of fruits and vegetables in a variety of forms, including dried, pre-peeled, frozen and canned (Tufts Now, 2011). The different forms are highlighted as cost and convenience are important factors for meals (Tufts Now, 2011). The goal is to provide suggestions that are easy, quick, and nutrient rich. The right half of the plate is split into halves with the bottom half being further separated. The top half shows grains focusing on whole grains sources and fiber (Life Examiner, 2013). The bottom half of the plate contains illustrations of both plant and lean animal protein sources with a subsection with a selection of choices of lean dairy products (Life Examiner, 2013). Along with choosing healthy foods, this plate emphasizes the role of physical activity as part of the older adult's daily routine by showing various activities (Tufts Now, 2011).

The center of the plate is cut out and filled with oil, spices, and a tub of soft spread margarine as a way of highlighting these options over products that contain more saturated fat (Tufts Now, 2011). The spice icon suggests that spices be used instead of salt and the message of reducing salt intake is also addressed with a low-sodium can of tomatoes (Tufts Now, 2011; Grossman 2012). The *Dietary Guidelines for Americans 2010* advises persons over 51 years of age to consume only 1500 milligrams of sodium per day (U.S. Department of Agriculture and U.S. Department of Human Services, 2010). Graphics of a fork on the left side and a knife on the right side of the plate emphasize the importance of focusing on enjoyment of food and decreasing distractions while eating (Grossman, 2012).

To the right and above the plate is a circle containing graphics depicting different fluid sources such as coffee, tea, water, milk (Tufts Now, 2011). Adequate fluid intake in the older adult is important as the physiological mechanism indicating thirst and the need for fluid tends to decline in effectiveness with age (Brown, 2014). In the depiction of the different glasses, the glass labeled OJ, referring to orange juice, is noticeably smaller in order to make the point that eating whole fruits rather than consuming juices can help increase fiber in the diet (Tufts Now, 2011; Grossman, 2012).

### **The Power Plate**

*The Power Plate* is a vegan plate divided into four equal parts – fruits, vegetables, legumes, and grains (Physicians Committee for Responsible Medicine -

*The Power Plate*, n.d.). It is promoted for heart health, lowering blood pressure, prevention of cancer, and prevention of kidney stones and gallstones (Physicians Committee for Responsible Medicine - Why *The Power Plate?*, n.d.). *The Power Plate*, by being vegan, has been advocated for those with Type 2 diabetes (Levin & Trapp, 2012). These authors note that since a vegan diet contains less total and saturated fat and lower calories, it may be associated potential improvement in hemoglobin A 1-C levels and insulin-sensitivity (Levin & Trapp, 2012). *The Power Plate* is the plate icon promoted by the Physicians' Committee Responsible Medicine and this image may be downloaded from its website (Physicians Committee for Responsible Medicine, n.d.).

### **My Vegan Plate**

*My Vegan Plate* was created by The Vegetarian Resource Group, i.e., VRG, (The Vegetarian Resource Group, *Most Frequently Asked Questions*, 1996-2014). This is a non-profit organization (The Vegetarian Resource Group, *Most Frequently Asked Questions*, 1996-2014). In March-April 2011, the VRG conducted a telephone survey of adults through Harris Interactive Group with results showing approximately five percent of the adults in the U.S. identifying as vegetarians with approximately half of the five percent identifying as vegans. (Stahler, 2011).

*My Vegan Plate* is an appropriate general guide for both vegetarian and vegan adult audiences (The Vegetarian Resource Group, *My Vegan Plate*, n.d.). This claim is based on the position statement from the Academy of Nutrition and Dietetics, formerly known as the American Dietetic Association, about vegetarian and vegan diets indicating these diets can be planned to meet nutritional needs for all phases of the life span (Craig & Mangels, 2009). The divisions of *My Vegan Plate* are the same as *MyPlate*, however, *My Vegan Plate* includes colorful photographs of food sources in the sections of the plate and text around the plate (The Vegetarian Resource Group. *My Vegan Plate*, n.d.). In the protein group images of tofu, beans, and peanuts are shown (The Vegetarian Resource Group. *My Vegan Plate*, n.d.). Eating a diet composed of a variety of plant foods can adequately provide enough protein to meet an individual's needs (Craig & Mangels, 2009). In the top right corner next to the plate is a circle with the word "Calcium" and photos of a glass of calcium-fortified soy milk as well as leafy greens are inside the circle (The Vegetarian Resource Group. *My Vegan Plate*, n.d.). Additionally, other recommended vegan calcium sources are mentioned (The Vegetarian Resource Group. *My Vegan Plate*, n.d.).

**Table 1. Dietary Advice Plates-at-a-Glance**

<b>Name of Plate</b>	<b>Primary Focus</b>	<b>Major Promoting Organization</b>	<b>Audience</b>	<b>Plate Description</b>
<i>MyPlate</i>	Prevention of Chronic Disease, Achievement of a Healthy Weight, and Promotion of General Health	U.S. Department of Agriculture	Adults and Children	Image available at: <a href="http://www.choosemyplate.gov/print-materials-ordering/graphic-resources.html">http://www.choosemyplate.gov/print-materials-ordering/graphic-resources.html</a>
<i>Healthy Eating Plate</i>	Prevention of Chronic Disease, Achievement of a Healthy Weight, and Promotion of General Health	Harvard School of Public Health	Adults	Image available at: <a href="http://www.health.harvard.edu/plate/healthy-eating-plate">http://www.health.harvard.edu/plate/healthy-eating-plate</a>
<i>The New American Plate</i>	Prevention of Cancer and Weight Management	American Institute for Cancer Research (AICR)	Adults	Image available at: <a href="http://www.aicr.org/new-american-plate/">http://www.aicr.org/new-american-plate/</a>
<i>The Idaho Plate Method</i>	Management of Diabetes	Idaho Plate Method, LLC	Adults with Diabetes	Images available at: <a href="http://platemethod.com/products.html">http://platemethod.com/products.html</a>
<i>The Healthy Diabetes Plate</i>	Management of Diabetes	University of Idaho (and uses materials of Idaho Plate, LLC)	Adults with Diabetes	Image available at The Idaho Plate Method and at the site below: <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1832142/">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1832142/</a>
<i>Create Your Plate</i>	Management of Diabetes	American Diabetes Association®	Adults with Diabetes	Image available at: <a href="http://www.diabetes.org/food-and-fitness/food/planning-meals/create-your-plate/">http://www.diabetes.org/food-and-fitness/food/planning-meals/create-your-plate/</a>

<i>The Balance Plate</i>	Weight Loss and Weight Maintenance	BalancePlate.com	Adults and Children Seeking to Lose Weight or Maintain Healthy Weight	Image available at: <a href="http://www.thebalanceplate.com/">http://www.thebalanceplate.com/</a>
<i>The Portion Plate®</i>	Weight Loss and Weight Maintenance  Management of Diabetes	The Portion Plate.com	Adults and Children Seeking to Lose Weight or Maintain Healthy Weight  Adults with Diabetes	Image available at: <a href="http://www.theportionplate.com/home.html">http://www.theportionplate.com/home.html</a>  Click on Products
<i>Nutri-Plate™</i>	Weight Management  (Portion Control) and Healthy Eating	Nutri-Plate.com	Adolescents	Image available at: <a href="http://www.nutri-plate.com/">http://www.nutri-plate.com/</a>
<i>MyPlate for Older Adults</i>	Health Maintenance and Chronic Disease Prevention	Tufts University	Adults over 60 years of age	Image available at: <a href="http://now.tufts.edu/news-releases/tufts-university-nutrition-scientists-unveil-">http://now.tufts.edu/news-releases/tufts-university-nutrition-scientists-unveil-</a>
<i>The Power Plate</i>	Prevention of Chronic Disease and Promotion of General Health	Physicians Committee for Responsible Medicine	Adult Vegans  Also has been studied in adults with Type 2 diabetes	Image available at: <a href="http://www.pcrm.org/health/diets/pplate/power-plate">http://www.pcrm.org/health/diets/pplate/power-plate</a>
<i>My Vegan Plate</i>	Prevention of Chronic Disease and Promotion of	The Vegetarian Resource Group	Adult Vegans	Image available at: <a href="http://www.vrg.org/nutshell/MyVeganPlate.p">http://www.vrg.org/nutshell/MyVeganPlate.p</a>

	General Health			<a href="#">df</a>
<i>Athlete's Plate (s)</i>	Enhancement of Athletic Performance	U. S. Olympic Committee, Sport Performance Division	Adult Athletes	Images can be downloaded for viewing from this site:  <a href="http://www.teamusa.org/About-the-USOC/Athlete-Development/Sport-Performance/Nutrition/Resources-and-Fact-Sheets">http://www.teamusa.org/About-the-USOC/Athlete-Development/Sport-Performance/Nutrition/Resources-and-Fact-Sheets</a>
<i>Healthy Criollo Plate</i>	Prevention of Chronic Disease and Promotion of General Health	The Institute for Family Health	Families following a Criollo eating pattern	Image available at:  <a href="http://www.institute2000.org/plates/">http://www.institute2000.org/plates/</a>
<i>Healthy West African Plate</i>	Prevention of Chronic Disease and Promotion of General Health	The Institute for Family Health	Families following a West African eating pattern	Image available at:  <a href="http://www.institute2000.org/plates/">http://www.institute2000.org/plates/</a>
<i>Healthy Soul Food Plate</i>	Prevention of Chronic Disease and Promotion of General Health	The Institute for Family Health	Families following a African American or traditional Southern food eating pattern	Image available at:  <a href="http://www.institute2000.org/plates/">http://www.institute2000.org/plates/</a>

Vegans also may have lower amounts of vitamin D, vitamin B<sub>12</sub>, and iodine in their diets (Craig & Mangels, 2009). *My Vegan Plate* addresses the importance of consuming enough vitamin D from food or supplements (The Vegetarian Resource Group. *My Vegan Plate*, n.d.). Iodine is highlighted because there are limited dietary sources of iodine when consuming a diet composed of purely plant food sources (Craig & Mangels, 2009). Sources of iodine cited in *My Vegan Plate* include iodized salt (3/8 teaspoon daily) or an iodine supplement containing 150 micrograms (The Vegetarian Resource Group. *My Vegan Plate*, n.d.). Recommendations for Vitamin B<sub>12</sub> are emphasized underneath the *My Vegan Plate* icon and it is noted that some individuals may need to take a supplement of 25 micrograms of Vitamin B<sub>12</sub> per day (The Vegetarian Resource Group. *My Vegan Plate*, n.d.).

### Athlete Plates

The U.S. Olympic Committee, in conjunction with the University of Colorado Sport Nutrition Graduate Program, has developed three plates for athletes with one plate being for days with light work outs (U.S. Olympic Committee, *Athlete Plate – Easy Day pdf.*, 2014 ), one is for days of moderate competition preparation (U.S. Olympic Committee, *Athlete Plate-Moderate Day*, 2014) with the last plate designed to guide food choices on the day of competition (U.S. Olympic Committee, *Athlete Plate – Hard Day*, 2014). All of the icons include not only a plate with food groups but text and pictures to provide guidance related to fats, flavors (herbs, spices, and condiments), and beverages. (U.S. Olympic Committee, *Athlete Plate – Easy Day pdf.*, 2014; U.S. Olympic Committee, *Athlete Plate - Moderate Day*, 2014; U.S. Olympic Committee, *Athlete Plate – Hard Day*, 2014).

The *Athlete Plate – Easy Day* is divided into three parts with approximately one-half of the plate being a combination of fruits and vegetables, one-fourth of the plate labeled as whole grains, and the remaining one-fourth of the plate labeled as lean protein. The *Athlete Plate-Easy Day* also recommends consumption of one teaspoon of fat (U.S. Olympic Committee, *Athlete Plate – Easy Day pdf.*, 2014 ). The *Athlete Plate – Moderate Day* is a tri-partite plate with grains, lean protein, and vegetables. Fruit is on the side of this plate and one tablespoon of fat is recommended (U.S. Olympic Committee, *Athlete Plate- Moderate Day*, 2014). The *Athlete Plate - Hard Day* has one-half of the plate as grains, one-fourth of the plate as lean protein, and one-fourth of the plate as vegetables. Fruit is on the side and two tablespoons of fat are recommended (U.S. Olympic Committee, *Athlete Plate – Hard Day*, 2014).

Finally all plates are accompanied by dietary guidance for athletes to include – (1) the importance of hydration; (2) the necessity to eat regularly; (3) the desirability of eating an anti-oxidant rich diet to support immune function; (4) the desirability of consuming healthy unsaturated fats while limiting saturated and trans fats and (5) the need to use sports nutritional products appropriately (U.S. Olympic Committee, *Athlete Eating Guidelines*, 2010).

### Ethnic Cuisine Plates

Whereas individuals may choose to tailor their plates to one or more ethnic food preferences, there are some plate icons which have been developed to demonstrate the application of a plate icon to healthy eating for a specific cuisine. Examples of ethnic specific healthy eating plates include those designed for the following cuisines - *Healthy Criollo Plate*- Puerto Rican/Dominican cuisine- in English and Spanish, the *Healthy West African Plate*, and the *Healthy Soul Food Plate* (The Institute for Family Health. 2010-2014). The Institute for Family Health plates featuring the above cuisines are divided into one-half vegetables, one-fourth protein, and one-fourth starch with water and optional fruit on the side of the plate (The Institute for Family Health. 2010-2014).

The graphics for these plate icons also feature portion size education using visual and text information (The Institute for Family Health. 2010-2014). The educational materials for the Institute for Family Health can be used by non-profit groups (The Institute for Family Health. *Healthy Plates around the World*. 2010-2014).

### CONCLUSIONS

The information provided in this review indicates that numerous versions of a plate icon are being used to provide nutritional guidance to the public. These are summarized in Table 1. Whereas an attempt has been made to be as extensive as possible, this review may not be comprehensive since new concepts in nutrition education messaging are constantly emerging.

Health professionals need to be able to help consumers understand the science behind each of the plate nutrition images being promoted today to the public. Given the multiplicity of visual images being promoted, it is possible for consumers to become confused. There are at least two similarities in the plate icons and this should offer some comfort to both health professionals and the public. All of the current plate dietary advice icons suggest that high amounts of vegetables and fruits be consumed with some being completely vegetarian or vegan. All plate icons also stress the importance of appropriate portion sizes of

foods and beverages to achieve or maintain healthy weight and decrease chronic disease risk (Prince, 2004; Wansink & van Ittersum, 2013; Young & Nestle, 2002).

The most variance in the plate images in terms of content relates to inclusion or exclusion of animal sources of protein, inclusion or exclusion of information about consumption of fats or oils, and which beverages are most appropriate. It is also notable that some of the plate icons, either as part of the icon or part of the affiliated text or materials, include pictures and/or text to emphasize the relationship between a healthy diet and exercise. Plates including exercise include: *MyPlate*, the *Healthy Plate*, *The Balance Plate*, *The Portion Plate*®, *MyPlate for Older Adults*, and variations of the *Athlete Plate*.

Visually plate icons vary considerably in terms of complexity, the use of text, design, and color. The variety of plate icons may make it possible to make a better fit between plate icon and the needs of a target audience or particular client. Health professionals should be aware of all of supporting materials available for the various icons. For example, it would be important to know – (1) the types of materials that are available for use as handouts by download; (2) the availability of materials that can be purchased (such as melamine plates and placemats) or used for free; and (3) what materials are computer-based such that clients will need a computer to access them. Although many of the icons discussed can be used directly by the consumer, the use of any of the mentioned icons would be optimized when used in conjunction with personal or group nutrition education and counseling conducted by a qualified health professional.

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